ILLINOIS HEALTH FACILITIES AND SERVICES REVIEW BOARD
APPLICATION FOR PERMIT

SECTION I. IDENTIFICATION, GENERAL INFORMATION, AND CERTIFICATION
This Section must be completed for all projects.

Facility/Project Identification

Facility Name: Rush Lisle Cancer Center
Street Address: 2455 Corporate West Drive
City and Zip Code: Lisle, 60532
County: DuPage Health Service Area: 7 Health Planning Area: A-05

Applicant(s) [Provide for each applicant (refer to Part 1130.220)]

Exact Legal Name: Rush University System for Health
Street Address: 1725 West Harrison Street, Suite 364
City and Zip Code: Chicago, 60612
Name of Registered Agent: Carl Bergetz
Registered Agent Street Address: 1700 West Van Buren Street, Suite 301
Registered Agent City and Zip Code: Chicago, 60612
Name of Chief Executive Officer: Dr. Omar Lateef
CEO Street Address: 1725 West Harrison Street, Suite 364
CEO City and Zip Code: Chicago, 60612
CEO Telephone Number: (708) 660-6660

Type of Ownership of Applicants

☒	Non-profit Corporation	☐	Partnership		
☐	For-profit Corporation	☐	Governmental		
☐	Limited Liability Company	☐	Sole Proprietorship	☐	Other

- Corporations and limited liability companies must provide an **Illinois certificate of good standing.**
- Partnerships must provide the name of the state in which they are organized and the name and address of each partner specifying whether each is a general or limited partner.

APPEND DOCUMENTATION AS ATTACHMENT 1, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

Primary Contact [Person to receive ALL correspondence or inquiries]

Name: Katherine B. Fishbein
Title: Assistant General Counsel
Company: Rush University Medical Center
Address: 1725 West Harrison Street, Suite 364 Chicago, IL 60612
Telephone Number: (312) 942-6886
E-mail Address: Katherine_Fishbein@rush.edu
Fax Number: (312) 942-6886

Additional Contact [Person who is also authorized to discuss the application for permit]

Name: Juan Morado Jr. and Mark J. Silberman
Title: Partner
Company Name: Benesch, Friedlander, Coplan & Aronoff, LLP
Address: 71 South Wacker Drive, 16th Floor, Chicago, IL 60606
Telephone Number: (312) 212- 4949
E-mail Address: jmorado@beneschlaw.com; msilberman@beneschlaw.com
Fax: (312) 767-9192

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Fax: (312) 767-9192

Post Permit Contact [Person to receive all correspondence after permit issuance-**THIS PERSON MUST BE EMPLOYED BY THE LICENSED HEALTH CARE FACILITY AS DEFINED AT 20 ILCS 3960]**

Name: Katherine B. Fishbein
Title: Assistant General Counsel
Company: Rush University Medical Center
Address: 1725 West Harrison Street, Suite 364 Chicago, IL 60612
Telephone Number: (312) 942-6886
E-mail Address: Katherine_Fishbein@rush.edu
Fax Number: (312) 942-6886

Site Ownership [Provide this information for each applicable site]

Exact Legal Name of Site Owner: Rush University Medical Center
Address of Site Owner: 1700 West Van Buren Street, Suite 301 Chicago, IL 60612
Street Address or Legal Description of the Site: **Proof of ownership or control of the site is to be provided as Attachment 2. Examples of proof of ownership are property tax statements, tax assessor's documentation, deed, notarized statement of the corporation attesting to ownership, an option to lease, a letter of intent to lease, or a lease**.
APPEND DOCUMENTATION AS ATTACHMENT 2, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

Operating Identity/Licensee- Not Applicable [Provide this information for each applicable facility and insert after this page.]

Exact Legal Name: Rush University System for Health
Street Address: 1725 West Harrison Street, Suite 364, Chicago, IL 60612

☒ Non-profit Corporation ☐ Partnership
☐ For-profit Corporation ☐ Governmental
☐ Limited Liability Company ☐ Sole Proprietorship ☐ Other

- Corporations and limited liability companies must provide an Illinois Certificate of Good Standing.
- Partnerships must provide the name of the state in which organized and the name and address of each partner specifying whether each is a general or limited partner.
- **Persons with 5 percent or greater interest in the licensee must be identified with the % of ownership.**

APPEND DOCUMENTATION AS ATTACHMENT 3, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

Organizational Relationships

Provide (for each applicant) an organizational chart containing the name and relationship of any person or entity who is related (as defined in Part 1130.140). If the related person or entity is participating in the development or funding of the project, describe the interest and the amount and type of any financial contribution.

APPEND DOCUMENTATION AS ATTACHMENT 4, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

Flood Plain Requirements [Refer to application instructions.]

Provide documentation that the project complies with the requirements of Illinois Executive Order #2006-5 pertaining to construction activities in special flood hazard areas. As part of the flood plain requirements, please provide a map of the proposed project location showing any identified floodplain areas. Floodplain maps can be printed at **www.FEMA.gov** or **www.illinoisfloodmaps.org**. **This map must be in a readable format**. In addition, please provide a statement attesting that the project complies with the requirements of Illinois Executive Order #2006-5 **(http://www.hfsrb.illinois.gov)**. **NOTE:** A SPECIAL FLOOD HAZARD AREA AND 500-YEAR FLOODPLAIN DETERMINATION FORM has been added at the conclusion of this Application for Permit that must be completed to deem a project complete.

APPEND DOCUMENTATION AS ATTACHMENT 5, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

Historic Resources Preservation Act Requirements [Refer to application instructions.]

Provide documentation regarding compliance with the requirements of the Historic Resources Preservation Act.

APPEND DOCUMENTATION AS ATTACHMENT 6, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

DESCRIPTION OF PROJECT

1. Project Classification

[Check those applicable - refer to Part 1110.20 and Part 1120.20(b)]

Part 1110 Classification :

☐ Substantive

☒ Non-substantive

2. Narrative Description

In the space below, provide a brief narrative description of the project. Explain **WHAT** is to be done in **State Board defined terms**, **NOT WHY** it is being done. If the project site does NOT have a street address, include a legal description of the site. Include the rationale regarding the project's classification as substantive or non-substantive.

Rush University Medical Center is proposing to establish a Medical Office Building ("MOB") consisting of 58,917 GSF in an existing office building at the site. The proposed facility location is 2455 Corporate West Drive, Lisle, IL 60532.

This project is classified as non-substantive, in that it does not involve the establishment of any category of services. However, it requires an expenditure in excess of the capital expenditure threshold, thus making it reviewable by the Review Board.

The proposed MOB will consist of the following:

- Infusion Therapy with 24 available chairs for patients;
- Radiation and Oncology Services supported by the installation of a linear accelerator and an onsite Medical Oncology Clinic;
- Supportive Oncology and Immediate Care;
- Pharmacy, Lab, Research space, Exam and Minor Procedure Rooms; and
- Imaging (Including CT, US, Breast MRI, Mammograms, X-Ray).

Project Costs and Sources of Funds

Complete the following table listing all costs (refer to Part 1120.110) associated with the project. When a project or any component of a project is to be accomplished by lease, donation, gift, or other means, the fair market or dollar value (refer to Part 1130.140) of the component must be included in the estimated project cost. If the project contains non-reviewable components that are not related to the provision of health care, complete the second column of the table below. Note, the use and sources of funds must be equal.

Project Costs and Sources of Funds			
USE OF FUNDS	**CLINICAL**	**NONCLINICAL**	**TOTAL**
Preplanning Costs			
Site Survey and Soil Investigation			
Site Preparation	$302,181	$165,634	$467,815
Off Site Work	-	-	-
New Construction Contracts	$16,036,521	$8,790,084	$24,826,605
Modernization Contracts	-	-	-
Contingencies	$1,137,635	$2,654,483	$3,792,118
Architectural/Engineering Fees	$978,828	$536,524	$1,515,352
Consulting and Other Fees	$1,686,312	$924,316	$2,610,628
Movable or Other Equipment (not in construction contracts)	$10,290,327	$5,640,428	$15,930,755
Bond Issuance Expense (project related)	-	-	-
Net Interest Expense During Construction (project related)	-	-	-
Fair Market Value of Leased Space or Equipment	-	-	-
Other Costs to Be Capitalized	$1,324,385	$725,934	$2,050,319
Acquisition of Building or Other Property (excluding land)	-	-	-
TOTAL USES OF FUNDS	$33,068,038	$18,125,554	$51,193,592
SOURCE OF FUNDS	**CLINICAL**	**NONCLINICAL**	**TOTAL**
Cash and Securities	$33,068,038	$18,125,554	$51,193,592
Pledges	-	-	-
Gifts and Bequests	-	-	-
Bond Issues (project related)	-	-	-
Mortgages	-	-	-
Leases (fair market value)	-	-	-
Governmental Appropriations	-	-	-
Grants	-	-	-
Other Funds and Sources	-	-	-
TOTAL SOURCES OF FUNDS	**$33,068,038**	**$18,125,554**	**$51,193,592**
NOTE: ITEMIZATION OF EACH LINE ITEM MUST BE PROVIDED AT ATTACHMENT 7, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.			

Related Project Costs
Provide the following information, as applicable, with respect to any land related to the project that will be or has been acquired during the last two calendar years:

Land acquisition is related to project ☒ Yes ☐ No
Purchase Price: $3,650,000
Fair Market Value: $3,650,000

The project involves the establishment of a new facility or a new category of service
☐ Yes ☒No

If yes, provide the dollar amount of all **non-capitalized** operating start-up costs (including operating deficits) through the first full fiscal year when the project achieves or exceeds the target utilization specified in Part 1100.

Estimated start-up costs and operating deficit cost is N/A

Project Status and Completion Schedules

For facilities in which prior permits have been issued please provide the permit numbers.

Indicate the stage of the project's architectural drawings:

☐ None or not applicable ☐ Preliminary
☒ Schematics ☐ Final Working

Anticipated project completion date (refer to Part 1130.140): July 1, 2025

Indicate the following with respect to project expenditures or to financial commitments (refer to Part 1130.140):

☐ Purchase orders, leases or contracts pertaining to the project have been executed.
☐ Financial commitment is contingent upon permit issuance. Provide a copy of the contingent "certification of financial commitment" document, highlighting any language related to CON Contingencies

☒ Financial Commitment will occur after permit issuance.

APPEND DOCUMENTATION AS ATTACHMENT 8, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

State Agency Submittals [Section 1130.620(c)]

Are the following submittals up to date as applicable?
☒Cancer Registry
☒ APORS
☒ All formal document requests such as IDPH Questionnaires and Annual Bed Reports been submitted
☒ All reports regarding outstanding permits
Failure to be up to date with these requirements will result in the application for permit being deemed incomplete.

Cost Space Requirements

Provide in the following format, the **Departmental Gross Square Feet (DGSF)** or the **Building Gross Square Feet** (**BGSF)** and cost. The type of gross square footage either **DGSF** or **BGSF** must be identified. The sum of the department costs **MUST** equal the total estimated project costs. Indicate if any space is being reallocated for a different purpose. Include outside wall measurements plus the departments or area's portion of the surrounding circulation space. **Explain the use of any vacated space.**

Not Reviewable Space [i.e., non-clinical]: *means an area for the benefit of the patients, visitors, staff, or employees of a health care facility and not directly related to the diagnosis, treatment, or rehabilitation of persons receiving services from the health care facility. "Non-clinical service areas" include, but are not limited to, chapels; gift shops; newsstands; computer systems; tunnels, walkways, and elevators; telephone systems; projects to comply with life safety codes; educational facilities; student housing; patient, employee, staff, and visitor dining areas; administration and volunteer offices; modernization of structural components (such as roof replacement and masonry work); boiler repair or replacement; vehicle maintenance and storage facilities; parking facilities; mechanical systems for heating, ventilation, and air conditioning; loading docks; and repair or replacement of carpeting, tile, wall coverings, window coverings or treatments, or furniture. Solely for the purpose of this definition, "non-clinical service area" does not include health and fitness centers.* [20 ILCS 3960/3]

		Gross Square Feet		Amount of Proposed Total Gross Square Feet That Is:			
Department/Area	**Cost**	**Existing**	**Proposed**	**New Const.**	**Modernized**	**As Is**	**Vacated Space**
REVIEWABLE							
Infusion	$9,922,730	-	11,556	11,556			
Diagnostic Radiology (MRI, 2 CT, 2 Mammogram, 1 Ultrasound, 1 X-ray Machine, 1 Linear Accelerator)	$8,067,155	-	9,734	9,734			
Oncology	$15,078,153	-	16,955	16,955			
Total Clinical	$33,068,038	-	38,245	38,245			
		-					
NON-REVIEWABLE							
Administrative	$13,078,282	-	14,203	14,203			
Research Offices	$1,012,892	-	869	869			
Stairs, Elevators, Shafts, Open Space	$5,346,229	-	5,600	5,600			
Total Non-clinical	$18,125,554	-	20,672	20,672			
TOTAL	**$51,193,592**	-	**58,917**	**58,917**			

APPEND DOCUMENTATION AS ATTACHMENT 9, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

Facility Bed Capacity and Utilization - NOT APPLICABLE

Complete the following chart, as applicable. Complete a separate chart for each facility that is a part of the project and insert the chart after this page. Provide the existing bed capacity and utilization data for the latest **Calendar Year for which data is available. Include observation days in the patient day totals for each bed service.** Any bed capacity discrepancy from the Inventory will result in the application being deemed **incomplete**.

FACILITY NAME:		**CITY:**			
REPORTING PERIOD DATES:	**From:**		**to:**		
Category of Service	**Authorized Beds**	**Admissions**	**Patient Days**	**Bed Changes**	**Proposed Beds**
Medical/Surgical					
Obstetrics					
Pediatrics					
Intensive Care					
Comprehensive Physical Rehabilitation					
Acute/Chronic Mental Illness					
Neonatal Intensive Care					
General Long-Term Care					
Specialized Long-Term Care					
Long Term Acute Care					
Other (identify)					
TOTALS:					

CERTIFICATION

The Application must be signed by the authorized representatives of the applicant entity. Authorized representatives are:

- in the case of a corporation, any two of its officers or members of its Board of Directors.
- in the case of a limited liability company, any two of its managers or members (or the sole manager or member when two or more managers or members do not exist).
- in the case of a partnership, two of its general partners (or the sole general partner, when two or more general partners do not exist).
- in the case of estates and trusts, two of its beneficiaries (or the sole beneficiary when two or more beneficiaries do not exist); and
- in the case of a sole proprietor, the individual that is the proprietor.

This Application is filed on the behalf of Rush University System for Health and Rush University Medical Center, in accordance with the requirements and procedures of the Illinois Health Facilities Planning Act. The undersigned certifies that he or she has the authority to execute and file this Application on behalf of the applicant entity. The undersigned further certifies that the data and information provided herein, and appended hereto, are complete and correct to the best of his or her knowledge and belief. The undersigned also certifies that the fee required for this application is sent herewith or will be paid upon request.

	Carl Bergetz
SIGNATURE	SIGNATURE
Omar B. Lateef, DO	Carl Bergetz, JD
PRINTED NAME	PRINTED NAME
President and CEO	Chief Legal Officer
PRINTED TITLE	PRINTED TITLE
Notarization:	Notarization:
Subscribed and sworn to before me	Subscribed and sworn to before me
this ____ day of _____	this 27th day of December, 2022
	Maritza Ramses
Signature of Notary	Signature of Notary
Seal	Seal

"OFFICIAL SEAL"
Maritza Ramses
Notary Public, State of Illinois
My Commission Expires February 27, 2026

*Insert the EXACT legal name of the applicant

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SIGNATURE

Omar B. Lateef, DO
PRINTED NAME

President and CEO
PRINTED TITLE

Notarization:

Subscribed and sworn to before me
this 21st day of DECEMBER 2022

Signature of Notary

Seal

Official Seal
Yurlesia Nichelle Monford
Notary Public State of Illinois
My Commission Expires 9/7/2025

SIGNATURE

Carl Bergetz, JD
PRINTED NAME

Chief Legal Officer
PRINTED TITLE

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this 21st day of DECEMBER 2022

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*Insert the EXACT legal name of the applicant

SECTION III. BACKGROUND, PURPOSE OF THE PROJECT, AND ALTERNATIVES - INFORMATION REQUIREMENTS

This Section is applicable to all projects except those that are solely for discontinuation with no project costs.

1110.110(a) – Background of the Applicant

READ THE REVIEW CRITERION and provide the following required information:

BACKGROUND OF APPLICANT

1. A listing of all health care facilities owned or operated by the applicant, including licensing, and certification if applicable.
2. A listing of all health care facilities currently owned and/or operated in Illinois, by any corporate officers or directors, LLC members, partners, or owners of at least 5% of the proposed health care facility.
3. For the following questions, please provide information for each applicant, including corporate officers or directors, LLC members, partners, and owners of at least 5% of the proposed facility. A health care facility is considered owned or operated by every person or entity that owns, directly or indirectly, an ownership interest.
    a. A certified listing of any adverse action taken against any facility owned and/or operated by the applicant, directly or indirectly, during the three years prior to the filing of the application.
    b. A certified listing of each applicant, identifying those individuals that have been cited, arrested, taken into custody, charged with, indicted, convicted, or tried for, or pled guilty to the commission of any felony or misdemeanor or violation of the law, except for minor parking violations; or the subject of any juvenile delinquency or youthful offender proceeding. Unless expunged, provide details about the conviction, and submit any police or court records regarding any matters disclosed.
    c. A certified and detailed listing of each applicant or person charged with fraudulent conduct or any act involving moral turpitude.
    d. A certified listing of each applicant with one or more unsatisfied judgements against him or her.
    e. A certified and detailed listing of each applicant who is in default in the performance or discharge of any duty or obligation imposed by a judgment, decree, order or directive of any court or governmental agency.
4. Authorization permitting HFSRB and DPH access to any documents necessary to verify the information submitted, including, but not limited to official records of DPH or other State agencies; the licensing or certification records of other states, when applicable; and the records of nationally recognized accreditation organizations. **Failure to provide such authorization shall constitute an abandonment or withdrawal of the application without any further action by HFSRB.**
5. If, during a given calendar year, an applicant submits more than one application for permit, the documentation provided with the prior applications may be utilized to fulfill the information requirements of this criterion. In such instances, the applicant shall attest that the information was previously provided, cite the project number of the prior application, and certify that no changes have occurred regarding the information that has been previously provided. The applicant can submit amendments to previously submitted information, as needed, to update and/or clarify data.

APPEND DOCUMENTATION AS ATTACHMENT 11, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM. EACH ITEM (1-4) MUST BE IDENTIFIED IN ATTACHMENT 11.

Criterion 1110.110(b) & (d)

PURPOSE OF PROJECT

1. Document that the project will provide health services that improve the health care or well-being of the market area population to be served.
2. Define the planning area or market area, or other relevant area, per the applicant's definition.
3. Identify the existing problems or issues that need to be addressed as applicable and appropriate for the project.
4. Cite the sources of the documentation.
5. Detail how the project will address or improve the previously referenced issues, as well as the population's health status and well-being.
6. Provide goals with quantified and measurable objectives, with specific timeframes that relate to achieving the stated goals **as appropriate**.

For projects involving modernization, describe the conditions being upgraded, if any. For facility projects, include statements of the age and condition of the project site, as well as regulatory citations, if any. For equipment being replaced, include repair and maintenance records.

NOTE: Information regarding the "Purpose of the Project" will be included in the State Board Staff Report.

APPEND DOCUMENTATION AS ATTACHMENT 12, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM. EACH ITEM (1-6) MUST BE IDENTIFIED IN ATTACHMENT 12.

ALTERNATIVES

1) Identify **ALL** the alternatives to the proposed project:

   Alternative options **must** include:

   A) Proposing a project of greater or lesser scope and cost.

   B) Pursuing a joint venture or similar arrangement with one or more providers or entities to meet all or a portion of the project's intended purposes; developing alternative settings to meet all or a portion of the project's intended purposes.

   C) Utilizing other health care resources that are available to serve all or a portion of the population proposed to be served by the project; and

   D) Provide the reasons why the chosen alternative was selected.

2) Documentation shall consist of a comparison of the project to alternative options. The comparison shall address issues of total costs, patient access, quality, and financial benefits in both the short-term (within one to three years after project completion) and long-term. This may vary by project or situation. **FOR EVERY ALTERNATIVE IDENTIFIED, THE TOTAL PROJECT COST AND THE REASONS WHY THE ALTERNATIVE WAS REJECTED MUST BE PROVIDED.**

3) The applicant shall provide empirical evidence, including quantified outcome data that verifies improved quality of care, as available.

APPEND DOCUMENTATION AS ATTACHMENT 13, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

SECTION IV. PROJECT SCOPE, UTILIZATION, AND UNFINISHED/SHELL SPACE

Criterion 1110.120 - Project Scope, Utilization, and Unfinished/Shell Space

READ THE REVIEW CRITERION and provide the following information:

SIZE OF PROJECT:

1. Document that the amount of physical space proposed for the proposed project is necessary and not excessive. **This must be a narrative and it shall include the basis used for determining the space and the methodology applied.**
2. If the gross square footage exceeds the BGSF/DGSF standards in Appendix B, justify the discrepancy by documenting one of the following:
   a. Additional space is needed due to the scope of services provided, justified by clinical or operational needs, as supported by published data or studies and certified by the facility's Medical Director.
   b. The existing facility's physical configuration has constraints or impediments and requires an architectural design that delineates the constraints or impediments.
   c. The project involves the conversion of existing space that results in excess square footage.
   d. Additional space is mandated by governmental or certification agency requirements that were not in existence when Appendix B standards were adopted.

Provide a narrative for any discrepancies from the State Standard. A table must be provided in the following format with Attachment 14.

SIZE OF PROJECT				
DEPARTMENT/SERVICE	**PROPOSED BGSF/DGSF**	**STATE STANDARD**	**DIFFERENCE**	**MET STANDARD?**
Infusion	11,556	N/A		N/A
Diagnostic Radiology (MRI, CT Simulator, CT Scan, 2 Mammography Units, 3 Ultrasound Units, 1 X-Ray Machine, 1 Linear Accelerator)	9,734	Total: 13,600 1300 GSF Per Unit (General Radiology, Ultrasound); 900 GSF Per Unit (Mammograms); 1800 Per Unit (MRI); 1800 Per Unit (CT); 2400 GSF Per Accelerator	-4,205	Yes
Oncology	16,955	N/A		N/A

APPEND DOCUMENTATION AS ATTACHMENT 14, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

PROJECT SERVICES UTILIZATION:

This criterion is applicable only to projects or portions of projects that involve services, functions, or equipment for which HFSRB has established utilization standards or occupancy targets in 77 Ill. Adm. Code 1100.

Document that in the second year of operation, the annual utilization of the service or equipment shall meet or exceed the utilization standards specified in 1110.Appendix B. **A narrative of the rationale that supports the projections must be provided.**

A table must be provided in the following format with Attachment 15.

UTILIZATION					
	DEPARTMENT/ SERVICE	HISTORICAL UTILIZATION (PATIENT DAYS) (TREATMENTS) ETC.	PROJECTED UTILIZATION	STATE STANDARD	MEET STANDARD?
YEAR 1	Linear Accelerator	14,061	3,663	7,500	No
YEAR 10	Linear Accelerator	14,061	7,848	7,500	Yes

APPEND DOCUMENTATION AS ATTACHMENT 15, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

UNFINISHED OR SHELL SPACE:

Provide the following information:

1. Total gross square footage (GSF) of the proposed shell space.
2. The anticipated use of the shell space, specifying the proposed GSF to be allocated to each department, area, or function.
3. Evidence that the shell space is being constructed due to:
    a. Requirements of governmental or certification agencies; or
    b. Experienced increases in the historical occupancy or utilization of those areas proposed to occupy the shell space.
4. Provide:
    a. Historical utilization for the area for the latest five-year period for which data is available; and
    b. Based upon the average annual percentage increase for that period, projections of future utilization of the area through the anticipated date when the shell space will be placed into operation.

APPEND DOCUMENTATION AS ATTACHMENT 16, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

ASSURANCES:

Submit the following:

1. Verification that the applicant will submit to HFSRB a CON application to develop and utilize the shell space, regardless of the capital thresholds in effect at the time or the categories of service involved.
2. The estimated date by which the subsequent CON application (to develop and utilize the subject shell space) will be submitted; and
3. The anticipated date when the shell space will be completed and placed into operation.

APPEND DOCUMENTATION AS ATTACHMENT 17, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

M. Criterion 1110.270 - Clinical Service Areas Other than Categories of Service

1. Applicants proposing to establish, expand and/or modernize Clinical Service Areas Other than categories of service must submit the following information:

2. Indicate changes by Service: Indicate # of key room changes by action(s):

Service	# Existing Key Rooms	# Proposed Key Rooms
☒ **General Clinical**	**0**	**N/A**
☒ **Oncology**	**0**	**17**
☒ **Diagnostic Imaging**	**0**	**6**
☒ **Therapeutic Radiology (Major Medical Equipment- Linear Accelerator)**	**0**	**1**
☒ **Infusion Center**	**0**	**24**

3. READ the applicable review criteria outlined below and **submit the required documentation for the criteria:**

Project Type	Required Review Criteria
New Services or Facility or Equipment	(b) − Need Determination − Establishment
Service Modernization	(c)(1) − Deteriorated Facilities
	AND/OR
	(c)(2) − Necessary Expansion
	PLUS
	(c)(3)(A) − Utilization − Major Medical Equipment
	OR
	(c)(3)(B) − Utilization − Service or Facility
APPEND DOCUMENTATION AS ATTACHMENT 31, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.	

The following Sections DO NOT need to be addressed by the applicants or co-applicants responsible for funding or guaranteeing the funding of the project if the applicant has a bond rating of A- or better from Fitch's or Standard and Poor's rating agencies, or A3 or better from Moody's (the rating shall be affirmed within the latest 18-month period prior to the submittal of the application):

- **Section 1120.120 Availability of Funds − Review Criteria**
- **Section 1120.130 Financial Viability − Review Criteria**
- **Section 1120.140 Economic Feasibility − Review Criteria, subsection (a)**

SECTION VII. 1120.120 - AVAILABILITY OF FUNDS

The applicant shall document those financial resources shall be available and be equal to or exceed the estimated total project cost plus any related project costs by providing evidence of sufficient financial resources from the following sources, as applicable **[Indicate the dollar amount to be provided from the following sources]:**

$51,193,592	a)	Cash and Securities − statements (e.g., audited financial statements, letters from financial institutions, board resolutions) as to: 1) the amount of cash and securities available for the project, including the identification of any security, its value and availability of such funds; and 2) interest to be earned on depreciation account funds or to be earned on any asset from the date of applicant's submission through project completion.
$0.00	b)	Pledges − for anticipated pledges, a summary of the anticipated pledges showing anticipated receipts and discounted value, estimated timetable of gross receipts and related fundraising expenses, and a discussion of past fundraising experience.
$0.00	c)	Gifts and Bequests − verification of the dollar amount, identification of any conditions of use, and the estimated timetable of receipts.
$0.00	d)	Debt − a statement of the estimated terms and conditions (including the debt time, variable or permanent interest rates over the debt time, and the anticipated repayment schedule) for any interim and for the permanent financing proposed to fund the project, including: 1) For general obligation bonds, proof of passage of the required referendum or evidence that the governmental unit has the authority to issue the bonds and evidence of the dollar amount of the issue, including any discounting anticipated. 2) For revenue bonds, proof of the feasibility of securing the specified amount and interest rate. 3) For mortgages, a letter from the prospective lender attesting to the expectation of making the loan in the amount and time indicated, including the anticipated interest rate and any conditions associated with the mortgage, such as, but not limited to, adjustable interest rates, balloon payments, etc. 4) For any lease, a copy of the lease, including all the terms and conditions, including any purchase options, any capital improvements to the property and provision of capital equipment. 5) For any option to lease, a copy of the option, including all terms and conditions.

$0.00	e)	Governmental Appropriations − a copy of the appropriation Act or ordinance accompanied by a statement of funding availability from an official of the governmental unit. If funds are to be made available from subsequent fiscal years, a copy of a resolution or other action of the governmental unit attesting to this intent.
$0.00	f)	Grants − a letter from the granting agency as to the availability of funds in terms of the amount and time of receipt.
$0.00	g)	All Other Funds and Sources − verification of the amount and type of any other funds that will be used for the project.
$51,193,592	**TOTAL FUNDS AVAILABLE**	

APPEND DOCUMENTATION AS ATTACHMENT 34, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

SECTION VIII. 1120.130 - FINANCIAL VIABILITY- VIABILITY WAIVER MET

All the applicants and co-applicants shall be identified, specifying their roles in the project funding, or guaranteeing the funding (sole responsibility or shared) and percentage of participation in that funding.

Financial Viability Waiver

The applicant is not required to submit financial viability ratios if:

1. "A" Bond rating or better
2. All the project's capital expenditures are completely funded through internal sources
3. The applicant's current debt financing or projected debt financing is insured or anticipated to be insured by MBIA (Municipal Bond Insurance Association Inc.) or equivalent
4. The applicant provides a third-party surety bond or performance bond letter of credit from an A rated guarantor.

See Section 1120.130 Financial Waiver for information to be provided

APPEND DOCUMENTATION AS ATTACHMENT 35, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

The applicant or co-applicant that is responsible for funding or guaranteeing funding of the project shall provide viability ratios for the latest three years for which **audited financial statements are available and for the first full fiscal year at target utilization, but no more than two years following project completion.** When the applicant's facility does not have facility specific financial statements and the facility is a member of a health care system that has combined or consolidated financial statements, the system's viability ratios shall be provided. If the health care system includes one or more hospitals, the system's viability ratios shall be evaluated for conformance with the applicable hospital standards.

	Historical 3 Years			Projected
Enter Historical and/or Projected Years:				
Current Ratio				
Net Margin Percentage				
Percent Debt to Total Capitalization				
Projected Debt Service Coverage				
Days Cash on Hand				
Cushion Ratio				

Provide the methodology and worksheets utilized in determining the ratios detailing the calculation and applicable line item amounts from the financial statements. Complete a separate table for each co-applicant and provide worksheets for each.

Variance

Applicants not in compliance with any of the viability ratios shall document that another organization, public or private, shall assume the legal responsibility to meet the debt obligations should the applicant default.

APPEND DOCUMENTATION AS ATTACHMENT 36, IN NUMERICAL SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

SECTION IX. 1120.140 - ECONOMIC FEASIBILITY
This section is applicable to all projects subject to Part 1120.

A. Reasonableness of Financing Arrangements

The applicant shall document the reasonableness of financing arrangements by submitting a notarized statement signed by an authorized representative that attests to one of the following:

1) That the total estimated project costs and related costs will be funded in total with cash and equivalents, including investment securities, unrestricted funds, received pledge receipts and funded depreciation; or

2) That the total estimated project costs and related costs will be funded in total or in part by borrowing because:

   A) A portion or all the cash and equivalents must be retained in the balance sheet asset accounts to maintain a current ratio of at least 2.0 times for hospitals and 1.5 times for all other facilities; or

   B) Borrowing is less costly than the liquidation of existing investments, and the existing investments being retained may be converted to cash or used to retire debt within a 60-day period.

B. Conditions of Debt Financing

This criterion is applicable only to projects that involve debt financing. The applicant shall document that the conditions of debt financing are reasonable by submitting a notarized statement signed by an authorized representative that attests to the following, as applicable:

1) That the selected form of debt financing for the project will be at the lowest net cost available.

2) That the selected form of debt financing will not be at the lowest net cost available but is more advantageous due to such terms as prepayment privileges, no required mortgage, access to additional indebtedness, term (years), financing costs and other factors.

3) That the project involves (in total or in part) the leasing of equipment or facilities and that the expenses incurred with leasing a facility or equipment are less costly than constructing a new facility or purchasing new equipment.

C. Reasonableness of Project and Related Costs

Read the criterion and provide the following:

1) Identify each department or area impacted by the proposed project and provide a cost and square footage allocation for new construction and/or modernization using the following format (insert after this page).

COST AND GROSS SQUARE FEET BY DEPARTMENT OR SERVICE

Department (List below)	A	B	C	D	E	F	G	H	Total Cost (G + H)
	Cost/Square Foot		Gross Sq. Ft.		Gross Sq. Ft.		Const. $ (A x C)	Mod. $ (B x E)	
	New	Mod.	New	Circ.*	Mod.	Circ.*			
Infusion	$125.79	-	38,245	-	-	-	$4,810,956	-	$4,810,956
Diagnostic Radiology (3 MRI, 2 CT, 2 Mammogram, 1 Ultrasound, 1 X-ray Machine, 1 Linear Accelerator)	$104.83	-	38,245	-	-	-	$4,009,130	-	$4,009,130
Oncology	$188.69	-	38,245	-	-	-	$7,216,435	-	$7,216,435
Contingency	$64.04	-	-	-	-	-	$2,449,484	-	$2,449,484
TOTALS	**$483.35**	**-**	**38,245**	**-**	**-**	**-**	**$18,486,005**	**-**	**$18,486,005**

* Include the percentage (%) of space for circulation

D. Projected Operating Costs

The applicant shall provide the projected direct annual operating costs (in current dollars per equivalent patient day or unit of service) for the first full fiscal year at target utilization but no more than two years following project completion. Direct cost means the fully allocated costs of salaries, benefits and supplies for the service.

E. Total Effect of the Project on Capital Costs

The applicant shall provide the total projected annual capital costs (in current dollars per equivalent patient day) for the first full fiscal year at target utilization but no more than two years following project completion.

APPEND DOCUMENTATION AS ATTACHMENT 37, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

SECTION X. SAFETY NET IMPACT STATEMENT

SAFETY NET IMPACT STATEMENT that describes all the following must be submitted for ALL SUBSTANTIVE PROJECTS AND PROJECTS TO DISCONTINUE HEALTH CARE FACILITIES [20 ILCS 3960/5.4]:

1. The project's material impact, if any, on essential safety net services in the community, including the impact on racial and health care disparities in the community, to the extent that it is feasible for an applicant to have such knowledge.
2. The project's impact on the ability of another provider or health care system to cross-subsidize safety net services, if reasonably known to the applicant.
3. How the discontinuation of a facility or service might impact the remaining safety net providers in each community, if reasonably known by the applicant.

Safety Net Impact Statements shall also include all the following:

1. For the 3 fiscal years prior to the application, a certification describing the amount of charity care provided by the applicant. The amount calculated by hospital applicants shall be in accordance with the reporting requirements for charity care reporting in the Illinois Community Benefits Act. Non-hospital applicants shall report charity care, at cost, in accordance with an appropriate methodology specified by the Board.
2. For the 3 fiscal years prior to the application, a certification of the amount of care provided to Medicaid patients. Hospital and non-hospital applicants shall provide Medicaid information in a manner consistent with the information reported each year to the Illinois Department of Public Health regarding "Inpatients and Outpatients Served by Payor Source" and "Inpatient and Outpatient Net Revenue by Payor Source" as required by the Board under Section 13 of this Act and published in the Annual Hospital Profile.
3. Any information the applicant believes is directly relevant to safety net services, including information regarding teaching, research, and any other service.

A table in the following format must be provided as part of Attachment 37.

Safety Net Information per PA 96-0031			
CHARITY CARE			
Charity (# of patients)	2018	2019	2020
Inpatient			
Outpatient			
Total			
Charity (cost in dollars)			
Inpatient			
Outpatient			
Total			
MEDICAID			
Medicaid (# of patients)	Year	Year	Year
Inpatient			
Outpatient			
Total			
Medicaid (revenue)			
Inpatient			
Outpatient			
Total			

APPEND DOCUMENTATION AS ATTACHMENT 38, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

SECTION X. CHARITY CARE INFORMATION

Charity Care information MUST be furnished for ALL projects [1120.20(c)].

1. All applicants and co-applicants shall indicate the amount of charity care for the latest three **audited** fiscal years, the cost of charity care and the ratio of that charity care cost to net patient revenue.

2. If the applicant owns or operates one or more facilities, the reporting shall be for each individual facility located in Illinois. If charity care costs are reported on a consolidated basis, the applicant shall provide documentation as to the cost of charity care; the ratio of that charity care to the net patient revenue for the consolidated financial statement; the allocation of charity care costs; and the ratio of charity care cost to net patient revenue for the facility under review.

3. If the applicant is not an existing facility, it shall submit the facility's projected patient mix by payer source, anticipated charity care expense and projected ratio of charity care to net patient revenue by the end of its second year of operation.

Charity care" means care provided by a health care facility for which the provider does not expect to receive payment from the patient or a third-party payer (20 ILCS 3960/3). Charity Care must be provided at cost.

A table in the following format must be provided for all facilities as part of Attachment 39.

CHARITY CARE			
	Year	**Year**	**Year**
Net Patient Revenue			
Amount of Charity Care (charges)			
Cost of Charity Care			

APPEND DOCUMENTATION AS ATTACHMENT 39, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.

SECTION XI. SPECIAL FLOOD HAZARD AREA AND 500-YEAR FLOODPLAIN DETERMINATION FORM

In accordance with Executive Order 2006-5 (EO 5), the Health Facilities & Services Review Board (HFSRB) must determine if the site of the CRITICAL FACILITY, as defined in EO 5, is in a mapped floodplain (Special Flood Hazard Area) or a 500-year floodplain. All state agencies are required to ensure that before a permit, grant or a development is planned or promoted, the proposed project meets the requirements of the Executive Order, including compliance with the National Flood Insurance Program (NFIP) and state floodplain regulation.

1. Applicant: Rush University System for Health (Name) 1725 West Harrison Street, Suite 364 (Address)

Chicago (City) Illinois (State) 60612 (Zip Code) (708) 660-6660 (Telephone Number)

2. Project Location: 2455 Corporate West Drive (Address) Lisle (City) Illinois (State)

DuPage County (County) Lisle Township (Township) (Section)

3. You can create a small map of your site showing the FEMA floodplain mapping using the FEMA Map Service Center website (https://msc.fema.gov/portal/home) by entering the address for the property in the Search bar. If a map, like that shown on page 2 is shown, select the ***Go to NFHL Viewer*** tab above the map. You can print a copy of the floodplain map by selecting the  icon in the top corner of the page. Select the pin tool icon  and place a pin on your site. Print a FIRMETTE size image.

If there is no digital floodplain map available select the **View/Print FIRM** icon above the aerial photo. You will then need to use the Zoom tools provided to locate the property on the map and use the **Make a FIRMette** tool to create a pdf of the floodplain map.

IS THE PROJECT SITE LOCATED IN A SPECIAL FLOOD HAZARD AREA: Yes___ No _X_

IS THE PROJECT SITE LOCATED IN THE 500-YEAR FLOOD PLAIN? NO

If you are unable to determine if the site is in the mapped floodplain or 500-year floodplain, contact the county or the local community building or planning department for assistance.

If the determination is being made by a local official, please complete the following:

FIRM Panel Number:_____ Effective Date:_____

Name of Official:_____ Title: _____

Business/Agency:_____ Address:_____

_____
(City) (State) (ZIP Code) (Telephone Number)

Signature:_____ Date: _____

NOTE: This finding only means that the property in question is or is not in a Special Flood Hazard Area or a 500-year floodplain as designated on the map noted above. It does not constitute a guarantee that the property will or will not be flooded or be subject to local drainage problems.

If you need additional help, contact the Illinois Statewide Floodplain Program at 217/782-4428

After paginating the entire completed application indicate, in the chart below, the page numbers for the included attachments:

INDEX OF ATTACHMENTS

Attachment 1
Type of Ownership of Applicants

Included with this attachment are:

1. The Certificate of Good Standing for Rush University System for Health.
2. The Certificate of Good Standing for Rush University Medical Center.

Attachment 1
Certificate of Good Standing - Rush University System for Health

File Number 5852-111-6

To all to whom these Presents Shall Come, Greeting:

I, Jesse White, Secretary of State of the State of Illinois, do hereby certify that I am the keeper of the records of the Department of Business Services. I certify that

RUSH SYSTEM FOR HEALTH, A DOMESTIC CORPORATION, INCORPORATED UNDER THE LAWS OF THIS STATE ON SEPTEMBER 22, 1995, ADOPTED THE ASSUMED NAME RUSH UNIVERSITY SYSTEM FOR HEALTH ON JANUARY 29, 2019, APPEARS TO HAVE COMPLIED WITH ALL THE PROVISIONS OF THE GENERAL NOT FOR PROFIT CORPORATION ACT OF THIS STATE, AND AS OF THIS DATE, IS IN GOOD STANDING AS A DOMESTIC CORPORATION IN THE STATE OF ILLINOIS.

Authentication #: 2221502920 verifiable until 08/03/2023
Authenticate at: https://www.ilsos.gov

In Testimony Whereof, *I hereto set my hand and cause to be affixed the Great Seal of the State of Illinois, this* 3RD *day of* AUGUST *A.D.* 2022 .

Jesse White

SECRETARY OF STATE

Attachment 1
Certificate of Good Standing - Rush University Medical Center

File Number 0200-214-1

To all to whom these Presents Shall Come, Greeting:

I, Jesse White, Secretary of State of the State of Illinois, do hereby certify that I am the keeper of the records of the Department of Business Services. I certify that

RUSH UNIVERSITY MEDICAL CENTER, A DOMESTIC CORPORATION, INCORPORATED UNDER THE LAWS OF THIS STATE ON JULY 21, 1883, APPEARS TO HAVE COMPLIED WITH ALL THE PROVISIONS OF THE GENERAL NOT FOR PROFIT CORPORATION ACT OF THIS STATE, AND AS OF THIS DATE, IS IN GOOD STANDING AS A DOMESTIC CORPORATION IN THE STATE OF ILLINOIS.

Authentication #: 2221503126 verifiable until 08/03/2023
Authenticate at: https://www.ilsos.gov

In Testimony Whereof, *I hereto set my hand and cause to be affixed the Great Seal of the State of Illinois, this* 3RD *day of* AUGUST *A.D.* 2022 .

Jesse White

SECRETARY OF STATE

Attachment 2
Site Ownership and Control

The land at which the Lisle Cancer Care Center will be located (2455 Corporate West Drive, Lisle, IL) is subject to a Purchase and Sale Agreement and Amendment by and between American National Insurance Company and Rush University Medical Center, effective March 21, 2022, as amended July 19, 2022.

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

PURCHASE AND SALE AGREEMENT
(2455 Corporate West Drive, Lisle, IL)

THIS PURCHASE AND SALE AGREEMENT ("**Agreement**") is made by and between AMERICAN NATIONAL INSURANCE COMPANY, a Texas insurance company ("**Seller**"), and RUSH UNIVERSITY MEDICAL CENTER, an Illinois not-for-profit corporation (together with its permitted assignee pursuant to Section 22(g) below, "**Purchaser**"), to be effective as of the Effective Date (as defined in Section 22(h) herein).

W I T N E S S E T H:

RECITALS

WHEREAS, Seller owns that certain building, having an address of 2455 Corporate West Drive, Lisle, DuPage County, Illinois, and being located on that certain parcel(s) of property more particularly described on the **Exhibit "A"** attached hereto and incorporated herein by this reference (the "**Land**"; with Seller's right, title and interest therein and thereto, along with any and all improvements located thereon, being collectively herein referred to as the "**Property**"); and

WHEREAS, Seller desires to sell and Purchaser desires to acquire the Property on the terms and provisions hereinbelow set forth.

NOW, THEREFORE, in consideration of the mutual covenants contained herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. Agreement of Purchase and Sale. Seller hereby agrees to sell and convey, and Purchaser agrees to purchase, on such terms and conditions as are hereinafter set forth, all of the following:

(a) fee simple title in and to the Property (subject to any Permitted Exceptions [as defined in Section 4(a) herein]), together with Seller's right, title and interest (if any) in and to any and all covenants, easements, rights-of-way, rights, privileges and other tenements, appurtenances and hereditaments appertaining thereto, including, without limitation, all of Seller's right, title and interest (if any) in and to (i) any strips or gores adjoining or adjacent to the Land, (ii) the streets and roads adjoining or adjacent to the Land to the center line thereof, (iii) all mineral, water and irrigation rights, if any, running with or otherwise pertaining to the Land and (iv) any award made or to be made or settlement in lieu thereof for the Property by reason of condemnation, eminent domain or exercise of police power;

(b) any and all of Seller's right, title and interest in and to any apparatus, fittings and fixtures in or on the Property or which are attached thereto ("**Fixtures**");

(c) any and all of Seller's right, title and interest in and to any equipment, machinery and personal property owned by Seller and located in or on the Property ("**Personal Property**"), SAVE AND EXCEPT those items set forth on **Schedule 1(c)** hereto and save and except those

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

items that Purchaser advises in writing it does not want, as to which said items excepted Seller shall remove at its sole cost and expense prior to Closing (hereinafter defined);

(d) any and all of Seller's right, title and interest (if any) in and to the trademark, service mark, trade name or otherwise as relates to the Project (as defined herein), and any variations thereof, together with all good will of the business connected with the use of and symbolized by such Project (as defined herein) trademarks, service marks, trade names, names and logos, any telephone numbers and listings for the Property ("**Intangibles**");

(e) to the extent assignable, any and all of Seller's right, title and interest in and to all warranties and guaranties, if any, relating to the Property (collectively, the "**Warranties**");

(f) to the extent assignable, any and all of Seller's right, title and interest in and to all consents, authorizations, variances or waivers, licenses, permits and approvals from any governmental or quasi-governmental agency, department, board, commission, bureau or other entity or instrumentality (if any) (collectively, "**Governmental Authority**") relating to the Property (collectively, the "**Approvals**");

(g) to the extent assignable, any and all of Seller's right, title and interest in and to all reciprocal easement agreements affecting the Property (if any) (collectively, the "**REAs**"), including, without limitation, any rights as a declarant, operator, approving party or like authority thereunder;

(h) to the extent assignable, any and all of Seller's right, title and interest in and to all existing construction contracts, subcontracts, architecture and engineering agreements, and similar agreements relating to the design, development and construction of the Property (if any) (collectively, the "**Development Materials**") excepting those Development Materials that Purchaser advises in writing it does not want; and

(i) if requested in writing by Purchaser to be assigned, and to the extent assignable, any and all of Seller's right, title and interest in and to any and all other written agreements which affect the operation, maintenance or use of the Property (if any) ("**Contracts**") including, without limitation, personal property leases and contracts, other than the Permitted Exceptions, which Purchaser expressly agrees to assume (a schedule of all Contracts in existence on the Effective Date [the "**Contracts Schedule**"] is attached hereto as **Schedule 1(i)**); and

(j) to the extent assignable, any and all of Seller's right, title and interest in and to all plans and specifications and other architectural and engineering drawings for the Property (collectively, the "**Plans**").

Subject to the foregoing, it is intended that Seller shall transfer to Purchaser all of Seller's interest of every kind or nature in the Property, the Fixtures, the Personal Property, the Intangibles, the Warranties, the Approvals, the REAs, the Development Materials, the Contracts, the Plans and all other interests of Seller in and to the Property (the Property, the Fixtures, the Personal Property, the Intangibles, the Warranties, the Approvals, the REAs, the Development Materials, the Contracts, the Plans and all other interests of Seller in and to the Property are herein collectively referred to as the "**Project**").

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

2. Purchase Price.

(a) The purchase price (the "**Purchase Price**") for the Project is [redacted], payable in accordance with Section 2(b) below.

(b) The Purchase Price is to be paid as follows:

(i) [redacted] (such amount and any interest earned on such amount(s), the "**Earnest Money**") shall be paid by Purchaser to First American Title Insurance Company, National Commercial Services, 30 North LaSalle Street, Suite 2700, Chicago, Illinois ("**Escrow Agent**" or "**Title Company**") within three (3) business days after the Effective Date. Unless otherwise released in accordance with this Agreement, the Earnest Money shall be held in escrow by Escrow Agent in trust for the benefit of the Purchaser and Seller, in accordance with the terms and provisions a strict joint order escrow agreement with the Escrow Agent, said escrow agreement in general form and substance as that attached hereto as **Exhibit C** (the "Joint Order Escrow"). If the purchase and sale of the Project is consummated in accordance with the terms and provisions of this Agreement, then the Earnest Money shall be applied fully to the Purchase Price at Closing and transferred to an account or accounts designated in writing by Seller. If Purchaser terminates this Agreement in accordance with Section 3(a)(iii) below, the Earnest Money shall be promptly returned to Purchaser, subject to the provisions of Section 2(b)(iii) herein.

(ii) The balance of the Purchase Price (after deducting the Earnest Money) shall be paid at Closing, plus or minus prorations and adjustments to be made pursuant to this Agreement, in good and immediately available United States funds by wire transfer to a bank account or accounts to be designated in writing by the Title Company prior to the Closing for transfer to an account or accounts designated in writing by Seller.

(iii) Notwithstanding anything in this Agreement to the contrary, a portion of the Earnest Money in the amount of [redacted] ("**Independent Consideration**") shall be non-refundable and shall be distributed to Seller at Closing or other termination of this Agreement as full payment and independent consideration for Seller's performance under this Agreement and for the rights granted to Purchaser hereunder. Such Independent Consideration shall be deducted from any refund or delivery of the Earnest Money to Purchaser pursuant to this Agreement and shall simultaneously be distributed to Seller.

Notwithstanding anything contained in this Agreement to the contrary, failure of Purchaser to timely escrow the Earnest Money as set forth in this Section 2 is a default by Purchaser under this Agreement, not subject to notice and cure, and Seller may terminate this Agreement as Seller's sole and exclusive remedy for such default, and the parties shall be relieved of all further obligations hereunder, except for that which expressly survives such termination. The parties agree to execute and deliver a written escrow agreement pertaining to the escrow of the Earnest Money in form and substance as set forth in **Exhibit C** hereto.

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

3. Inspection Period; Property Materials.

(a) Inspection Period.

(i) Purchaser will have the period that is sixty (60) days from the Effective Date (as calculated commencing on the day following the Effective Date) (the "**Inspection Period**"), to enter upon and investigate the Property and the Project from time to time to perform physical examinations and inspections, and to make such feasibility, financing, environmental, engineering, architectural, development, survey, title, zoning, regulatory, utility, soil and other tests and studies as are deemed necessary or desirable by Purchaser, and such other due diligence reviews of the Project, and the Property Materials (as defined herein), and to decide, in Purchaser's sole discretion, whether the Project is satisfactory or unsatisfactory to Purchaser. Except as may otherwise be provided herein, any and all due diligence costs including, without limitation, costs of building and site inspections, engineering, environmental and/or other reports or inspections undertaken by Purchaser, shall be paid for by Purchaser. Further, Purchaser acknowledges and agrees that some of the information as to the Project that may be made available to Purchaser for its review pursuant to Section 3(c) below may have been prepared by third parties other than Seller, and except as stated in Section 3(c) of this Agreement: (A) Seller shall have no liability with respect to the results of or any inaccuracies contained in any of the Property-related information; and (B) Seller makes no representations or warranties whatsoever, express or implied, concerning the (1) completeness of such items, documents, or reports, (2) the truth or accuracy of such items, documents, or reports or (3) the existence or non-existence of any Hazardous Materials in, on or about the Property.

(ii) During the Inspection Period, Seller, upon at least one (1) day's prior written notice from Purchaser, will provide Purchaser or its designated representative(s) access to the Property at reasonable times to conduct, at Purchaser's sole cost and expense, Purchaser's due diligence with respect to the Project; provided that: (A) such access shall be coordinated with a representative of Seller and, at Seller's election, may be accompanied by a representative of Seller; (B) Purchaser shall INDEMNIFY, DEFEND and HOLD HARMLESS Seller and its employees, directors, owners, agents or other representatives (collectively, the "**Seller Parties**") from and against any and all claims for costs, expenses, losses, damages and/or liabilities (including, but not limited to, reasonable attorneys' fees and expenses actually incurred by any of the Seller Parties) (collectively "**Claims**") asserted against or actually incurred by Seller or any of the other Seller Parties arising from Purchaser's due diligence activities on or about the Property and/or its review of the Property-related information, excluding from the foregoing indemnity any Claims relating to pre-existing conditions and/or the actions of Seller, including without limitation, the negligence, gross negligence or willful misconduct of Seller or any of the other Seller Parties; (C) Purchaser shall promptly repair any damage resulting from any such activities and restore the Property to its condition prior to such activities; (D) Purchaser shall fully comply with all applicable laws, ordinances, rules and regulations (collectively, the "**Legal Requirements**"); and (E) Purchaser shall not permit any inspections, investigations or other due diligence activities to result in any liens, judgments or other encumbrances being filed against the Property and shall, at its sole cost and expense, as promptly as possible but in no event more than five (5) business days after Purchaser receives actual notice of the filing or recording, discharge of record any such liens or encumbrances that are so filed or recorded. Purchaser's

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

liabilities under this Section 3(a)(ii) shall survive the Closing or earlier termination of this Agreement.

(iii) On or before the expiration of the second (2nd) business day following the expiration of the Inspection Period, Purchaser will have the right in its sole and absolute discretion to terminate this Agreement by giving written notice of termination to Seller. In the event Purchaser timely exercises its right to terminate this Agreement pursuant to this Section 3(a)(iii), (A) Purchaser shall receive a full return of the Earnest Money (less the Independent Consideration) and (B) except for obligations hereunder that expressly survive such a termination, neither party hereto shall have any further rights against or obligations to the other hereunder. If Purchaser fails to give Seller, on or before the second (2nd) business day following the expiration of the Inspection Period, written notice that Purchaser has waived its right to terminate this Agreement pursuant to this Section 3(a)(iii), Purchaser shall be deemed to have elected to terminate this Agreement, in which case, clauses (A) and (B) of the preceding sentence shall apply. Purchaser shall have the right to extend the Inspection Period for one (1) additional sixty (60) day period by providing written notice of its exercise of such extension right on or before the expiration of the second (2nd) business day following the expiration of the initial 60-day Inspection Period.

(iv) Notwithstanding anything in this Section 3 to the contrary, Purchaser shall not be allowed to cause any test to be performed which involves any intrusive sampling from the Property and shall not conduct any environmental inspections, or conduct any testing, of any nature whatsoever without Seller's express written consent (not to be unreasonably withheld, conditioned or delayed), which prohibited actions shall include, without limitation, making test borings, sampling groundwater, conducting soil bearing tests and any other environmental tests and assessments. Prior to entry for inspection of the Property and during the Inspection Period, Purchaser and each agent, consultant or contractor shall, at no cost to Seller, furnish to Seller in a form reasonably satisfactory to Seller, a certificate or certificates of insurance, or other satisfactory evidence indicating that Purchaser and each agent, consultant or contractor have obtained commercial general liability insurance with limits, not less than $2,000,000.00 per occurrence and $2,000,000.00 in the aggregate, for bodily injury, including death, and property damage combined. All such insurance shall name Seller as an additional insured. In addition, all such certificate(s) or other evidence shall indicate that the coverage evidenced thereby shall not be modified or cancelled without at least ten (10) days' prior written notice to Seller.

(v) It is acknowledged and agreed that Purchaser will be seeking zoning changes so as to allow Purchaser to use and operate the Property for medical office uses, and that the obligations of Purchaser under this Agreement are subject to the "Zoning Use Condition" (hereinafter defined). It is further acknowledged and agreed that Purchaser may need Seller's assistance in securing zoning changes, and Seller hereby agrees to timely and reasonably accommodate and assist Purchaser, but at no out of pocket cost or expense to Seller.

(b) Property Materials. Seller or its agent shall within ten (10) business days from the Effective Date of this Agreement make available to Purchaser those items listed on **Schedule 3(c)** attached hereto (the "**Property Materials**"), with Seller's warranties as to such items being only those warranties set forth on **Schedule 3(c)**.

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4. **Title.** Purchaser shall accept good and indefeasible fee simple title to the Property subject only to the Permitted Exceptions.

(a) Seller will promptly order, if it has not previously done so, a title insurance commitment ("**Title Commitment**") to be issued by the Title Company and shall cause the Title Company to promptly deliver the Title Commitment and all, and best available, copies of all recorded instruments referenced therein (collectively, the "**Title Documents**"), to Purchaser and to Seller and their counsel. Seller shall also deliver its existing Property survey, if any, to Purchaser within ten (10) days of the Effective Date. Purchaser shall order an ALTA/NSPS "as-built" survey of the Property certified to the Title Company, Purchaser, Seller and, if applicable, Purchaser's lender (either of Seller's existing Property survey or any new Property survey obtained by Purchaser being the "**Survey**"; collectively with the Title Documents, the "**Title Materials**"). Not later than twenty-five (25) days following Purchaser's receipt of all of the Title Materials, ("**Title Review Period**"), Purchaser shall furnish Seller with a written statement of title and Survey objections, if any, to the Property ("**Objections**"). Failure of Purchaser to timely deliver Objections within the Title Review Period will constitute a waiver of Purchaser's right to object to any exceptions contained in the Title Materials, and such exceptions will be deemed Permitted Exceptions for all purposes herein. If an update or endorsement to the Title Commitment delivered to Purchaser or a revision to the Survey ("**Title/Survey Update**") discloses a title or Survey matter that was not disclosed in the original Title Commitment, on the Survey or in a previous Title/Survey Update, Purchaser may deliver to Seller, within five (5) business days following Purchaser's receipt of the Title/Survey Update ("**Title/Survey Update Review Period**") written Objections to such defect(s) first disclosed on the Title/Survey Update, accompanied by a copy of the Title/Survey Update.

(b) If Purchaser notifies Seller in writing within the Title Review Period or the Title/Survey Update Review Period, as applicable, of Objections, then within five (5) business days after Seller's receipt of Purchaser's written notice, Seller shall notify Purchaser in writing ("**Seller's Title Response Notice**") of the Objections which Seller agrees to satisfy at or prior to the Closing, which shall be cured at Seller's sole cost and expense. Failure by Seller to timely respond to Purchaser before the expiration of said 5-business-day response period shall be deemed as Seller's election not to cure the Objections provided in Purchaser's written notice; provided, however, that Seller shall, in any event, continue to be obligated to satisfy the Seller's Required Removal Items. If Seller chooses not to satisfy (or is deemed not to choose to satisfy) any or all of the Objections (other than Seller's Required Removal Items), then Purchaser shall have the option, to be exercised within five (5) business days following the later of (y) Purchaser's receipt of the Seller's Title Response Notice and (z) the expiration of the Inspection Period, to either (i) terminate this Agreement by giving written notice of termination to Seller and Escrow Agent, whereupon the rights of the parties shall be as set forth in Section 3(a)(iii) hereof and the Earnest Money shall be returned to Purchaser, or (ii) elect to consummate the purchase of the Project, in which case Purchaser shall be deemed to have waived such Objections and such Objections shall become "**Permitted Exceptions**" for all purposes hereunder. Failure by Purchaser to respond to Seller on or before the expiration of said five (5) business-day period shall be deemed as Purchaser's election to terminate this Agreement whereupon the rights of the parties shall be as set forth in Section 3(a)(iii) hereof and the Earnest Money shall be returned to Purchaser. If, at or prior to the Closing, Seller is unable or unwilling to satisfy any Objections that Seller has agreed to satisfy in Seller's Title Response Notice, Seller

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shall be in default of its obligations under this Agreement, and Purchaser shall have the option, at Purchaser's sole discretion and without limiting any other right or remedy of Purchaser: (A) to adjourn the Closing Date to allow Seller additional time to satisfy such Objections; (B) to terminate this Agreement by giving written notice of termination to Seller, whereupon the rights of the parties shall be as set forth in Section 3(a)(iii) hereof and the Earnest Money shall be returned to Purchaser; (C) to declare Seller in default of its obligations under this Agreement and pursue any and all remedies available to Purchaser under applicable law, or (D) to close this transaction in accordance with the terms and provisions hereof, with reservation of claims for damages against Seller for its default. The foregoing to the contrary notwithstanding, the following are all considered Objections which Seller shall remove on or prior to Closing: (A) (1) mechanics or materialmen's liens or (2) monetary liens, encumbrances or security interests against Seller placed of record on the Property and/or the remainder of the Project, and which can be removed and/or eliminated by the payment of money (either of items (1) or (2) being "Monetary Liens"), (B) encumbrances that have been placed against the Property by Seller or other person, other than by Purchaser, after the Effective Date without Purchaser's prior written consent and that will not otherwise be satisfied on or before the Closing, and (C) exceptions that can be removed from the Title Commitment by Seller's delivery of a customary owner's title affidavit (all of the foregoing hereinafter collectively referred to as the **"Seller's Required Removal Items"**). All title matters and exceptions set forth in the Title Commitment and any Title/Survey Update and the state of facts shown on the Survey which are not identified by Purchaser as Objections, or which are thereafter deemed to be accepted or waived by Purchaser as provided above, other than the Seller's Required Removal Items, are hereafter referred to as the "Permitted Exceptions".

(c) It is a condition to Purchaser's obligation to close hereunder that the Title Company shall issue to Purchaser an Owner's Policy of Title Insurance in the amount of the Purchase Price, insuring that Purchaser has good and indefeasible fee simple title to the Property, subject only to the Permitted Exceptions, showing that all requirements applicable to Seller have been satisfied, deleting all standard and/or general exceptions (including the standard survey exception, and the standard parties in possession exception), showing that all taxes, assessments, and municipal charges which are due have been paid, and containing such endorsements thereto as are requested by Purchaser (and available) and are of the type normally requested in similar transactions in the State in which the Property is located (collectively, the "**Title Policy**").

5. Closing Date; Closing. Provided that all of the conditions to Purchaser's obligation to close shall be satisfied or waived (as the case may be), the sale contemplated by this Agreement shall be consummated and closed through an escrow arrangement with the Title Company on the date that is fifteen (15) days after the later of the following ("**Closing Date**") (with any closing to occur on or prior to 5:00 pm Central Standard Time on the Closing Date): (a) the expiration of the Inspection Period (as the same may be extended as provided herein), or (b) satisfaction of the CON Condition. The terms and conditions of such escrow arrangement shall be consistent with the terms of this Agreement and shall otherwise be reasonably acceptable to Seller, Purchaser and the Title Company. The consummation and the closing of the purchase and sale of the Project as contemplated by this Agreement are herein referred to as the "**Closing**".

6. No Representations or Warranties.

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(a) Purchaser acknowledges that it is not relying upon any representation, statement or other assertion with respect to the condition of the Property, but is relying upon its own examination of the Property.

(b) EXCEPT AS OTHERWISE EXPRESSLY SET FORTH HEREIN, IT IS UNDERSTOOD AND AGREED THAT SELLER IS NOT MAKING AND SPECIFICALLY DISCLAIMS ANY AND ALL WARRANTIES OR REPRESENTATIONS OF ANY KIND OR CHARACTER, EXPRESS OR IMPLIED, WITH RESPECT TO THE PROJECT, INCLUDING, BUT NOT LIMITED TO, WARRANTIES OR REPRESENTATIONS AS TO MATTERS OF TITLE (OTHER THAN SELLER'S LIMITED WARRANTY OF TITLE SET FORTH IN THE DEED TO BE DELIVERED AT THE CLOSING), ZONING, TAX CONSEQUENCES, PHYSICAL OR ENVIRONMENTAL CONDITIONS, FINANCIAL OR BUSINESS CONDITIONS, AVAILABILITY OF ACCESS, INGRESS OR EGRESS, OPERATING HISTORY OR PROJECTIONS, VALUATION, GOVERNMENTAL APPROVALS, GOVERNMENTAL REGULATIONS OR ANY OTHER MATTER OR THING RELATING TO OR AFFECTING THE PROPERTY, INCLUDING, WITHOUT LIMITATION, (i) THE VALUE, CONDITION, MERCHANTABILITY, MARKETABILITY, PROFITABILITY, SUITABILITY OR FITNESS FOR A PARTICULAR USE OR PURPOSE OF THE PROJECT; (ii) THE MANNER OR QUALITY OF THE CONSTRUCTION OR MATERIALS INCORPORATED INTO ANY OF THE PROJECT; AND (iii) THE MANNER, QUALITY, STATE OF REPAIR OR LACK OF REPAIR OF THE PROJECT. EXCEPT AS OTHERWISE EXPRESSLY SET FORTH HEREIN, PURCHASER HAS NOT RELIED UPON AND WILL NOT RELY UPON, EITHER DIRECTLY OR INDIRECTLY, ANY REPRESENTATION OR WARRANTY OF SELLER OR ANY AGENT OF SELLER. PURCHASER REPRESENTS THAT IT IS A KNOWLEDGEABLE PURCHASER OF REAL ESTATE, AND THAT IT IS RELYING SOLELY ON ITS OWN EXPERTISE AND THAT OF PURCHASER'S CONSULTANTS IN PURCHASING THE PROPERTY. PURCHASER HAS CONDUCTED OR WILL CONDUCT SUCH INSPECTIONS AND INVESTIGATIONS OF THE PROJECT AS PURCHASER DEEMS NECESSARY, INCLUDING, BUT NOT LIMITED TO, THE PHYSICAL AND ENVIRONMENTAL CONDITIONS THEREOF AND SHALL RELY UPON SAME. UPON THE CLOSING, PURCHASER SHALL ASSUME THE RISK THAT ADVERSE MATTERS, INCLUDING, BUT NOT LIMITED TO, ADVERSE PHYSICAL AND ENVIRONMENTAL CONDITIONS, MAY NOT HAVE BEEN REVEALED BY PURCHASER'S INSPECTIONS AND INVESTIGATIONS. PURCHASER ACKNOWLEDGES AND AGREES THAT UPON CLOSING, SELLER SHALL SELL AND CONVEY TO PURCHASER AND PURCHASER SHALL ACCEPT FROM SELLER THE ENTIRE PROJECT IN AN "AS IS, WHERE IS" AND WITH ALL FAULTS CONDITION. TO THE FULLEST EXTENT ALLOWABLE UNDER APPLICABLE LAW, WITH ITS ACQUISITION OF THE PROJECT, PURCHASER HEREBY RELEASES SELLER FROM ANY AND ALL LIABILITY RELATED TO THE PROJECT, INCLUDING, WITHOUT LIMITATION, MATTERS PERTAINING TO ENVIRONMENTAL ISSUES ON THE PROPERTY (PROVIDED THE FOREGOING RELEASE SHALL NOT RELEASE SELLER FOR A DEFAULT OF ITS OBLIGATIONS UNDER THIS AGREEMENT). PURCHASER FURTHER ACKNOWLEDGES AND AGREES THAT THERE NO ORAL AGREEMENTS, WARRANTIES OR REPRESENTATIONS, COLLATERAL TO OR AFFECTING ANY PORTION OF THE PROJECT BY SELLER, ANY AGENT OF SELLER OR ANY THIRD PARTY HAVE BEEN MADE WITH PURCHASER. THE TERMS AND CONDITIONS OF

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THIS SECTION 6(b) SHALL EXPRESSLY SURVIVE THE CLOSING, NOT MERGE WITH THE PROVISIONS OF ANY OF THE CLOSING DOCUMENTS AND SHALL BE INCORPORATED INTO THE DEED. SELLER IS NOT LIABLE OR BOUND IN ANY MANNER BY ANY ORAL OR WRITTEN STATEMENTS, REPRESENTATIONS OR INFORMATION PERTAINING TO ANY PORTION OF THE PROJECT FURNISHED BY ANY REAL ESTATE BROKER, AGENT, EMPLOYEE, SERVANT OR OTHER PERSON UNLESS THE SAME ARE SPECIFICALLY SET FORTH OR REFERRED TO HEREIN. PURCHASER FURTHER ACKNOWLEDGES AND AGREES THAT THE PROVISIONS OF THIS SECTION 6, AND IN PARTICULAR THIS PARAGRAPH, WERE A MATERIAL FACTOR IN THE DETERMINATION OF THE PURCHASE PRICE FOR THE PROPERTY.

DS

Purchaser's Initials

(c) Purchaser hereby represents and warrants to Seller that (i) Purchaser is not in a significantly disparate bargaining position in relation to Seller; (ii) Purchaser is represented by legal counsel of its own choice and designation in connection with the transaction contemplated by this Agreement; and (iii) Purchaser is purchasing the Property for business or commercial investment or other similar purpose and not for use as Purchaser's residence.

DS

Purchaser's Initials

(d) Seller hereby represents and warrants to Purchaser that (i) Seller is not in a significantly disparate bargaining position in relation to Purchaser; and (ii) Seller is represented by legal counsel of its own choice and designation in connection with the transaction contemplated by this Agreement.

Seller's Initials

7. Satisfaction of Seller's Required Removal Items. If at the Closing there are any Seller's Required Removal Items, Seller or Purchaser (to the extent Seller fails to timely direct the Title Company to so act) shall have the right to instruct the Title Company to use any cash portion of the Purchase Price to satisfy the same. Notwithstanding the foregoing, provided that Seller shall have delivered to the Title Company at or before the Closing acceptable pay-off letters from any lien holders verifying any amounts to be paid at Closing to satisfy and release any such Seller's Required Removal Items and Seller irrevocably authorizes the Title Company to use the Purchase Price (or a portion thereof) to pay such items, such that the Title Company will issue at Closing the Title Policy without exception to any such Seller's Required Removal Items and with the written obligation to Purchaser that it shall timely pay such items and cause the release thereof as evidenced by properly executed and recorded releases, then the mere existence of any such liens to be satisfied and released out of the Purchase Price shall not be deemed unsatisfied Seller's Required Removal Items.

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8. Representations, Warranties and Covenants.

(a) Seller hereby represents, warrants and covenants for the sole, exclusive and limited benefit of Purchaser as of the Effective Date and as of the Closing as follows:

(i) Seller is an insurance company duly organized, validly existing and in good standing under the laws of the State of Texas and is entitled to and has all requisite power and authority to own and operate its assets as they are presently owned and operated, to enter into this Agreement and to carry out the transactions contemplated hereby.

(ii) The execution of this Agreement by Seller, the consummation of the transactions herein contemplated, and the execution and delivery of all documents to be executed and delivered by Seller, have been or will be duly authorized by all requisite action on the part of Seller, and this Agreement has been and all documents to be delivered by Seller pursuant to this Agreement, will be, duly executed and delivered by Seller and is or will be, as the case may be, binding upon and enforceable against Seller in accordance with their respective terms.

(iii) Neither the execution of this Agreement nor the carrying out of the transactions contemplated herein will result in any violation of or be in conflict with the instruments pursuant to which Seller was organized and/or operates, or, to Seller's actual knowledge, without due investigation, any applicable law, rule or regulation of any Governmental Authority, or of any instrument or agreement to which Seller is a party, nor will it result in the creation or imposition of any lien on the Project, and no consent or approval of any third party is required for the execution of this Agreement by Seller or the carrying out by Seller of the transactions contemplated herein.

(iv) The Contracts Schedule provides a list of all Contracts affecting the Project as of the date hereof. All amounts due and payable under the REAs (if any) and the Contracts have been paid in accordance with the terms and conditions provided for therein. All of the Contracts may be terminated with or without cause, and all may be terminated without cause and without incurrence or payment of fee, upon no more than thirty (30) days notice. Seller shall terminate all Contracts (excepting only those that Purchaser advises Seller in writing to not terminate prior to expiration of the Due Diligence Period) such that same will terminate prior to Closing.

(v) There are no known actions, suits or other proceedings by any person, firm, corporation, or by any Governmental Authority now pending or, to Seller's actual knowledge, without due investigation, threatened against or affecting the Project or any part thereof, to which Seller is a party, except those which are described on **Schedule 8(a)(v)** ("**Existing Violations**").

(vi) To Seller's actual knowledge, without due investigation, there are no pending or threatened (A) eminent domain proceedings affecting the Property, in whole or in part, or (B) actions or proceedings to change road patterns or grades which would affect ingress to or egress from the Property. Seller has not received written notice that the Property is in violation of any order, judgment, injunction, award or decree of any court or agency of competent jurisdiction or any other requirement of any governmental authority or arbitrator or

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Board of Fire Underwriters applicable to the Property. To Seller's actual knowledge, the Property is in material compliance with all applicable building and construction codes, zoning, fire, occupational safety, and health laws, regulations, and ordinances, whether federal, state, or local ("Applicable Law"). Seller has to its actual knowledge materially complied with all Applicable Laws in its occupancy and use of the Property, and to Seller's knowledge, neither Seller nor any agent, employee or representative of Seller, has received any notice or notices, from any municipal, county, state or any other governmental agency or body, alleging noncompliance with any Applicable Law. Seller is not in default or breach of any REA.

(vii) Seller is not a foreign person (as defined in Section 1445 of the Internal Revenue Code of 1986, as amended, and the regulations promulgated thereunder).

(viii) To Seller's actual knowledge, without due investigation, Seller has not received any written notice from any Governmental Authority of the violation of any Environmental Laws (as hereinafter defined) pertaining to the Property, which remain uncured. The term "**Environmental Laws**" means all laws or regulations which relate to the manufacture, processing, distribution, use or storage of Hazardous Materials (as hereinafter defined). The term "**Hazardous Materials**" shall mean those materials in excess of de minimis amounts and which come under the following:

(A) those substances included within the definitions of "hazardous substances", "hazardous materials", "toxic substances" or "solid waste" in the: Comprehensive Environmental Response, Compensation and Liability Act (CERCLA), 42 U.S.C. sec. 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act or any equivalent state or local laws or ordinances; the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. sec. 6901 et seq., as amended by the Hazardous and Solid Waste Amendments of 1984, or any equivalent state or local laws or ordinances; the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. sec. 136 et seq. or any equivalent state or local laws or ordinances; the Hazardous Materials Transportation Act, 49 U.S.C. sec. 1801, et seq.; the Emergency Planning and Community Right-to-Know Act (EPCRA), 42 U.S.C. sec. 11001 et seq. or any equivalent state or local laws or ordinances; the Toxic Substance Control Act (TSCA), 15 U.S.C. sec. 2601 et seq. or any equivalent state or local laws or ordinances; or the Occupational Safety and Health Act, 29 U.S.C. sec. 651 et seq. or any equivalent state or local laws or ordinances;

(B) those substances listed in the United States Department of Transportation Table (49 CFR 172.101 and amendments thereto or by the Environmental Protection Agency (or any successor agency) as hazardous substances (40 CFR pt. 302 and amendments thereto);

(C) any material waste or substance which is (A) designated as a "hazardous substance" pursuant to Section 311 of the Clean Water Act, 33 U.S.C. sec. 1251 et seq. (33 U.S.C. sec. 1321) or listed pursuant to Section 307 of the Clean Water Act (33 U.S.C. sec. 1317) or (B) radioactive materials; and

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(D) those substances included within the definitions of "hazardous substances", "hazardous materials", "toxic substances" or "solid waste" in the Hazardous Waste Management Act of 1978.

(ix) There are no utility deposits posted by Seller with respect to the Property that shall not be returned to Seller or otherwise distributed to other third parties at Seller's direction or prior to the Closing.

(x) There are no options or rights of first refusal to purchase granted by Seller that affect or relate to the Property or any portion thereof.

(xi) No construction agreements, contracts or plans or any agreements, contract or plans relating to any current or proposed capital expenditures or repairs relating to the Property have been entered into on behalf of Seller.

(xii) There are no leases, subleases, licenses or other rights of third parties to occupy or use the Property and Project, nor any portion thereof. There are no persons in possession or claiming a right to possession of the Property and or remaining Project, other than Seller. Seller shall deliver exclusive possession of the Project to Purchaser at Closing.As used in this Agreement, the term "**Seller's knowledge**" or "**Seller's actual knowledge**" or other words of similar meaning means the actual, present knowledge of Robert J. Kirchner, without due inquiry or investigation (each a "**Seller Property Representative**"). Seller represents and warrants that each Seller Property Representative is a person within Seller's organization having (i) direct responsibility for the day-to-day operation and management of the Property and (ii) knowledge of the matters set forth in this Section 8(a).

(b) Purchaser hereby warrants and represents for the sole, exclusive and limited benefit of Seller as of the Effective Date and as of the Closing, as follows:

(i) Purchaser is and will continue at all times to be until the Closing an entity, duly and validly existing in the state of its formation and is entitled to and has all requisite power and authority to carry out the transactions contemplated hereby. Further, Purchaser represents and warrants that Purchaser has adequate financial resources available for Purchaser's acquisition and development of the Property as provided in this Agreement.

(ii) The execution of this Agreement by Purchaser, the consummation of the transactions herein contemplated, and the execution and delivery of all documents to be executed and delivered by Purchaser, have been or will be, prior to the Closing, duly authorized by all requisite action on the part of Purchaser, and this Agreement has been, and all documents to be delivered by Purchaser pursuant to this Agreement, will be, duly executed and delivered by Purchaser and is or will be, as the case may be, binding upon and enforceable against Purchaser in accordance with their respective terms;

(iii) Neither the execution of this Agreement nor the carrying out by Purchaser of the transactions contemplated herein will result in any violation of or be in conflict with the instruments pursuant to which Purchaser was organized and/or operates, or any applicable law, rule or regulation of any Governmental Authority, or of any instrument or agreement to which Purchaser is a party and no consent or approval of any third party is required for the execution of

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this Agreement by Purchaser or the carrying out by Purchaser of the transactions contemplated herein.

(iv) Neither Purchaser, nor to Purchaser's knowledge, any of Purchaser's owners, or any officers, directors or employees, is named as a "Specially Designated National and Blocked Person" as designated by the United States Department of the Treasury's Office of Foreign Assets Control or as a person, group, entity or nation designated in Presidential Executive Order 13224 as a person who commits, threatens to commit, or supports terrorism; (B) to Purchaser's knowledge, Purchaser is not owned or controlled, directly or indirectly, by the government of any country that is subject to a United States Embargo; (C) to Purchaser's knowledge, Purchaser is not acting, directly or indirectly, for or on behalf of any person, group, entity or nation named by the United States Treasury Department as a "Specially Designated National and Blocked Person", or for or on behalf of any person, group, entity or nation designated in Presidential Executive Order 13224 as a person who commits, threatens to commit, or supports terrorism; and (D) to Purchaser's knowledge, Purchaser is not engaged in the transaction contemplated hereby directly or indirectly on behalf of, or facilitating the transaction contemplated hereby directly or indirectly on behalf of, any such person, group, entity or nation. Purchaser's knowledge as it relates to its investors is based on information provided by its U.S. broker dealer network in connection with the normal and customary investor screening practices used by its U.S. broker dealer network. Purchaser has and will continue to rely exclusively on its U.S. broker dealer network to implement the normal and customary investor screening practices mandated by applicable law and Financial Industry Regulatory Authority, Inc.

(c) Between the Effective Date and the Closing Date, if any representation or warranty contained in Sections 8(a) or (b) above shall fail to be true and correct, then the party who is aware of such failure shall notify the other party, in writing, of such failure. In such event, the party making such representation or warranty shall have the obligation, prior to Closing, to cure the failure. The representations and warranties set forth in Sections 8(a) and (b) hereof shall survive the Closing, provided however, that any claim for a violation or alleged violation thereof shall be asserted within six (6) months following the Closing in a written notice giving reasonable details of the claims and, if not so asserted within such time, there shall be no further liability with respect thereto. Any such claim not brought within said 6-month period shall be deemed waived. The provisions of the preceding sentences shall survive the Closing for the 6-month period referenced above.

9. Operations.

(a) Ongoing Operations. During the pendency of this Agreement, but subject to the limitations set forth below, Seller shall carry on its business and activities relating to the Project substantially in the same manner as it did prior to the Effective Date.

(b) New Contracts. Seller will not enter into any new or amend any existing Contracts that will be an obligation affecting the Property subsequent to the Closing (except Contracts entered into in the ordinary course of business that are terminable with or without cause, and terminable without fee or cost, on no less than thirty (30) days' prior written notice), without the prior consent of Purchaser, which shall not be unreasonably withheld or delayed.

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10. Conditions to Obligations to Close.

(a) For Purchaser. The obligations of Purchaser to consummate the transactions contemplated herein shall be subject to the fulfillment of the following conditions ("**Purchaser's Conditions**"), any of which may be waived by Purchaser in its sole and absolute discretion:

(i) The covenants, representations and warranties of Seller made herein shall be performed, true and correct in all respects (subject to the rights granted under Section 8(c) herein), Seller shall have performed all covenants and agreements required of it made herein and Seller shall have delivered to Purchaser all of the closing documents required pursuant to Section 11(a) hereof.

(ii) An unconditional and irrevocable agreement by the Title Company to issue the Title Policy together with all endorsements, subject only to the Permitted Exceptions.

(iii) Purchaser's receipt of a Certificate of Need approval from the Illinois Health Facilities and Services Review Board (the "**CON Condition**"), which Purchaser shall diligently and in good faith attempt to obtain.

(iv) Delivery of exclusive possession of the Property to Purchaser at the Closing.

(v) No person or entity has, or claims to have, any right to possession of the Project or any component thereof, or is in possession of the Project or any component thereof, whether by lease, license, or other means or claim of right, and no person or entity is in possession of the Project or any component thereof.

(vi) Purchaser's receipt of release of transferee liability for unpaid taxes of Seller pursuant to: Section 902(d) of the Illinois Revenue Act, the Retailers Occupation Tax Act, and the Illinois Unemployment Insurance Act.

(vii) Purchaser's obtaining zoning changes, including securing special use permits, so as to allow Purchaser to use and occupy the Property for the operation of medical offices and uses, including without limitation, for medical uses and sub-specialties associated with outpatient care (the **"Zoning Use Condition"**).

In the event any of the Purchaser's Conditions (i), (ii), (iv), (v) and (vi) above shall not be satisfied as of the Closing Date, Purchaser shall have the right at Purchaser's sole discretion and without limiting any other right or remedy of Purchaser, (y) to adjourn the Closing Date to allow Seller additional time to satisfy Purchaser's Conditions, or (z) to terminate this Agreement by giving written notice to Seller and receive a return of the Earnest Money and any amount owing under Section 16(b) hereof (if any), whereupon neither party shall have any further rights or obligations hereunder except for any provisions of this Agreement that expressly survive termination.

In the event the CON Condition is not satisfied by the "CON Outside Date" (hereinafter defined, Purchaser shall have the right at Purchaser's sole discretion (y) to waive the CON Condition and proceed to Closing, or (z) to terminate this Agreement by giving written notice to

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Seller and receive a return of the Earnest, whereupon neither party shall have any further rights or obligations hereunder except for any provisions of this Agreement that expressly survive termination. For purposes hereof, the CON Outside Date shall be December 31, 2022, unless extended by Purchaser for sixty (60) days through March 1, 2023, due to the Illinois Health Facilities and Services Review Board not yet having made a final decision on Purchaser's CON Permit Application and the issuance of its approval permit.

In the event the Zoning Use Condition is not satisfied by the "Zoning Use Condition Outside Date" (hereinafter defined), Purchaser shall have the right at Purchaser's sole discretion (y) to waive the Zoning Use Condition and proceed to Closing, or (z) to terminate this Agreement by giving written notice to Seller and receive a return of the Earnest, whereupon neither party shall have any further rights or obligations hereunder except for any provisions of this Agreement that expressly survive termination. For purposes hereof, the Zoning Use Condition Outside Date shall be December 31, 2022, unless extended by Purchaser for sixty (60) days through March 1, 2023.

(b) For Seller.

(i) The representations and warranties of Purchaser made herein shall be true and correct in all material respects (subject to the rights granted under Section 8(c) herein), Purchaser shall have performed all covenants and agreements required of it made herein and Purchaser shall have delivered to Purchaser all of the closing documents required pursuant to Section 11(b) hereof.

(ii) Purchaser has not previously terminated this Agreement.

(iii) Purchaser is not otherwise in default under this Agreement (subject to any applicable notice, grace and/or cure periods as may be provided for herein).

11. Closing Documents and Deliveries.

(a) At the Closing, Seller shall deliver the following documents to the Title Company:

(i) a special warranty deed (the "**Deed**") fully executed and acknowledged by Seller, conveying to Purchaser title to the Land, subject only to the Permitted Exceptions, in the form attached as **Exhibit "B-1"** attached hereto;

(ii) a bill of sale fully executed by Seller conveying to Purchaser all of Seller's right, title and interest in and to the Personal Property, in the form attached as **Exhibit "B-2"** attached hereto;

(iii) an assignment transferring Seller's right, title and interest in and to Warranties, Approvals, Intangibles and Development Materials, if any and to the extent the same are assignable, in the form of **Exhibit "B-3"** attached hereto and made a part hereof executed by Seller (the "**Intangibles Assignment**");

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(iv) a FIRPTA Affidavit in Seller's standard form executed by Seller stating that Seller is not a foreign person (as defined in Section 1445 of the Internal Revenue Code of 1986, as amended, and the Regulations promulgated thereunder);

(v) two original assignment of the Contracts to be accepted by Purchaser, in the form of **Exhibit "B-4"** attached hereto and made a part hereof executed by Seller ("**Contracts Assignment**");

(vi) a notice letter in the form of **Exhibit "B-5"** attached hereto and made a part hereof executed by Seller to each vendor under Contracts being assigned advising the vendor of the transfer of the Property and the assignment and assumption of the applicable Contracts;

(vii) a closing statement setting forth the Purchase Price and all closing credits and adjustments expressly provided for in this Agreement ("**Closing Statement**") executed by Seller;

(viii) such authorization documentation of Seller and such other instruments and documents executed by Seller (including, without limitation, an owner's title affidavit) as shall be reasonably required by the Title Company to consummate the transaction evidenced hereby;

(ix) the written release from the Illinois Department of Revenue acceptable to Purchaser that Purchaser has no liability for Seller's unpaid taxes, if any, pursuant to Section 902(d) of the Illinois Revenue Act, the Retailers Occupation Tax Act, and the Illinois Unemployment Insurance Act;

(x) such other instruments and documents which shall be necessary in connection with the transaction contemplated herein and which do not impose, create, or potentially create any liability or expense upon Seller not expressly required under this Agreement; and

(xi) all keys to the Property.

(b) At the Closing, Purchaser shall deliver the following documents in addition to payment of the balance of the Purchase Price:

(i) evidence reasonably satisfactory to Seller and the Title Company of Purchaser's authority to execute and deliver this Agreement and the documents to be delivered by it pursuant thereto;

(ii) two (2) counterpart originals of each of the Contracts Assignment, the Intangibles Assignment and the Bill of Sale, as executed by Purchaser;

(iii) the Closing Statement executed by Purchaser; and

(iv) such other instruments or documents which shall be necessary in connection with the transaction herein contemplated and which do not impose, create, or

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potentially create any liability or expense upon Purchaser not expressly required under this Agreement.

12. Brokerage. Seller and Purchaser mutually represent and warrant to each other that there are no brokers involved in this transaction except Property Services, Inc., which represents Seller ("**Seller's Broker**"), and Johnson Development, LLC, John Michael Davis its Illinois Managing Broker ("together with Seller's Broker, "**Broker**"). Seller shall pay to Broker a commission amount as is set forth in a separate agreement by and between Seller and Broker. Seller and Purchaser shall indemnify, defend and hold harmless the other against any costs, claims or expenses, including reasonable attorneys' fees, arising out of the breach of their respective representations and/or agreements hereunder. The provisions of this Section 12 shall survive the Closing for a period of one (1) year thereafter.

13. Notices. Wherever any notice or other communication is required or permitted hereunder, such notice or other communication shall be in writing and shall be delivered by overnight courier, hand, or electronic transmission, email, or sent by U.S. registered or certified mail, return receipt requested, postage prepaid, to the addresses set out below or at such other addresses as are specified by written notice delivered in accordance herewith:

If to Seller: American National Insurance Company
Attn: Mortgage and Real Estate Investment Dept.
2525 South Shore Blvd., Ste. 207
League City, TX 77573
Email: robert.kirchner@americannational.com

With a copy to: Greer, Herz & Adams, L.L.P.
Attn: Meredith Bates
2525 South Shore Blvd., Ste. 207
League City, TX 77573
Email: mbates@greerherz.com

If to Purchaser: RUSH University Medical Center
1700 W. Van Buren Street, Suite 301
Chicago, IL 60612
Attention: General Counsel
Email: LegalNotices@rush.edu

With a copy to: MKS Attorneys at Law, LLC
Attention: Daniel M. McCarthy, Managing Member
Email: dmccarthy@mkslaw.com
Ph: 312.238.9653

Any notice or other communication (i) mailed as hereinabove provided shall be deemed effectively given or received on the third (3rd) Business Day following the postmark date of such notice or other communication, (ii) sent by overnight courier or by hand shall be deemed effectively given or received upon receipt, and (iii) sent by email or facsimile or other electronic transmission shall be deemed effectively given or received on the day of such electronic

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transmission of such notice or other communication. Refusal to accept delivery shall be deemed delivered. Any notices given by the attorneys for the parties shall be deemed effective as if given by such party.

14. Prorations and Costs.

(a) Prorations. Purchaser and Seller shall apportion as of 12:01 a.m. Central Standard Time on the day of the Closing (so that Purchaser receives the income generated by the Project and bears the expenses for the Project for the day of Closing), the items hereinafter set forth. Any errors or omissions in computing apportionments at Closing shall be promptly corrected. The obligations set forth in this Section 14(a) shall survive the Closing for a period of one (1) year. The items to be adjusted are:

(i) city, state, county, school, ad valorem taxes and other assessments that have accrued with respect to the tax year in which the Closing occurs (it being understood that Seller shall be solely responsible (and Purchaser shall receive a credit against the Purchase Price) for any such taxes or assessments that are due and payable in the year in which Closing occurs, and for any such taxes or assessments that have accrued during the year in which Closing occurs, but are not due and payable until the year following the year in which Closing occurs); should such proration be inaccurate based on the actual millage set forth on the ad valorem tax bill if the current tax bill has not been received by the date of the Closing, either party may demand after the date of Closing, that such taxes and assessments be re-prorated based on the actual bill and shall be entitled to receive upon demand, any amount owing to such party based on such re-proration; and

(ii) all other income and all operating expenses of the Project for the assumed Contracts and public utility charges and charges and/or payments under the REAs with respect to the Project shall be prorated in accordance with this Section 14(a) above, and appropriate cash adjustments shall be made by Purchaser and Seller. Seller and Purchaser shall cooperate to arrange for final utility readings as close to the Closing Date as possible and the issuance of a final bill to Seller with Purchaser being designated the billing party in lieu of Seller for all utilities that Seller desires at the Property. Notwithstanding anything herein to the contrary, any management and/or leasing agreement, if any, for the Property shall be terminated as of the Closing Date and there shall be no apportionment of any fees or charges relating thereto.

(iii) If, at Closing, the Property or any part thereof shall have been affected by an assessment or assessments, which are or may become payable in annual installments, of which the first installment is then a charge or lien, then for the purposes of this Agreement, all the unpaid installments of any such assessment due and payable in calendar years prior to the year in which the Closing occurs shall be paid by Seller and all installments becoming due and payable after the Closing shall be assumed and paid by Purchaser, except, however, that any installments which are due and payable in the calendar year in which the Closing occurs shall be adjusted pro rata. However, if such an assessment or assessments is required to be paid in one lump sum payment, then to the extent such assessment(s) is for improvements in place as of the date of this Agreement, then such assessment(s) shall be paid by Seller but if such assessment(s) is for improvements to be made subsequent to the date of Closing, then the same shall be paid by Purchaser.

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(b) Purchaser's Costs. Purchaser will pay:

(i) the fees and disbursements of Purchaser's counsel, inspecting architect, engineer, environmental consultant and other consultants, if any;

(ii) one-half (1/2) of any closing escrow fees of the Title Company;

(iii) the premium for any endorsements or extended coverage required by Purchaser for the Title Policy;

(iv) the cost of any new Survey of the Property (or any update to any existing Survey provided by Seller, if any);

(v) costs and expenses relating to any financing of the Purchase Price, including, without limitation, costs and expenses relating to the preparation and/or recording of any loan-related documents and/or any mortgage taxes or levies; and

(vi) any costs relating to Purchaser's due diligence inspections and any financing obtained by Purchaser (including, without limitation, any mortgage taxes and any additional title premiums resulting from obtaining a lender's/mortgagee's title policy.

(c) Seller's Costs. Seller will pay:

(i) the fees and disbursements of Seller's counsel;

(ii) any amounts relating to the issuance of the Title Policy excluding extended coverage (including any examination and commitment issued by the Title Company relating thereto), amounts charged for any endorsements to the Title to correct Objections, and any recording costs relating to the conveyance of the Property;

(iii) one-half (1/2) of any closing escrow fees of the Title Company; and

(iv) recording fees relating to the Deed and the costs of releasing any Seller's Required Removal Items.

(v) State and county real estate transfer taxes, and to the extent imposed upon Seller pursuant to local ordinance any municipal or local transfer taxes or the like which is imposed upon sellers.

(d) **NOTICE REGARDING POSSIBLE LIABILITY FOR ADDITIONAL TAXES. If for the current ad valorem tax year the taxable value of the Property is determined by a special appraisal method that allows for appraisal of such Property at less than its market value, the person to whom the Property is transferred may not be allowed to qualify the Property for that special appraisal in a subsequent tax year, and the Property may then be appraised at its full market value. In addition, the transfer of the Property or a subsequent change in the use of the Property may result in the imposition of an additional tax plus interest as a penalty for the transfer or the change in the use of the Property. The taxable value of the Property and the applicable method of appraisal for the**

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current tax year is public information and may be obtained from the tax appraisal district established for the county in which the Property is located.

15. Damage or Destruction Prior to Closing and Condemnation.

(a) If prior to the Closing the Property is damaged or destroyed, but not materially damaged or destroyed, by fire or other casualty, Purchaser shall be required to perform this Agreement and shall be entitled to the casualty insurance proceeds payable with respect thereto (including, without limitation, any business income, rent loss or like insurance proceeds relating to Property income lost or abated for periods following Closing (such lost or abated income, the "**Lost Income**")) under the policies of insurance maintained by Seller (collectively, the "**Insurance Proceeds**"), and a downward adjustment to the Purchase Price if the insurance proceeds are not sufficient in amount to repair and restore the damage. If the insurance proceeds are not available at Closing, the Purchase Price shall be adjusted downward to fully compensate Purchaser for the cost to repair and restore the damage, and Seller shall retain the Insurance Proceeds. If the Property is materially damaged or destroyed by fire or other casualty, Purchaser may terminate this Agreement on written notice to Seller given within ten (10) business days after receiving notice of the occurrence of such fire or casualty. If Purchaser shall exercise such option to terminate, it shall be deemed that Purchaser terminated this Agreement pursuant to Section 3(a)(iii) herein and the rights of the parties shall be as set forth therein including returning the Earnest Money to Purchaser. If Purchaser does not exercise such option to terminate, this Agreement shall remain in full force and effect in accordance with its terms and Purchaser shall be entitled to the Insurance Proceeds and a downward adjustment to the Purchase Price if the insurance proceeds are not sufficient in amount to repair and restore the damage. If the insurance proceeds are not available at Closing, the Purchase Price shall be adjusted downward to fully compensate Purchaser for the cost to repair and restore the damage, and Seller shall retain the Insurance Proceeds. For purposes hereof, the Project shall be deemed "**materially damaged or destroyed**" if (i) the cost of repair and restoration of such damage or destruction as estimated by the engineer or contractor selected by Seller and Purchaser (the "**Estimated Repair Cost**") is greater than $50,000.00, (ii) the damage or destruction is not covered by Seller's insurance or if such insurance is not for full replacement cost, or (iii) if Purchaser's lender shall refuse to consummate a loan to Purchaser in an amount equal to at least the Purchase Price solely as a result of such damage or destruction.

(b) In the event prior to Closing written notice of a proposed condemnation or taking is received by Seller, a condemnation proceeding is commenced, a condemnation proceeding is concluded or all, or any part, of the Property is conveyed in lieu of condemnation, and such condemnation is for a material portion of the Property (i.e., (i) the Estimated Repair Cost is greater than $500,000.00, (ii) if the portion of the Property so taken is valued in excess of $50,000.00 (iii) if Purchaser's lender shall refuse to consummate a loan to Purchaser in an amount equal to at least the Purchase Price solely as a result of such condemnation), or (iv) the Property is no longer sufficient for Purchaser's intended use, as reasonably determined by Purchaser, Purchaser shall have the right to terminate this Agreement, in which event it shall be deemed that Purchaser terminated this Agreement pursuant to Section 3(a)(iii) hereof and the rights of the parties shall be as set forth therein including returning the Earnest Money to Purchaser. In the event Purchaser does not elect to terminate this Agreement as a result of any such condemnation or condemnation action, Seller shall assign to Purchaser, at the Closing, all

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of Seller's rights, title and interest in and to any condemnation claim and/or proceeds payable with respect to Seller's interest in and to the Property or grant Purchaser a credit against the Purchase Price equal to the amount of any condemnation award paid to Seller, at Purchaser's election.

16. Remedies.

(a) EXCLUDING ANY INDEMNITY OR NON-CLOSING RELATED OBLIGATIONS OF PURCHASER CONTAINED HEREIN THAT SURVIVE CLOSING OR TERMINATION OF THIS AGREEMENT, FOR WHICH PURCHASER SHALL REMAIN LIABLE TO SELLER, IF THE SALE IS NOT CONSUMMATED DUE TO ANY DEFAULT BY PURCHASER HEREUNDER WHICH IS NOT CURED BY PURCHASER WITHIN FIVE (5) BUSINESS DAYS OF PURCHASER'S RECEIPT OF WRITTEN NOTICE OF DEFAULT THEREOF FROM SELLER SPECIFYING THE NATURE OF THE DEFAULT, THEN SELLER, AS ITS SOLE AND EXCLUSIVE REMEDY FOR PURCHASER'S DEFAULT, SHALL RETAIN THE EARNEST MONEY, AS LIQUIDATED DAMAGES, THE PARTIES HAVING AGREED THAT SELLER'S ACTUAL DAMAGES, IN THE EVENT OF A FAILURE TO CONSUMMATE THIS SALE DUE TO PURCHASER'S DEFAULT, WOULD BE EXTREMELY DIFFICULT OR IMPRACTICABLE TO DETERMINE. AFTER NEGOTIATION, THE PARTIES HAVE AGREED THAT, CONSIDERING ALL THE CIRCUMSTANCES EXISTING ON THE DATE OF THIS AGREEMENT, THE AMOUNT OF THE EARNEST MONEY IS A REASONABLE ESTIMATE OF THE DAMAGES THAT SELLER WOULD INCUR IN SUCH EVENT. EACH PARTY WAS REPRESENTED BY COUNSEL WHO EXPLAINED, AT THE TIME THIS AGREEMENT WAS MADE, THE CONSEQUENCES OF THIS LIQUIDATED DAMAGES PROVISION. THE FOREGOING SHALL BE DEEMED TO BE SELLER'S UNCONDITIONAL AND IRREVOCABLE ELECTION OF A REMEDY FOR A DEFAULT BY PURCHASER UNDER THIS AGREEMENT.

(b) EXCLUDING ANY INDEMNITY OR NON-CLOSING RELATED OBLIGATIONS OF SELLER CONTAINED HEREIN THAT SURVIVES CLOSING OR TERMINATION OF THIS AGREEMENT, FOR WHICH SELLER SHALL REMAIN LIABLE TO PURCHASER, Seller shall default in its obligations under this Agreement if (i) there shall be a breach of any of Seller's representations or warranties, (ii) if Seller fails to timely perform any of its covenants, agreements, and/or obligations contained in this Agreement, (iii) if, as of Closing, there exists any unpermitted title and/or survey exceptions or (iv) if there is a failure of a condition precedent set forth in Section 10 herein (not otherwise waived by Purchaser) which is within the reasonable control of Seller, the parties hereto agree that Purchaser's sole and exclusive remedies for Seller's default shall be (a) the termination of this Agreement as set forth in Section 3(a)(iii) hereof and a return to Purchaser of the Earnest Money or (b) specific performance of this Agreement. Purchaser shall provide Seller with written notice of default and Seller shall be entitled to cure any such default within five (5) business days of receipt of Purchaser's notice of default thereof specifying the nature of the default.

(c) The provisions of Sections 16(a) and (b) hereof shall not limit any rights or remedies that either party may have against the other after the Closing with respect to those

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provisions of this Agreement that survive Closing or the documents delivered pursuant to Sections 11(a) and (b) hereof.

17. Reporting Requirements. Purchaser and Seller shall each deposit such other instruments required to close the escrow and consummate the purchase and sale of the Property in accordance with the terms hereof, including, without limitation, an agreement designating the Title Company as the "Reporting Person" for the transaction pursuant to Section 6045(e) of the Internal Revenue Code and the regulations promulgated thereunder, and executed by Seller, Purchaser and the Title Company, but in no event shall such instruments impose, create or potentially create any liability for Seller or Purchaser not expressly provided for herein. Such agreement shall comply with the requirements of Section 6045(e) of the Internal Revenue Code and the regulations promulgated thereunder.

18. Confidentiality. All Property-related information made available by Seller or its agents and representatives to Purchaser with respect to the Property ("**Confidential Information**") shall be treated as confidential information by Purchaser, using the same degree of care with respect to the Confidential Information as Purchaser employs with respect to its own proprietary or confidential information of like importance. Notwithstanding the foregoing, Purchaser may disclose Confidential Information (a) to its respective consultants, investors, lenders, appraisers, attorneys, accountants, advisers, and affiliates assisting Purchaser with its purchase of the Property (collectively, "**Related Parties**"), provided Purchaser shall advise each parties of the confidential nature of such information and that such parties are required to maintain the confidentiality thereof and (b) to the extent Purchaser is required to disclose the same pursuant to a court order, applicable laws or regulations or pursuant to a legal dispute between Purchaser and Seller, provided that Purchaser provides written notice to Seller of such demand so as to provide Seller with the opportunity to challenge such required disclosure. Purchaser and the Related Parties shall not be obligated to keep confidential any Confidential Information that (i) is already in the public domain, (ii) is or becomes generally available to the public other than as a result of a disclosure by Purchaser or the Related Parties or (iii) is or becomes available to Purchaser on a non-confidential basis from a source other than Seller who, to Purchaser's knowledge, is not subject to a confidentiality agreement with, or other obligation of secrecy to, Seller prohibiting such disclosure. Purchaser's obligations under the foregoing provisions of this Section 18 shall terminate on the earlier of (y) one (1) year from the Effective Date, or (z) the Closing Date. If the transaction evidenced hereby fails to close for any reason whatsoever, Purchaser shall return to Seller, or confirm in writing that all such information has been destroyed, all Property-related information which Seller or its agents made available to Purchaser in accordance with this Agreement, which obligation shall survive termination and shall be a condition precedent to the return of the Earnest Money to Purchaser, if Purchaser is so entitled. THE FURNISHING OF ANY MATERIALS, DOCUMENTS, REPORTS, OR AGREEMENTS UNDER THIS AGREEMENT SHALL NOT BE INTERPRETED IN ANY MANNER AS A REPRESENTATION OR WARRANTY OF ANY TYPE OR KIND BY SELLER, ANY MEMBER OF SELLER OR AGENT OF SELLER, OR ANY OFFICER, DIRECTOR, OR EMPLOYEE OF SELLER, OR ITS AGENTS, OR ANY OTHER PARTY RELATED IN ANY WAY TO ANY OF THE FOREGOING.

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Except as required by applicable law, each of Seller and Purchaser agrees that it shall not publicize this transaction without the prior written approval of the other party. This provision shall survive Closing for a period of six (6) months thereafter.

19. Indemnity. (a) Purchaser shall INDEMNIFY, HOLD HARMLESS and DEFEND Seller, Seller's affiliates, trustees, shareholders, directors, officers, attorneys, employees and agents of each of them, and their respective heirs, successors, personal representatives and assigns ("**Seller's Indemnified Parties**") from and against any and all Claims that may arise on account of or in any way be connected with any actions, suits, proceedings or claims brought by third parties against Seller relating to any alleged events, acts or omissions occurring with respect to the Property from and after the Closing Date, except to the extent such Claims arise from the acts or omissions of Seller, including without limitation, gross negligence or willful or intentional misconduct of Seller of any of the Seller's Indemnified Parties. (b) Seller shall indemnify, hold harmless and defend Purchaser, Purchaser's affiliates, the partners, members, trustees, shareholders, directors, officers, attorneys, employees and agents of each of them, and their respective heirs, successors, personal representatives and assigns (collectively, the "**Purchaser's Indemnified Parties**") from any and all Claims that may arise on account of or in any way be connected with any actions, suits, proceedings or claims brought by third parties against Purchaser relating to any alleged events, acts or omissions occurring with respect to the Property prior to the Closing Date, except to the extent such Claims arise from acts or omissions of Purchaser, including without limitation the gross negligence or willful or intentional misconduct of Purchaser or any of the other Purchaser's Indemnified Parties. The provisions of this Section 19 shall survive Closing for a period of one (1) year thereafter.

20. Intentionally Reserved.

21. 1031 Transaction. Purchaser and Seller hereby acknowledge that it is possible that the other party may wish to complete a deferred tax-free exchange and qualify for treatment under Section 1031 of the Internal Revenue Code. The exchange shall not delay the Closing. The exchanging party's rights and obligations under this Agreement would be assigned to a Qualified Intermediary (as defined in IRS Regulation 1.1031(k)-1) of such party's choice, for the purpose of completing the exchange. Each party agrees to cooperate reasonably with the other party and the Qualified Intermediary in a manner necessary to complete the exchanging party's exchange, provided that (i) the other party is not responsible for any additional cost or liability as a result of cooperation with the exchanging party and the Qualified Intermediary to consummate such transaction and (ii) no such assignment shall relieve the requesting party of its obligations under this Agreement and the requesting party shall remain liable for the performance of its obligations hereunder, including, without limitation, the representations, warranties and covenants given by it under this Agreement.

22. Miscellaneous.

(a) This Agreement constitutes the entire Agreement between the parties and supersedes any other previous agreement, oral or written, between the parties. This Agreement cannot be changed, modified, waived or terminated orally but only by an agreement in writing signed by the parties hereto. This Agreement shall be binding upon the parties hereto and their respective heirs, executors, personal representatives and permitted successors and assigns.

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(b) In the event that a party hereto is in default of its obligations herein contained and the nondefaulting party sues to enforce its rights hereunder, the defaulting party shall pay all of the costs and expenses (including reasonable attorney fees) incurred by the nondefaulting party in the enforcement of the terms and provisions of this Agreement.

(c) This Agreement may be executed by facsimile, by email (in ".pdf" format) and/or in any number of counterparts, each of which when so executed and delivered shall be deemed an original, and all of which together shall constitute one and the same instrument.

(d) This Agreement shall be governed, construed and enforced in accordance with the laws of the State of Illinois.

(e) The section headings within this Agreement are for convenience and for reference only and shall not modify or affect this Agreement in any manner whatsoever. Wherever required by the context, any gender shall include any other gender, the singular shall include the plural and the plural shall include the singular.

(f) The parties agree that neither this Agreement nor any memorandum or notice thereof shall be recorded.

(g) This Agreement may be assigned by Purchaser in whole or in part with respect to certain portions of the Property, without the prior written consent of Seller provided, that Seller, prior to Closing, shall have received written notice of such assignment(s) together with an executed copy of each assignment and assumption instrument pursuant to which Purchaser assigns all of its right, title and interest in and to this Agreement to the assignee(s) (including all rights to the Earnest Money) and the assignee(s) assume and agree to be bound by all of the obligations of Purchaser under this Agreement. No assignment of this Agreement shall release Purchaser herein; provided, however, with respect to any assignment, if Closing occurs, the assigning party (but not the assignee) shall be relieved of all its obligations arising under this Agreement before, on and after Closing.

(h) The date on which this Agreement, is fully executed and delivered by both parties shall be the "**Effective Date**" for all purposes as to this Agreement.

(i) Each of the parties agrees that upon request from the other party following the Closing and without further consideration, such party shall do, execute, acknowledge and deliver or cause to be done, executed, acknowledged and delivered all such further acts or instruments as shall be reasonably requested by a party and are reasonably necessary to effect or carryout the transactions contemplated herein provided same do not impose any obligations or liabilities upon the party not contemplated in this Agreement. The provisions of this Section 22(i) shall survive the Closing for a period of one (1) year thereafter.

(j) If the final date of any period set forth herein (including, but not limited to, the Closing Date) falls on a Saturday, Sunday or legal holiday under the laws of the State of Texas, or the United States of America, the final date of such period shall be extended to the next day that is not a Saturday, Sunday or legal holiday. The term "**days**" as used herein shall mean calendar days, with the exception of "**business days**", which term shall mean each day except for

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any Saturday, Sunday or legal holiday under the laws of the State of Texas, State of Illinois, or the United States of America.

(k) In the event any one or more of the provisions contained in this Agreement shall for any reason be held to be invalid, illegal or unenforceable in any respect, such invalidity, illegality or unenforceability shall not affect any other provision hereof, and this Agreement shall be construed as if such invalid, illegal or unenforceable provision had never been contained herein.

(l) The parties hereto acknowledge and agree that each such party and its counsel have reviewed and revised this Agreement and that the normal rules of construction to the effect that any ambiguities are to be resolved against the drafting party shall not be employed in the interpretation of this Agreement or any amendments or exhibits hereto.

(m) Time is of the essence for all matters provided for under this Agreement.

[SIGNATURE PAGE(S) TO FOLLOW]

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IN WITNESS WHEREOF, this Agreement has been entered into as of the day and year set forth below each respective signature, but to be effective as of the Effective Date.

SELLER:

AMERICAN NATIONAL INSURANCE COMPANY,
a Texas insurance company

By: _____

Name: _____

Title: _____

Date: March ___, 2022

PURCHASER:

RUSH UNIVERSITY MEDICAL CENTER,
an Illinois not-for-profit corporation

By: DocuSigned by: _____
804809DFB32E4D6...

Name: Wayne Keathley

Title: EVP, Chief Operating Officer

Date: March ___, 2022 3/17/2022

Exhibits and Schedules:

Exhibit "A"	Description of Land
Exhibit "B-1"	Deed
Exhibit "B-2"	Bill of Sale
Exhibit "B-3"	Assignment of Warranties, Approvals, Intangibles and Development Materials
Exhibit "B-4"	Assignment and Assumption of Contracts
Exhibit "B-5"	Vendor Notice Letter
Schedule 1(c)	Omitted Personal Property
Schedule 1(i)	Schedule of Contracts
Schedule 3(c)	Property Materials
Schedule 8(a)(v)	Existing Violations
Exhibit C	Strict Joint Order Escrow

[Signature Page(s) to Purchase and Sale Agreement – 2455 Corporate West Drive, Lisle, IL – Johnson Development LLC]

GHA452587
102-001 (FRE 5168; Corporate Drive Office)

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EXHIBIT "A"

DESCRIPTION OF LAND

TO BE CONFIRMED BY SURVEY

PARCEL 1:

LOT 5 IN CORPORATE WEST UNIT THREE, A SUBDIVISION OF PART OF SECTION 4, TOWNSHIP 38 NORTH, RANGE 10, EAST OF THE THIRD PRINCIPAL MERIDIAN, ACCORDING TO THE PLAT THEREOF RECORDED DECEMBER 28, 1976 AS DOCUMENT R76-92672, IN DUPAGE COUNTY, ILLINOIS.

PARCEL 2:

NON-EXCLUSIVE EASEMENT FOR THE BENEFIT OF PARCEL 1 AS CREATED BY THE PLAT OF CORPORATE WEST UNIT THREE RECORDED DECEMBER 28, 1976 AS DOCUMENT R76-92672 FOR INGRESS, EGRESS AND VEHICULAR PURPOSES OVER THAT PART OF LOTS 1, 2, 3 AND 4 IN CORPORATE WEST UNIT THREE AFORESAID AS MORE PARTICULARLY DELINEATED THEREIN, IN DUPAGE COUNTY, ILLINOIS.

Address: 2455 Corporate West Drive, Lisle, Illinois

Property Index No.: 08-04-101-012

[Exhibit "A" to Purchase and Sale Agreement – 2455 Corporate West Drive, Lisle, IL – Johnson Development LLC]

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EXHIBIT "B-1"

FORM SPECIAL WARRANTY DEED

(Space Above for Recorder's Use)

SPECIAL WARRANTY DEED

THIS INDENTURE WITNESSETH THAT as of the _____ day of _____, 20___, AMERICAN NATIONAL INSURANCE COMPANY, a Texas insurance company (hereinafter referred to as "**Grantor**"), for One and 00/100 Dollars ($1.00) and other good and valuable consideration, receipt of which is hereby acknowledged, DEMISES, RELEASES, ALIENATES, and CONVEYS to _____, a _____ ("**Grantee**") whose address is _____, the real estate located in DuPage County, Illinois and being more particularly described in **Exhibit "A"** attached hereto and by this reference made a part hereof, together with all improvements and all rights, easements, hereditaments and appurtenances belonging thereto (the "Property").

TO HAVE AND TO HOLD the Property, together with all and singular the rights and appurtenances thereto in any way belonging, unto Grantee, its legal representatives, successors and assigns, forever; and Grantor does hereby bind itself and its legal representatives, successors and assigns to WARRANT AND FOREVER DEFEND all and singular the Property, subject to the Encumbrances, unto Grantee, its legal representatives, successors and assigns, against every person whomsoever lawfully claiming or to claim lawfully the same or any part thereof, by, through, or under Grantor, but not otherwise

The warranty of title hereinabove contained is hereby made expressly subject to real estate taxes not delinquent and to all easements, conditions, covenants, restrictions, rights-of-way and other matters of record and listed on **Exhibit "B" (the Encumbrances")** attached hereto and by this reference made a part hereof to the extent any such matters continue to affect the Property .

[THE REMAINDER OF THIS PAGE INTENTIONALLY RESERVED]

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

IN WITNESS WHEREOF, the undersigned hereby executes and delivers this Special Warranty Deed as of this _____ day of _____, 20___.

GRANTOR:

AMERICAN NATIONAL INSURANCE COMPANY,
a Texas insurance company

By: _____

Name: _____

Title: _____

THE STATE OF TEXAS §
§
COUNTY OF GALVESTON §

BEFORE me, the undersigned Notary Public, on this day personally appeared _____ the _____ of AMERICAN NATIONAL INSURANCE COMPANY, a Texas insurance company, known to me to be the person whose name is subscribed to the foregoing instrument and acknowledged to me that he executed the same for the purposes and consideration therein expressed on behalf of said insurance company.

Given under my hand and seal of office this ____ day of _____, 20___.

_____
NOTARY PUBLIC –State of Texas

THIS DEED PREPARED BY:

Greer, Herz & Adams, LLP
Attn: Meredith Bates
2525 South Shore Blvd., Ste. 203
League City, TX 77573

AFTER RECORDING RETURN TO AND
MAIL FUTURE TAX INFORMATION AND
TAX STATEMENTS TO:

RUSH UNIVERSITY MEDICAL CENTER
1700 W. Van Buren Street, Suite 301
Chicago, IL 60612
Attention: Katherine B. Fishbein, Assistant General Counsel

[Exhibit "B-1" to Purchase and Sale Agreement – 2455 Corporate West Drive, Lisle, IL – Johnson Development LLC]

GHA452587
102-001 (FRE 5168; Corporate Drive Office)

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

EXHIBIT "B-2"

BILL OF SALE

FOR GOOD AND VALUABLE CONSIDERATION, the receipt and sufficiency of which is hereby acknowledged, AMERICAN NATIONAL INSURANCE COMPANY, a Texas insurance company ("**Seller**"), does hereby sell, transfer and convey to _____, a _____ ("**Purchaser**"), all personal property owned by Seller and used in connection with the operation of that certain real property more particularly described in **Exhibit "A"** and attached hereto (collectively, the "**Personal Property**").

PURCHASER ACKNOWLEDGES THAT SELLER IS SELLING AND PURCHASER IS PURCHASING SUCH PERSONAL PROPERTY ON AN "AS IS", "WHERE IS" AND "WITH ALL FAULTS" BASIS AND THAT PURCHASER IS NOT RELYING ON ANY REPRESENTATIONS OR WARRANTIES OF ANY KIND WHATSOEVER, EXPRESS OR IMPLIED, FROM SELLER, ITS AGENTS, OR BROKERS AS TO ANY MATTERS CONCERNING SUCH PERSONAL PROPERTY, INCLUDING, WITHOUT LIMITATION, ANY WARRANTIES AS TO TITLE OR IMPLIED WARRANTIES OF MERCHANTABILITY, SUITABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NOTWITHSTANDING THE FOREGOING, SELLER REPRESENTS AND WARRANTS THAT IT OWNS ALL OF THE PERSONAL PROPERTY FREE AND CLEAR OF ALL LIENS AND ENCUMBRANCES AND RIGHTS OF THIRD PARTIES.

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY RESERVED.]

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

Dated: _____, 20___

SELLER:

AMERICAN NATIONAL INSURANCE COMPANY,
a Texas insurance company

By: _____

Name: _____

Title: _____

PURCHASER:

_____,
a _____

By: _____

Name: _____

Title: _____

[Exhibit "B-2" to Purchase and Sale Agreement – 2455 Corporate West Drive, Lisle, IL – Johnson Development LLC]

GHA452587
102-001 (FRE 5168; Corporate Drive Office)

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

EXHIBIT "B-3"

ASSIGNMENT OF WARRANTIES, APPROVALS, INTANGIBLES AND DEVELOPMENT MATERIALS

ASSIGNMENT OF WARRANTIES, APPROVALS, INTANGIBLES AND DEVELOPMENT MATERIALS (this "**Assignment**") made as of the ____ day of _____, 20___ by and between AMERICAN NATIONAL INSURANCE COMPANY, a Texas insurance company ("**Assignor**"), and _____, a _____ ("**Assignee**").

W I T N E S S E T H:

WHEREAS, Assignor has simultaneously herewith conveyed to Assignee all of Assignor's right, title and interest in and to the "**Property**", as defined in and in accordance with the terms and conditions of that certain Purchase and Sale Agreement dated effective _____, 20___ (the "**Agreement**"), and in connection therewith, Assignor has agreed to assign to Assignee all of Assignor's right, title and interest in and to (i) any warranties and/or guaranties relating to the Property (collectively, "**Warranties**"), (ii) any governmental consents, authorizations, variances, waivers, licenses, permits and approvals relating to the Property (collectively, "**Approvals**"), (iii) the trademark, service mark, trade name and name "_____" and all other trademarks, services marks, trade names, names and logos used in connection with the advertising and promotion of the Property in accordance with Section 1(d) of the Agreement (collectively, "**Intangibles**"), and (iv) all existing construction contracts, subcontracts, architecture and engineering agreements, and similar agreements relating to the design, development, and construction of the Property ("**Development Materials**") (the items described in (i) through (iv) above being collectively referred to as the "**Subject Rights**").

NOW, THEREFORE, in consideration of the sum of Ten and No/100 Dollars ($10.00) and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereto hereby agree as follows:

1. Assignor hereby assigns unto Assignee, all of the right, title and interest, if any, of Assignor in and to the Subject Rights. The execution of this Assignment shall not be deemed to constitute a representation or warranty by Assignor that Assignor has the right to transfer any right, title or interest in any of the Subject Rights, or that Assignee shall be entitled to receive the benefit of any of such Subject Rights;

TO HAVE AND TO HOLD the same unto Assignee, its successors and assigns from and after the date hereof.

2. This Assignment shall be binding on Assignor and its successors, assigns and legal representatives and shall inure to the benefit of the Assignee and its successors, assigns and legal representatives.

3. This Assignment may be executed in multiple counterparts, each of which being deemed an original and all of which, when combined, being one and the same instrument.

[Exhibit "B-3" to Purchase and Sale Agreement – 2455 Corporate West Drive, Lisle, IL – Johnson Development LLC]

GHA452587
102-001 (FRE 5168; Corporate Drive Office)

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

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[THE REMAINDER OF THIS PAGE IS INTENTIONALLY RESERVED.]

[Exhibit "B-3" to Purchase and Sale Agreement – 2455 Corporate West Drive, Lisle, IL – Johnson Development LLC]

GHA452587
102-001 (FRE 5168; Corporate Drive Office)

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

IN WITNESS WHEREOF, this Assignment has been duly executed as of the date first above written.

ASSIGNOR:

AMERICAN NATIONAL INSURANCE COMPANY,
a Texas insurance company

By: _____

Name: _____

Title: _____

ASSIGNEE:

_____,
a _____

By: _____

Name: _____

Title: _____

[Exhibit "B-3" to Purchase and Sale Agreement – 2455 Corporate West Drive, Lisle, IL – Johnson Development LLC]

GHA452587
102-001 (FRE 5168; Corporate Drive Office)

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

EXHIBIT "B-4"

ASSIGNMENT AND ASSUMPTION OF CONTRACTS

ASSIGNMENT AND ASSUMPTION OF CONTRACTS (this "**Assignment**") made as of the ____ day of _____, 20___ by and between AMERICAN NATIONAL INSURANCE COMPANY, a Texas insurance company ("**Assignor**"), and _____, a _____ ("**Assignee**").

W I T N E S S E T H:

WHEREAS, Assignor has simultaneously herewith conveyed to the Assignee all of Assignor's right, title and interest in and to the premises located as set forth on **Exhibit "A"** attached hereto, and in connection therewith, Assignor has agreed to assign to Assignee all of Assignor's right, title and interest in and to the agreements, instruments and understandings listed on **Exhibit "1"** annexed hereto ("**Contracts**").

NOW, THEREFORE, in consideration of the sum of Ten and 00/100 Dollars ($10.00) and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the parties hereto hereby agree as follows:

1. Assignor hereby assigns unto Assignee, all of the right, title and interest, if any, of Assignor in and to the Contracts;

TO HAVE AND TO HOLD the same unto Assignee, its successors and assigns from and after the date hereof.

2. Assignee assumes the performance of all of the obligations of Assignor arising or accruing under the Contracts from and after the date hereof.

3. Assignor agrees to indemnify, protect, defend and hold Assignee harmless from and against any and all claims, demands, liabilities, losses, costs, damages or expenses including, without limitation, reasonable attorneys' fees and costs (collectively, "**Claims**") arising as a result of any act, omission or obligation of Assignor arising or accruing with respect to the Contracts prior to the date hereof.

4. Assignee agrees to indemnity, protect, defend and hold Assignor harmless from and against any and all Claims arising as a result of any act, omission or obligation of Assignee arising or accruing with respect to the Contracts on or after the date hereof.

5. This Assignment shall be binding upon and shall inure to the benefit of Assignor and Assignee and their respective successors, assigns and legal representatives.

6. This Assignment may be executed in separate counterparts, which, together, shall constitute one and the same fully executed Assignment.

[THE REMAINDER OF THIS PAGE IS INTENTIONALLY RESERVED.]

[Exhibit "B-4" to Purchase and Sale Agreement – 2455 Corporate West Drive, Lisle, IL – Johnson Development LLC]

GHA452587
102-001 (FRE 5168; Corporate Drive Office)

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

IN WITNESS WHEREOF, this Assignment has been duly executed as of the date first above written.

ASSIGNOR:

AMERICAN NATIONAL INSURANCE COMPANY,
a Texas insurance company

By: _____

Name: _____

Title: _____

ASSIGNEE:

_____,
a _____

By: _____

Name: _____

Title: _____

[Exhibit "B-4" to Purchase and Sale Agreement – 2455 Corporate West Drive, Lisle, IL – Johnson Development LLC]

GHA452587
102-001 (FRE 5168; Corporate Drive Office)

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

EXHIBIT "B-5"

VENDOR NOTICE LETTER

_____, 20___

[Name]
[Company]
[Mailing Address]
[City, State, Zip]

Re: Contract dated _____ (as amended, the "**Contract**") by and between _____ ("**Vendor**") and AMERICAN NATIONAL INSURANCE COMPANY, a Texas insurance company ("**Seller**") relating to the building located at 2455 Corporate West Drive, Lisle, DuPage County, Illinois (the "**Facility**")

Dear [_____]:

Please be advised that, as of the date set forth above, the Facility was purchased by _____, a _____ ("**New Owner**"), and Seller's interest in the Contract was assigned to New Owner. All invoices for services performed or materials provided to New Owner under the Contract, and correspondence should be sent to:

Telephone:

If you have any questions, please contact _____ at:

Telephone:

[REMAINDER OF THIS PAGE IS INTENTIONALLY RESERVED]

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

Very truly yours,

AMERICAN NATIONAL INSURANCE COMPANY,
a Texas insurance company

By: _____

Name: _____

Title: _____

[Exhibit "B-5" to Purchase and Sale Agreement – 2455 Corporate West Drive, Lisle, IL – Johnson Development LLC]

GHA452587
102-001 (FRE 5168; Corporate Drive Office)

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

SCHEDULE 1(c)

SELLER'S RETAINED PERSONAL PROPERTY

NONE.

[Schedule 1(c) to Purchase and Sale Agreement – 2455 Corporate West Drive, Lisle, IL – Johnson Development LLC]

GHA452587
102-001 (FRE 5168; Corporate Drive Office)

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

SCHEDULE 1(i)

LIST OF CONTRACTS

1. Backflow Inspection Agreement with Valley Fire Protection Services, LLC, dated March 18, 2021.
2. Alarm Monitoring Contract with Zoepaz Incorporated, dated April 1, 2018.
3. Management Agreement with Property Services, Inc., dated effective September 18, 2018.
4. Security Services Agreement with United Network Bureau, Inc., dated March 30, 2018.

[Schedule 1(i) to Purchase and Sale Agreement – 2455 Corporate West Drive, Lisle, IL – Johnson Development LLC]

GHA452587
102-001 (FRE 5168; Corporate Drive Office)

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

SCHEDULE 3(c)

PROPERTY MATERIALS

Only to the extent such items are in Seller's possession, Seller warrants that the following Property Materials are, and will be as of the Closing Date, true and complete copies of the originals:

1. To the extent in Seller's possession, copies of survey, environmental reports, soil reports, engineering reports, fire safety reports, boiler inspection reports, wetland reports, termite reports, structural and engineering reports and building plans and specifications.

2. To the extent in Seller's possession, copies of any investigations or studies conducted on or relating to the Property.

3. To the extent in Seller's possession, any plans and/or specifications relating to the Property.

[Schedule 3(c) to Purchase and Sale Agreement – 2455 Corporate West Drive, Lisle, IL – Johnson Development LLC]

GHA452587
102-001 (FRE 5168; Corporate Drive Office)

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

SCHEDULE 8(a)(v)

EXISTING VIOLATIONS

NONE.

D

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

Exhibit C
Strict Joint Order Escrow

Escrow Agent: First American Title Insurance Company

Escrow Number: _____

Date: March __, 2022

Purchaser: RUSH University Medical Center, an Illinois not-for-profit corporation

Seller: American National Insurance Company

Real Property Address: 2455 Corporate West Drive, Lisle, Illinois

Deposits: $100,000.00 **Escrow shall notify the parties to this Agreement of and upon its receipt of the Deposit.**

DELIVERY OF DEPOSIT: The above referenced escrow trust deposit to be deposited with the Escrow Agent shall be disbursed by it only upon the receipt of a joint order of the Purchaser and Seller or their respective legal representatives or assigns. In no case shall the above mentioned deposit be surrendered except upon the receipt of an order signed by the Purchaser and Seller, or their respective legal representatives or assigns, or in obedience to the court order described below. Escrow Agent WILL NOTIFY BOTH THE PURCHASER'S AND SELLER'S COUNSEL BY EMAIL UPON RECEIPT OF THE DEPOSIT.

BILLING INSTRUCTIONS: Escrow trust fee will be billed as follows: N/A

PLEASE NOTE: The escrow trust fee for these joint order instructions is due and payable within 30 days from the projected disbursement date (which may be amended by joint written direction of the parties hereto). In the event no projected disbursement date is ascertainable, said escrow trust fee is to be billed at acceptance and is due and payable within 30 days from billing.

INVESTMENT: Any direction to Escrow Agent for such investment shall be expressed in writing and contain the consent of all other parties of this escrow, and also provided that you are in receipt of the taxpayers identification number and investment forms as required.

COMPLIANCE WITH A COURT ORDER: The undersigned authorizes and directs the Escrow Agent to disregard any and all notices, warnings or demands given or made by the undersigned (other than jointly) or by any other person. The said undersigned also hereby authorizes and directs the Escrow Agent to accept, comply with, and obey any and all writs, orders, judgements or decrees of any court. It shall not be liable to any of the parties hereto or any other person, by

D

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

reason of compliance, notwithstanding should any such writ, order judgment or decree be entered without jurisdiction or be subsequently reversed, modified, annulled, set aside or vacated. In the event the Escrow Agent is made a party defendant to any suit or proceedings regarding this escrow trust, the undersigned for themselves, their heirs, personal representatives, successors, and assigns, jointly and severally, agree to pay to said Escrow Agent, upon written demand, all costs, attorney's fees and expenses incurred with respect thereto. The Escrow Agent shall have a lien on the deposit(s) herein for any costs, fees and expenses. If said costs, fees and expenses are not paid then the Escrow Agent shall have the right to reimburse itself from the said deposit.

EXECUTION: These escrow trust instructions are governed by and are to be construed under the State of Illinois. The escrow trust instructions, amendments or supplemental instructions hereto, may be executed in counterparts, each of which shall be deemed an original and all such counterparts together shall constitute one and the same instrument.

PURCHASER:

RUSH University Medical Center,
an Illinois not-for-profit corporation

By:_____
Its:_____
Name:_____

SELLER:
AMERICAN NATIONAL INSURANCE COMPANY,
a Texas insurance company

By:_____
Its:_____
Name:_____

_____
ACCEPTED:
ESCROWEE
First American Title Insurance Company

By:_____
Authorized Signatory

D

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

AMENDMENT TO PURCHASE AND SALE AGREEMENT

THIS AMENDMENT TO PURCHASE AND SALE AGREEMENT (this "Amendment"), by and between AMERICAN NATIONAL INSURANCE COMPANY, a Texas insurance company, as seller ("Seller"), and RUSH UNIVERSITY MEDICAL CENTER, an Illinois not-for-profit corporation, as purchaser ("Purchaser"), is dated effective as of July 19, 2022.

RECITALS

A. Seller and Purchaser entered into a Purchase and Sale Agreement dated effective March 21, 2022 (as amended, modified, restated or supplemented from time to time, the "Contract").

B. Seller and Purchaser desire to modify the Contract as hereinafter set forth.

AGREEMENT

NOW, THEREFORE, in consideration of the above Recitals and the agreements, covenants and promises contained herein and other good and valuable consideration, the receipt, sufficiency and validity of which are hereby acknowledged, the parties agree as follows:

1. Incorporation; Defined Terms. The foregoing Recitals are hereby incorporated into this Amendment as if fully set forth herein. Capitalized terms used but not defined in this Amendment shall have the meaning given such terms in the Contract.

2. Amendments to the Contract.

(a) Section 3 of the Contract is amended to provide that the Inspection Period shall be extended to December 31, 2022. Purchaser shall have the right to further extend the Inspection Period through March 1, 2023, by providing written notice of its exercise of such extension right on or before 7 p.m. Houston, Texas time on December 31, 2022. It is acknowledged and agreed that during the "Inspection Period" Purchaser's rights of examination, inspection, etc., include Purchaser securing and receiving: (i) a Certificate of Need approval from the Illinois Health Facilities and Services Review Board, (ii) zoning changes, including securing special use permits, so as to allow Purchaser to use and occupy the Property for the operation of medical offices and uses, including without limitation, for medical uses and sub-specialties associated with outpatient care, (iii) third party consents to Purchaser's plans and specifications for changes and/or improvements to the Property, and (iv) an amendment to the Amended and Restated Declaration and Amended and Restated By Laws of Corporate West Maintenance Association No. 1 recorded with the DuPage County, Illinois Recorder on August 9, 2019 as Document # R2019-067659.

(b) Section 5 of the Contract is amended to provide that the Closing Date shall be fifteen (15) days after expiration of the Inspection Period (as the same may be extended).

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

3. Authority. Each individual executing this Amendment on behalf of the parties hereto represents and warrants that they are duly authorized to execute and deliver this Amendment for such party and that this Amendment is binding upon such party in accordance with its terms.

4. Counterparts. This Amendment may be executed in any number of counterparts, each of which, when signed shall be deemed an effective original, but all of which together will constitute one binding Amendment. This Amendment may also be executed and delivered by way of facsimile or email copy of wet-ink signature or via DocuSign or other electronic signature.

5. Attorneys' Fees. In the event of any controversy or dispute arising out of this Amendment, the prevailing party or parties shall be entitled to recover from the non-prevailing party or parties its reasonable expenses, including without limitation, attorneys' fees and costs actually incurred.

6. Successors. This Amendment shall be binding upon the successors and assigns of each of the parties hereto.

7. Construction; Headings. The parties agree that each party and its counsel have reviewed and prepared this Amendment and that any rule of construction to the effect that ambiguities are to be resolved against the drafting party shall not apply in the interpretation of this Amendment or any amendments or exhibits hereto. All section and paragraph titles, headings or captions contained in this Amendment are for convenience only and shall not be deemed part of the context nor affect the interpretation of this Amendment.

8. Governing Law. This Amendment shall be governed by, construed and enforced in accordance with the laws of the state where the Property is located.

9. Continued Validity of the Contract. Except as expressly amended herein, the Contract shall remain in full force and effect. In the event of any conflict or inconsistency between the terms and provisions contained in this Amendment and the terms and conditions contained in the Contract, this Amendment shall prevail.

[REMAINDER OF PAGE INTENTIONALLY BLANK]

Attachment 2
Evidence of Control - Purchase Agreement and Amendment

IN WITNESS WHEREOF, this Amendment is hereby executed as of the date first written above.

SELLER:

AMERICAN NATIONAL INSURANCE COMPANY,
a Texas insurance company

By: _____
Name: Scott F. Brast
Title: SVP & Chief ML&RE Investment Officer

PURCHASER:

RUSH UNIVERSITY MEDICAL CENTER,
an Illinois not-for-profit corporation

By: _____
Name: _____
Title: _____

Signature Page to Amendment to Purchase and Sale Agreement

Attachment 3
Operating Entity/Licensee

The operating entity will be Rush University Medical Center. However, Medical Office Buildings are not licensed by the Illinois Department of Public Health. Attached as evidence of the entity's good standing is a Certificate of Good Standing issued by Illinois Secretary of State.

Attachment 3
Operating Entity/Licensee
Certificate Of Good Standing for Rush University Medical Center

File Number 0200-214-1

STATE OF ILLINOIS
OFFICE OF
THE SECRETARY OF STATE

To all to whom these Presents Shall Come, Greeting:

I, Jesse White, Secretary of State of the State of Illinois, do hereby certify that I am the keeper of the records of the Department of Business Services. I certify that

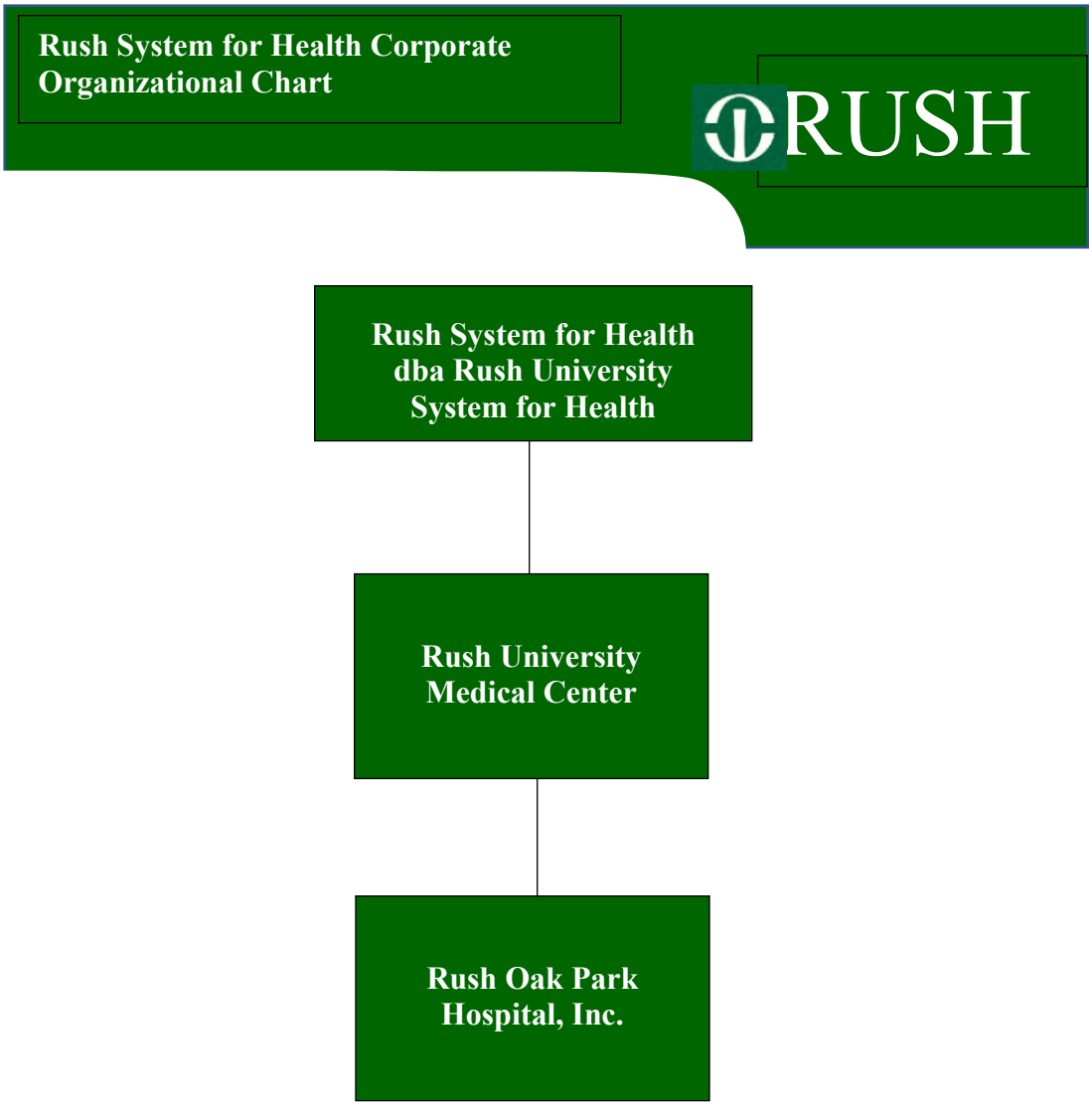
RUSH UNIVERSITY MEDICAL CENTER, A DOMESTIC CORPORATION, INCORPORATED UNDER THE LAWS OF THIS STATE ON JULY 21, 1883, APPEARS TO HAVE COMPLIED WITH ALL THE PROVISIONS OF THE GENERAL NOT FOR PROFIT CORPORATION ACT OF THIS STATE, AND AS OF THIS DATE, IS IN GOOD STANDING AS A DOMESTIC CORPORATION IN THE STATE OF ILLINOIS.

In Testimony Whereof, *I hereto set my hand and cause to be affixed the Great Seal of the State of Illinois, this* 3RD *day of* AUGUST *A.D.* 2022 .

Authentication #: 2221503126 verifiable until 08/03/2023
Authenticate at: https://www.ilsos.gov

Jesse White
SECRETARY OF STATE

Attachment 4
Organizational Chart



Attachment 5
Flood Plain Requirements

Rush University System for Health
1725 West Harrison Street
Suite 364
Chicago, IL 60612

RUSH

December 27, 2022

John Kniery
Board Administrator
Health Facilities and Services Review Board
525 W Jefferson Street, Floor 2
Springfield, IL 62761

Re: Rush Lisle Cancer Center - Flood Plain Requirements

Dear Mr. Kniery:

As representative of Rush University System for Health, I, Carl Bergetz, affirm that the proposed relocation for the facility complies with Illinois Executive Order #2005-5. The facility location at 2455 Corporate West Drive, Lisle, IL 60532 is not located in a flood plain, as evidence please find enclosed a map from the Federal Emergency Management Agency ("FEMA").

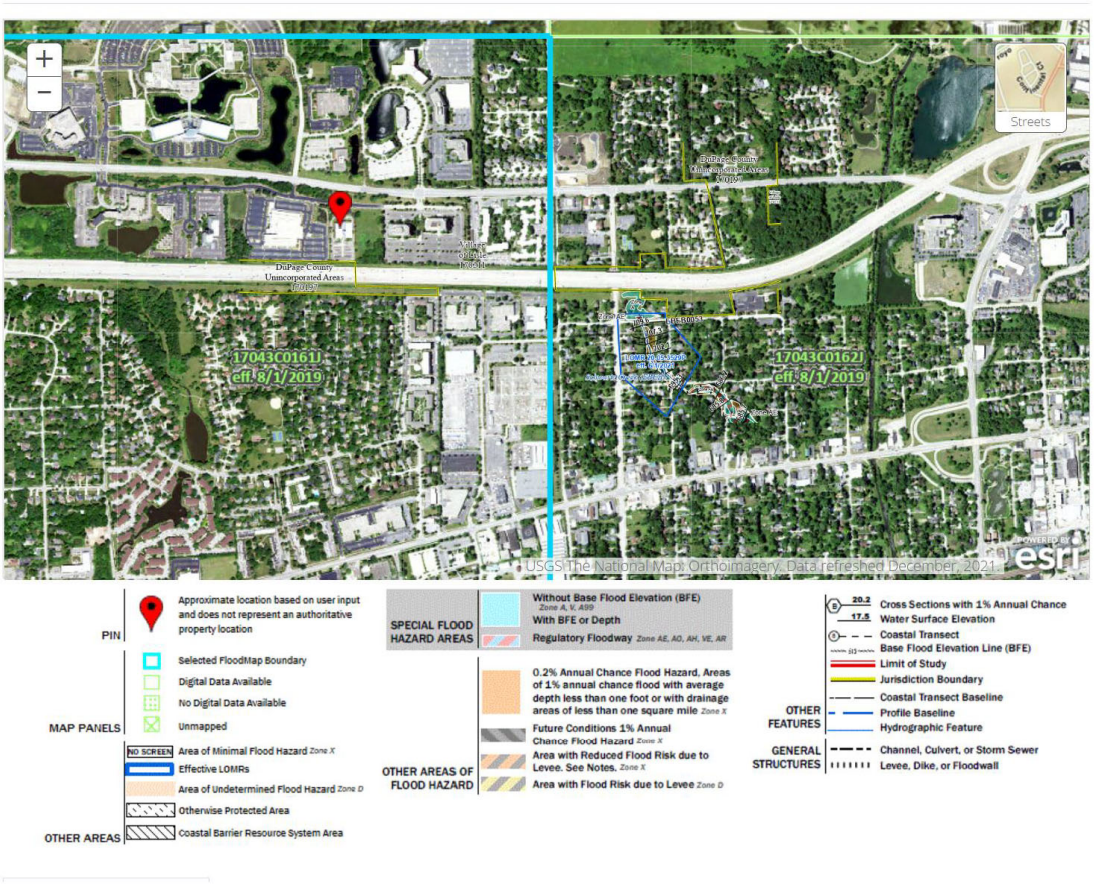
I hereby certify this true and is based upon my personal knowledge under penalty of perjury and in accordance with 735 ILCS 5/1-109.

Sincerely,

Carl Bergetz, JD
Chief Legal Officer
Rush University System for Health

RUSH is an academic health system comprising Rush University Medical Center, Rush University, Rush Copley Medical Center and Rush Oak Park Hospital.

Attachment 5
Flood Plain Requirements



Attachment 6
Historic Preservation Letter

The Applicants submitted a request for determination to the Illinois Department of Natural Resources- Preservation Services Division on September 14, 2022. A final determination was received on October 20,2022 that confirms that there are no historic, architectural, or archaeological sites that exist within the property.

Attachment 6
Historic Preservation Letter

Benesch
Attorneys at Law

Juan Morado, Jr.
71 South Wacker Drive, Suite 1600
Chicago, IL 60606
Direct Dial: 312.212.4967
Fax: 312.757.9192
jmorado@beneschlaw.com

September 14, 2022

VIA EMAIL

Jeffrey Kruchten
Chief Archaeologist
Preservation Services Division
Illinois Historic Preservation Office
Illinois Department of Natural Resources
1 Natural Resources Way
Springfield, IL 62702
Jeffrey.kruchten@illinois.gov

Re: Certificate of Need Application for the Establishment of a Medical Office Building- Rush Lisle Cancer Center

Dear Jeffrey:

I am writing on behalf of my clients, Rush University System for Health and Rush University Medical Center (collectively, "Rush") to request a review of the project area under Section 4 of the Illinois State Agency Historic Resources Preservation Act (20 ILCS 3420/1 et. seq.). Rush is submitting an application for a Certificate of Need from the Illinois Health Facilities and Services Review Board. Rush is proposing to establish a Medical Office Building, to be located at 2455 Corporate West Drive, Lisle, IL 60532, to offer comprehensive cancer care treatment to the Lisle community (the "Rush Lisle Cancer Center").

The proposed Rush Lisle Cancer Center will occupy an existing corporate office building.. The Rush Lisle Cancer Center will contain twenty-four (24) infusion chairs, four (4) procedure rooms, ten (10) examination rooms, space for group exercise, support groups and family therapy, and social care (including dieticians and social workers). For your reference, we have included pictures of the existing structure and topographic maps (Attachments 1-2) showing the general location of the project. The proposed location for the Rush Lisle Cancer Center is the existing

Attachment 6
Historic Preservation Letter

corporate facility shown on the lot and topographical maps, which will be retrofitted to house the Rush Lisle Cancer Center.

We respectfully request review of the project area and a determination letter at your earliest convenience. Thank you in advance for all of the time and effort that will be going into this review.

Very truly yours,

BENESCH, FRIEDLANDER,
COPLAN & ARONOFF LLP

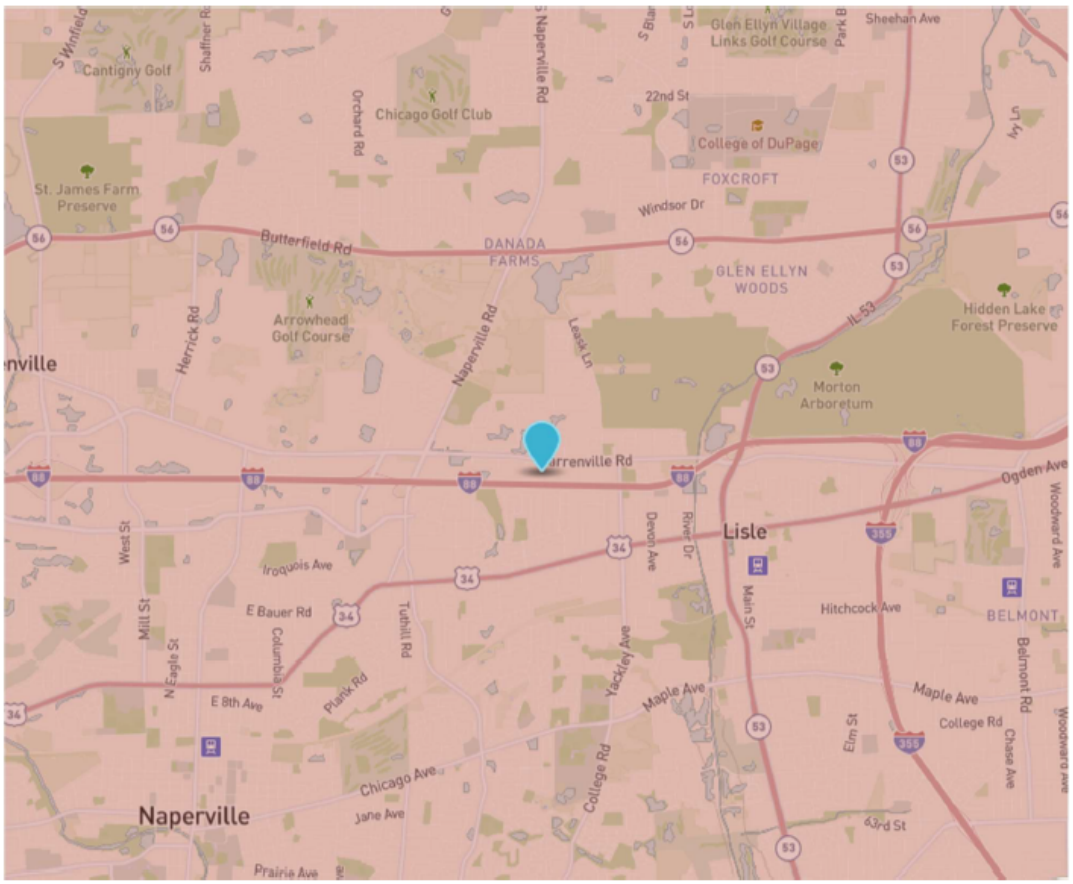
Juan Morado, Jr.

JM:
Enclosures

Attachment 6
Historic Preservation Letter

Page 3

Topographic Map



Attachment 6
Historic Preservation Letter

Page 4

Aerial Map

Attachment 6
Historic Preservation Letter

Page 5

Side View of Property from Ronald Reagan Memorial Tollway

Attachment 6
Historic Preservation Letter

Page 6

Side View of Property from Corporate Dr W:

Attachment 6
Historic Preservation Letter

ILLINOIS DEPARTMENT OF NATURAL RESOURCES
Illinois Department of
Natural Resources
One Natural Resources Way Springfield, Illinois 62702-1271
www.dnr.illinois.gov
JB Pritzker, Governor
Colleen Callahan, Director

DuPage County
Lisle
CON - Rehabilitation to Establish the Rush Lisle Cancer Center
2455 Corporate West Dr.
SHPO Log #007092622

October 20, 2022

Juan Morado
Benesch, Friedlander, Coplan and Aronoff LLP
71 S. Wacker Dr., Suite 1600
Chicago, IL 60606

Dear Mr. Morado:

This letter is to inform you that we have reviewed the information provided concerning the referenced project.

Our review of the records indicates that no historic, architectural or archaeological sites exist within the project area.

Please retain this letter in your files as evidence of compliance with Section 4 of the Illinois State Agency Historic Resources Preservation Act (20 ILCS 3420/1 et. seq.). This clearance remains in effect for two years from date of issuance. It does not pertain to any discovery during construction, nor is it a clearance for purposes of the Illinois Human Skeletal Remains Protection Act (20 ILCS 3440).

If you have any further questions, please contact Rita Baker, Cultural Resources Manager, at 217/785-4998 or at Rita.E.Baker@illinois.gov.

Sincerely,

Carey L. Mayer

Carey L. Mayer , AIA
Deputy State Historic
Preservation Officer

Attachment 7
Project Costs and Sources of Funds

Project Costs and Sources of Funds			
USE OF FUNDS	**CLINICAL**	**NONCLINICAL**	**TOTAL**
Preplanning Costs	-	-	-
Site Survey and Soil Investigation	-	-	-
Site Preparation	$302,181	$165,634	$467,815
Off Site Work	-	-	-
New Construction Contracts	$16,036,521	$8,790,084	$24,826,605
Modernization Contracts	-	-	-
Contingencies	$1,137,635	$2,654,483	$3,792,118
Architectural/Engineering Fees	$978,828	$536,524	$1,515,352
Consulting and Other Fees	$1,686,312	$924,316	$2,610,628
Movable or Other Equipment (not in construction contracts)	$10,290,327	$5,640,428	$15,930,755
Bond Issuance Expense (project related)	-	-	-
Net Interest Expense During Construction (project related)	-	-	-
Fair Market Value of Leased Space or Equipment	-	-	-
Other Costs to Be Capitalized	$1,324,385	$725,934	$2,050,319
Acquisition of Building or Other Property (excluding land)	-	-	-
TOTAL USES OF FUNDS	$33,068,038	$18,125,554	$51,193,592
SOURCE OF FUNDS	**CLINICAL**	**NONCLINICAL**	**TOTAL**
Cash and Securities	$33,068,038	$18,125,554	$51,193,592
Pledges	-	-	-
Gifts and Bequests	-	-	-
Bond Issues (project related)	-	-	-
Mortgages	-	-	-
Leases (fair market value)	-	-	-
Governmental Appropriations	-	-	-
Grants	-	-	-
Other Funds and Sources	-	-	-
TOTAL SOURCES OF FUNDS	**$33,068,038**	**$18,125,554**	**$51,193,592**

New Construction Contracts - The proposed project will be constructed in an existing office building previously used for medical services. The projected building costs are based on national architectural and construction standards and adjusted to compensate for several factors. The clinical construction costs are estimated to be $16,036,521 or $417.34 per clinical square foot.

Contingencies - The Project's contingencies costs are designed to allow the construction team an amount of funding for unforeseeable event related to construction. Clinical construction costs for contingencies are estimated to be $1,137,635 or 7% percent of projected clinical new construction costs.

Architectural/Engineering Fees - The clinical project cost for architectural/engineering fees are projected to be $978,828 or 5.70% of the new construction and contingencies costs.

Consulting and Other Fees - The Project's consulting fees are primarily comprised of various project related fees, additional state/local fees, and other CON related costs.

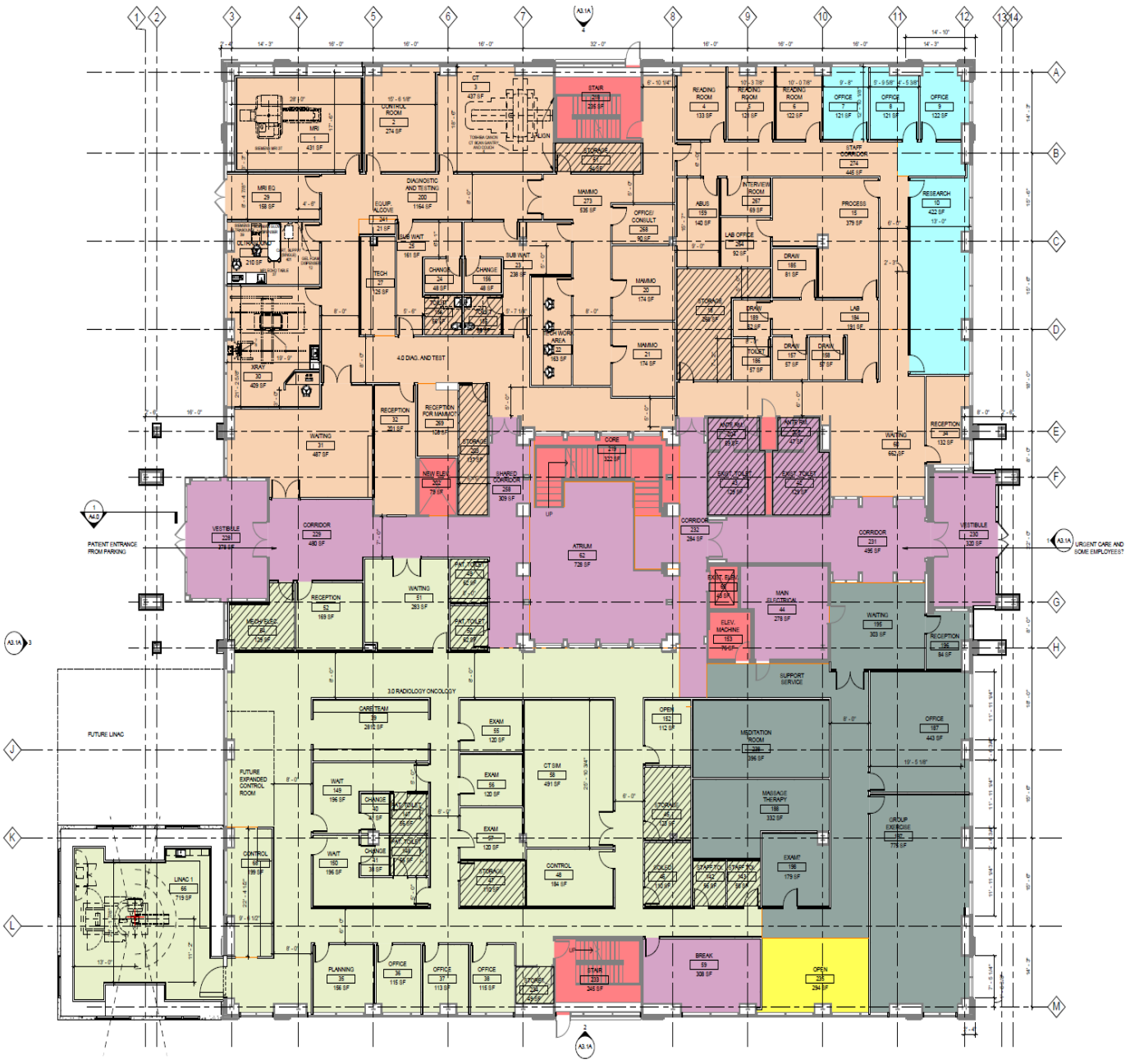
Attachment 7
Project Costs and Sources of Funds

Moveable Equipment Costs - The moveable equipment costs are necessary for the operation of the MOB, and proposed operating rooms.

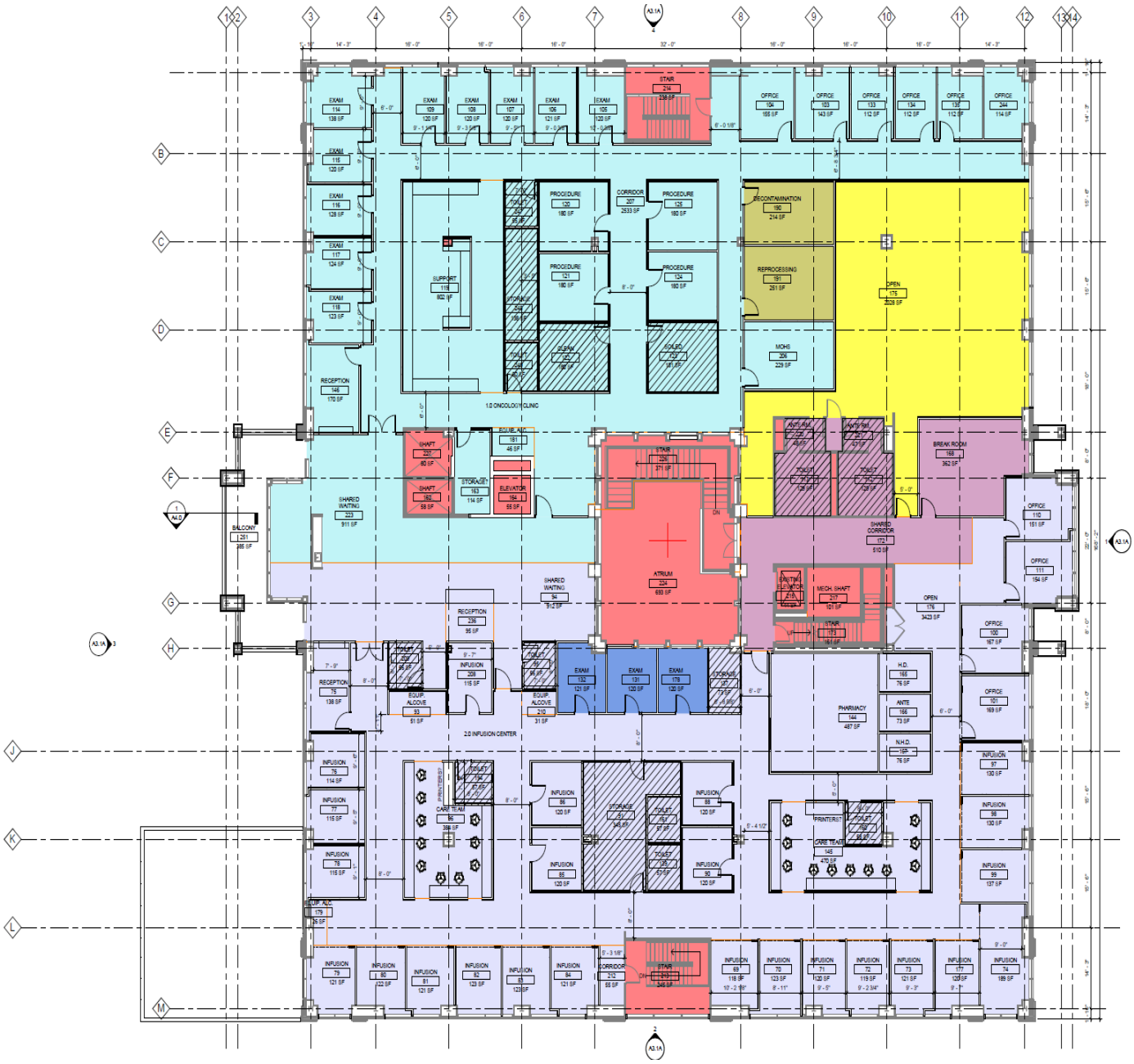
Other Costs to be Capitalized - These costs include miscellaneous fees, and costs associated with infrastructure of the space.

Attachment 8
Project Status and Completion Schedules

The proposed project plans are still at the schematic stage and the proposed project completion date is July 1, 2025. Financial commitment for the project will occur following permit issuance.



Attachment 8
Project Status and Completion Schedules



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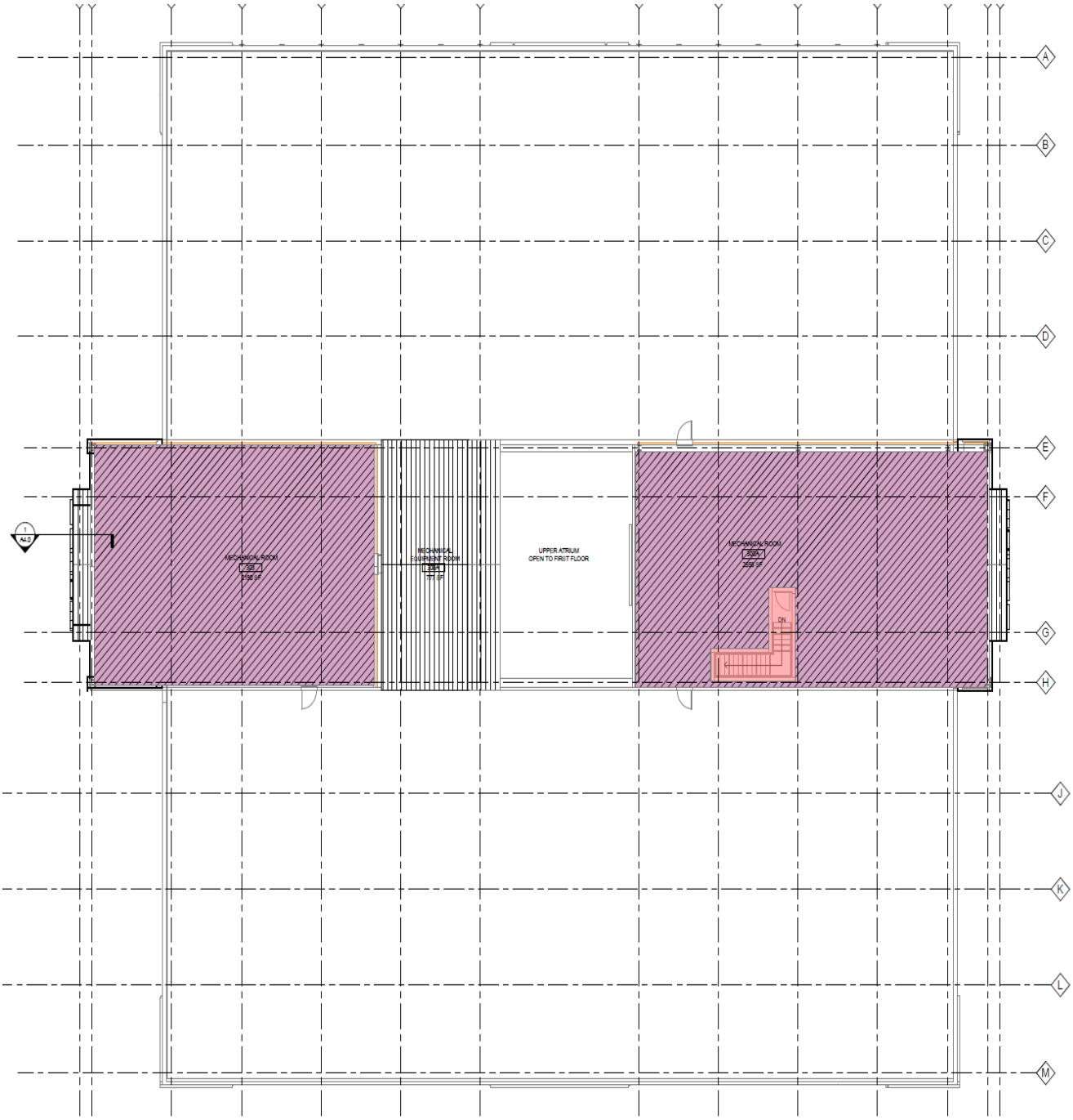
Project Status and Completion Schedules



Attachment 9
Cost Space Requirements

		Gross Square Feet		Amount of Proposed Total Gross Square Feet That Is:			
Department/Area	**Cost**	**Existing**	**Proposed**	**New Const.**	**Modernized**	**As Is**	**Vacated Space**
REVIEWABLE							
Infusion	$9,922,730	-	11,556	11,556			
Diagnostic Radiology (MRI, 2 CT, 2 Mammogram, 1 Ultrasound, 1 X-ray Machine, 1 Linear Accelerator)	$8,067,155	-	9,734	9,734			
Oncology	$15,078,153	-	16,955	16,955			
Total Clinical	$33,068,038	-	38,245	38,245			
		-					
NON-REVIEWABLE							
Administrative	$13,078,282	-	14,203	14,203			
Research Offices	$1,012,892	-	869	869			
Stairs, Elevators, Shafts, Open Space	$5,346,229	-	5,600	5,600			
Total Non-clinical	$18,125,554	-	20,672	20,672			
TOTAL	**$51,193,592**	-	**58,917**	**58,917**			

Attachment 11
Background of the Applicants

The following information is provided to illustrate the qualifications, background, and character of the Applicants, and to assure the Review Board that the proposed Medical Office Building will provide a proper standard of health care services for the community.

Background of Rush University System for Health

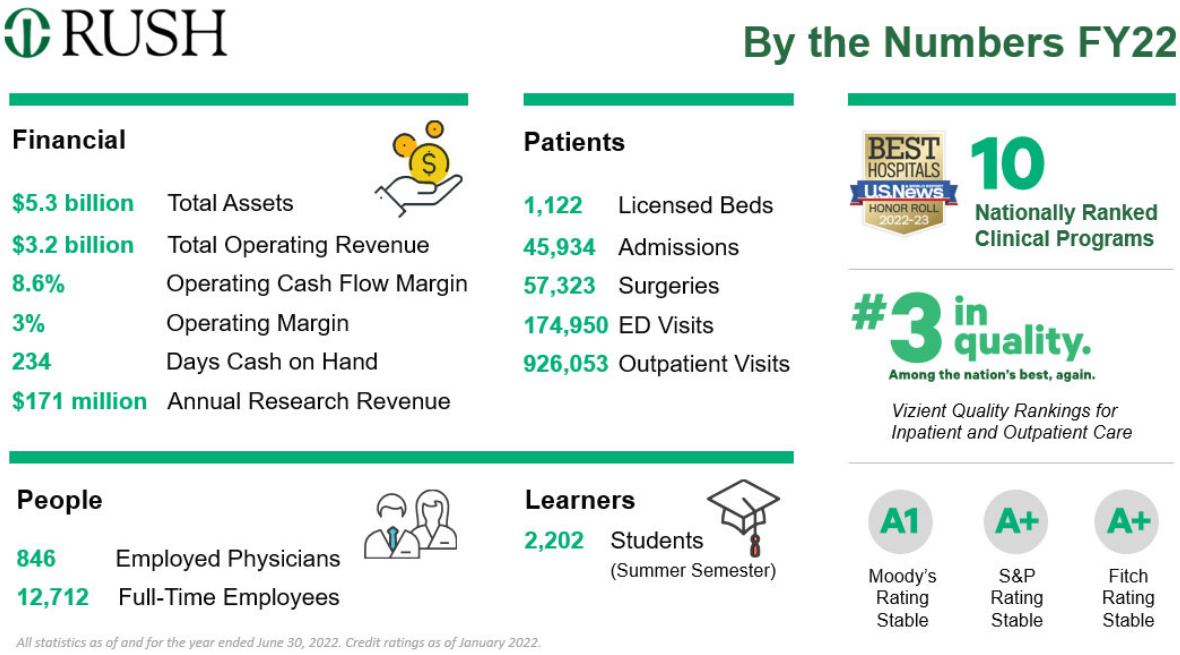
Rush University System for Health ("Rush") is a nationally-recognized system anchored by Rush University Medical Center located in the Illinois Medical District, with additional hospitals in Aurora (Rush Copley Medical Center) and Oak Park (Rush Oak Park Hospital), ambulatory surgical treatment centers, its newly approved Ambulatory Care Building, and more than 30 clinical locations across the Chicago area. Rush University System for Health is consistently recognized for exceptional patient care, education, research and community partnerships.

Rush University Medical Center

Rush University Medical Center ("RUMC") is an academic medical center that includes a 727-bed hospital serving adults and children and Rush University. For more than 180 years, the Medical Center has been leading the way in developing innovative and often life-saving treatments. Rush has been part of the Chicago landscape longer than any other healthcare institution in the city. The Great Chicago Fire destroyed the original Rush Medical College in 1871 and the faculty rebuilt the Medical College at its present location at the corner of Polk and Harrison in 1876.

RUMC has grown from an 80-bed teaching hospital founded in 1882 as Presbyterian Hospital to the hospital that it is today with over 700 beds, 29,189 total admissions, 22,566 surgical cases, 62,020 emergency room visits, and 686,220 outpatient visits in CY2021. RUMC provides medical/surgical, pediatric, intensive care, obstetrics/gynecological, neonatal, AMI and Rehabilitation services across these beds. RUMC is a flourishing center for research and education. This hospital is an anchor facility in the Illinois Medical District located on the city's near west side.

Attachment 11
Background of the Applicants



Rush Lisle Cancer Care

Rush has offered cancer care in the "Western Corridor" of the Chicago area since 2013 through an existing site in Lisle, in partnership with the DuPage Medical Group. However, the relationship with DuPage Medical Group (now called Duly Health and Care) will shortly be sunsetting, and the services offered and available at the current Lisle site are not meeting the needs of the community, nor will they be able to into the future. The current site only offers limited infusion chairs and two (2) procedure rooms, three (3) full exam rooms (with space-sharing for additional exam rooms), and does not offer supportive oncology, or space for urgent care services. Comprehensive cancer care is and will continue to be a priority to Rush and its patient population.

The current Rush site in Lisle serves both the West and Southwest Chicagoland suburbs, including the cities of Lisle, Addison, Wheaton, Warrenville, Downers Grove, Lemont, DuPage, Lockport, Shorewood, Carol Stream, Glen Ellyn, Lombard, and Glendale Heights. The population of the western suburbs is 2.6 million and the population of the south suburbs is approximately 1.5 million. The cancer incidence between the years of 2019 and 2029 is projected to increase. For example, in the western market, urologic cancer is projected to increase by 1.6% and GI cancer by 1.3%. In the south suburbs, urologic cancer is projected to increase by 1.2% and GI cancer by 1.3%.

While Rush has provided successful care to the community through the existing site in Lisle, it remains committed to doing so. To that end and to meet the growing needs of its patient population, a more comprehensive building that can offer additional services, and manage a higher volume of such services, is needed to respond to the increase in cancer care needs.

Attachment 11
Background of the Applicants

Rush's Commitment to Health Equity

Rush maintains a strong commitment to Chicago and is a national leader in builder healthier communities through the promotion of health equity and dismantling of barriers to health. RUMC named structural racism and economic deprivation as among the root causes for neighborhood-based racial health inequities and proposed an organizational anchor mission and equity strategy to begin to address the social and structural determinants of health that underpinned these racial health inequities. Like many other health systems, Rush began the shift to value-based care and population health, with the goal of improving the health of the individuals and diverse communities they serve through the integration of outstanding patient care, education, research, and community partnerships. Rush developed five pillars to guide their health equity strategy in 2016, and they include:

1. Name and eliminate racism.
   Rush has stated that if structural racism, economic deprivation, and neighborhood conditions were afflictions at the root cause of health inequities, that they had an obligation as an academic health system to name these as the first step in identifying ways to address these inequities.

2. Adopt an anchor mission.
   Rush launched an "anchor mission" to hire, purchase, invest and volunteer locally. Rush is focusing on hiring locally and developing talent, utilizing local labor for contracts and projects, buying and sourcing locally, investing locally and ensuring retirement readiness, and volunteering locally.

Attachment 11
Background of the Applicants

Rush is one of the largest employers on Chicago's West Side with a hearty supply chain, and this pillar guides them to focus on community health and wealth-building. The impact of the Anchor Mission initiatives has spanned a range of areas. Some examples include:

• RUMC spending on its Anchor Mission initiatives was $7.9 million in fiscal year (FY) 2019, $8.4 million in FY 2020, and has reached $4.1 million through Q2 of FY 2021.

• RUMC has invested $6.0 million over 3 years in West Side social impact projects.

• RUMC has opened 16 employment application hubs in Anchor Mission communities to support local hiring.

• RUMC hiring of individuals from Anchor Mission communities has increased over time: from 16.1% of all hires in FY 2018 to 18.2% through Q2 of FY 2021.

• The percentage of RUMC employees contributing at least 6% of their income to a 403(b) retirement plan has increased from 68% in FY 2019 to 80.1% through February 2021.

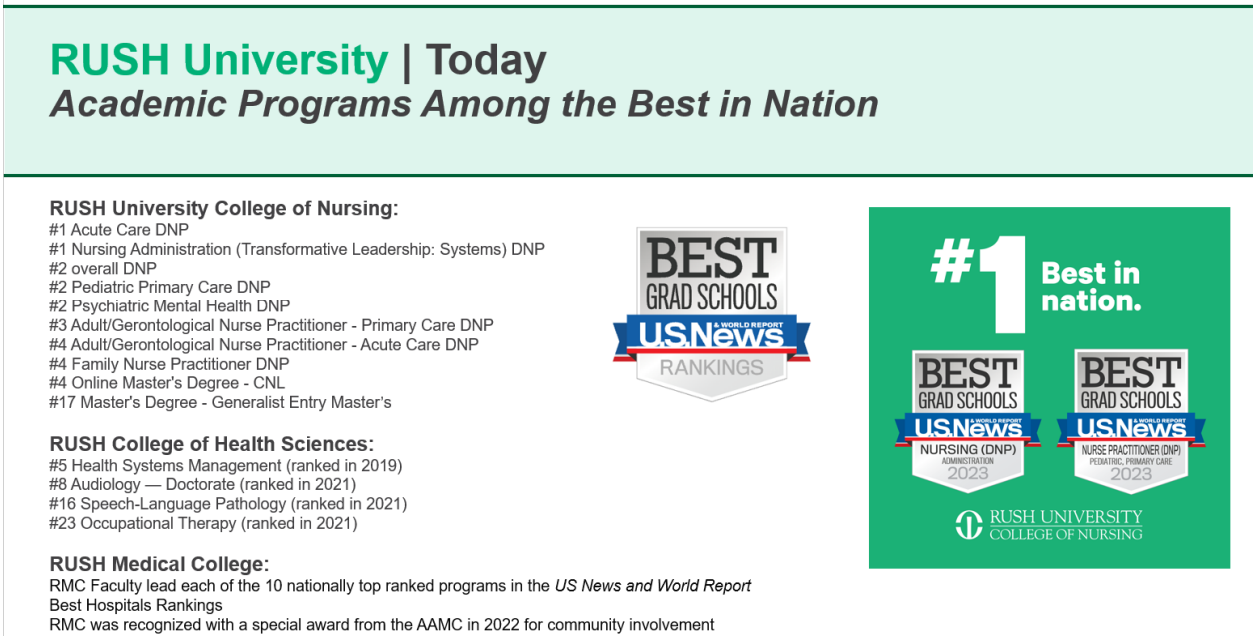
3. Create wealth-building opportunities for employees.
   Internal listening sessions determined that many employees experienced extreme financial distress and were not saving for retirement. Many of Rush's employees lived in the low-income neighborhoods that Rush was trying to elevate. Rush initiated a pension reform program to significantly increase retirement savings, raised entry hourly wages to $15 per hour, launched healthcare career pathways for incumbent employees, and offered financial wellness and credit training. At the same time, Rush's long-standing Diversity Leadership Council made achieving demographic parity in leadership positions a critical part of the strategy. It was not enough to support low-wage employees: the medical center leadership representation needed to better reflect the demographics of our communities.

4. Eliminate healthcare inequities.
   Rush established the Health Equity Governance Committee to report on performance projects that address racial, ethnic, gender and age inequities. Rush began screening patients for social determinants of health, including food, transportation, access to primary care and more. The health system launched a home visiting program for homebound patients who live with chronic illness and for postpartum mothers who live in communities with low life expectancy. With a gift from BMO Financial Group this past year, the Rush BMO Institute for Health Equity was established. This will allow Rush to maintain their most concentrated investment in health equity yet, and organize and coordinate all of their strategies for eliminating health inequities under a single umbrella.

5. Address the social and structural determinants of health.
   Rush partnered with other hospitals in Chicago so they could collectively make a greater impact. Consisting of Rush and five other hospitals, West Side United is able to invest millions back into the community and hire West Side employees. The partnership will work toward cutting Chicago's 14-year life expectancy gap between wealthy and low-income communities by 50 percent by 2030.

Attachment 11
Background of the Applicants

RUMC ranked 19th out of almost 3,000 hospitals in the U.S. News and World Report's 2021-2022 Best Hospital rankings. RUMC also ranked in the top 50 hospitals in nine specialties, with three the highest ranked programs in Illinois.



Attachment 11
Background of the Applicants

Rush's commitment to providing safety net services is not only limited to the patients it serves, but also to training the next generation of healthcare providers. With over 40 educational degree programs, 9 of those programs in the College of Nursing having been ranked by U.S. News and World Report's Best Graduate Schools, with four of its programs being ranked #1 Nationally.

Attachment 11
Background of the Applicants

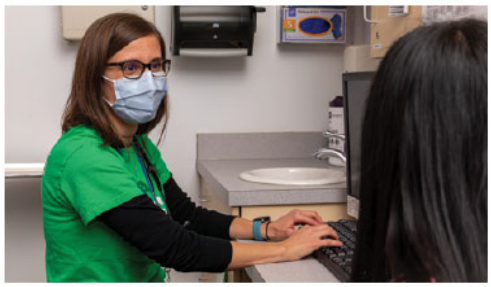
Community health: Connecting with underserved communities

Decades of disinvestment in many West Side neighborhoods mean that people have less access to resources and opportunities essential to good health. These disparities help explain why COVID-19 hit communities of color so hard — and why removing those obstacles is essential to achieving health equity. When the pandemic struck, we quadrupled our team of community health workers. They continue to provide screening for the social determinants of health and connect people to resources and health education; their additional duties now include contact tracing, testing and educating people about vaccines.

1,274
cases of COVID-19 **contact-traced**
after being identified at Rush testing sites

2,215 people contacted for COVID-19
vaccine education and **scheduling**

293
people screened for the social determinants of health
(outside of contact tracing and vaccine outreach calls)



20,000
people received **free, healthy food** distributed by Rush employee volunteers

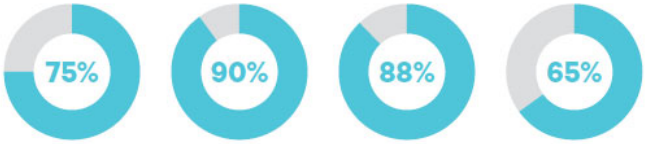
Attachment 11
Background of the Applicants

Education: Creating opportunities

The Rush Education and Career Hub (REACH) provides innovative, hands-on STEM learning for underrepresented students to increase postsecondary achievement and to build diversity in health care and STEM professions. During the pandemic, REACH continued its educational programming virtually. The team also expanded its efforts to connect with families in response to COVID-19, hosting webinars about the virus, distributing meal kits to those in need, distributing personal protective equipment and more.

4000+
students, parents, educators and community members served

Students were:



180+
high school and college students interned/ apprenticed through MedSTEM programs

45% of MedSTEM participants and families received **wraparound supports:** technology, food, transportation and other resources

100% of college students in REACH programs persist in a **STEM** or **health care** major

Attachment 11
Background of the Applicants

Community-Based Practices: Meeting people where they are

The Rush Community-Based Practices team brings health care to people who face barriers to accessing care. We provide primary care, reproductive health care and mental health services to young people in conveniently located clinics on the West Side, and inclusive, affirming care for the LGBTQ+ community throughout the Rush system. During the pandemic, the team provided telehealth services along with health education through webinars and workshops. They also reached out to patients and their families to connect them with resources like mental health services, food and housing.

Affirm: The Rush Center for Gender, Sexuality and Reproductive Health

Affirm: The Rush Center for Gender, Sexuality and Reproductive Health is working to close gaps in the health care system for LGBTQ+ people. Longstanding internalized stigma, trauma and socioeconomic inequities contribute to health disparities in this community, so the Affirm team helps providers across the Rush system provide affirming care and services for everyone.

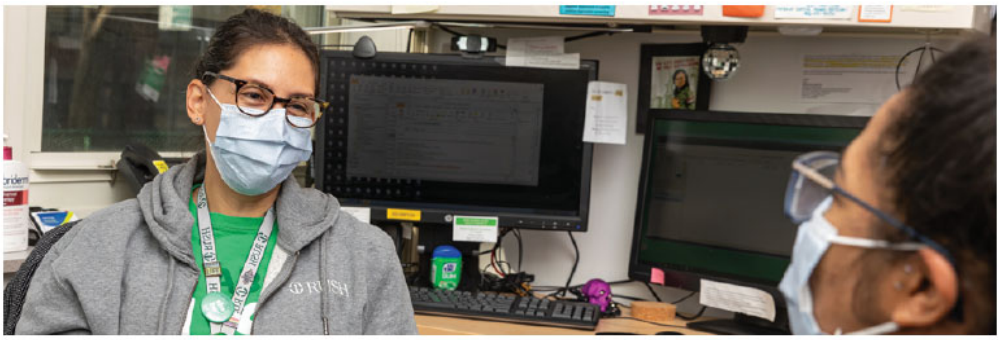
55 letters of readiness written for transgender patients seeking surgery

221 patients connected to affirming services at Rush and in the community

291 training hours provided for Rush clinicians;

13 hours for community providers

Attachment 11
Background of the Applicants



School-Based Health Centers (SBHCs) and the Adolescent Family Center (AFC)

In three public school–based health centers on the West Side, we provide a full range of clinic services for young people, including physicals and immunizations, primary care, treatment of injuries and mental health services. The Adolescent Family Center on the Rush University Medical Center campus provides confidential, age-competent health care, including prenatal and reproductive care, for those ages 12 to 25.

1,405 mental health visits provided

Children and adolescents served: **768**

539 phone calls made to SBHC families to **screen for social determinants of health**

1,702 students and adults reached through sexual health education programming

122 teen pregnancies prevented through family planning services

Committed to Community | 5

Attachment 11
Background of the Applicants

Community health and engagement: Making connections

People who live in the communities we serve are the ones who know best what would help them and their neighbors get and stay healthy. We build relationships and work closely with community members, community-based organizations, clinics and public health agencies to develop strategies for fostering healthier, more equitable communities. During the pandemic, these relationships were invaluable in guiding our work to help feed, educate, vaccinate and care for our communities.

Faith-based initiatives

Houses of worship are some of the most trusted anchor institutions on the West Side, and their leaders are authoritative voices in the community. They were close collaborators as we worked to test for COVID-19, educate people about the virus and encourage them to get the vaccine — a critical effort because COVID-19 had a disproportionate impact on Black Chicagoans, who were more likely to be hospitalized and to die from the virus than Latinx and white residents.

9 West Side and South side **partner churches** served as COVID-19 testing sites

1,200
community members tested

West Side Walk for Wellness

This summer program was designed to engage West Side residents in regular exercise and educate them about health issues that disproportionately impact their communities. Held virtually in 2021 because of COVID-19 restrictions, the program was able to expand to all of Chicagoland and beyond. Participants walked on their own and engaged with each other and health experts via Zoom. They developed such a strong sense of connectedness during the pandemic that the program was extended for an additional three weeks.

386 walkers

Attachment 11
Background of the Applicants

Adopt-a-Family

Through this longstanding holiday partnership with West Side churches and social service agencies, Rush employees and outside partners provide personal care items, clothing, toys and more to West Side families experiencing hardship. For more than 25 years, Adopt-a-Family has been a beloved tradition at Rush.

251 families served during the 2021 holiday season

1,167
people served, including children, teens, parents and grandparents

36 **community members** trained

Mental Health First Aid

West Side residents consistently identify mental health resources as something their communities need. Rush's Mental Health First Aid training empowers community members to respond appropriately when someone needs help. More than that, it empowers neighbors to help neighbors without having to rely on large health care or social services institutions. Participants learn how to identify, understand and respond to signs and symptoms of mental illness and substance use disorders, reaching out and providing initial support until professionals can take over.

3
Mental Health First Aid **community trainings** held

Committed to Community | 7

Attachment 11
Background of the Applicants

Anchor Mission: Building health by building community

Shorter life expectancies on the West Side aren't caused by genetics or poor choices, but by the impact of social determinants of health like poverty and a lack of access to healthy food, high-quality education and family-supporting jobs. Through our Anchor Mission strategy, we commit to using our economic power to improve West Side economic vitality by hiring, purchasing, investing and volunteering locally. During the pandemic, we paid particular attention to supporting local vendors, recruiting employees from the West Side and providing food and vaccinations.

Hiring locally

We work with citywide community-based organizations to align our hiring needs with job candidates' skills and offer programs to help our entry-level employees advance their careers within Rush. Our goal is to hire people into stable jobs that offer both a living wage and growth opportunities — an "outside in and inside up" approach.

100% of patient care technician pathway program participants hired by Rush

17% of all new hires at Rush University Medical Center came from **Anchor Mission communities**

Spending locally

Every dollar spent at a small business recirculates within that community 33% more than a dollar spent at a chain store or restaurant. We encourage Rush departments to purchase through local businesses; bring local restaurants onto the Medical Center campus; and hire community residents to staff the Concordance Healthcare Solutions warehouse that keeps us stocked with medical supplies.

$8 million spent with local vendors

40% of employees at the **Concordance Healthcare Solutions warehouse** live in Anchor Mission communities

Attachment 11
Background of the Applicants

Investing locally

We invest in Rush's "first community" of employees, many of whom live on the West Side, by helping them build their own household wealth through increased 403(b) contributions and free financial education. We also take part in local impact investing projects that address the social determinants of health, and have signed a national pledge to allocate 1% of our portfolio—$7.5 million over the next five years—to these investments. And our contracts for capital projects include goals for local hiring and spending.

$11.4 million
loaned to West Side social impact projects through **impact investing** with our partners

15% more
Rush employees began saving at least 6% of their paychecks for retirement

$4 million
spent with Anchor Mission communities on capital projects

Volunteering locally

The Rush Employee Volunteer Program (EVP) lets employees take time during the work day to volunteer on the West Side. We address issues that improve health and well-being and reduce hardship, and work to provide volunteer opportunities that enrich and inspire employees.

22,588
people served

490 employee volunteers **distributed food** and staffed COVID-19 vaccination clinics

Attachment 11
Certification and Authorization Letter

Rush University System for Health
1725 West Harrison Street
Suite 364
Chicago, IL 60612

RUSH

December 27, 2022

John Kniery
Board Administrator
Health Facilities and Services Review Board
525 W Jefferson Street, Floor 2
Springfield, IL 62761

Re: Certification and Authorization

Dear Mr. Kniery:

As representative of Rush University System for Health, I, Carl Bergetz, respectively, give authorization to the Health Facilities and Services Review Board and the Illinois Department of Public Health (IDPH) to access documents necessary to verify the information submitted including, but not limited to: official records of IDPH or other state agencies, the licensing or certification records of other states, and the records of nationally recognized accreditation organizations.

I further verify that Rush University System for Health and Rush University Medical Center has no ownership interest in other healthcare facilities. Therefore, there are no adverse actions to report for the past three (3) years.

I hereby certify this is true and based upon my personal knowledge under penalty of perjury and in accordance with 735 ILCS 5/1-109.

Sincerely,

Carl Bergetz, JD
Chief Legal Officer
Rush University System for Health

RUSH is an academic health system comprising Rush University Medical Center, Rush University, Rush Copley Medical Center and Rush Oak Park Hospital.

Attachment 12
Purpose of the Project

RUSH is and will always be committed to providing world-class comprehensive cancer care to its patient population. This project is designed to meet the growing need of innovative cancer care as well as the increased demand for these types of cutting-edge treatments and to continue the established practice of cancer care in the community. It reflects the commitment of Rush University System for Health to maintain and expand its presence in the west and southwest suburbs of the Chicagoland area by relocating and improving Rush Cancer Center Lisle ("Rush Lisle"), creating a more comprehensive cancer center, with increased space and resources.

Treatment at RUSH for cancer is currently primarily focused on Rush University Medical Center (RUMC)'s Main Campus, as well as Rush Oak Park Hospital, Rush Copley Medical Center, Lisle and the western area of Chicagoland. Rush Cancer Care in Lisle is currently a successful cancer center serving the western and southwestern suburbs of Chicago, but it has incomplete services that can be enhanced with a more comprehensive building. Rush wants to see the western and southwestern suburbs have more comprehensive access to its high quality care, a goal in line with and embodied within the principles of the Certificate of Need program.

The market area of Rush Lisle will encompass the West and Southwest Chicagoland suburbs, including, of note, Lisle, Addison, Wheaton, Warrenville, Downers Grove, Lemont, DuPage, Lockport, Shorewood, Carol Stream, Glen Ellyn, Lombard, and Glendale Heights. The population of the western suburbs is 2.6 million and the population of the south suburbs is 1.5 million. The cancer incidence between the years of 2019 and 2029 is projected to increase. For example, in the western market, urologic cancer is projected to increase by 1.6% and GI cancer by 1.3%. In the south suburbs, urologic cancer is projected to increase by 1.2% and GI cancer by 1.3%. This increase in incidence of cancer creates a need for more comprehensive cancer care with expanded resources.

Cancer care is consistently changing as technology grows more advanced. In 2021 alone, the Food and Drug Administration introduced 16 new oncology drugs, including two to treat genetic conditions that cause high rates of tumor formation, and approved two cancer detection agents that help physicians better identify certain tumors during imaging or surgery.[1] These types of targeted and gene therapies as well as nanomedicine, immunotherapy, telehealth, and robotic surgery have gained traction to replace or improve conventional therapies.[2] The biggest impacts on research advances include the emergence of technological developments and computational data sciences which requires the embracing of collaboration and communication among scientists and health care providers.[3] To facilitate this collaboration and communication, a continuum of care that connects not only patients' cancer care, but the larger picture of their health care overall, is of the utmost importance.

[1] Calley Jones, *Experts Forecast Cancer Research and Treatment Advances in 2022,* American Association for Cancer Research: Cancer Research Catalyst (January 5, 2022), https://www.aacr.org/blog/2022/01/05/experts-forecast-cancer-research-and-treatment-advances-in-2022/.
[2] National Cancer Institute, *The Tech Revolutionizing Cancer Research and Care*, National Institutes of Health, https://www.cancer.gov/news-events/nca50/stories/technologies-and-innovations#:~:text=Technologies%20and%20innovations%20like%20CRISPR,helping%20accelerate%20progress%20against%20cancer (last visited, Sept. 16, 2022), Carlotta Pucci, et al., *Innovative approaches for cancer treatment: current perspectives and new challenges*, 13 Ecancermedicalscience 961 (Oct. 9, 2019), https://doi.org/10.3332/ecancer.2019.961.
[3] Jones, *Experts Forecast Cancer Research and Treatment Advances in 2022.*

Attachment 12
Purpose of the Project

This increase in innovation and use of technology in cancer care has created a need for the expansion of cancer centers, including specifically in the Midwest region. “Cancer affects everyone but not everyone equally” and this applies to communities in Illinois.[4] Disparity in cancer screening and access to these technologies was worsened by the COVID-19 pandemic.[5] Lack of access to health systems, services, and quality care are major drivers of cancer disparities in Illinois. [6] While access to care is important, access alone is not sufficient to address health disparities if it is not high quality care.[7] This means that of utmost importance is the access to the innovative care provided by facilities such as cancer centers.[8] Additionally, access to patient navigation resources including counseling and emotional support is vital to patients traversing treatment and survivorship.[9] Where a person resides vastly impacts their access to resources and quality of health care.[10]

The proposed improved state of Rush Lisle would assist in the availability of innovative cancer treatment through greater continuity of care, the availability of increased diagnostics and patient counseling, and thereby improvement of cancer care disparities in the Midwest region. Rush Lisle has been successful in its current state, but requires an increase in resources to be able to assist in these areas.

Rush Lisle currently houses 16 infusion chairs, 2 procedure rooms, and 3 exam rooms. In its proposed, improved state, it would house 24 infusion chairs, 4 procedure rooms, and 10 exam rooms. The number of hours would increase from the current 8 hours of operation to 10 hours of availability per day. The impact of this increased access cannot be underestimated. The meaningful increase in access to care is undeniable and readily apparent. However, the burden relieved on patients and families undergoing cancer treatment – both in access to the availability to receive care closer to home, the reduced periods of time spent awaiting available care and the anxiety accompanying that delay – is significant. These updates to Rush Lisle would also provide for the ability to treat with radiation oncology, which is not an in-house option at the current Rush Lisle. This would provide the opportunity to improve coordination of frequently used services by cancer patients, thereby consolidating patients’ care. Additionally, the proposed Rush Lisle would have the ability to represent all disease sites and provide multidisciplinary and subspeciality care to patients.

The new Rush Lisle would provide the opportunity for supportive oncology. This would include space for group exercise, support groups, and family meetings with a chaplain or therapist. Additionally, there would be other supportive options, including nutritional sessions with dieticians, social workers on site, massage/acupuncture and wig offerings, and space for survivorship offerings. These supportive oncology offerings are essential to successful cancer care.

The most transformative impact on cancer care would be to prevent cancer from happening in the first place. Researchers are currently working to expand the ability to predict which precancerous lesions advance to cancer.[11] Another important way to intercept advancing cancer is through diagnostics and screening. Through increased diagnostics and screening, cancer centers can assist in the prevention of the progression of cancer early on. The new Rush Lisle would provide diagnostics, including mammography, ultrasounds, breast MRIs, CT imaging, and X-rays.

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[4] *Health Equity and Health Disparities,* Illinois Department of Public Health, https://dph.illinois.gov/topics-services/diseases-and-conditions/cancer/2022-2027-illinois-comprehensive-cancer-control-plan/health-equity-health-disparities.html (last visited Sept. 16, 2022).
[5] Jones, *Experts Forecast Cancer Research and Treatment Advances in 2022.*
[6] *Health Equity and Health Disparities,* Illinois Department of Public Health.
[7] *Id.*
[8] *Id.*
[9] *Id.*
[10] *Id.*
[11] Jones, *Experts Forecast Cancer Research and Treatment Advances in 2022.*

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Health Equity and Health Disparities

In the previous section, the populations at highest risk for cancer or cancer mortality were reviewed, as well as the highest risk groups for priority cancers. In this section, health equity and how health disparities impact cancer screening, early detection, and treatment are discussed.

All Illinoisans deserve to live long, healthy lives, free of modifiable differences in health status and outcomes.

Health inequities affect everyone. Disparities in health status exist between many population groups, with the greatest disparities found between people of different racial or ethnic groups, and between people of different socioeconomic statuses. Significant racial/ethnic and income disparities are observed when examining the rates of illnesses and conditions, such as diabetes, heart disease, depression, lung and breast cancer, and infant mortality. Interventions to reduce health inequities can improve the health of all communities. Health inequities exist for the lesbian, gay, bisexual, transgender, and queer (LGBTQ) communities.

Health disparities are a particular type of health differences closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identify; geographical location; or other characteristics historically linked to discrimination or to exclusion.

Community Engagement Strategy to Understand Cancer Disparities in Illinois

"Cancer affects everyone but not everyone equally" and this extends to communities in Illinois. The Illinois Comprehensive Cancer Control Program (ICCCP), in collaboration with the University of Illinois Cancer Center's Community Engagement and Health Equity (CEHE) office, implemented a community engagement strategy for the 2022-2027 Illinois Comprehensive Cancer Control Plan. The overall goals of the collaboration were

1. to develop a plan to engage diverse stakeholders in the development process of the plan
2. to receive community feedback on cancer disparities and needs in Illinois

Enlisting the participation of stakeholders from the community ensures that the 2022-2027 plan reflects the expertise, voices, and priorities of Illinoisans who are directly impacted by cancer, including cancer patients, survivors, and caregivers. The community engagement strategy included a statewide town hall, as well as eight focus groups. Throughout the development of the plan, information from the community engagement efforts was continuously discussed and reviewed with the ICP and the Prevention; Screening and Early Detection; and Diagnosis, Treatment, and Survivorship work groups.

Methods

On January 26, 2021, CEHE hosted a statewide town hall followed by eight focus groups in March and April 2021. The objectives of the town hall and focus groups were to:

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1. identify cancer-related problems, barriers, and gaps that Illinoisans experience
2. identify solutions, facilitating factors, and strengths to address the problems
3. propose recommendations based on findings

The approach, development, and analysis of the town hall and the focus groups were guided by the Model for Analysis of Population Health and Health Disparities, the Centers for Disease Control and Prevention's Community Health Assessment and Group Evaluation (CHANGE) Action Guide, and the Community Tool Box. The town hall facilitator guide and the semi-structured focus group guide included questions about biologic responses and pathways (genetic factors), individual demographics and risk factors (socioeconomic status and health behaviors), the social and physical context (environment, social relations, social norms, and beliefs), and fundamental causes (policy, health care system, and discrimination). This project (Protocol #2020-1552) received a formal Determination of Quality Improvement status according to University of Illinois at Chicago institutional research policy.

Town Hall

The virtual town hall was open to all interested individuals. A registration link was sent out via IDPH's, the ICP's, and CEHE's partner and stakeholder networks. During the 90-minute virtual town hall and in breakout rooms, participants discussed how cancer impacts their life, strategies to improve cancer outcomes in Illinois, and what the state can do to improve cancer disparities. The town hall and its breakout rooms were hosted by a facilitator and a note taker. Immediately following the town hall, notes were composed to align with the facilitator guide. The notes were reviewed and then organized by the topic areas in which they were discussed with attendees.

Focus Groups

As a follow-up to the town hall, CEHE hosted eight focus groups to delve deeper into themes about health equity and cancer disparities. Interested individuals were asked to complete a basic demographic form that included questions about geographic residence in Illinois, whether they were a cancer survivor and/or caregiver, insurance status, and race and ethnicity. Participants were selected using purposive sampling methods to maximize group heterogeneity and to ensure a broad group of individuals were represented in the focus groups. Three general population focus groups were held, as well as focus groups specifically for rural residents, survivors, young survivors, caregivers, and Spanish speakers. The focus groups, held both during the week and on weekends, were audio-recorded and ranged between 75-98 minutes (M= 83 minutes) and had on average seven participants (range of 5 to 10 participants). Participants received a $40 gift card to thank them for their time. The focus groups were transcribed professionally, checked for accuracy, and de-identified prior to analysis. The analytic team used content analysis procedures and developed a codebook to facilitate the identification of themes and subthemes. The final codebook consisted of 58 codes. Finally, the town hall notes and focus group findings were synthesized and are presented together below.

Results

The major themes from the town hall and focus groups are presented to first describe the factors that contribute to cancer disparities among Illinoisans, aligning with the Model for Analysis of Population Health and Health Disparities framework (fundamental causes, the physical and social context, and individual demographic and risk factors), followed by proposed solutions, recommendations, and priorities across the

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cancer continuum. Finally, a brief section on the impact of COVID-19 on cancer is presented. Exemplary quotes are included in the results text and supplemental tables will present additional sample quotes.

Participants

The town hall had a total of 62 participants. Town hall participants were asked to report their affiliations and could select as many categories as they felt were applicable. About a third (36%) of participants reported being an academic affiliate, 16% reported they were from a community-based organization, and 13% were from a hospital or clinical setting. About 13% reported being a cancer survivor and 10% reported they were a current or past caregiver of a cancer patient.

Characteristics of Town Hall Participants

ETHNICITY	NUMBER
Hispanic, Spanish, or Latino origin	11 (18%)

RACE	NUMBER
Asian	6 (10%)
Black or African American	15 (24%)
White	38 (61%)
Race not reported	3 (5%)

AFFILIATION	NUMBER
Cancer survivors	8 (13%)
Caregiver for a cancer patient (current or past)	6 (10%)
Community member	5 (8%)
Academic affiliate	22 (36%)
Community-based organization	10 (16%)
Hospital/Clinical setting	8 (13%)
Government agency/Health department	5 (8%)

Town hall participants asked to select all affiliations that applied

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The eight focus groups had 53 participants from Illinois. About 62% reported being a cancer survivor and 47% were a current or past caregiver of a cancer patient. Most (94%) participants were female, and on average 52 years of age. About 15% reported their ethnicity as Hispanic, Spanish, or Latino origin, and nearly a quarter (25%) reported their race as Black or African American. Regarding current health insurance coverage, about a quarter (27%) were covered by Medicare, Medicaid, or through the Affordable Care Act (ACA) marketplace, and 6% were uninsured. Finally, regarding geographic representation, about 26% of participants were rural residents, and 16 of Illinois's 102 counties were represented in at least one of the focus groups (Figure 20).

Characteristics of Focus Group Participants

CHARACTERISTIC	NUMBER
Ever diagnosed with cancer	33 (62%)
Current or past caregiver for a cancer patient	25 (47%)
Current rural residence	14 (26%)

AGE AT CANCER DIAGNOSIS	NUMBER
< 40 years of age	8 (24%)
40-59 years of age	18 (55%)
> 60 years of age	7 (21%)

GENDER	NUMBER
Female	50 (94%)
Male	3 (6%)

AGE	NUMBER
< 40 years of age	12 (23%)
40-59 years of age	25 (47%)
> 60 years of age	16 (30%)

ETHNICITY	NUMBER
Hispanic, Spanish, or Latino origin	8 (15%)

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RACE	NUMBER
Black or African American	12 (23%)
American Indian/Alaska Native	1 (2%)
Asian	1 (2%)
White	39 (73%)

CURRENT HEALTH INSURANCE COVERAGE	NUMBER
Private	33 (61%)
Medicare	9 (17%)
Medicaid	2 (4%)
Coverage through the Affordable Care Act	3 (6%)
Other source of coverage	3 (6%)
Uninsured, no coverage	3 (6%)

PREFERRED LANGUAGE FOR FOCUS GROUP	NUMBER
English	48 (91%)
Spanish	5 (9%)

Geographic representation of focus group participants for the 2022-2027 Illinois Comprehensive Cancer Control Plan community engagement strategy

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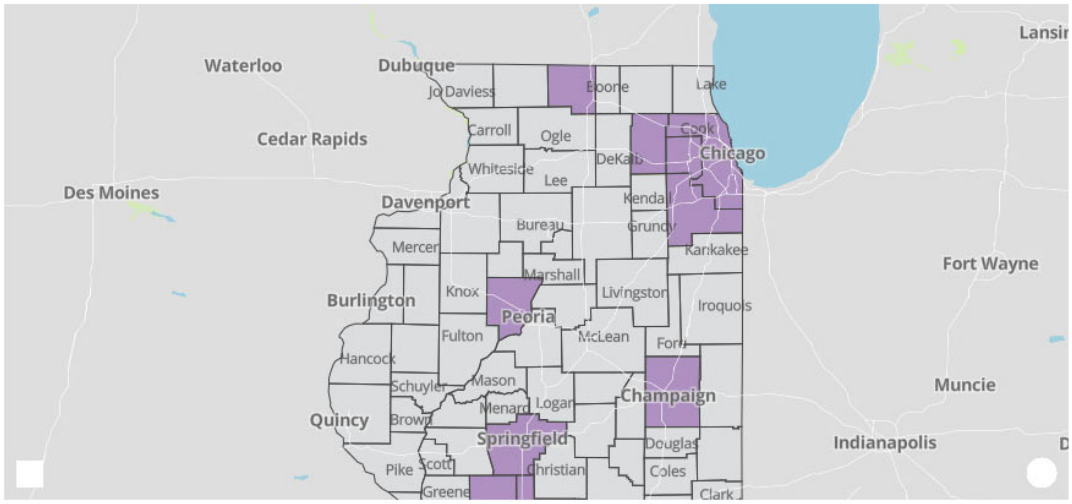

Factors that Contribute to Cancer Disparities among Illinoisans

Town hall and focus group participants described how fundamental causes, the physical and social context, individual demographic and risk factors, and biologic responses and pathways contributed to disparities across the cancer continuum for Illinoisans and in line with the Model for Analysis of Population Health and Health Disparities framework. The sections below describe each of the factors in greater depth.

Fundamental Causes

Participants described several fundamental causes, those distal determinants of health that include population social conditions, policies that affect social conditions, and the policymaking bodies that influence or determine them that contribute to disparate health.

Social conditions and policies

Overall, the lack of a comprehensive health insurance system for all and discrimination were identified as being the primary social conditions and policies that contributed to cancer disparities across the cancer continuum.

Lack of comprehensive health insurance system for all Illinoisans

Although Illinois was a Medicaid expansion state through the Patient Protection and ACA, a significant segment of the population remains uninsured or underinsured (unaffordable out-of-pocket costs and deductibles). The costs of cancer screenings and preventative care were often too expensive for these individuals, and thus were at times avoided. One cancer survivor noted the unaffordability of their ACA plan.

And even though the term is Affordable Care Act, the insurance, if you're paying it on your own –which I am right now – is not very affordable. (African American cancer survivor from Cook County, 60 years of age)

It's been said we don't have a health care system; we have a sick care system. And that's because people don't, and they're not encouraged, to seek out health care. They're encouraged to get better if they're sick. And only if they can afford it. (Non-Hispanic White cancer survivor from central Illinois, 57 years of age)

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Further, it was noted that Medicaid managed care organizations (MCOs) are not comprehensive in terms of geographic coverage for all communities. So, some communities struggle to access cancer care, even when insured. One cancer survivor discussed having clinical options because of their insurance.

My insurance is through the Affordable Care Act. When Illinois extended Medicaid to cover low-income individuals, I qualified. And I find having that as my insurance affects who I can see... I feel that the quality of health care I'm getting... because of my insurance is less. It isn't as good. (Non-Hispanic White cancer survivor from central Illinois, 57 years of age)

Discrimination

Discrimination, both within the historical context as well as within the medical system, was discussed as a major contributor to cancer disparities. Specially, a lack of trust between patients and providers was perceived to be a significant issue that impacted engagement with the health system.

Some people don't have access or are afraid, especially in the Black community and Brown communities. (African American male cancer survivor from Cook County, 57 years of age)

And I've heard from friends – in particular, friends who are not White, who do not feel like doctors trust or actually listen to them and validate what they're experiencing. (Non-Hispanic White cancer survivor from Cook County, 34 years of age)

Relatedly, there were conversations about how people of color and undocumented populations specifically may not engage with the health system due to internalized stigma. One person described how people in their community avoid safety net screening programs.

We also want people to understand that the financial help that they give us, from the state, in the hospitals and clinics is because it's a part of what we also pay in taxes as immigrants. Don't feel like they're giving you something for free or are doing you a favor. (Latina community member Cook County, 48 years of age)

Institutional context

A lack of access to health systems, services, and quality care were described as major drivers of cancer disparities in Illinois. Participants expressed the belief that not all health systems provide equivalent standards of care and groups with lower socioeconomic status may be receiving worse care.

Access to quality care

Access to care, although important, is not sufficient to address health disparities if the care is not of high quality. Specially, it was noted that access to cancer centers and research institutions was important.

[Access to a research institution] is literally a lifeline. You have access to clinical trials... and the response time is phenomenal if you're in a location that has that kind of infrastructure. But most... in this country do not live near a major research hospital. And I do not expect that we can be successful at treating cancer early, or even getting people treatment that they need, without the access. Access is everything. (African American cancer survivor from Cook County, 60 years of age)

Access to clinical trials

Clinical trial research leads to exciting and important discoveries for addressing cancer, especially around screening and treatments, yet not everyone is able to access them. One cancer survivor talked about how they felt their survival was a result of previous clinical trials.

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I feel strongly that I am going to live and survive cancer because of 20 years of clinical trials that women were willing to endure. And I feel like I stand on the shoulders of a lot of women who did the clinical trials for... all the drugs that I'm now taking that are saving my life. So, I pray for those people every day and I pray for their families and the survivors of those women. When I was diagnosed, I volunteered to join a clinical trial.... As someone in cancer treatment, if we can contribute to the science of treatment, we can and we should. (Non-Hispanic White cancer survivor from rural, central Illinois, 55 years of age)

However, even for those with access to clinical trials, the decision to participate was not always an easy one to make. People discussed weighing the potential risks and benefits of participating, as well as potential burdens, like travel and time, involved with being part of a clinical trial. For some, participating in a clinical trial was seen as a last-ditch effort to address their cancer.

At first, I was terrified... "Oh. I'm gonna be this guinea pig." But I've been on it. I decided to go with the clinical trial, and I am so happy I did because it's keeping me stable. And I'm lucky enough, I don't have side effects. (White cancer survivor from suburban Cook County, 60 years of age)

I think [my participation in a clinical trial] would just depend upon the situation, what my health situation is, and what the details of the trial are, I would be willing to participate depending upon those things. But then again, I might not be willing to participate depending upon those things. (Non-Hispanic White cancer survivor from rural, southern Illinois, 48 years of age)

African American cancer patients, who have traditionally been excluded from clinical trials research, may also be hesitant to participate in clinical trials research, in part due to historical medical mistreatment.

It was a big issue as far as who was coming to them and asking [to participate in a clinical trial]... I mean, especially like individuals from African American communities. Who is asking me to be a participant? Because I don't necessarily trust everybody out here. (African American community member from Cook County, 37 years of age)

Access to patient navigation services

Another important access issue, especially for those undergoing diagnostic and treatment procedures, is related to patient navigation services. Patient navigators were viewed as an essential member of the patient care team and can improve and enhance patients' experiences throughout the cancer continuum by coordinating care, offering support and education, and identifying resources, yet they are not available universally or equitably.

But what would've been great, and hospitals have this but ours doesn't – it would be to have a patient navigator. I had friends who did have patient navigators and it just blew my mind. I mean, they basically take care of all that stuff for you, answer your questions. (Non-Hispanic White cancer survivor from central Illinois, 66 years of age)

And so, there are insurance companies that do have patient navigators... And there are hospitals that have patient navigators... But they're so few and far between. (African American cancer survivor from Cook County, 60 years of age)

Physical and Social Context

The physical and social contexts are intermediate factors through which the distal effects of fundamental factors are experienced and impact cancer disparities. Participants described how their community's physical and social contexts were important determinants of health and contributors to health disparities.

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Physical context

Abundant discussions were held on the importance of place and where one lives and how this determines health. Specifically, environmental hazards, internet access and the digital divide, transportation, and food insecurity were discussed.

Location, location, location

Where a person lives impacts their access to facilities and to resources, to quality of care, and their ability to support their overall health and cancer-care needs. One person talked about the importance of place in determining health.

There's been a lot of discussion about health care disparities, and I just called it ZIP code health care... Your ZIP code determines your access as well as the type of environment that you are living that injures your health. (African American cancer survivor from Cook County, 60 years of age)

Discussions were held specifically related to the challenges faced by rural communities in Illinois, and the fact that they included many aging individuals as well as those of lower socioeconomic status. Some felt that rural populations were more likely to receive substandard care.

So, if you're in a hard-to-reach region, why should you get third tier treatment? It's an unequal distribution of medical care in the state and it has been for a very, very long time. (Non-Hispanic White cancer survivor from rural, central Illinois, 55 years of age)

Living in an urban area, on the other hand, was sometimes described as a barrier, but at other times as an asset to addressing cancer disparities. For example, some urban areas are medically underserved, including communities on the South Side of Chicago. During the town hall, people discussed the closure of a Chicago hospital, which provided cancer treatment to a high-risk population. As a result, patients are having to travel far outside their neighborhood for treatment which may be difficult depending on resources they have available. Conversely, people discussed how the advantages of living in in an urban area. In some urban areas, there is easy access to resources, like patient/nurse navigators, community and support services, and community health centers.

Environmental hazards

Both rural and urban communities discussed their risk of exposure to carcinogens that affect the air, food, or water sources. The suspected sources of the environmental hazards differed between rural and urban populations, wherein farms and coal mines were identified by rural residents and factories and other waste-producing companies were identified by urban residents.

I live in a very rural part. There are farms, coal mines. And in my small community, I mean, there aren't a lot of people, but I don't know of anyone who has not had cancer in their family. It seems like almost every day it's like someone said, "Oh, did you know so-and-so down the road has cancer? This person has cancer." (Non-Hispanic White caregiver from rural, southern Illinois, 48 years of age)

I think if one lives in an urban area, your air quality probably isn't very good. So, that probably has a lot to do with cancer diagnoses. (Non-Hispanic White cancer survivor from Cook County, 58 years of age)

The digital divide and telehealth

Participants made a recognition that the digital divide is a contributor to cancer disparities. Although telehealth has opened the door of opportunity and is allowing patients a way to connect with their health

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care provider virtually, many communities still do not have internet service nor know how to use technology. Further, this limits opportunities to engage with online education and resources. Cost was noted as a major barrier, specifically for rural residents. The digital divide has perhaps widened during the COVID-19 pandemic, when people have had to rely on telehealth for their care. Because many people are no longer physically attending appointments, they have not been able to be screened or receive treatment. This barrier is especially impactful in the older population, where many of the elderly do not know how to operate technological devices or connect virtually with providers.

I will say, for my mother-in-law who's 73, during COVID..., and because of technology – she wasn't technology savvy – she was discouraged and didn't do it. So, she went through a lot of pain as a result of that was the only thing that they offered her. So, I just imagine that community who may not be comfortable with technology and having to do to that would struggle. (African American cancer survivor and caregiver from central Illinois, 49 years of age)

While telehealth does not offer the same experiences or clinical services as in-person visits, some welcomed its availability. Telehealth eliminated travel times and costs, allowed for more patient-provider interaction.

I'm going to share someone else's story... She has a mental health issue and was constantly, again because of transportation, was a no show or would arrive at her appointments late and then couldn't be seen. And she loves telehealth because she doesn't have to rely on anyone else... She hopes that they always keep that because it's so successful for her. (African American cancer caregiver from rural, central Illinois, 65 years of age)

Transportation

Some people have cars and get around easily, some use public transportation, and some bike or walk for care, while others rely on family and friends. Rural, suburban, and urban communities experience transportation barriers, which makes it difficult to navigate appointments, attend support groups, buy healthy food, and go to health facilities for exercise. One person described their frustration in that this was a barrier that was not discussed enough with health care providers.

I mean, not everyone has access to a vehicle... Quite often, the medical profession doesn't consider that... And in a way, it's like blaming the victim because I don't have access to what I need to get there... Access for me is difficult. And somehow, they never seem to ask those questions. You know, what can we do to help you get here? Do you need a ride? Something like that. None of that becomes a conversation. (African American cancer survivor and caregiver from central Illinois, 49 years of age)

In rural and suburban areas, public and private transportation and ride share options are limited. Contrarily, urban areas generally have greater walkability, access to public transportation, ride sharing options, and resources. However, within cities, there are barriers to public transportation in high crime areas. Public transportation can also be challenging to neighborhoods in urban areas that have limited and changing bus routes based on time or other outside factors.

Food insecurity

In high need communities, food deserts, and/or food swamps have a negative impact on one's overall health. Food deserts greatly impact cancer rate, treatment, and survival. In these neighborhoods there is a lack of affordable, healthy foods, and a surplus of processed, unhealthy, fast food. Food pantries are a viable option to address this barrier, but pantries come with a certain stigma that can sometimes deter patients who could benefit from using them.

Social context

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The social context includes community and neighborhood demographic characteristics, such as community poverty, education, and income levels, residential segregation, as well as social networks and norms. Participants discussed a sense that community organizations are struggling to reach out and connect with other organizations and community members to address health equity and create awareness of existing resources. One person described the availability of funds and programs for cancer screening in their community, but that corresponding outreach need to accompany programs for it to reach those who need it most.

For the ladies that cannot afford to get their mammograms, the [name of county health department] [has] grants. Once they get their hands on that money, then it's our job to go out there and share it in those populations, then say, "Hey, what you need to do is you need to contact A, B, and C, and there's money to cover your mammogram costs and any other type of your regular annual checkups that you have..." It's gonna be up to people like us that... approach our legislatures because that's where the money is...and how important it is that they provide these grants and these resources for these communities. We can't have our communities dying for lack of knowledge. (African American caregiver from central Illinois, 72 years of age)

Fear of cancer in communities

Many communities fear the word "cancer" and noted it invokes negative emotions and feelings of "death, fear, stress, and the unknown." The "unknown" that participants talk about is not limited to the person diagnosed with cancer's state of health, but other factors: how to navigate insurance, what to expect in treatment, the future, finances, family, etc. This anxiety of the unknown is further amplified in undocumented communities because of lack of resources available.

I think part of it is the fear of the expense of medical care, not understanding it –having insurance or not, understanding insurance, and that financial fear. (Asian cancer survivor and caregiver from Cook County, 63 years of age)

Despite this fear, participants also discussed how cancer can also be associated with opportunities, especially related to improving treatments and continued learning.

Patient-provider relationship

The impact of patient-providers relationships across the cancer continuum were discussed extensively. First, participants identified essential elements of patient-provider relationships - humane and compassionate care, trust, and communication – and a need to establish a medical home.

For me it's a partnership, and if you're going to judge or not be able to listen and communicate and acknowledge that I have value in my own health care, then it's not a relationship that's going to work for me. (Non-Hispanic White caregiver from southern Illinois, 39 years of age)

You... need to establish a relationship with a primary care doc, because they're gonna be your advocate and your referral system and with everything. So, I'm very blessed that I had a great family doc that I've been able to lean on. (Non-Hispanic White cancer survivor from northern Illinois, 44 years of age)

My doctors lead the way in [influencing my decisions to get screened for different cancers]... But I really trust my – god, I'm gonna get emotional. I trust my doctors so much.... They've done so much for me, and I think that the trusting relationship we've had has been the key. So, I pay attention to my body... I'm blessed with really good doctors, and they lead the way, and I let them. (Non-Hispanic White cancer survivor from central Illinois, 57 years of age)

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Participants discussed a lack of effective communication between patients and health care providers as a major barrier to achieving quality relationships. They attributed this to a multitude of factors, including providers' implicit biases and lack of cultural cognizance, patient literacy levels, and communication skills. People felt that some providers make assumptions based on the culture, appearance, or financial status of the patient. Communication skills are essential for both patients and providers, so that patients can better advocate for themselves and their loved ones, and so providers can deliver messages in appropriate, understandable fashion.

Supplemental patient-provider relationship and communication quotes

It's all about finding – I'm connected with the LGBTQ community, and just finding an open and affirming provider that's not going to have bias about your sexual orientation is like a whole extra step and can be complicated for people to overcome and make sure that they feel safe with a doctor. (Non-Hispanic White caregiver from southern Illinois, 39 years of age)

I also feel like there is also that demeanor especially for people of color – sorry to bring up race issues – but I feel like there is a demeanor that doctors have, especially towards people of color like, "You don't know any better." Like, they don't want to listen to you. It's like, "Man, are you really a doctor? Why are you treating me like I'm trash?"...Talk to me because I'm a human being. Not a second-class human being but a human being just like you." So, unfortunately, if you are Black, that's something that you have to live with. You have to educate yourself like [name of other focus group participant] said, before you go in, know your talking points. Stick to your talking points. (African American community member from rural southern Illinois, 40 years of age)

Having a conversation with the doctor may not be as understandable, and people don't know how to continue to say, "I don't understand" or "tell me in a different way." So, it's also a point of literacy and understanding. So, the doctor went to medical school and he or she is an expert. But if they can't deliver that message and that information in a way that's understandable, then they haven't done a good job. And so, I may sit in the office, I may get lots of information which is good pertinent information. But if I don't understand it, I don't have anything. (African American cancer survivor and caregiver from central Illinois, 49 years of age)

I'm not usually worried about a doctor believing me or following up on if I say something and they're like, "No, we think you're fine." I feel very comfortable pressing and being like, "Well, nope. I disagree." And I'm still reluctant sometimes to go to the doctor, but once I'm there I feel comfortable advocating. And I also feel like my doctors listen to me. (Non-Hispanic White cancer survivor from Cook County, 34 years of age)

I was sent to a neurosurgeon... And they started talking around me. I'm sitting there and these two doctors are talking like I'm not in the room. And they said, "We think she should do this," and I'm thinking, "I'm here. Somebody wanna say something to me? I could answer a question." And so, my response to that was to tell my doctor that I wasn't going to do it. And I canceled all future appointments. And I put a note in the file. "When you have somebody in the room with you, you don't talk over them. I'm not a simpleton. But more importantly, I'm a patient." (African American cancer survivor from Cook County, 60 years of age)

I went to a doctor to talk about some issues... and she didn't wanna listen to me... She told me that she knew what was wrong with me, she didn't have to listen to me. And I asked her, "How did you know?" And she said, "Because I've been to school for five years." And I'm like, "I've been in my body for 40 years. So, how can you know me better than me?" (African American caregiver from rural southern Illinois, 40 years of age)

Individual Demographics, Risk Factors, and Biologic Responses and Pathways

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Demographics, risk factors, and biological responses and pathways are proximal, individual-level determinants of health. Overall, town hall and focus group attendees had minimal discussion of individual-level risk factors and health behaviors. When they were mentioned, it was typically in relation to the different social and physical community contexts that shape behavior, such as access to resources and safety and engagement in physical activity. While individual demographics and risk factors, especially insurance status and immigration status, were described as contributing to cancer disparities across the continuum among Illinoisans, they were not perceived to be the primary drivers of the disparities. Concerning biologic responses and pathways, attendees had conversations about knowing one's family health and cancer history.

Insurance status

Overall, participants noted concerns that being uninsured or underinsured means neglecting your health simply because care is unaffordable otherwise. For example, people discussed the inability to get screened for cancer without insurance, hesitation to engage with screening in the event because if cancer is detected, the care will be unaffordable, and the exorbitant cost of treatment.

Health insurance plays such a huge role in cancer screening... When you end up losing your insurance, you have no other choice but to then start neglected your health... My oncologist appointments are only covered because I'm under a cancer study and they're helping me with those, and I can only go to the annual ones. I can't go if I have a complaint or anything. I can't go in... The low income, we are definitely, sadly affected by the fact that we have to neglect our health (Non-Hispanic White cancer survivor and caregiver from Central Illinois, 57 years of age).

A lot of people I know of lower income, of no health care or can't afford it, are afraid if they go get screened, they're gonna be in debt because of the bills that are gonna be coming their way. (African American male cancer survivor from Cook County, 57 years of age)

You know, I'm blessed to have a husband, and I've told him many times that were it not for our insurance coverage, I don't know where I'd be. Ovarian cancer is a very expensive treatment. CT scans are $12,000 sometimes. I just don't know how people could do it if they were not covered. I really don't. (Latina cancer survivor and caregiver from Cook County, 48 years of age)

Immigration status

In conversations concerning those in undocumented communities, participants noted the perception that they are less likely to utilize resources or seek medical care. For some, this may be due to fear of engaging with a health system, a lack of knowledge about where to receive care, or having to deal with long wait times for appointments.

There's a lot of people who have the thought that... [name of public hospital] isn't good because that's where all of the immigrants go, but... people who don't have resources to go to another hospital go there, and that's why they take a long time. Personally, I can say that years ago it was like that... They gave me an ultrasound [appointment] in six months. When I got to six months, I didn't have the pain anymore. (Latina community member from Cook County, 48 years of age)

Biologic Responses and Pathways

Participants discussed the importance of knowing their family history to assess their person cancer risk. Once cancer was diagnosed in a family, this opened up conversation opportunities. This also prompted other family members to engage in genetic testing.

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When I did my genetic testing and we did the whole history of the family, everyone's like, "Oh, can I get a copy of that?" So, having your family history and medical history, I should say, was very helpful for me and to be able to give it to other family members as well just so they could know what the background is for medical. Because I have a lot of cousins and they're like, "Wait, can I have that?" Because if we don't talk about it, they don't know about it. (Non-Hispanic White cancer survivor from Cook County, 36 years of age)

Once we found out there was a genetic mutation in the family – so now, one of my cousins who's younger than me, she actually got screened for it and so she's talking to a specialist to see what her options are so that she has more of a choice with it. (Non-Hispanic White cancer survivor from rural southern Illinois, 36 years of age)

Proposed Recommendations and Funding Priorities to Improve the Health of Illinoisans across the Cancer Continuum

During the town hall and focus groups, participants were asked to recommend and prioritize strategies and funding to address cancer disparities in Illinois. These strategies were organized and presented by policy and systems, clinical, community, and individual-level recommendations. These recommendations span the entire cancer care continuum, from with prevention and continuing through survivorship.

Policy and systems level recommendations

Overall, there was a strong sense that there should be continued advocacy, from policy makers, health care systems, providers, patients, and community members to ensure that all those who need health care receive it, irrespective of cost. One person described the ease of getting a COVID-19 vaccine at no cost and wondered why the receipt of cancer treatment was not free.

I just think about being able to go into a clinic and get a COVID vaccine for free. Why is it…? Why aren't more treatments available like that, regardless of what your income level is and what your financial situation is? I just think that the health care system in this country has a lot to be desired. (Non-Hispanic White cancer survivor and caregiver from suburban Cook County, 60 years of age)

Relatedly, the need for more affordable cancer screening for early detection and genetic counseling as prevention measures to improving health disparities was discussed often. One person stated:

Why can't we just make these services affordable to everybody? If they can't afford them, let's find a way of paying for those services so that we can, in the long run, save more lives. (African American community member from rural southern Illinois, 40 years of age)

At the health systems level, participants recommended a need for building trust and ensuring quality, standardized care for all. Health care organizations can enhance diversity among providers and recruit oncologists of color that mirror the communities they serve. This is especially important as there have been tremendous shifts in the health care landscape in terms of health care system closures, consolidations, and mergers. It is essential to set the same standard of care for all hospitals/cancer centers to ensure that all patients receive the same care no matter where they go for screening or where they receive treatment.

I think when it comes to the institutions… there's probably a handful [of well-known health care institutions] … and it could be that those systems have figured it out… but why can't everybody else figure it out? Why is a really big teaching hospital… not doing what [name of hospital] doing?… Why can't all of these institutions offer the same?… Everyone at McDonald's knows how to flip a hamburger the same way. Why can't everyone who does intake at a hospital, or a nurse navigator have the same kinda playbook of how to treat somebody? (Non-Hispanic White cancer survivor from central Illinois, 49 years of age)

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Clinical level

Several recommendations were suggested to address clinical-level factors that contribute to health disparities. These included access to patient navigation, improved patient provider communication, and provider trainings.

Patient navigation

It was clear that those who had access to patient navigation resources fared better in traversing treatment and survivorship. People discussed how important it was for everyone to have access to this clinical resource, and the importance of including information about counseling/emotional support and financial resources. Patient navigators can help to navigate the health care system and multilingual navigators are especially important. Also, navigation should include a billing advocate or interpreter that helps patients understand their coverage. One person compared their experience of not have a patient navigator to those of their friends, who did have access.

But what would've been great, and hospitals have this but ours doesn't –it would be to have a patient navigator. I had friends who did have patient navigators and it just blew my mind. I mean, they basically take care of all that stuff for you, answer your questions. And pretty much on our own to figure things out, I had to have homecare. And the poor social worker, she's just one person. So, she ended up getting us a list of possibilities. We called them all – my family – and just nothing clicked. And then, we finally hooked up with a company, business, that could do it for me. And I don't know what I would've done without it because my family couldn't do that. So, I really wish there were more patient navigators. (Non-Hispanic White cancer survivor from central Illinois, 66 years of age).

Communication

When patients and providers communicate effectively, patients' fears and uncertainties are addressed by care teams and providers can start to build trust in marginalized communities they serve. Participants talked about the need for communication to be bi-directional, respectful, and empathetic, and the importance of treating all patients equally, regardless of race, immigration status, sexual orientation, and/or socioeconomic status. One person described the need for provider education concerning communication.

...we need to do a better job at teaching... doctors [that] are in med school... how to communicate effectively...and empathetically because some of these doctors – bam bam bam – I'm out of here. It's like, "I cannot be bothered with questions. You have any questions, talk to my nurse. They'll let me know what you need." There is that attitude like, "I'm up here and you are down here, and I will just look on top of your head and just walk by you." So, I feel like the doctors need to get to your level, eye on eye, talk to you as an individual, especially and adult individual, where you are both respecting one another but still creating that space of respect... Doctors need to learn how to communicate effectively with their patients. (African American community member from rural southern Illinois, 40 years of age)

In addition to the recommendation for effective communication between patients and providers, there is a need for primary care providers, specialists, and care teams to communicate better.

If you have cancer... sometimes [the specialists] ... don't relay the information to the primary care physician or they don't have the kind of communication that needs to occur... I think that then affects the care because the specialist may tell me something, and if it's documented when I go to my primary care, then I can have the conversation with him or her, and that can provide a different lens from which to view. And that doesn't happen even with the electronic record. (African American cancer survivor and caregiver from central Illinois, 49 years of age)

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Provider training

Health care professionals should undergo additional training to address cultural competency. Participants recommended that these trainings should raise awareness among providers about the need to be understanding of their patients' preferences, even if they differ from their own. For example, in some cultures, women prefer female only providers, or make health decisions based on family input. If providers are better equipped to serve patients of diverse backgrounds, they can provide culturally appropriate resources, services for undocumented individuals, and more evidence-based interventions. Providers should understand communities they serve and its culture around cancer.

Community level

Community organizations, members, and health care providers can come together to address cancer disparity issues in Illinois. Specific recommendations included increased access to community navigators, ensuring that transportation needs are met for both rural and urban communities, and addressing food insecurity by establishing food depositories throughout the state.

Community navigators

It was recommended that cancer patients and survivors, as well as those engaging in cancer screenings, have access to community navigators. Because navigators are embedded in their communities, they are aware of the cancer-related resources and services. They can also help health care professionals understand the community's needs and help to create linkages to community resources. A variety of different disciplines can provide navigation services, including community health workers and health promotors.

I think part of it is, too – with our minority communities, is that it's almost as if we have to plant patient navigators in the community – or the churches or community groups – who speak the language. Not saying – the language as far as community, and nuance, and beliefs, and understand the community to help them trust the medical system. (Asian cancer survivor and caregiver from Cook County, 63 years of age)

Individual level

At the individual-level, the need to increase awareness and education opportunities about cancer among communities was a top recommendation among town hall and focus group participants. Specific topics of education included prevention/risk reduction, programs and resources available within a community, the existence of disparities and their impact, navigating the health care system, treatment options, including getting a second opinion, what to expect during treatment, and participation in clinical trials. Additionally, patients should be given information, so they are better equipped to ask questions and advocate for themselves. One cancer survivor talked specifically about the need for more individuals to be aware of screening guidelines.

I think there's a lack of knowledge about when to get screened... I was surprised that, as a cancer survivor, how little I knew about other cancers. I was just floored... if I don't know about other cancers and screening timing, how is the general population going to know?.... There's gotta be a way to present it to different communities and different age groups where it's not as scary. (Asian cancer survivor and caregiver from Cook County, 63 years of age)

Funding priorities

Participants shared their thoughts and ideas on how funds should be prioritized to address cancer in Illinois. First, it was noted that community organizations doing collaborative work should be prioritized if addressing cancer disparities, especially around screening, should be prioritized for funding. People also stated that

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cancer prevention should be kept in mind as the ultimate goal for funding priorities. There was a concern that COVID-19 was diverting available dollars and resources that had previously been allocated for cancer. Additional information about specific activities that were discussed and recommended for funding are presented below.

Social/emotional/educational support and patient navigation

...at the main clinics and hospitals and midsize areas, it's hit or miss whether an oncologist and their nurses are familiar with social/emotional support. And I think if there was more established connection and funding for that social work/counseling side, to refer patients to that, if they wanted, would be great. (Non-Hispanic White male cancer survivors from central Illinois, 35 years of age)

There are hospitals that have patient navigators... but they're so few and far between... That's the biggest problem... there was some discussion in the creation of the Affordable Care Act about creating a community health plan that could fund that. And, of course, it never got to fruition because they continued to eat away at it. But a lot of people recognized that it's not just the cancer but it's across the board. And the question is, who funds the patient navigators. (African American cancer survivor from Cook County, 60 years of age)

Cancer prevention efforts and research

There's a lot of emphasis on screening and catching it [cancer] early, which is obviously good, but... there needs to be a lot more emphasis on prevention and what actually causes cancer. (Non-Hispanic White cancer survivor from northern Illinois, 55 years of age)

Distribution of funds to different types of cancers

When men start getting ovarian cancer, that's when the research money will come up. That's what happened with breast cancer... Another interesting thing... how money is spent on different types of cancers. (Non-Hispanic White cancer survivor from Cook County, 81 years of age)

Cancer in the Era of COVID-19

Given the timing of the community engagement efforts, it is not surprising that the topic of COVID-19 was discussed repeatedly, and not only in relation to the cancer continuum. These conversations included discussions of health equity, as well as the fear and uncertainty surrounding COVID-19 as it overtook the U.S. health system. These conversations included discussions of health equity. Supplemental quotes about COVID-19 are included at the end of this section.

COVID-19 has unveiled long-standing health inequalities

On one hand, the global pandemic exacerbated health inequities and disparities, especially among racial and ethnic minority groups, rural residents, and people in lower socioeconomic standing. But on the other hand, as COVID-19 unveiled these long-standing health inequalities, it presented an opportunity for people to have conversations about that may not have occurred otherwise.

There's been... groups in the history of the United States that have been specifically mistreated or failed by the medical system... We're seeing that right now even with certain people groups not feeling safe to go get COVID testing or treatment or vaccines because of the history of how they've been treated. (Non-Hispanic White cancer survivor from central Illinois, 29 years of age)

One of the few good things about the COVID discussion is that health equity issues are finally coming into discussion by a broader audience. I think a lot of people weren't even aware that living in a rural community

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could impact the quality of your life, the quality of your health, the length of your life. And I think that's one of the few blessings... So, as terrible as COVID has been, I'm grateful that this is the discussion that's starting to occur. (Asian cancer survivor and caregiver from Cook County, 63 years of age)

Hesitation and fear to engage with health systems

Most certainly, COVID-19 affected engagement in cancer screenings. For some, the fear of contracting COVID-19 outweighed the benefits of engaging in non-cancer screenings. Additionally, the shifting public health guidance was confusing for some. One person stated:

I think for people who don't already have a diagnosis, there might have been some pause on [engaging in screenings], "Should I go out, should I not? Is this really something to be concerned about? Is it not something to be concerned about? Should I wait it out? Should I not?" So, I think there was a lot in the very beginning, a lot of confusion on what you can and cannot do. (Non-Hispanic White caregiver from suburban Cook County, 27 years of age)

Others that did contract COVID-19 delayed their engagement in cancer screenings. One person spoke of their experiences and their preferences to wait until they were vaccinated against COVID-19 to return to a clinical setting for a mammogram.

I was supposed to get a mammogram...but unfortunately, I got sick with COVID-19, and I had a hard time with it. I had a very hard time. And, I was supposed to have the appointment at the beginning of – at the end of 2020... So, honestly, I canceled it because I didn't feel safe... Fortunately, I got the second vaccine, so I feel safer to be able to go to a clinic and do my checkup. So, I preferred to just not go and hold off here and just ask God that when I go to get the tests, everything will come out okay. (Latina community member from Cook County, 48 years of age)

Medical prioritization of COVID-19 efforts

In addition to individuals' hesitations to engage with screenings, many health systems paused their screening appointments to prioritize their COVID-19 response efforts. People spoke of cancelled and backlog appointments for screenings and how this may translate into missed diagnoses. During the rural focus group, a participant described a huge decrease in screenings.

I think they estimate that there's been a decrease in screening by up to 90% in some areas, like, take a mammogram or prostate cancer. I don't know if that's right or not.... So, I think COVID's had a huge impact and I think oncologists are expecting a huge spike in the number of cases because we will have had so many undetected cases. It'll be a pity. (Non-Hispanic White cancer survivor from rural central Illinois, 55 years of age)

In addition to a pauses, delays, and cancellations of appointments for screen-able cancers, those individuals undergoing diagnostic and treatment procedures also experienced service interruptions. One person described challenges that recently diagnosed breast cancer patients experienced.

I spoke to two people who recently were diagnosed with breast cancer, and I think the most they've gotten is one appointment... Because of COVID, more than anything, there are backups on the appointments. (Latina community member from Cook County, 48 years of age)

Supplemental Focus Group Quotes about COVID-19

Impact of COVID-19 on cancer screenings

I think...when the pandemic began, exactly a year ago, a lot of appointments were canceled. Even appointments that were for cancer exams... They weren't allowing people into the hospitals unless it was an emergency. The

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hospitals started getting filled with people for COVID-19, so they gave priority to the pandemic. (Latina community member Cook County, 48 years of age)

In the communities that I work in with health advocacy, it's... valid [excuses for not engaging in cancer screening] such as, "I no longer have insurance. Because of COVID, I got laid off," or "Now, my anxiety –or I'm suffering from mental health, and a screening is not priority right now," or... "I just forgot because so many other things are going on in the world." It's not just, "I was busy at work and forgot to get my screening," or "it's a myth, that I don't believe screenings work." COVID has made so many other reasons for people to not get screened. (African American cancer survivor and caregiver from central Illinois, 49 years of age)

Impact of COVID-19 on late-stage diagnoses

I don't know that there's going to be a way to quantify it, but I'm terrified of the number of cancer cases that are caught in later stages as a result of not going in during COVID. (Non-Hispanic White cancer survivor from Cook County, 34 years of age)

African Americans had disproportionally higher COVID-19 mortality rates

I live in a very, very, very Black town, very Black part of Chicago... We had among the highest COVID incidence and cases... [and] mortality. And I think that the myriad of systematic influences that allow that, also are the same persistent for cancer. (African American community member from Cook County, 37 years of age)

Telehealth is here to stay

When we are over COVID and... back to somewhat semblance of normalcy, I think telehealth is here to stay... It does provide, particularly those people out in the boondocks, or those who don't have... transportation – it does give you an access to health care... I don't particularly like it. I prefer face-to-face, but that's just me. (Non-Hispanic White cancer survivor, central Illinois, 88 years of age)

Conclusion

The results of the community engagement strategy for the 2022-2027 Illinois Comprehensive Cancer Control Plan indicate that Illinoisans experience disparities across the cancer continuum. These disparities are a result of multilevel determinants of health, and include fundamental factors, like policies and social conditions; intermediate factors, including physical and social contexts; and proximate factors, such as individual demographics and risk factors. Participants from the town hall and focus groups proposed a number of policies, clinical, community, and individual-level recommendations to address the disparities. These recommendations should be considered by stakeholders, including community organizations, providers and oncologists, policy makers, and researchers, who are concerned with eliminating cancer disparities in Illinois. Undoubtedly, eliminating cancer disparities in Illinois will be a challenge, especially considering the COVID-19 pandemic. However, Illinois has an abundance of resources and assets to address this challenge, as well as a dedicated group of stakeholders who continue to work and advocate for the health of all Illinoisans.

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Innovative approaches for cancer treatment: current perspectives and new challenges

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Abstract

Every year, cancer is responsible for millions of deaths worldwide and, even though much progress has been achieved in medicine, there are still many issues that must be addressed in order to improve cancer therapy. For this reason, oncological research is putting a lot of effort towards finding new and efficient therapies which can alleviate critical side effects caused by conventional treatments. Different technologies are currently under evaluation in clinical trials or have been already introduced into clinical practice. While nanomedicine is contributing to the development of biocompatible materials both for diagnostic and therapeutic purposes, bioengineering of extracellular vesicles and cells derived from patients has allowed designing *ad hoc* systems and univocal targeting strategies. In this review, we will provide an in-depth analysis of the most innovative advances in basic and applied cancer research.

Keywords: *cancer, nanomedicine, extracellular vesicles, targeted therapy, immunotherapy, gene therapy, thermal ablation, radiomics, pathomics*

Review

Introduction

Cancer is one of the main causes of death worldwide, and in the past decade, many research studies have focused on finding new therapies to reduce the side effects caused by conventional therapies.

During cancer progression, tumours become highly heterogeneous, creating a mixed population of cells characterised by different molecular features and diverse responsivity to therapies. This heterogeneity can be appreciated both at spatial and temporal levels and is the key factor responsible for the development of resistant phenotypes promoted by a selective pressure upon treatment administration [1]. Usually, cancer is treated as a global and homogeneous disease and tumours are considered as a whole population of cells. Thus, a deep understanding of these complex phenomena is of fundamental importance in order to design precise and efficient therapies.

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Nanomedicine offers a versatile platform of biocompatible and biodegradable systems that are able to deliver conventional chemotherapeutic drugs *in vivo*, increasing their bioavailability and concentration around tumour tissues, and improving their release profile [2]. Nanoparticles can be exploited for different applications, ranging from diagnosis to therapy [2].

Recently, extracellular vesicles (EVs), responsible for cancer development, microenvironment modification and required for metastatic progression, have been widely investigated as efficient drug delivery vehicles [3].

Natural antioxidants and many phytochemicals have been recently introduced as anti-cancer adjuvant therapies due to their anti-proliferative and pro-apoptotic properties [4, 5].

Targeted therapy is another branch of cancer therapy aiming at targeting a specific site, such as tumour vasculature or intracellular organelles, leaving the surroundings unaffected. This enormously increases the specificity of the treatment, reducing its drawbacks [6].

Another promising opportunity relies on gene therapy and expression of genes triggering apoptosis [7] and wild type tumour suppressors [8], or the targeted silencing mediated by siRNAs, currently under evaluation in many clinical trials worldwide [9].

Thermal ablation of tumours and magnetic hyperthermia are opening new opportunities for precision medicine, making the treatment localised in very narrow and precise areas. These methods could be a potential substitute for more invasive practices, such as surgery [10, 11].

Furthermore, new fields such as radiomics and pathomics are contributing to the development of innovative approaches for collecting big amounts of data and elaborate new therapeutic strategies [12, 13] and predict accurate responses, clinical outcome and cancer recurrence [14–16].

Taken all together, these strategies will be able to provide the best personalised therapies for cancer patients, highlighting the importance of combining multiple disciplines to get the best outcome.

In this review, we will provide a general overview of the most advanced basic and applied cancer therapies, as well as newly proposed methods that are currently under investigation at the research stage that should overcome the limitation of conventional therapies; different approaches to cancer diagnosis and therapy and their current status in the clinical context will be discussed, underlining their impact as innovative anti-cancer strategies.

Review

Nanomedicine

Nanoparticles are small systems (1–1,000 nm in size) with peculiar physicochemical properties due to their size and high surface-to-volume ratio [17]. Biocompatible nanoparticles are used in cancer medicine to overcome some of the issues related to conventional therapies, such as the low specificity and bioavailability of drugs or contrast agents [2]. Therefore, encapsulation of the active agents in nanoparticles will increase their solubility/biocompatibility, their stability in bodily fluids and retention time in the tumour vasculature [18–20]. Furthermore, nanoparticles can be engineered to be extremely selective for a precise target [21, 22] (see the "Targeted therapy and immunotherapy" section) and to release the drug in a controlled way by responding to a specific stimulus [18, 23–25]. This is the case of ThermoDox, a liposomal formulation that can release doxorubicin as a response to an increment of temperature [26].

Inorganic nanoparticles are generally used as contrast agents for diagnosis purposes. Among them, quantum dots are small light-emitting semiconductor nanocrystals with peculiar electronic and optical properties, which make them highly fluorescent, resistant to photobleaching and sensitive for detection and imaging purposes [27]. Combined with active ingredients, they can be promising tools for theranostic applications [27]. In a recent study, quantum dots coated with poly(ethylene glycol) (PEG) were conjugated to anti-HER2 antibody and localised in specific tumour cells [28].

Superparamagnetic iron oxide nanoparticles (SPIONs) are usually exploited as contrast agents in magnetic resonance imaging (MRI) because they interact with magnetic fields [29, 30]. Five types of SPIONs have been tested for MRI: ferumoxides (Feridex in the US, Endorem in Europe), ferucarbotran (Resovist), ferucarbotran C (Supravist, SHU 555 C), ferumoxtran-10 (Combidex) and NC100150 (Clariscan). Ferucarbotran is currently available in few countries, while the others have been removed from the market [25]. SPIONs have also been studied for

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cancer treatment by magnetic hyperthermia (see the "Thermal ablation and magnetic hyperthermia" section), and a formulation of iron oxide coated with aminosilane called Nanotherm has been already approved for the treatment of glioblastoma [31].

Gold nanoparticles have raised interest because of their optical and electrical properties and low toxicity [32–34]. They are mainly used as contrast agents for X-ray imaging, computed tomography [25], photoacoustic imaging [35] and photodynamic therapy [36]. A nanoshell made of a silica core and a gold shell coated with PEG was approved by the Food and Drug Administration (FDA) in 2012 and commercialised as AuroShell (Nanospectra) for the treatment of breast cancer by photodynamic therapy [25].

Organic nanoparticles are mainly used as delivery systems for drugs. Liposomes and micelles are both made of phospholipids, but they differ in their morphology. Liposomes are spherical particles having at least one lipid bilayer, resembling the structure of cell membranes. They are mainly used to encapsulate hydrophilic drugs in their aqueous core, but hydrophobic drugs can also be accommodated in the bilayer or chemically attached to the particles [37]. Micelles, instead, own a hydrophobic core that can encapsulate hydrophobic drugs [38]. Doxil, doxorubicin-loaded PEGylated liposomes, were the first nanoparticles approved by the FDA in 1995 to treat AIDS-associated Kaposi's sarcoma [39]. This formulation drastically reduces doxorubicin side effects. Since then, other liposomal formulations have been approved by the FDA for cancer therapy, such as Myocet and DaunoXome [40–42]. Polymeric nanoparticles are made of biocompatible or natural polymers, such as poly(lactide-co-glycolide), poly(ε-caprolactone), chitosan, alginate and albumin [43]. Some formulations have already been accepted by the FDA, such as Abraxane (albumin-paclitaxel particles for the treatment of metastatic breast cancer and pancreatic ductal adenocarcinoma) and Ontak (an engineered protein combining interleukin-2 and diphtheria toxins for the treatment of non-Hodgkin's peripheral T-cell lymphomas).

As well as these systems, which have been either accepted or are under clinical investigation, it is worth mentioning some new nanoparticles currently undergoing testing at the research level, which should improve treatment performance. For example, solid lipid nanoparticles, made of lipids that are solid at body temperature [44], and fabricated to load hydrophobic drugs [45] have been demonstrated to give a higher drug stability and prolonged release compared to other systems; however, the encapsulation efficiency is often low because of their high crystallinity [46]. To overcome this issue, one or more lipids, liquid at room temperature (like oleic acid, for example), are included in the formulation [47]. Lipid nanoparticles are good candidates for brain tumour therapy as they are able to cross the blood–brain barrier (BBB) [48]. A recent work showed that lipid nanoparticles loaded with SPIONs and temozolomide are efficient to treat glioblastoma since they combine the effect of the conventional chemotherapy and hyperthermia [49, 50]. Dendrimers are another family of nanoparticles composed of polymers with a repetitive branched structure and characterised by a globular morphology [51, 52]. Their architecture can be easily controlled, making their structure extremely versatile for many applications. For example, some recent studies show that poly-L-lysine (PLL) dendrimers loaded with doxorubicin induce anti-angiogenic responses in *in vivo* tumour models [53]. Currently, there is only one clinical trial for a formulation named ImDendrim based on a dendrimer and on a rhenium complex coupled to an imidazolium ligand, for the treatment of inoperable liver cancers that do not respond to conventional therapies [54].

Review

Extracellular vesicles for cancer diagnosis and therapy

EVs are classified in two categories based on their biogenesis. Specifically, exosomes are small vesicles of around 30–150 nm originated from endosomes in physiological and pathological conditions and released by a fusion of multivesicular bodies (MVBs) to the cell membrane [55, 56], while shed microvesicles (sMVs), with a typical size of 50–1,300 nm, are present in almost any extracellular bodily fluid and are responsible for the exchange of molecular materials between cells [57, 58]. Exosomes are involved in cancer development and spreading [3, 59, 60], in the bidirectional communication between tumour cells and surrounding tissues, and in the construction of the microenvironment needed for pre-metastatic niche establishment and metastatic progression [61]. Hence, circulating vesicles are clinically relevant in cancer diagnosis, prognosis and follow up. Exosomes are actually recognised as valid diagnostic tools, but they can also be isolated and exploited as anti-cancer vaccines or nanosized drug carriers in cancer therapy [62].

Nowadays, one of the main issues in cancer diagnosis is the early identification of biomarkers by non-invasive techniques. Obtaining a significant amount of information, before and during tumour treatment, should allow the monitoring of cancer progression and the efficacy of therapeutic regimens. Liquid biopsies to detect circulating tumour cells, RNAs, DNAs and exosomes have been used as indicators for

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personalised medicine [63]. In recent years, exosomes detection has been validated as a reliable tool for preclinical practice in different cancer types [64], thanks to the identification of their content: double-stranded DNA (dsDNA) [65, 66], messenger RNA (mRNA), micro RNA (miRNA), long non-coding RNA (lncRNA) [67], proteins and lipids [68]. DsDNA has been detected in exosomes isolated from plasma and serum of different cancer cell types, and mutated genes involved in tumorigenesis, such as mutated *KRAS* and *TP53* [69, 70], have been identified as disease predictors. Similarly, exosomal AR-V7 mRNA has been used as a prognostic marker of resistance to hormonal therapy in metastatic prostate cancer patients [71]. Gene expression profiling of multiple RNAs from urinary exosomes has been adopted as an efficient diagnostic tool [72]. LncRNAs isolated from serum exosomes have been exploited for disease prognosis in colorectal cancer patients [73], and multiple miRNAs allow one to distinguish between different lung cancer subtypes [74]. GPC1-positive exosomes have been employed to detect pancreatic cancer [75], while circulating exosomal macrophage migration inhibitory factor (MIF) was able to predict liver metastasis onset [76]. Finally, multiple lipids present in urinary exosomes have been approved as prostate cancer indicators [77]. Due to the high variability of patient classes and sample size, and in order to obtain clinically significant results for a fast and effective diagnosis, huge investments in exosome research will be required in the near future.

Exosomes could also be exploited as natural, biocompatible and low immunogenic nanocarriers for drug delivery in cancer therapy. They can be passively loaded by mixing purified vesicles with small drugs [78–82], or actively loaded by means of laboratory techniques, such as electroporation and sonication [83, 84]. Superparamagnetic nanoparticles conjugated to transferrin have been tested for the isolation of exosomes expressing transferrin receptor from mice blood. After incubation with doxorubicin, they have been used to target liver cancer cells in response to external magnetic fields, inhibiting cell growth both *in vitro* and *in vivo* [80]. Kim *et al.* [83] engineered mouse macrophage-derived exosomes with aminoethyl anisamide-PEG to target sigma receptor, overexpressed in lung cancer cells and passively loaded them with paclitaxel. These systems acted as targeting agents able to suppress metastatic growth *in vivo*.

Three clinical trials with loaded exosomes are currently ongoing for the treatment of different tumours [85–87]: a phase I trial is evaluating the ability of exosomes to deliver curcumin to normal and colon cancer tissues [85]; a phase II trial is investigating the *in vivo* performance of autologous tumour cell-derived microparticles carrying methotrexate in lung cancer patients [86] and a clinical inquiry is focusing on autologous erythrocyte-derived microparticles loaded with methotrexate for gastric, colorectal and ovarian cancer treatment [87].

Recently, new strategies to produce *ad hoc* exosomes have been developed. Cells releasing exosomes have been genetically engineered to overexpress specific macromolecules, or modified to release exosomes with particular targeting molecules [88–90].

Exosomes derived from different cancer cells have already been exploited as cancer vaccines. Autologous dendritic cell-derived exosomes with improved immunostimulatory function have been tested in a phase II clinical trial for the activation of $CD8^+$ T cells [91] in non-small cell lung cancer (NSCLC) patients, observing disease stabilisation and a better overall survival [92]. In a phase I trial, ascites-derived exosomes supplemented with granulocyte-macrophage colony stimulating factor (GM-CSF) have been administered to colorectal cancer patients, soliciting a tumour-specific immune response [93].

Many issues related to exosomes clinical translation remain open and are mostly connected to the definition of preclinical procedures for isolation, quantification, storage and standard protocols for drug loading. It is becoming even more necessary to distinguish between tumour and healthy blood cell-derived vesicles to characterise their post-isolation half-life and to perform standard content analyses. For these purposes, innovative approaches and technologies have been set up, such as microarrays and specific monoclonal antibodies and RNA markers amplification strategies [94].

Natural antioxidants in cancer therapy

Every day, the human body undergoes several exogenous insults, such as ultraviolet (UV) rays, air pollution and tobacco smoke, which result in the production of reactive species, especially oxidants and free radicals, responsible for the onset of many diseases, including cancer. These molecules can also be produced as a consequence of clinical administration of drugs, but they are also naturally created inside our cells and tissues by mitochondria and peroxisomes, and from macrophages metabolism, during normal physiological aerobic processes.

Oxidative stress and radical oxygen species are able to damage DNA (genetic alterations, DNA double strand breaks and chromosomal aberrations [95, 96]) and other bio-macromolecules [97], such as lipids (membrane peroxidation and necrosis [98]) and proteins (significantly changing the regulation of transcription factors and, as a consequence, of essential metabolic pathways [99]).

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The protective mechanisms our body has developed against these molecules are sometimes insufficient to counteract the huge damages produced. Recently, in addition to research into the roles of the physiological enzymes superoxide dismutase (SOD), catalase (CAT) and glutathione peroxidase (GP), natural antioxidants such as vitamins, polyphenols and plant-derived bioactive compounds are being studied in order to introduce them as preventive agents and potential therapeutic drugs [100, 101]. These molecules have anti-inflammatory and anti-oxidant properties and are found in many vegetables and spices [102]. Vitamins, alkaloids, flavonoids, carotenoids, curcumin, berberine, quercetin and many other compounds have been screened *in vitro* and tested *in vivo*, displaying appreciable anti-proliferative and pro-apoptotic properties, and have been introduced as complementary therapies for cancer [4, 5, 103].

Despite the advantages of using natural drugs, their translation into clinical practice remains difficult due to their limited bioavailability and/or toxicity. Curcumin, a polyphenolic compound extracted from turmeric (*Curcuma longa*), is a traditional Southeast Asian remedy with anti-inflammatory, anti-oxidant and chemopreventive and therapeutic activities [104]. It has been shown to have cytotoxic effects in different kinds of tumours, such as brain, lung, leukaemia, pancreatic and hepatocellular carcinoma [105, 106], with no adverse effects in normal cells at the effective therapeutic doses [107]. Curcumin can modulate a plethora of cellular mechanisms [108, 109]; however, its biological properties, and as a consequence, the treatment duration and the efficient therapeutic doses, have not been completely elucidated yet. This molecule is highly lipophilic, poorly soluble in water and not very stable [110]. Different strategies and specific carriers, such as liposomes and micelles [111, 112], have been developed to improve its bioavailability. Currently, 24 clinical trials involving curcumin are ongoing and 23 have been already completed [113].

Berberine is an alkaloid compound extracted from different plants, such as *Berberis*. Recently, it has been demonstrated to be effective against different tumours and to act as a chemopreventive agent, modulating many signalling pathways [114, 115]. Like curcumin, it is poorly soluble in water; therefore, different nanotechnological strategies have been developed to facilitate its delivery across cell membranes [116–119]; six clinical trials are open and one has been completed [120].

Quercetin, a polyphenolic flavonoid found in fruits and vegetable, has been proven to be effective to treat several tumours, such as lung, prostate, liver, colon and breast cancers [121–123], by binding cellular receptors and interfering with many signalling pathways [124]. Interestingly, it has been shown to be effective also in combination with chemotherapeutic agents [125]. Presently, seven clinical trials are open and four have been completed [126].

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Targeted therapy and immunotherapy

One of the main problems of conventional cancer therapy is the low specificity of chemotherapeutic drugs for cancer cells. In fact, most drugs act both on healthy and diseased tissues, generating severe side effects. Researchers are putting a lot of effort into finding a way to target only the desired site. Nanoparticles have raised great interest for their tendency to accumulate more in tumour tissues due to the enhanced permeability and retention effect (EPR) [127]. This process, called passive targeting, relies on the small size of nanoparticles and the leaky vasculature and impaired lymphatic drainage of neoplastic tissues [6]. Passive targeting, however, is difficult to control and can induce multidrug resistance (MDR) [128]. Active targeting, on the other hand, enhances the uptake by tumour cells by targeting specific receptors that are overexpressed on them [129, 130]. Nanoparticles, for example, can be functionalized with ligands that univocally bind particular cells or subcellular sites [6]. Several kinds of ligands can be used, such as small molecules, peptides, proteins, aptamers and antibodies.

Folic acid and biotin are small molecules, whose receptors are overexpressed in tumour tissues. Several nanocarriers have been functionalized with folic acid to target ovarian and endometrial cancers [131]: folic acid-conjugated polyethylene glycol-poly(lactic-co-glycolic acid) nanoparticles delivering docetaxel increased drug cellular uptake by human cervical carcinoma cells [132]. Small ligands are cheap and can be linked to nanoparticles by simple conjugation chemistry [133, 134].

Different kinds of small peptides and proteins are also effective in active targeting. Angiopep-2 is a peptide that has raised great interest in the treatment of brain cancer [135], because it binds to low-density lipoprotein receptor-related protein-1 (LRP1) of endothelial cells in the BBB, and it is also overexpressed in glioblastoma cancer cells [136]. Bombesin peptide conjugated to poly(lactic-co-glycolic acid) (PLGA) nanoparticles loaded with docetaxel was used to target the gastrin-releasing peptide receptor, overexpressed on cell surface of prostate, breast, ovarian, pancreatic and colorectal cancer cells [137, 138]. Transferrin is a serum glycoprotein overexpressed on many solid tumours, especially on glioblastoma multiforme cells [139], and on epithelial cells of the BBB [6, 140]. Transferrin-conjugated chitosan-PEG nanoparticles delivering paclitaxel exhibited a higher cytotoxicity towards transferrin-overexpressing human non-small cell lung cancer cells (NSCLCs) (HOP-62) [141].

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Aptamers are small synthetic single-stranded RNA or DNA oligonucleotides folded into specific shapes that make them capable of binding specific targets [142]. Farokhzad *et al.* [143] reported that the use of A10 RNA aptamer conjugated to docetaxel-loaded nanoparticles significantly enhances *in vitro* cytotoxicity. The same aptamer has been also used to prepare quantum dot-doxorubicin conjugates [144].

Antibodies are currently the most exploited ligands for active targeting. These proteins have a typical 'Y' shape, where the two arms are responsible for the selective interaction with the antigen [145]. Antibodies can be used as immunoconjugates, when conjugated to a drug or nanoparticle, or naked. In the first case, their function is mainly to target a specific antigen overexpressed on cancer cells. Antibodies used for this purpose include those ones that bind to the human epidermal growth factor receptor 2 (HER2), the epidermal growth factor receptor (EGFR), the transferrin receptor (TfR) and the prostate-specific membrane antigen (PSMA) [6]. Rapamycin-PLGA nanoparticle conjugated to EGFR antibody exhibited higher cellular uptake by human breast adenocarcinoma cells (MCF-7), with enhanced apoptotic activity [146]. Loperamide-loaded human serum albumin nanoparticles conjugated to antibodies that specifically bind transferrin receptor successfully crossed the BBB and delivered the drug to the desired site [147].

Naked antibodies or immunoconjugates can also be used in immunotherapy, which is a cancer treatment that aims at stimulating or restoring the immune system of the patient against cancer cells [148]. Antibodies can act as markers for cancer cells to make them more vulnerable to the immune system response (non-specific immune stimulation), or as inhibitors for immune checkpoint proteins on cancer cell surface, that can modulate the action of T-cells [148]. Several antibodies have been already tested and accepted by FDA for immunotherapy, such as rituximab (1997, [149]), ibritumomab tiuxetan (2002, [150]), trastuzumab emtansine (2013, [151]), nivolumab (2014, [152]) and pembrolizumab (2014, [153]).

Immunotherapy can be achieved by another strategy called adoptive cell transfer (ACT) and it consists of isolating T-lymphocytes (T-cells) with the highest activity against cancer directly from the patient's blood, expanding them *ex vivo*, and reinfusing them again into the patient [154]. Autologous T-cells can be genetically engineered *in vitro* to express a chimaeric antigen receptor (CAR), which makes them more specific against cancer cell antigens [148]. Different CARs can be designed to be directed against a certain cancer antigen. The genetic modification of T-cells can be achieved by different methods such as viral transduction, non-viral methods like DNA-based transposons, CRISPR/Cas9 or other plasmid DNA and mRNA transfer techniques (i.e., electroporation, encapsulation in nanoparticles) [155]. ACT protocols have been already adopted in clinical practice for advanced or recurrent acute lymphoblastic leukaemia and for some aggressive forms of non-Hodgkin's lymphoma [148]. For example, it has been shown that the treatment of end-stage patients affected by acute lymphocytic leukaemia with CAR T-cells led to a full recovery in up to 92% of patients [155]. Despite these very promising results, much research is currently devoted to understanding the long-term side effects of CAR T-cell therapies and their fate within tumours, and to improving CAR T-cell expansion technologies.

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Gene therapy for cancer treatment

Gene therapy is intended as the introduction of a normal copy of a defective gene in the genome in order to cure specific diseases [156]. The first application dates back to 1990 when a retroviral vector was exploited to deliver the adenosine deaminase (ADA) gene to T-cells in patients with severe combined immunodeficiency (SCID) [157]. Further research demonstrated that gene therapy could be applied in many human rare and chronic disorders and, most importantly, in cancer treatment. Approximately 2,900 gene therapy clinical trials are currently ongoing, 66.6% of which are related to cancer [158]. Different strategies are under evaluation for cancer gene therapy: 1) expression of pro-apoptotic [159, 160] and chemo-sensitising genes [4]; 2) expression of wild type tumour suppressor genes [5]; 3) expression of genes able to solicit specific antitumour immune responses and 4) targeted silencing of oncogenes.

One approach relied on thymidine kinase (TK) gene delivery, followed by administration of prodrug ganciclovir to activate its expression and induce specific cytotoxicity [161]. This has been clinically translated for the treatment of prostate cancer and glioma [162–164]. In recent decades, different vectors carrying the p53 tumour suppressor gene have been evaluated for clinical applications. ONYX-015 has been tested in NSCLC patients and gave a high response rate when administered alone or together with chemotherapy [165]. Gendicine, a recombinant adenovirus carrying wild-type p53 in head and neck squamous cell cancer had a similar success, inducing complete disease regression when combined with radiotherapy [166].

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Despite many achievements, there are still some challenges to face when dealing with gene therapy, such as the selection of the right conditions for optimal expression levels and the choice of the best delivery system to univocally target cancer cells. Gene therapy also presents some drawbacks linked to genome integration, limited efficacy in specific subsets of patients and high chances of being neutralised by the immune system. Therefore, particular interest has been elicited by targeted gene silencing approaches.

RNA interference (RNAi) has been recently established as an efficient technology both for basic research and medical translation. Small interfering RNAs (siRNAs) consist of double-stranded RNAs [167] able to produce targeted gene silencing. This process is intracellularly mediated by the RNA-induced silencing complex (RISC), responsible for cleaving the messenger RNA (mRNA), thus leading to interference with protein synthesis [168]. This physiological mechanism has been demonstrated in many eukaryotes, including animals. A few years after RNAi discovery, the first clinical application for wet-age related macular degeneration treatment entered phase I clinical trial [169]. Since cancer is triggered by precise molecular mechanisms, siRNAs can be rationally designed to block desired targets responsible for cell proliferation and metastatic invasion. This strategy relies on siRNA-mediated gene silencing of anti-apoptotic proteins [170], transcription factors (i.e., *c-myc* gene) [171, 172] or cancer mutated genes (i.e., *K-RAS*) [173]. Most of the clinical trials currently ongoing are based on local administration of siRNA oligonucleotides in a specific tissue/organ or on systemic delivery throughout the entire body [9, 174]. Using siRNA-based drugs has several advantages: 1) safety, since they do not interact with the genome; 2) high efficacy, because only small amounts can produce a dramatic gene downregulation; 3) possibility of being designed for any specific target; 4) fewer side effects when compared to conventional therapies and 5) low costs of production [175, 176]. However, siRNAs are relatively unstable *in vivo* and can be phagocytosed during blood circulation, excreted by renal filtration, or undergo enzymatic degradation [177]. Occasionally, they can induce off-target effects [178] or elicit innate immune responses, followed by specific inflammation [179, 180]. Since naked siRNAs are negatively charged hydrophilic molecules, they cannot spontaneously cross cell membranes. Consequently, different delivery strategies are currently under study, such as chemical modification, encapsulation into lipid or polymeric carriers or conjugation with organic molecules (polymers, peptides, lipids, antibodies, small molecules [181], for efficient targeting [182, 183]). Chemical modifications include the insertion of a phosphorothioate at 3' end to reduce exonuclease degradation [184], the introduction of 2' O-methyl group to obtain longer half-life in plasma [185] and the modification by 2,4-dinitrophenol to favour membrane permeability [186]. Nevertheless, the degradation of modified siRNAs often elicits cytotoxic effects; therefore, it is preferable to design *ad hoc* nanocarriers.

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Different cationic lipid nanoparticles, such as liposomes, micelles and solid lipid nanoparticles [183], have been exploited for siRNA loading. Cationic liposomes interact with negatively charged nucleic acids, which can be easily transfected by simple electrostatic interactions [187, 188]. They can be constituted by 1,2-dioleoyl-3-trimethylammonium propane (DOTAP) and N-[1-(2,3-dioleoyloxy) propyl]-N,N,N-trimethylammonium methyl sulphate (DOTMA) [189]. A theranostic agent consisting of an anticancer survivin siRNA entrapped in PEGylated liposomes has been developed to achieve simultaneous localisation inside tumour cells by means of entrapped MR agents and fluorophores and reduction of proliferation *in vivo* [190].

Neutral liposomes based on 1,2-dioleoyl-sn-glycero-3-phosphatidylcholine (DOPC) have shown high efficacy in mice models of ovarian carcinoma and colorectal cancer [191, 192]. A phase I clinical trial is currently recruiting patients for evaluating the safety of siRNA-EphA2-DOPC when administered to patients with advanced and recurrent cancer [193].

Stable nucleic acid lipid particles (SNALPs) have been evaluated in non-human primates [194]. SiRNAs have been encapsulated in a mixture of cationic lipids coated with a shell of polyethylene glycol (PEG) [195]. SNALPs entered a phase I clinical trial in patients affected by advanced solid tumours with liver involvement [196] and a phase I/II trial for treating neuroendocrine tumours and adrenocortical carcinoma patients refractory to standard therapy [197].

SiRNAs can be condensed in cationic polymers such as chitosan, cyclodextrin and polyethylenimine (PEI). Chitosan is a natural polysaccharide that, due to its cationic charge, has been exploited as carrier for nucleic acids *in vitro* and *in vivo* [198]. Specifically, a targeted siRNA has been delivered in mice xenografts of breast cancer [199]. Cyclodextrin polymers coated with PEG, conjugated with human transferrin and carrying a siRNA called CALAA-01, inhibit tumour growth by reducing the expression of M2 subunit of ribonucleotide reductase (R2), and have entered a phase I clinical trial [200]. PEI is able to form small cationic nanoparticles containing siRNAs and it has been exploited as antitumoural, upon loading with HER-2 receptor-specific siRNA [201]. A phase II clinical trial is presently starting to evaluate siG12D LODER directed to mutated KRAS oncogene and encapsulated into a biodegradable polymeric matrix for locally treating advanced pancreatic cancer patients in combination with chemotherapy [202].

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SiRNAs may be conjugated to peptides, antibodies and aptamers in order to improve their stability during circulation and to enhance cellular uptake [203]. A success is represented by siRNAs targeting PSMA, overexpressed in this type of cancer [204].

The introduction of nanocarriers has largely improved siRNAs stability, pharmacokinetics and biodistribution properties, and the targeting specificity [205, 206]. Smart nanomaterials responsive to external (i.e., magnetic field, ultrasounds) and tumour-specific stimuli (i.e., acidic pH, redox conditions) are currently under the development for controlled release and reduction of undesired negative effects [207, 208]. Nanocarriers delivering siRNAs undergo a series of pH variations from blood circulation to intracellular environment and, for this reason, many pH responsive materials have been designed to favour cargo release under specific pH conditions [209]. Poly(allylamine) phosphate nanocarriers, stable at physiological pH, have been developed to release siRNAs in the cytoplasm after disassembly at low endosomal pH [210].

Although there have been many successes, some questions remain open and make the clinical translation of the siRNA-based approach very challenging, such as the correct doses to be delivered to patients and the many variabilities observed between individuals and different stages of disease. Further research towards controlled release to reach only specific targets, and the set-up of the best personalised therapy for cancer patients will be necessary in the near future.

Thermal ablation and magnetic hyperthermia

Review

Thermal ablation of tumours includes a series of techniques that exploit heat (hyperthermia) or cold (hypothermia) to destroy neoplastic tissues [13]. It is known that cell necrosis occurs at temperatures lower than -40°C or higher than 60°C. Long exposures to temperatures between 41°C and 55°C are also effective for tumour cell damage. Moreover, it has been shown that cancer cells are more sensitive to high temperatures than healthy ones [211].

Hypothermic ablation is due to the formation of ice crystals upon cooling, which destroy cell membranes and finally kill cells. Argon gas is the preferred cooling agent because it can cool down the surrounding tissues to -160°C. Also, gases at their critical point, such as nitrogen, can be exploited since they have a higher heat capacity than argon. However, the technology to control and direct them is not well developed yet [10].

Hyperthermic ablation currently comprises radiofrequency (RF), microwave and laser ablation [10].

RF ablation is the most used in clinics, because it is effective and safe [212]. An alternated current of RF waves is applied to a target zone by an insulated electrode tip, while a second electrode, needed to close the circuit, is placed on the skin surface [10]. The interaction with the current causes the oscillation of ions in the extracellular fluid, which, in turns, produces heat. The more conductive the medium, the more effective the process. For this reason, RF ablation works very well in the liver and in other areas with a high content of water and ions, whereas it has a poor effect in lungs [10]. Moreover, the efficiency of the treatment decreases with the size of the lesion, giving the best results for areas not larger than 3 cm^2 [213, 214].

Microwave ablation is based on the electromagnetic interaction between microwaves and the polar molecules in tissues, like water, that causes their oscillation and the consequent increase in temperature. Unlike the electrical current in RF ablation, microwaves can propagate through any kind of tissue [215, 216], and this allows high temperatures to be reached in a short amount of time, to have a deeper penetration and to treat larger areas of tumours [217].

Laser therapy exploits the properties of laser beams of being very narrow and extremely focused at a specific wavelength. This makes the treatment very powerful and precise, thus a promising alternative to conventional surgery [218]. The absorption of the light emitted by the laser results in the heating and subsequent damage of the treated area [219]. Depending on the specific application, different kinds of lasers can be used. Neodymium:yttrium-aluminium-garnet (Nd:YAG) lasers (wavelength of 1064 nm) and diode lasers (wavelength of 800–900 nm) are used to treat internal organs, since they have a penetration depth up to 10 cm [218]. Conversely, CO_2 lasers (10,600 nm), with a penetration depth of 10 μm up to 1 mm maximum are used for superficial treatments. Laser therapy is receiving a lot of attention in research because of its advantages compared to other ablation techniques, such as a higher efficacy, safety and precision, and a shorter treatment session needed to achieve the same results [220, 221]. Moreover, the fibres to transmit laser light are compatible with MRI, allowing for a precise

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measure of the temperature and the thermal dose [222]. However, there are still some limitations to overcome, such as the need of a very skilled operator to place the fibre in the correct position [218].

Finally, a new way to heat tumour tissues, currently under study, is through magnetic hyperthermia. This technique exploits superparamagnetic or ferromagnetic nanoparticles that can generate heat after stimulation with an alternating magnetic field. The most studied systems in nanomedicine are SPIONs [11]. The production of heat, in this case, is due to the alignment of magnetic domains in the particles when the magnetic field is applied, and the subsequent relaxation processes (Brownian and/or Neel relaxations) during which heat is released, when the magnetic field is removed and the magnetisation of the particles reverts to zero [223]. Magnetic hyperthermia can reach any area of the body and SPIONs can also act as MRI contrast agents to follow their correct localisation before the stimulation. The particles can be coated with biocompatible polymers and/or lipid and functionalized with specific ligands to impart targeting properties [224]. As already mentioned, until now, just a formulation of 15-nm iron oxide nanoparticles coated with aminosilane (Nanotherm) obtained approval for the treatment of glioblastoma [31]. SPIONs have also been successfully encapsulated in lipid nanocarriers together with a chemotherapeutic agent to combine chemotherapy and hyperthermia [49, 50].

Recent innovations in cancer therapy: Radiomics and pathomics

Efficient cancer therapy currently relies on surgery and, in approximately 50% of patients, on radiotherapy, that can be delivered by using an external beam source or by inserting locally a radioactive source (in this case, the approach is named brachytherapy), thus obtaining focused irradiation. Currently, localisation of the beam is facilitated by image-guided radiotherapy (IGRT), where images of the patient are acquired during the treatment allowing the best amount of radiation to be set. Thanks to the introduction of intensity-modulated radiotherapy (IMRT), radiation fields of different intensities can be created, helping to reduce doses received by healthy tissues and thus limiting adverse side effects. Finally, by means of stereotactic ablative radiotherapy (SABR), it has become feasible to convey an ablative dose of radiation only to a small target volume, significantly reducing undesired toxicity [225].

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Unfortunately, radioresistance can arise during treatment, lowering its efficacy. This has been linked to mitochondrial defects; thus, targeting specific functions have proven to be helpful in restoring anti-cancer effects [226]. A recent study has shown, for example, that radioresistance in an oesophageal adenocarcinoma model is linked to an abnormal structure and size of mitochondria, and the measurement of the energy metabolism in patients has allowed discrimination between treatment resistant and sensitive patients [227]. Targeting mitochondria with small molecules acting as radiosensitizers is being investigated for gastrointestinal cancer therapy [228].

Cancer is a complex disease and its successful treatment requires huge efforts in order to merge the plethora of information acquired during diagnostic and therapeutic procedures. The ability to link the data collected from medical images and molecular investigations has allowed an overview to be obtained of the whole tridimensional volume of the tumour by non-invasive imaging techniques. This matches with the main aim of precision medicine, which is to minimise therapy-related side effects, while optimising its efficacy to achieve the best individualised therapy [229].

Radiomics and pathomics are two promising and innovative fields based on accumulating quantitative image features from radiology and pathology screenings as therapeutic and prognostic indicators of disease outcome [12, 13, 230]. Many artificial intelligence technologies, such as machine learning application, have been introduced to manage and elaborate the massive amount of collected datasets and to accurately predict the treatment efficacy, the clinical outcome and the disease recurrence. Prediction of the treatment response can help in finding an *ad hoc* adaptation for the best prognosis and outcome. Nowadays, personalised medicine requires an integrated interpretation of the results obtained by multiple diagnostic approaches, and biomedical images are crucial to provide real-time monitoring of disease progression, being strictly correlated to cancer molecular characterisation.

Radiomics is intended as the high throughput quantification of tumour properties obtained from the analysis of medical images [14, 15, 231]. Pathomics, on the other side, relies on generation and characterisation of high-resolution tissue images [16, 232, 233]. Many studies are focusing on the development of new techniques for image analysis in order to extrapolate information by quantification and disease characterisation [234, 235]. Flexible databases are required to manage big volumes of data coming from gene expression, histology, 3D tissue reconstruction (MRI) and metabolic features (positron emission tomography, PET) in order to identify disease phenotypes [236, 237].

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Currently, there is an urgent need to define univocal data acquisition guidelines. Some initiatives to establish standardised procedures and facilitate clinical translation have been already undertaken, such as quantitative imaging network [238] or the German National Cohort Consortium [239]. Precise description of the parameters required for image acquisition and for the creation and use of computational and statistical methods are necessary to set robust protocols for the generation of models in radiation therapy. According to the US National Library of Medicine, approximately 50 clinical trials involving radiomics are currently recruiting patients, and a few have already been completed [240].

Conclusions and future perspectives

In recent years, research into cancer medicine has taken remarkable steps towards more effective, precise and less invasive cancer treatments (Figure 1). While nanomedicine, combined with targeted therapy, helped improving the biodistribution of new or already tested chemotherapeutic agents around the specific tissue to be treated, other strategies, such as gene therapy, siRNAs delivery, immunotherapy and antioxidant molecules, offer new possibilities to cancer patients. On the other hand, thermal ablation and magnetic hyperthermia are promising alternatives to tumour resection. Finally, radiomics and pathomics approaches help the management of big data sets from cancer patients to improve prognosis and outcome.

At the moment, the most frequent entries concerning cancer therapies in the database of clinical trials (www.clinicaltrials.gov) involve the terms targeted therapy, immunotherapy and gene therapy, highlighting that these are the most popular methodologies under investigation, especially because, as already mentioned before, they have been shown to be very promising and effective (Figure 2A). However, Figure 2B shows that the clinical trials started in the past decade on different therapies mentioned in this review (except for liposomes-based therapies) have increased in number, showing how the interest on these new approaches is quickly growing in order to replace and/or improve conventional therapies. In particular, radiomics, immunotherapy and exosomes are the entries whose number has increased the most in the last 10 years.

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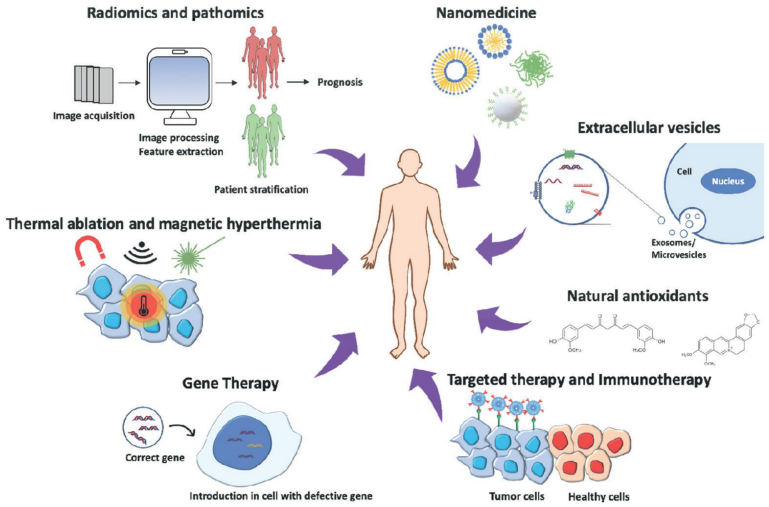

Figure 1. Cancer therapy approaches: The image represents the most innovative strategies to treat cancer, combining different disciplines to obtain the most efficient and personalised therapy for patients.

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The current scenario for cancer research is wide, offering many possibilities for the constant improvement of treatment, considering not only patient recovery but also caring for their well-being during therapy. As summarised in Table 1, these new approaches offer many advantages compared to conventional therapies. However, some disadvantages still have to be overcome to improve their performances. Much progress has been made, but many others are likely to come in the near future, producing more and more *ad hoc* personalised therapies.

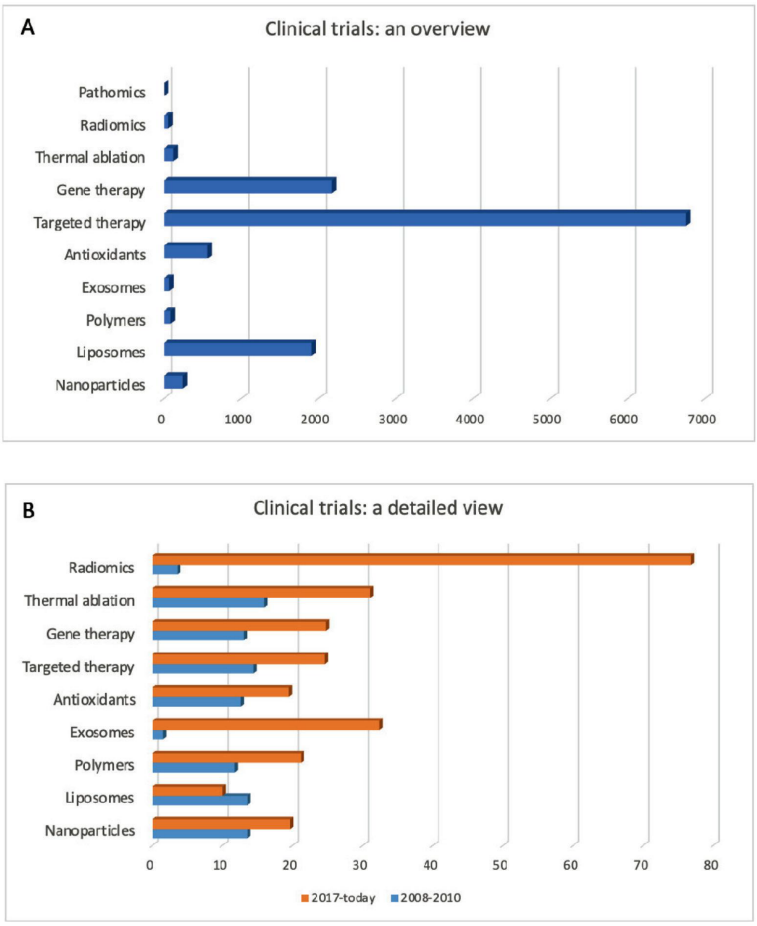

Figure 2. Cancer clinical trials. (A): Total number of clinical trials currently registered on www.clinicaltrials.gov for each approach discussed in this review. (B): Number of the clinical trials [in % respect with the total studies shown in (A)] started during the years 2008–2010 (blue) and from 2017 until today (orange). Date accessed: 01/08/19

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Table 1. Advantages and disadvantages of the main innovative cancer therapeutic approaches.

Strategy	Advantages	Disadvantages
Nanoparticles	• High stability and specificity • Good biocompatibility and bioavailability	• It depends on the particular nanoparticle
EVs	• Physiologically secreted • Good molecular characterisation • High biocompatibility • *In vitro* modifiable/loadable	• Lack of preclinical procedures for isolation, quantification, storage and drug loading
Natural antioxidants	• Easily available in large quantities • Exploitation of their intrinsic properties	• Limited bioavailability • Possible toxicity
Targeted therapy	• High specificity • Reduction of adverse reactions	• Lack of information regarding long-term side effects
Gene therapy	• Expression of pro-apoptotic and chemo-sensitising genes • Expression of wild type tumour suppressor genes • Expression of genes able to solicit specific anti-tumour immune responses • Targeted silencing of oncogenes and safety (RNAi)	• Genome integration • Limited efficacy in specific subsets of patients • High chances to be neutralised by immune system • Off-target effects and inflammation (RNAi) • Need of *ad hoc* delivery systems (RNAi) • Set-up of doses and suitable conditions for controlled release (RNAi)
Thermal ablation Magnetic hyperthermia	• Precise treatment of the interested area • Possibility to perform the treatment along with MRI imaging (magnetic hyperthermia)	• High efficiency only for localised areas • Low penetration power • Need for a skilled operator to perform the treatment
Radiomics/pathomics	• Creation of tumour whole tridimensional volume by non-invasive imaging techniques • Therapeutic and prognostic indicators of disease outcome	• Definition of univocal data acquisition guidelines • Standardisation of procedures to facilitate clinical translation • Description of parameters and computational/statistical methods to set robust protocols for the generation of models for therapy

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Conflicts of interest

The authors declare that they have no conflict of interest.

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Authors' contributions

Carlotta Pucci and Chiara Martinelli contributed equally to this work.

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NIH NATIONAL CANCER INSTITUTE

The Tech Revolutionizing Cancer Research and Care

What once seemed impossible in cancer research is now a reality thanks to a number of technological innovations that have led to breakthroughs in the ways we find, visualize, understand, and treat cancer. Continuing to explore and use these technologies can open the door to accelerate progress against this disease.

Technologies and innovations like CRISPR, artificial intelligence, telehealth, the Infinium Assay, cryo-electron microscopy, and robotic surgery are helping accelerate progress against cancer.
Credit: National Cancer Institute

CRISPR

Revolutionizing gene editing

Researchers never imagined being able to quickly and easily change the genetic code of living cells. But now that's possible with CRISPR, which works like a pair of scissors that can precisely delete, insert, or edit specific bits of DNA inside cells. The discovery of this revolutionary gene-editing tool emerged from a side project fueled by curiosity about how bacteria fight viruses. After making key discoveries about CRISPR, Drs. Jennifer Doudna and Emmanuelle Charpentier won a Nobel Prize in 2020. A year earlier, the first US clinical trial of a CRISPR-made cancer immunotherapy began, and more studies are exploring CRISPR-made cancer treatments. Additionally, trials are starting to test using CRISPR directly in the body. While it is a game-changer, CRISPR still has its limitations and debate continues around the ethics of gene editing. But one thing is clear—CRISPR is a powerful tool that could help make significant progress, in cancer research and beyond.

Read more about how CRISPR is changing cancer research and treatment.

Artificial Intelligence

Computer programming used to improve cancer diagnosis, drug development, and precision medicine

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What if a computer simulation could create a virtual model of you, a "digital twin" that physicians could use to "explore" treatments and predict possible outcomes before presenting you with personalized care options? It's no longer science fiction, thanks to advances in artificial intelligence (AI). AI involves programming a computer to act, reason, and learn. It's great at finding patterns in large amounts of data, which is particularly helpful in scientific research. NCI, the Department of Energy, the Frederick National Laboratory for Cancer Research, and a transdisciplinary group of investigators are using AI to advance development of digital twins for people with cancer. Others use it to analyze imaging data and electronic health records to tailor patients' radiation doses. AI is even being harnessed to quickly analyze population-based cancer data and estimate the probability of certain cancers. And these examples just scratch the surface—AI has the potential to truly transform cancer care.

Learn how AI is being used in cancer research.

Telehealth

Bringing cancer care, treatment, and clinical trials to the patient

Providing cancer care and running clinical trials are necessities, even during a pandemic. Many health care organizations participating in the NCI Community Oncology Research Program (NCORP) successfully incorporated or expanded telehealth practices to provide patients' cancer treatment and care remotely. These hospitals and clinics are maximizing safety and convenience for both patients and providers across the country by using telehealth for remote health monitoring, video visits, and even in-home chemotherapy. Telehealth also makes access to clinical trials and cancer care easier for more diverse groups of patients across wider geographical areas. Outside of cancer care, you might've taken advantage of telehealth practices and contributed to the nearly one-third of health visits performed virtually last year. Despite its growing popularity, not all care can be performed remotely. Ensuring that remote health care technology is used equitably comes with challenges, but researchers are working to address them.

Clinical trial participants like Marilyn have had positive experiences using telehealth. Read her story.

Cryo-EM

Generating high-resolution images of how molecules behave to help inform cancer treatment

You might think the latest iPhone has an amazing camera, but maybe you haven't heard about cryo-electron microscopy (cryo-EM). Cryo-EM captures images of molecules that are ten-thousandths the width of a human hair, at resolutions so high they were unheard of just a decade ago. Like sorting through multiple candid photos before posting the "good" ones on social media, researchers analyze hundreds of thousands of cryo-EM images for quality, reconstructing 3-D images of molecules that allow scientists to study how they behave. For cancer, this means better understanding how cancer cells survive, grow, and interact with therapies and other cells. Just recently at the Frederick National Laboratory for Cancer Research, cryo-EM showed how a drug for chronic myeloid leukemia interacts with ribosomes (a molecular machine inside cells) and in the process developed the most detailed view of a human ribosome to date—an achievement that could inform the creation of treatments for cancer and other diseases.

Visit the National Cryo-Electron Microscopy Facility's page to learn how NCI is expanding access to this technology.

Infinium Assay

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Providing important insights into how genetic variations relate to cancer

What can genotyping, a technology that reads and compares genes across people, tell us about cancer? Used by companies like 23andMe and Ancestry, the Infinium Assay, developed by Illumina, is a process and set of tools that analyzes millions of single nucleotide polymorphisms, or SNPs, the most common type of genetic variation. SNPs can help map genes that cause cancer and provide insight into cancer risk, progression, and development. Initially met with skepticism about whether this technology was technically feasible, the assay was created with support from NCI's Small Business Innovation Research program and is a compelling instance of taxpayer-funded innovation. The assay is now used in a wide range of applications—from ancestry reports and cancer research, to NIH's All of Us Research Program, and even to analyzing a plant's genome to see what influences insect and drought resistance.

Learn more about how NCI partners with small businesses to advance innovations in cancer research and care.

Robotic Surgery

Using robotic arms to perform precise, minimally invasive surgeries to remove cancer

A speedier recovery and quicker return to normal life—that's what robotic surgery can make possible. For instance, someone with prostate cancer may need their prostate gland removed (a prostatectomy), and what once required making a large incision from navel to pubic bone can now be performed with the assistance of robotic arms that enter the body through small incisions. A surgeon controls the arms using a special console that also provides a real-time, magnified view of the surgical site. Robotic surgery involves less blood loss and pain, and in the prostatectomy example, a patient could leave the hospital as soon as the day after surgery. While the robotic arms may look straight out of a futuristic movie, in a setting where just millimeters could stand between removing all cancerous tissue and potentially injuring healthy tissue, their fine, precise motions can make a world of difference.

Learn more about robotic surgery.

The signing of the National Cancer Act of 1971 began a golden age of cancer research, which includes the discovery and development of technologies and innovations that have enabled progress. Find out more about the act.

50 Years of Technological Innovations

Data, communications technology, next-generation DNA sequencing and more have helped accelerate NCI's mission over the past 50 years. Listen to Healthcast's National Cancer Act podcast series to learn about technology's role in fighting cancer.

Related Resources

Partnering with Small Business to Advance Innovation in Cancer Research and Care

NCI Technology Transfer Center

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JAMA Network Open

Original Investigation | Public Health

Association of Neighborhood Measures of Social Determinants of Health With Breast, Cervical, and Colorectal Cancer Screening Rates in the US Midwest

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Abstract

IMPORTANCE Despite advances in cancer treatment and cancer-related outcomes, disparities in cancer mortality remain. Lower rates of cancer prevention screening and consequent delays in diagnosis may exacerbate these disparities. Better understanding of the association between area-level social determinants of health and cancer screening may be helpful to increase screening rates.

OBJECTIVE To examine the association between area deprivation, rurality, and screening for breast, cervical, and colorectal cancer in patients from an integrated health care delivery system in 3 US Midwest states (Minnesota, Iowa, and Wisconsin).

DESIGN, SETTING, AND PARTICIPANTS In this cross-sectional study of adults receiving primary care at 75 primary care practices in Minnesota, Iowa, and Wisconsin, rates of recommended breast, cervical, and colorectal cancer screening completion were ascertained using electronic health records between July 1, 2016, and June 30, 2017. The area deprivation index (ADI) is a composite measure of social determinants of health composed of 17 US Census indicators and was calculated for all census block groups in Minnesota, Iowa, and Wisconsin (11 230 census block groups). Rurality was defined at the zip code level. Using multivariable logistic regression, this study examined the association between the ADI, rurality, and completion of cancer screening after adjusting for age, Charlson Comorbidity Index, race, and sex (for colorectal cancer only).

MAIN OUTCOMES AND MEASURES Completion of recommended breast, cervical, and colorectal cancer screening.

RESULTS The study cohorts were composed of 78 302 patients eligible for breast cancer screening (mean [SD] age, 61.8 [7.1] years), 126 731 patients eligible for cervical cancer screening (mean [SD] age, 42.6 [13.2] years), and 145 550 patients eligible for colorectal cancer screening (mean [SD] age, 62.4 [7.0] years; 52.9% [77 048 of 145 550] female). The odds of completing recommended screening were decreased for individuals living in the most deprived (highest ADI) census block group quintile compared with the least deprived (lowest ADI) quintile: the odds ratios were 0.51 (95% CI, 0.46-0.57) for breast cancer, 0.58 (95% CI, 0.54-0.62) for cervical cancer, and 0.57 (95% CI, 0.53-0.61) for colorectal cancer. Individuals living in rural areas compared with urban areas also had lower rates of cancer screening: the odds ratios were 0.76 (95% CI, 0.72-0.79) for breast cancer, 0.81 (95% CI, 0.79-0.83) for cervical cancer, and 0.93 (95% CI, 0.91-0.96) for colorectal cancer.

CONCLUSIONS AND RELEVANCE Individuals living in areas of greater deprivation and rurality had lower rates of recommended cancer screening, signaling the need for effective intervention strategies that may include improved community partnerships and patient engagement to enhance access to screening in highest-risk populations.

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Key Points

Question How are area-level social determinants of health and rurality each associated with cancer screening practices?

Findings Among 78 302, 126 731, and 145 550 patients eligible for breast, cervical cancer, and colorectal cancer screening, respectively, in this cross-sectional study of adults receiving primary care in primary care practices in Minnesota, Iowa, and Wisconsin, census block group–level area deprivation and zip code–level rurality were separately associated with lower rates of screening in the 3 Midwest US states.

Meaning Individuals living in areas of greater deprivation and rurality have lower rates of cancer screening, underscoring the need for evidence-based interventions and targeted outreach to at-risk communities.

+ Supplemental content

Author affiliations and article information are listed at the end of this article.

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Introduction

One of every 3 persons is expected to be diagnosed as having cancer in his or her lifetime,[1,2] with cancer ranking as the second leading cause of death in the United States.[3] Although cancer-related mortality has declined over the past few decades, substantial racial/ethnic,[4,5] rural,[4,6] educational attainment,[5,7] and socioeconomic[7,8] disparities remain.[9] Breast, cervical, and colorectal cancers are among the most frequently diagnosed cancers in the United States, and breast cancer and colorectal cancer are the second and fourth most prevalent causes of cancer-related deaths.[10,11] The morbidity and mortality associated with these cancers can be reduced with timely guideline-recommended screening, diagnosis, and treatment.[12-14] Therefore, lower rates of preventive screening for cancer may contribute to and exacerbate the disparities in cancer-related health outcomes in minority,[5,7] rural,[6] and low-income[7,8] individuals.[8] As such, it is important to improve our understanding of contemporary cancer screening disparities beyond the individual patient and potentially identify opportunities for population-focused and area-focused interventions.[6]

Addressing social determinants of health and ameliorating disparities in underserved populations are a priority, made increasingly more urgent and feasible as health systems shift toward value-based care models and a more holistic view of patients and population health.[15] The social determinants of health framework hypothesizes that social and economic conditions shape population health, with the following 5 constructs associated with health outcomes: (1) economic stability, (2) educational level, (3) neighborhood and built environment, (4) health and health care, and (5) social and community context.[16] However, prior studies examining disparities in cancer screening practices have not considered all aspects of this framework, instead focusing on select components that may not capture the full complexity of a patient's situation.[15] Yet, doing so is particularly important for preventive health behaviors, such as cancer screening, which involve access to care, adequate insurance coverage, health literacy, individual perceptions of health, and social capital.[9,15]

Given these complexities, public health and clinical interventions aimed at improving cancer screening rates and reducing cancer-related mortality would benefit from identification of areas with greatest gaps in care access and use. Geospatial disparities in social determinants of health are effectively captured by the area deprivation index (ADI), a validated composite area-based indicator composed of 17 US Census indicators spanning 4 domains, including poverty, educational level, housing, and employment,[17] that is distinct from rurality. The ADI can be constructed for granular census-based regions such as the census block group, which contains 600 to 3000 persons,[18] and denotes area-level socioeconomic disparities and disadvantages that cannot be measured or explained by traditional income, rurality, and race/ethnicity variables. Although cancer-related disparities based on income,[8] rurality,[19] and race/ethnicity[5] have been individually described, it is not known how area-level deprivation alters recommended cancer screening practices independent of rurality. With 20% of the US population residing in rural areas,[20] the present study examined rates of US Preventive Services Task Force (USPSTF)–recommended screening for breast, cervical, and colorectal cancer[21] using patient-level data from 75 primary care practices in Minnesota, Iowa, and Wisconsin between July 1, 2016, and June 30, 2017. This work aims to increase understanding of the value of area-based metrics and their potential role in health care delivery and to identify opportunities for clinical and public health organizations to form partnerships to improve care.

Methods

Study Design

In this retrospective cross-sectional study, census block group–level cancer screening rates were analyzed for breast, cervical, and colorectal cancer among adults receiving primary care at 75 Mayo Clinic and Mayo Clinic Health System practices in Minnesota, Iowa, and Wisconsin. Census block groups are the smallest geographic unit for which the US Census Bureau publishes sample data.[22] All

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data were abstracted and analyzed between December 2018 and September 2019. The study was approved by the Mayo Clinic Institutional Review Board and the requirement for informed consent was waived because the study was deemed minimal risk. This study followed the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) reporting guideline.

Study Population

The present study included all persons empaneled to a Mayo Clinic or Mayo Clinic Health System primary care practice in Minnesota, Iowa, and Wisconsin who were eligible for breast, cervical, and/or colorectal cancer screening between July 1, 2016, and June 30, 2017. Screening eligibility was ascertained from electronic health records (EHRs) in accordance with USPSTF guidelines.[21] The breast cancer cohort was composed of women aged 50 to 75 years and excluded women with a history of bilateral mastectomy.[21] The cervical cancer cohort was composed of women aged 21 to 65 years and excluded women with a prior hysterectomy.[21] The colorectal cancer cohort included adults aged 50 to 75 years and excluded patients with a prior total colectomy or previous colorectal cancer.[21]

The Census Geocoder, an address look-up tool that converts inputted addresses into latitude and longitude points,[23] was used to link each patient address to a census block group. The coordinate points are accompanied by a match score (maximum value, 100), which details how closely the inputted address matches a candidate in the reference data[23] (in this case, the 2010 US Census). Patients whose addresses could not be geocoded to a census block group with a match score greater than 60 or who were living in a zip code that did not have an associated rural-urban commuting area (RUCA) code were excluded.

Primary Outcomes

Screening completion was ascertained from the EHRs in accordance with USPSTF guidelines.[21] For breast cancer, screening completion was having 1 or more mammograms over a 2-year period.[21] For cervical cancer, screening completion was undergoing cervical cytology in the past 3 years for women aged 21 to 65 years or cervical cytology and human papillomavirus co-testing in the past 5 years for women aged 30 to 65 years.[21] For colorectal cancer, screening completion was having either colonoscopy within 10 years, flexible sigmoidoscopy or computed tomographic colonography within 5 years, multitarget stool DNA test within 3 years, or fecal occult blood test during the measurement year.[21]

Explanatory Variables

Receipt of recommended cancer screening was examined as a function of ADI quintile. Census block group–level information necessary for ADI derivation was ascertained from 2012 to 2016 estimates of the 5-year American Community Survey (ACS).[24] The ACS is an annual survey conducted by the US Census Bureau, which randomly samples housing units and provides population-level estimates representative of the noninstitutionalized US population.[24] Seventeen census block group–level indicators were used, representing poverty, educational level, housing, and employment, to compute 2016 ADIs for all census block groups in Minnesota, Iowa, and Wisconsin (11 230 census block groups) (eTable in the Supplement). In-depth survey methods can be found on the US Census Bureau website.[24,25]

Independent Variables

Rurality was assessed using patient zip code to identify corresponding RUCA codes, which were classified using published definitions for urban, rural, and highly rural areas.[26] Zip code–level RUCA codes were used as individual risk factors to make patient-level inferences because census block group–level RUCA codes are not available through the US Department of Agriculture. Additional information regarding RUCA code descriptions can be found on the US Department of Agriculture website.[27]

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Patient demographic characteristics (age, race/ethnicity, and sex) and comorbidities were ascertained from the EHRs. Race was classified as white or nonwhite per the EHRs. Race/ethnicity was assessed to investigate if there was an independent association between race and cancer screening completion after adjusting for other patient-level risk factors. The severity-weighted Charlson Comorbidity Index was calculated using codes from *International Classification of Diseases Ninth Revision* and *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision (ICD-10)* for evaluation and management visits during the year before cohort entry.[28,29]

ADI Derivation and Statistical Analysis

Modified 2016 ADIs were calculated based on the method described by Singh[17] for all 11 230 census block groups in Minnesota, Iowa, and Wisconsin using 5-year ACS estimates.[24] The variables used to derive ADIs are listed in the eTable in the Supplement. Variables were selected using a factor analysis approach,[17,30,31] and missing values were substituted using single imputation. All variables were transformed to a rate per capita for the census block group. To improve on published ADI methods[17] and prevent distortion of the ADI by larger continuous variables, such as income, these proportions were standardized to a mean (SD) of 0 (1), thereby ensuring that all variables in the modified ADI were scaled equally before weighting. Each variable was multiplied by its respective weight obtained from the factor score coefficient, and the 17 weighted measures were summed for each census block group to obtain the base score. Base scores were then standardized to a mean (SD) of 100 (20). The ADI was divided into quintiles for all analyses, with higher ADIs indicative of greater deprivation. A sensitivity analysis modeling the ADI as a continuous variable was also performed to ensure that findings remained consistent.

Multivariable logistic regression was used to identify the association between the ADI and cancer screening completion. Independent variables in the models included age, ADI quintile, rural status, Charlson Comorbidity Index, race, and sex (for the colorectal cancer outcome only).

Because of the small size of census block groups, traditional heat maps can be difficult to interpret. Therefore, a hot spot clustering analysis[32] was performed to visualize area-level deprivation across the Midwest. Statistically significant hot spots represent concentration of census block groups with high deprivation; statistically significant cold spots represent concentration of census block groups with less deprivation. To be considered a statistically significant hot spot, a census block group will have a higher ADI (greater deprivation) and be surrounded by census block groups with high deprivation. This definition is similar for statistically significant cold spots but with lower ADIs (less deprivation). A census block group will result in a statistically significant *z* score if the local sum is very different from the expected local sum and the difference is too large to be attributable to random chance. Positive statistically significant *z* scores indicate more intense clustering of deprived census block groups (hot spots), and negative statistically significant *z* scores indicate intense clustering of less deprived census block groups (cold spots).

The testing was 2-sided, and the threshold of statistical significance for the study was $P < .05$. Analyses were conducted using SAS, version 9.4 (SAS Institute Inc) and Stata, version 15.1 (StataCorp LLC). A geographic information system map representing hot spot analysis of the ADI (**Figure**) at the census block group level was created in ArcMap, version 10.7 (Esri), using TIGER/Line Shapefiles from the US Census Bureau.

Results

The study cohorts were composed of 78 302 patients eligible for breast cancer screening (mean [SD] age, 61.8 [7.1] years), 126 731 patients eligible for cervical cancer screening (mean [SD] age, 42.6 [13.2] years), and 145 550 patients eligible for colorectal cancer screening (mean [SD] age, 62.4 [7.0] years; 52.9% [77 048 of 145 550] women). More than 90% were of white race. Their baseline characteristics are summarized in **Table 1**. Distinct spatial clusters of census block group deprivation

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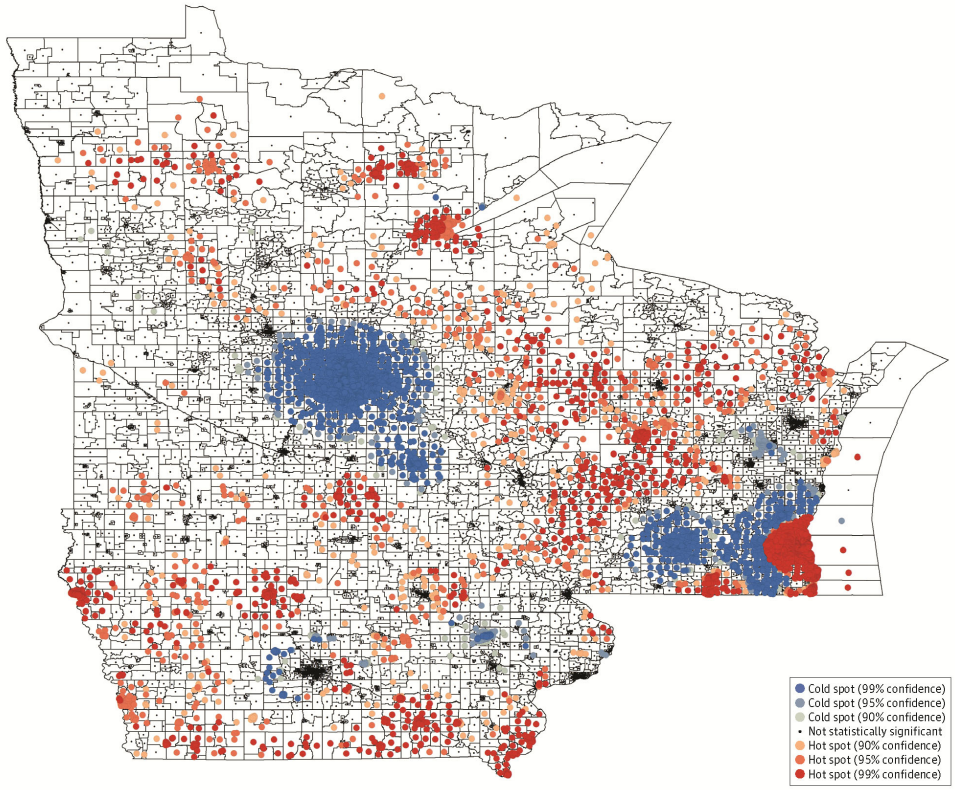
were identified throughout Minnesota, Iowa, and Wisconsin (Figure), with clustered cold spots (ie, areas of lower deprivation) concentrated around Minneapolis, Minnesota; Rochester, Minnesota; and Madison, Wisconsin.

Association of Area-Level Deprivation With Cancer Screening

There was an inverse association between the ADI and screening rates for all 3 cancers. The adjusted probability of completing a screening decreased incrementally across ADI quintiles for the 3 cancers, as shown in the eFigure in the Supplement. The odds of completing recommended screening were decreased for individuals living in the most deprived (highest ADI) census block group quintile compared with the least deprived (lowest ADI) census block group quintile: the odds ratios (ORs) were 0.51 (95% CI, 0.46-0.57) for breast cancer, 0.58 (95% CI, 0.54-0.62) for cervical cancer, and 0.57 (95% CI, 0.53-0.61) for colorectal cancer (**Table 2**, **Table 3**, and **Table 4**).

Figure. Census Block Group–Level Hot Spot Analysis of 2016 Area Deprivation Indexes Across Minnesota, Iowa, and Wisconsin



Hot spots (red) indicate spatial clusters of census block groups with greater deprivation, and cold spots (blue) indicate spatial clusters of census block groups with less deprivation. White areas represent areas without statistically significant clustering. Higher area deprivation indexes indicate greater deprivation. In the key, "% confidence" means the statistical significance with a 99%, 95%, or 90% confidence level.

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Association of Rurality With Cancer Screening

Rurality had a separate association from the ADI in decreasing screening rates for breast, cervical, and colorectal cancer (Table 2, Table 3, and Table 4). Rurality was associated with breast cancer screening, with ORs of 0.35 (95% CI, 0.32-0.39) for patients living in highly rural areas and 0.76 (95% CI, 0.72-0.79) for patients living in rural areas compared with those living in urban areas. For cervical cancer screening, the ORs were 0.78 (95% CI, 0.71-0.87) and 0.81 (95% CI, 0.79-0.83) for highly rural and rural areas, respectively, compared with urban areas. For colorectal cancer screening, the ORs were 0.94 (95% CI, 0.86-1.03) and 0.93 (95% CI, 0.91-0.96) for highly rural and rural areas, respectively, compared with urban areas.

Additional Patient-Level Factors Associated With Cancer Screening

Older patients were consistently more likely to complete cancer screening than younger patients (Table 2, Table 3, and Table 4). For breast cancer screening, the OR was 1.13 (95% CI, 1.09-1.18) for individuals aged 65 to 75 years compared with individuals aged 50 to 64 years. For cervical cancer screening, the ORs were 1.86 (95% CI, 1.80-1.92) for individuals aged 30 to 49 years and 1.21 (95% CI, 1.17-1.25) for individuals aged 50 to 65 years compared with individuals aged 21 to 29 years. For colorectal cancer screening, the ORs were 1.41 (95% CI, 1.35-1.45) for individuals aged 65 to 74 years and 1.22 (95% CI, 1.13-1.31) for individuals 75 years and older compared with individuals aged 50 to 64 years. Nonwhite patients were approximately half as likely to complete screening as white patients. For colorectal cancer, women were 16% more likely to complete the recommended screening than men. Finally, high comorbidity burden (Charlson Comorbidity Index score ≥4) was associated with increased odds of colorectal cancer screening (OR, 1.11; 95% CI, 1.04-1.17) but with decreased odds of breast cancer (OR, 0.81; 95% CI, 0.74-0.88) and cervical cancer (OR, 0.86; 95% CI, 0.77-0.97) screening (Table 2, Table 3, and Table 4).

Table 1. Patient Baseline Characteristics

Variable	Frequency, No. (%)		
	Breast Cancer (n = 78 302)	Cervical Cancer (n = 126 731)	Colorectal Cancer (n = 145 550)
Age, mean (SD), y	61.8 (7.1)	42.6 (13.2)	62.4 (7.0)
ADI quintile			
1	12 934 (16.5)	21 192 (16.7)	24 106 (16.6)
2	28 244 (36.1)	43 844 (34.6)	53 253 (36.6)
3	23 049 (29.4)	36 328 (28.7)	42 780 (29.4)
4	11 298 (14.4)	19 651 (15.5)	20 392 (14.0)
5	2777 (3.5)	5716 (4.5)	5019 (3.4)
Rural status			
Urban	27 948 (35.7)	49 889 (39.4)	51 100 (35.1)
Rural	48 779 (62.3)	74 866 (59.1)	91 556 (62.9)
Highly rural	1575 (2.0)	1976 (1.6)	2894 (2.0)
Charlson Comorbidity Index score			
1	49 646 (63.4)	102 423 (80.8)	89 349 (61.4)
2	14 026 (17.9)	15 906 (12.6)	26 761 (18.4)
3	7878 (10.1)	5251 (4.1)	15 024 (10.3)
≥4	3236 (4.1)	1651 (1.3)	6831 (4.7)
Race			
White	74 923 (95.7)	115 937 (91.5)	139 122 (95.6)
Nonwhite	3379 (4.3)	10 794 (8.5)	6428 (4.4)
Sex			
Female	NA	NA	77 048 (52.9)
Male	NA	NA	68 502 (47.1)

Abbreviations: ADI, area deprivation index (higher ADIs indicate greater deprivation); NA, not applicable.

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Table 2. Factors Associated With Breast Cancer Screening Completion in Minnesota, Iowa, and Wisconsin

Variable	OR (95% CI)	*P* Value
Age, y		
50-64	1 [Reference]	NA
65-75	1.13 (1.09-1.18)	<.001
ADI quintile		
1	1 [Reference]	NA
2	0.81 (0.76-0.86)	<.001
3	0.72 (0.68-0.77)	<.001
4	0.66 (0.62-0.71)	<.001
5	0.51 (0.46-0.57)	<.001
Rural status		
Urban	1 [Reference]	NA
Rural	0.76 (0.72-0.79)	<.001
Highly rural	0.35 (0.32-0.39)	<.001
Charlson Comorbidity Index score		
0	1 [Reference]	NA
1	0.99 (0.94-1.04)	.56
2	1.00 (0.94-1.06)	.99
3	0.90 (0.82-0.98)	.02
≥4	0.81 (0.74-0.88)	<.001
Race		
White	1 [Reference]	NA
Nonwhite	0.48 (0.44-0.52)	<.001

Abbreviations: ADI, area deprivation index (higher ADIs indicate greater deprivation); NA, not applicable; OR, odds ratio.

Table 3. Factors Associated With Cervical Cancer Screening Completion in Minnesota, Iowa, and Wisconsin

Variable	OR (95% CI)	*P* Value
Age, y		
21-29	1 [Reference]	NA
30-49	1.86 (1.80-1.92)	<.001
50-65	1.21 (1.17-1.25)	<.001
ADI quintile		
1	1 [Reference]	NA
2	0.80 (0.77-0.83)	<.001
3	0.77 (0.74-0.80)	<.001
4	0.69 (0.66-0.72)	<.001
5	0.58 (0.54-0.62)	<.001
Rural status		
Urban	1 [Reference]	NA
Rural	0.81 (0.79-0.83)	<.001
Highly rural	0.78 (0.71-0.87)	<.001
Charlson Comorbidity Index score		
0	1 [Reference]	NA
1	1.00 (0.96-1.04)	.91
2	0.94 (0.88-1.00)	.04
3	0.80 (0.72-0.88)	<.001
≥4	0.86 (0.77-0.97)	.01
Race		
White	1 [Reference]	NA
Nonwhite	0.64 (0.61-0.67)	<.001

Abbreviations: ADI, area deprivation index (higher ADIs indicate greater deprivation); NA, not applicable; OR, odds ratio.

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Discussion

Timely screening and early detection of breast, cervical, and colorectal cancer improve health outcomes,[33] decrease cancer-related mortality,[33,34] and reduce costs.[33-36] Despite population improvements in cancer survivorship, statistically significant disparities remain. The present study built on earlier work that focused primarily on race/ethnicity–based[4,5] and income-based[7,9] disparities to identify a strong inverse association between area-level deprivation (as measured by the ADI), rurality, and USPSTF-recommended screening for breast, cervical, and colorectal cancer across Minnesota, Iowa, and Wisconsin. Individuals living in the 20% most deprived census block groups were almost half as likely to undergo recommended cancer screening as those living in the 20% least deprived census block groups, and individuals living in rural areas compared with urban areas were 7% to 24% less likely to complete a cancer screening. These associations were independent of one another and adjusted for patient age, comorbidity burden, and race. Overall, the results of the present study suggest that implementing area-based measures, such as the ADI, into practice and understanding differential cancer screening practices based on rural status may help inform and guide tailored interventions to meaningfully address disparities based on social determinants of health.[37]

Public health and policy interventions grounded in the environmental context may have enhanced effectiveness and practicality because of the reduced individual burden[38] and consideration of the multifaceted nature of social determinants of health. In the case of cancer screening, community-based factors may intensify or supersede individual risk factors, including inadequate access to health care resources, poor community engagement with or distrust of the health care system, misperceptions about cancer screening, and other factors. Therefore, identifying disparities in cancer screening and other preventive health behaviors that stem from area-level

Table 4. Factors Associated With Colorectal Cancer Screening Completion in Minnesota, Iowa, and Wisconsin

Variable	OR (95% CI)	*P* Value
Age, y		
50-64	1 [Reference]	NA
65-74	1.41 (1.37-1.45)	<.001
≥75	1.22 (1.13-1.31)	<.001
ADI quintile		
1	1 [Reference]	NA
2	0.90 (0.87-0.94)	<.001
3	0.81 (0.78-0.85)	<.001
4	0.69 (0.66-0.73)	<.001
5	0.57 (0.53-0.61)	<.001
Rural status		
Urban	1 [Reference]	NA
Rural	0.93 (0.91-0.96)	<.001
Highly rural	0.94 (0.86-1.03)	.20
Charlson Comorbidity Index score		
0	1 [Reference]	NA
1	1.07 (1.04-1.11)	<.001
2	1.29 (1.23-1.35)	<.001
3	1.19 (1.11-1.26)	<.001
≥4	1.11 (1.04-1.17)	<.001
Race		
White	1 [Reference]	NA
Nonwhite	0.46 (0.44-0.49)	<.001
Sex		
Male	1 [Reference]	NA
Female	1.16 (1.13-1.19)	<.001

Abbreviations: ADI, area deprivation index (higher ADIs indicate greater deprivation); NA, not applicable; OR, odds ratio.

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deprivation and rurality signals the need for health care systems to form partnerships with local communities to enhance awareness, increase access, and improve overall health.

Issues potentially associated with accessing care were evident in this study, with deprivation altering cancer screening rates for the more frequent in-person tests and procedures, such as mammography (at least once every 2 years), compared with cervical cancer screening (every 3-5 years) or colorectal cancer screening (at least every 10 years for colonoscopy or stool-based testing that does not require in-person visits).[39,40] Persons living in deprived and rural areas may especially benefit from comprehensive multilevel efforts,[37] such as mobile screening service facilities or extended-hour screening clinics, which could enable patients in areas of high deprivation to seek care and mitigate access barriers faced by underserved populations, particularly in the rural Midwest.[19]

Contrary to national trends demonstrating similar screening completion rates for colorectal cancer among men and women,[41] our study found that women were more likely to complete screening than men. This finding may be because of concurrent screening opportunities (with women also due for breast and cervical cancer screening) and more frequent contact with health care professionals because of pregnancy and childcare.[11,42] Extensive media coverage, awareness, and promotion of women's cancers may also contribute to higher rates of screening among women.[11] Therefore, outreach efforts targeted specifically at men may be beneficial.

Strengths and Limitations

To our knowledge, this is the first study to concurrently examine the association of area-level deprivation, as measured by the ADI, rurality, and race/ethnicity, with screening completion rates. The present study is strengthened by the high level of granularity in examining area deprivation, which renders these findings readily pertinent and actionable. Disparities in cancer screening in urban and rural settings across 3 Midwest states were examined, allowing investigation of the separate associations of deprivation and rurality, which has not been previously done to date. Focusing on data from 75 primary care practices within a single integrated health care delivery system allowed us to maximize data capture and accuracy of reported screening information. By identifying areas where patients are most likely to forego recommended cancer screenings, these findings can instruct health systems and practices that serve patients at highest risk. This study can further inform staffing decisions associated with care coordination, social work, and outreach.

This study has limitations. The findings are limited by the cross-sectional nature of this work, preventing the assessment of longitudinal associations between area-level deprivation and cancer screening rates and definitive ascertainment of causal relationships. Reliance on ACS data to compute the ADI makes our results vulnerable to nonresponse and imputation bias, although the main study outcomes (ie, cancer screening rates) were ascertained at the person level from the EHRs. The lack of racial/ethnic diversity is another limitation, with more than 90% of the cohorts composed of non-Hispanic white individuals. However, although not representative of the general US population, the cohorts are characteristic of the Midwest and particularly its more rural areas. We believe that this study is strengthened by its population because it allowed us to concurrently examine the associations of both the ADI and rurality across 3 Midwest states.

Conclusions

The implications of this study extend beyond reporting of the association between area-level deprivation and cancer screening practices. Area-level deprivation likely alters all aspects of health care use and health behaviors and, as a result, should be considered in addition to rurality when developing interventions aimed at improving cancer screening rates. Further research is needed to examine how the ADI correlates with chronic disease management, receipt of other preventive services, and potentially preventable acute care use. Using the ADI has the potential to support and advance practice, public health, and policy by empowering health systems and community organizations to provide more patient-centered and equitable care.

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ARTICLE INFORMATION

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SUPPLEMENT.

eTable. American Community Survey 5-Year Estimates and Factor Score Coefficients

eFigure. Adjusted Percentage of Cancer Screening Completion Rates Among Primary Care Patients in Minnesota, Iowa, and Wisconsin

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Experts Forecast Cancer Research and Treatment Advances in 2022

January 5, 2022 by Calley Jones, PhD

The year 2021 defied our expectations in a variety of ways.

The **delta** and **omicron** COVID-19 variants imposed unprecedented challenges on the health care system and threatened our hopes of an end to the pandemic, but widespread vaccine distribution provided protection, preventing an estimated **36 million cases and 1 million deaths** in the United States. As omicron called into question the efficacy of existing vaccines, tests, and treatments, the U.S. Food and Drug Administration (FDA) provided new options, in the form of emergency use authorizations for the first two oral COVID-19 drugs, nirmatrelvir/ritonavir (Paxlovid) and molnupiravir (Lagevrio).

Aside from the pandemic, supply chain delays and worker shortages sparked frustration, but the national unemployment rate gradually fell to its **lowest percentage** since February 2020. Through a year of harsh weather conditions ranging from ice storms to wildfires to hurricanes and tornadoes, the United States **doubled down** on initiatives to battle **climate change**.

In spite of the year's setbacks, the field of cancer research also made progress. The FDA approved **16 new oncology drugs**—including two to treat genetic conditions that cause high rates of tumor formation—as well as two cancer detection agents that help physicians better identify certain tumors during imaging or surgery. We celebrated the **50th anniversary of the National Cancer Act**, saw marked progress in **many areas of cancer research**, and helped provide cancer patients with reliable information about their **COVID-19 risks** and **vaccine efficacy**.

Attachment 12
Purpose of the Project

As in **previous years**, we have asked a panel of experts to reflect on the progress made in 2021 and forecast their predictions for cancer research in the year 2022. We spoke with AACR President-Elect **Lisa Coussens, PhD, FAACR**, about basic research; AACR board member and co-editor-in-chief of *Cancer Discovery* **Luis Diaz Jr., MD**, about precision immunotherapy; co-editor-in-chief of *Cancer Prevention Research* **Michael Pollak, MD**, and deputy editor of *Cancer Prevention Research* **Avrum Spira, MD**, about cancer prevention; and AACR board member and former Annual Meeting Program Chair **John Carpten, PhD, FAACR**, about cancer disparities.

PRIORITIES FOR BASIC RESEARCH IN 2022

"There isn't a drug on the market that doesn't have its origins in a basic science discovery," said **Lisa Coussens, PhD, FAACR**, chair of the department of Cell Development and Cancer Biology at Oregon Health and Science University, when asked about the ways that laboratory science has shaped the landscape of cancer care. "We can't lose sight of the importance of basic research at any step in the pipeline toward advancing cancer medicine and improving outcomes for our patients."

Basic science—fundamental research about the way cells and molecules function and interact—spans applications from protein chemistry to cell genomics to animal models. Such discoveries help researchers determine, for example, which proteins can be targeted with drugs to fight a disease, or which biomarkers might help determine a patient's prognosis or course of treatment.

An important priority for improving our knowledge of cancer cell biology, Coussens explained, is to better understand how cells shift between different states, especially in response to a disease or therapy.

"We need to understand nuances between different tissue states within our body, and how they respond to changes in their environment," Coussens said, noting that this is true in healthy organs as well as in evolving tumors, where single cell types typically steer disease processes but are dependent on cues from the multiple cell types surrounding them.

"Understanding those nuances will lead to bigger discoveries about how to target cell state changes so we can return cells back to normal control mechanisms," she continued.

Tumor cells are not the only cells that might change their patterns of gene expression and metabolism during the course of cancer progression and treatment, however. Other cells that surround and interact with the tumor, such as fibroblasts and immune cells, play a vital role in determining how the tumor behaves.

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"A full understanding of tumor ecosystems includes the neoplastic cells—the 'bad guys' with mutations—as well as the normal host cells that are recruited or co-opted to help tumor cells survive and disseminate," Coussens said.

Emerging classes of therapies, such as immune checkpoint inhibitors, leverage elements of the tumor microenvironment to kill cancer cells. In order to develop more drugs targeting these cancer support systems, researchers need to learn more about how tumors interact with their surroundings.

"I think the next years will bring a major focus on understanding communication networks between all the different types of cells in tumor ecosystems," Coussens said, adding that a basic understanding of cell communications could produce benefits beyond the scope of cancer. "Basic discoveries about tumor ecosystems can have far-reaching impacts on autoimmune diseases, chronic inflammatory diseases, and how individuals respond to therapies that are designed to treat Alzheimer's, for example," she explained.

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Coussens believes that many of these discoveries will be driven by the expanded use of technology and data science. Since the turn of the century, rapid advances in genomics, proteomics, and metabolomics have created an abundance of biological data from patients, animal models, and cell lines. Designing computational programs capable of integrating these data and determining how to analyze them in meaningful ways has been a constant source of innovation over the past 20 years.

Coussens emphasized that continued progress in this area could significantly shape basic research in the coming years.

"The biggest impact we're seeing right now is with the emergence of technology development and computational data sciences," Coussens said. "I think the greatest advances we will see over the next several years will be emerging out of team science embracing technology, data science, and biology."

As technological advances spur more integration between different disciplines, Coussens predicts that collaboration will become more crucial than ever.

"Science has changed—we no longer do science in isolation," she said. "The best science today, I think, comes out of multidisciplinary team science. I'm a biologist, but I now need to be able to communicate with data scientists, epidemiologists, and chemists."

Coussens expressed that young investigators entering the field should consider this new paradigm when planning their training. "The more you can round out your education in a multidisciplinary way, the better. You need to be able to communicate your science with people who don't necessarily speak your field's language."

Part of her advice hinged on trainees finding strong mentors who can help guide them toward these opportunities, especially as they recover from lost time and funding resulting from the COVID-19 pandemic. "Invest your time and energy in identifying mentors who care about who you are and the trajectory of your career. Find mentors who you will grow to respect and love," she said.

Overall, Coussens was optimistic about the state of basic research moving forward.

"The basic science discoveries we're going to see in the next five years will reshape the medical landscape for years to come," she said.

PRIORITIES FOR PRECISION IMMUNOTHERAPY IN 2022

The art of deciding which cancer therapies to give a patient, based on their individual tumor characteristics, has evolved over the past several decades, according to **Luis Diaz Jr., MD**, head of Solid Tumor Oncology at Memorial Sloan Kettering Cancer Center and a member of the National Cancer Advisory Board. Such decisions were first made based on protein markers expressed by the tumor, then by genetic changes in the tumor's DNA. Now, Diaz said, a precise understanding of tumor characteristics can predict which patients may benefit most from immunotherapy.

"One example has been PD-L1 overexpression, either on the tumors themselves or on the surrounding cells," Diaz said. "Another is mismatch repair deficiency, which seems to prime cells to become very sensitive to immunotherapy."

This is just one of the ways that the fields of precision medicine and immunotherapy have grown to complement each other in recent years. As Diaz noted, antibodies targeting PD-1 or PD-L1 have become an effective therapy for patients whose tumors express these immunosuppressive markers.

The treatment of patients with CAR T cells—immune cells which are harvested from a patient's body, engineered to target tumors, and returned to the patient's bloodstream—represents an even more patient-specific approach to immunotherapy.

But these therapies are not appropriate for all cancer types, and many patients who receive these therapies eventually relapse, creating a need for the expansion of immunotherapy types and indications.

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Diaz believes researchers can improve the efficacy of immunotherapy by offering it earlier in a patient's course of treatment.

"In many cases, we're testing new therapies on patients for whom all standard therapies have already failed," he said. "As we move forward, we need to begin to treat earlier in the diagnosis."

Diaz emphasized that treating advanced cancer poses far more challenges than intervening in early-stage disease or preventing tumor formation altogether. "If we can begin to bring targeted therapy and immunotherapy into the prevention space, I think we'll see a profound impact," he said.

A different approach to improving immunotherapy efficiency is to reach more patients by making cell-based immunotherapies, such as CAR T, effective against a broader range of tumor types, including solid tumors.

To overcome these hurdles, Diaz said, "The priority needs to be in maximizing specificity and minimizing toxicity."

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Solid tumors, Diaz explained, are often heterogeneous. An immune response against a single target may kill some of the tumor, but cancer cells that don't express the target may continue to grow and evade the immune system. Researchers have designed CAR T cells that target multiple tumor cell markers, but more targets also increase the likelihood of harmful side effects.

"It's a mathematical problem we can't solve very easily," Diaz said. "We need some clever new ideas."

Boosting the number of people who receive immunotherapy also involves addressing accessibility issues, especially for patients in rural or underresourced communities. Diaz speculated that the increase in remote care options resulting from the COVID-19 pandemic might provide a blueprint for the decentralization of clinical trials, paving the way for large cancer centers to collaborate with community hubs.

He emphasized that one way to promote decentralization is to encourage more clinical trial ownership from clinicians rather than pharmaceutical companies. "I'd like to see our investigators becoming the initiators of more trials to be run at large cancer centers and elsewhere," Diaz said.

He noted that clinical trial decentralization will pose some challenges, such as standardizing procedures and supplies and ensuring that quality does not suffer. However, he was optimistic that it would eventually improve care. "I think it will make clinical development move faster than it ever has before," he said.

Targeting new populations and tumor types with immunotherapy, however, will only benefit patients whose tumors mount an immune response. Some tumors—deemed immunologically "cold"—expertly evade the immune system, and the mechanisms underlying that process are complex.

"We need a better understanding of what makes tumors immunogenic so we can harness that knowledge to make cancers more immunogenic," Diaz said.

He noted that research into the interface between immune cells and cancer cells has done a great job of producing the therapies on the market today, but that advancing precision immunotherapy will require those efforts to continue.

"As exciting as everything is that we're doing, we need to do so much more," Diaz said. "What's popular right now is probably only the tip of the iceberg."

PRIORITIES FOR CANCER PREVENTION IN 2022

"The most transformative impact we could have on cancer care would be to prevent cancer from happening in the first place," said **Avrum Spira, MD**, a professor of medicine, pathology and laboratory medicine, and bioinformatics at the Boston University School of Medicine and global head of the Lung Cancer Initiative at Johnson & Johnson.

Spira and his colleagues study how physicians can better detect early-stage lung cancer or signs of precancerous changes in the lungs. He also studies how to intervene in these early stages to prevent disease progression.

"Researchers have found molecular alterations in late-stage cancer and used that information to develop new targeted therapies and immunotherapies that are transforming the treatment of advanced-stage disease," Spira said. "It's absolutely critical to move that fundamental molecular understanding to early-stage and even premalignant disease."

Understanding what drives benign cells into a tumorigenic state is an important component of this process, Spira emphasized. Drawing on the success of large-scale programs such as **The Cancer Genome Atlas**, the **Human Cell Atlas**, and the **Human Tumor Atlas Network**, dedicated to fully characterizing the blueprints of the human body, researchers have embarked on the development of a **Pre-cancer Atlas**.

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"Within the Human Tumor Atlas Network, researchers are forming large coalitions for multiple different cancer types to develop a temporal and spatial atlas of the cellular and molecular changes associated with the transition of a premalignant lesion to a fully-blown invasive cancer," Spira said. "I think, in 2022, we're going to see a proliferation of those types of studies, generating a vast amount of cellular and molecular data from premalignant tissue across many cancer types."

Spira believes such an atlas will benefit patients in two key ways: the development of biomarkers that can help predict which precancerous lesions will advance to cancer, and the identification of drug targets to stop the progression.

"For most cancer types, we don't know what those early events are, and therefore, we have no effective way to intercept the disease process," he said. "I think in 2022, we will begin to understand these events and gain unprecedented insight into targeted approaches aimed at intercepting premalignancy."

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Spira elaborated more on the need for biomarkers, which may not only identify patients at an elevated cancer risk but may also determine which patients with abnormal imaging results may need a biopsy. The most effective biomarkers, he stressed, would be the ones detectable via noninvasive tests.

"I'm excited about the future of blood-based tests looking at nucleic acids," Spira said. "The technologies are evolving very rapidly to the point where they can now detect very small amounts of DNA or epigenetic changes that are circulating in the blood, and they can screen people across multiple cancer types."

While blood-based liquid biopsies have attracted a great deal of attention in recent years, Spira also drew attention to other emerging noninvasive tests with the potential to have a significant impact on early cancer detection, such as urine markers of urologic cancer, stool markers of colon cancer, and nasal brushings to assess lung cancer risk.

Spira hopes these noninvasive tests can be integrated with each other and with imaging results to give the best possible assessment of a patient's risk. "That's a complicated space, but I think this convergent approach is one that will advance significantly in 2022," he said.

Even noninvasive tests, however, can only benefit patients who are able to access them. Spira pointed out a few ways the field adapted during the COVID-19 pandemic that could continue to be leveraged moving forward.

"We need to find ways to get screening to patients as opposed to them having to come to the hospital," Spira said. He highlighted advances such as remote clinical trial management, as well as mobile CT and radiology units, set up in large vans or trucks that can drive to various neighborhoods to perform screening. Used during COVID-19 to promote social distancing and minimize virus exposure, such units could be used in the future to help people catch up on screenings missed during the pandemic, especially in areas with poor health care access.

Spira also noted that the pandemic placed a spotlight on behavioral risk factors that increased COVID-19 susceptibility and the risk for severe disease, such as smoking, alcohol consumption, obesity, and physical inactivity. He pointed out that, often, these same behaviors contribute to cancer risk.

"This has become a teachable moment," Spira said. "I think we can encourage the public to alter some cancer-causing behaviors that are also related to virus susceptibility."

Michael Pollak, MD, a professor of oncology and medicine at McGill University in Montreal, Canada, who studies cancer prevention through the lens of reducing risk, also emphasized addressing lifestyle behaviors that affect multiple health conditions.

"An important trend for 2022 may be the concept of healthy lifestyle behaviors integrated across diseases," Pollak said. "We have to recognize that some of the activities and lifestyles and approaches to cancer risk just contribute to overall good health."

While many behavioral factors are known to broadly increase risk of several cancers, Pollak noted that risks vary in unique ways among different individuals.

"Oncologists are used to personalization of treatments," he said. "We try to find out what treatment would be particularly useful for one patient as compared to their neighbor. In prevention, we may discover an analogy to that customization."

He explained that an individual assessment of risk may make the message of behavioral intervention more personal. "If you hear your doctor saying that, in your particular case, the way your body is put together, your weight especially increases your risk for cancer, it may help motivate some people."

Pollak believes risk assessment can be further personalized beyond the level of the individual, down to the level of discrete cell types. "We're used to thinking of a person's cancer risk as if the person was homogeneous, but carcinogenesis takes place at the cellular level," he said. "We need to know what's going on differently in the different cells that might determine risk on a per-cell basis."

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Pollak mentioned the Pre-cancer Atlas as an important vehicle for realizing this goal. "With the Pre-cancer Atlas, we'll learn more about the cellular composition and subcellular features that lead to carcinogenesis," he said, noting that such a granular understanding of tumor formation could pave the way for improved therapies.

"We really won't be able to prevent every cancer, but even if we confine our goals to preventing the subset of cancers that are preventable, that's estimated to be about half of all cancers," Pollak concluded. "Even acknowledging the limitations, the potential gains are absolutely enormous."

PRIORITIES FOR CANCER DISPARITIES IN 2022

The past two years have presented health care challenges beyond COVID-19, encompassing financial and access-related struggles that affected many facets of medicine, including cancer care. Many individuals have had to delay routine cancer screenings, alter the course of treatment, or miss follow-up appointments as a result of the pandemic.

Such problems were more pronounced in some communities than others.

"The pandemic has definitely impacted our opportunities to move forward toward eliminating disparities in all areas of cancer research," said **John Carpten, PhD, FAACR**, chair of the department of Translational Genomics at the University of Southern California Keck School of Medicine and chair of the National Cancer Advisory Board. "As we consider gaps in cancer screening and cancer diagnosis, many challenges were further exacerbated in underrepresented minority communities during the pandemic."

Carpten also pointed out the disproportionate challenges minority cancer researchers faced during COVID-19. "Many underrepresented minority investigators, who may have already had challenges in terms of access to funding, were also impacted severely by the pandemic," he said. "This is especially true for early-stage investigators and postdoctoral fellows who were unable to be in their laboratories to perform research."

Although the issue of lost time and funding due to the pandemic may be difficult to solve, Carpten believes that other initiatives to support underrepresented minority researchers—especially trainees and early-career investigators—will positively influence health disparities research in 2022.

Carpten specifically listed diversifying the biomedical workforce as a key priority for tackling health disparities. "Increasing underrepresented minority faculty members will increase the number of mentors who will then be able to train more underrepresented minorities and fellows," he said.

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©2021 American Association for Cancer Research | Graphic based on conversation with John Carpten, PhD, FAACR

He mentioned the National Institutes of Health (NIH) FIRST program, a funding opportunity provided to institutions to promote the hiring of early-career investigator cohorts from diverse backgrounds in support of their career development. Providing a supportive environment and sufficient resources to these investigators, Carpten said, can make significant strides toward ensuring a successful career trajectory in academic research.

"We believe that this is going to be a huge component in the growth of underrepresented minorities in the area of biomedical research, specifically cancer research," he said.

Encouraging diversity of researchers, however, is only one step where meaningful interventions can occur. Another is the broader inclusion of diverse patients and samples in cancer research, especially of patients recruited into clinical trials.

"We need to understand the broader impact of new therapies for all people, preferably prior to approvals, to ensure that we have the most accurate picture relative to effectiveness and toxicity profiles across representative groups of patients," Carpten said.

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Diversity in preclinical studies, including patient-derived samples, genetic data, and model systems, is also key to understanding the biological basis of cancer health disparities.

"Whether it's understanding the influence of genetic factors on cancer risk or understanding how collections of mutations that occur in cancer cells differ across individuals from different groups, it will be very important for us to continue increasing representation of the reagents, models, and data that we use," Carpten said.

"Ensuring that we understand how biological changes impact cancer initiation, progression, and growth across an array of models will provide additional information so that we can really capture the full complexity of cancer," he added.

Carpten also encourages working to address the cultural, social, and access-related issues underlying cancer health disparities by striving harder to engage with the community.

"We need to advance our relationships with various stakeholders, especially in terms of community engagement, outreach, and involvement," Carpten said. "If we don't build better relationships with the community, get their feedback, understand their issues, and work together to address them, I think we'll continue to have challenges."

As **observed during the pandemic**, improving community engagement can help health care providers build trust with their patients, bring care to broader geographic areas, and better understand the needs of the populations disparities researchers are working to serve.

"I really look forward to working with my colleagues in academia, industry, and the government, but most importantly, with our colleagues in the community," Carpten concluded. "Their voice really needs to be heard and will be key in achieving cancer health equity."

Attachment 12
Purpose of the Project

CATEGORIES:

AACR, Featured, Research

TAGS:

Basic cancer research, Cancer health disparities, Experts' Forecast, immunotherapy

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This is very informative blog about Cancer research forecast, I will definitely share this content with others.

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Also of Interest:

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Experts Forecast Cancer Research and Treatment...
Experts Forecast Cancer Research and Treatment...
Q&A with Anil K. Sood, MD, on Ovarian Cancer...

Attachment 13
Alternatives

Alternative #1: Maintain the Status Quo. **(No Additional CON costs / Healthcare Delivery Costs)**

This alternative has no capital cost associated with it, but also yields no benefit to the community. The need for cancer care services in the west and south suburbs indicates that the current Lisle site at which Rush provides services is no longer sufficient for the growing needs of the community. This Board and Rush alongside it want to see healthcare ready to meet the changing needs of patient populations, rather than playing catch-up. Prioritizing maintained and improved access to care for this community is too important to delay. Moreover, the practice requires additional physician office space and associated clinical space to service its patients, as well as the ability to offer additional radiology and oncology services, as well as support services. Taking no action now ensures a significant disruption in the ongoing care necessary for patients who are reliant upon cancer care services from Rush in the community. It also will result in a notable gap in available care and would reflect poor healthcare planning. For these reasons, this alternative was not selected.

Alternative #2: Construct another Medical Office Building at another location. **(Similar CON costs to Proposed Project)**

Other locations in the health service area were considered. The overall cost and ultimate benefit did not support the selection of any of those sites. Notably, the location selected will be close to the existing patient base in Lisle, allowing there to be little to no disruption for existing patients receiving care from the existing Lisle site. The purchase price of the land associated with this site was reflective of other sites in the market. The construction costs would not have been substantially more or less than the proposed project's cost. For these reasons, this alternative was not selected.

Alternative #3: Construct a smaller Medical Office Building at the same location. **(Lower CON costs than Proposed Project / Smaller Healthcare Delivery Impact)**

While a smaller Medical Office Building could be built on the site identified for this proposed project, this would fail to meet the demands of the growing demands of cancer care services in the west and south suburbs. The result of this would be falling behind in Rush's commitment to advance access to necessary care throughout its patient population. The construction costs for this alternative would likely have been smaller than the proposed project's cost, but the cost to its mission is more significant and more impactful than the financials. The inability of this alternative to meet the needs of the community would be poor healthcare planning. For these reasons, this alternative was not selected.

Alternative #4: Project as Proposed.

The project, as proposed, is the most responsible from a health planning perspective as well as from a patient care delivery perspective. Accordingly, this project enables the applicant to fulfil the CON principle of pursuing the most effective increase in access to cancer care at the lowest appropriate cost. More importantly, it will ensure those patients reliant upon the exceptional cancer care providers in the western and southern suburbs of Chicago will continue to have access to the providers for not only acute care, but continuing care and support services. For those reasons, and given the deficiencies of the alternatives identified above, this is the alternative that was selected and is being presented to the Board for consideration and approval.

Attachment 14
Size of the Project

The gross square footage identified in this application for the proposed projects is 59,620 and includes 38,511 gross square feet of clinical and 21,109 gross square feet of non-clinical space. This gross square footage is necessary, not excessive, and consistent with the standards identified in Appendix B of 77 Illinois Admin. Code Section 1110, as documented below.

SIZE OF PROJECT				
DEPARTMENT/SERVICE	**PROPOSED BGSF/DGSF**	**STATE STANDARD**	**DIFFERENCE**	**MET STANDARD?**
Infusion	11,556	N/A		N/A
Diagnostic Radiology (MRI, CT Simulator, CT Scan, 2 Mammography Units, 3 Ultrasound Units, 1 X-Ray Machine, 1 Linear Accelerator)	9,734	Total: 13,600 1300 GSF Per Unit (General Radiology, Ultrasound); 900 GSF Per Unit (Mammograms); 1800 Per Unit (MRI); 1800 Per Unit (CT); 2400 GSF Per Accelerator	-4,205	Yes
Oncology	16,955	N/A		N/A

Attachment 15
Project Services Utilization

The proposed RUSH Lisle Cancer Center is designed with the primary purpose of providing care to the residents of the planning area where the facility will be located. In addition, given the expansive nature of the RUSH patient base it is expected that the RUSH Lisle Cancer center will also provide services to patients in secondary service areas. The total number of RUSH Radiological Oncology Patients in 2021 was 25,995 and increase from 2020.

Hospital - Radiological Oncolgoy Patients	CY2018	CY2019	CY2020	CY2021
RUSH UNIVERSITY MED CAL CENTER	15,245	19,673	12,202	14,061
RUSH OAK PARK HOSPITAL	4,400	4,645	3,847	4,918
RUSH COPLEY MEDICAL CENTER	8,807	7,028	7,891	7,016

Historically, a significant amount of healthcare has been facility- or practitioner-centric. Travel to where the care is, if you want access to that care. Oftentimes, to access world class care this can be a necessity. However, this project embodies the core principles advanced by the Rush system in ensuring the entire patient population it cares for has meaningful access to care. This commitment yields more access to care within the communities in which its patients live and work, communities that too often have been marginalized and underserved. Not only do projects like this have immediate impact for those in the Lisle area, it has a cascading effect for those beyond that community because it extends the reach of access to care in a meaningful way. This is particularly true for those undergoing cancer treatment, because it is rarely – if ever – the patient undergoing treatment alone, but their entire family and support network alongside them. As evidenced below, the ongoing need for cancer care persists.

The Applicants have reviewed their patient data from the hospitals currently operated in the area and additionally conducted a market study before proposing the project. For the primary planning area, the patients treated at the existing Lisle facility come from all of the RUSH area hospitals. Below is a graph reflecting the top disease site and the number of percentage of patients treated from each RUSH hospital.

Lisle Infusions

Disease Site	FY 18	FY 19	FY 20	FY 21	% of Total
Hematological	847	1,122	1,207	1,163	28%
Thoracic	938	945	826	919	22%
GI	468	154	286	481	12%
Breast	160	95	218	406	10%
Urology	357	190	228	134	3%

% by Location
IP & OP procedural data

RUMC	RCMC	ROPH
63%	28%	9%
53%	42%	5%
32%	59%	9%
23%	59%	18%
65%	31%	3%

The Applicants found that while their facilities' treat a number of different cancer diseases, the four main disease sites are Hematological, Thoracic, Gastrointestinal, Breast. Urological related diseases have actually decreased the most out of any of the disease treated in the RUSH system, however the most significant growth has been in the Breast and Hematological disease sites. In the primary planning area, RUSH patients dealing with musculoskeletal diseases make up the 3rd most infusions.

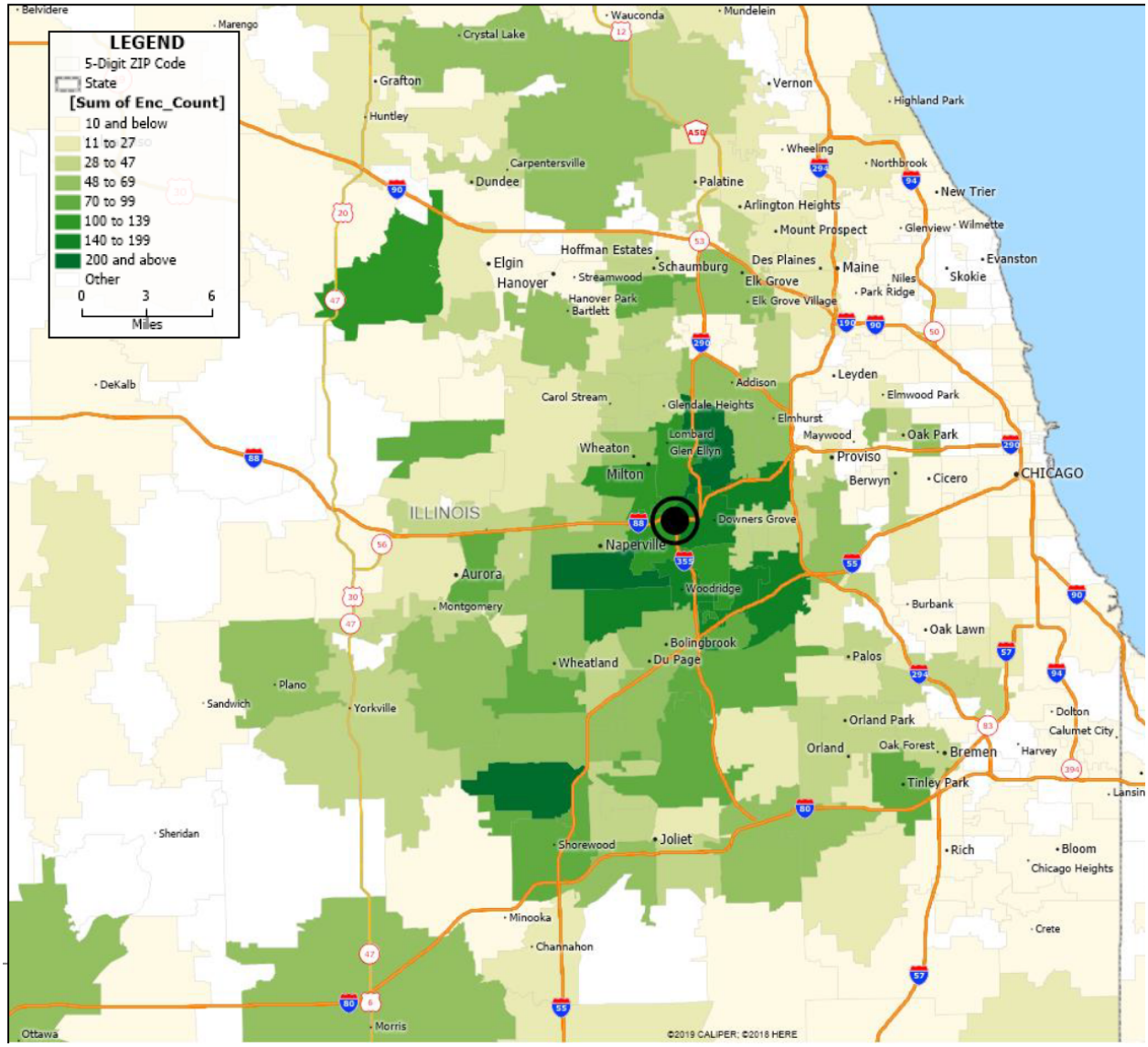
Attachment 15
Project Services Utilization

Disease Site	FY 18	FY 19	FY 20	FY 21	% of Total
Hematological	847	1,122	1,207	1,163	28%
Thoracic	938	945	826	919	22%
Musculoskeletal	747	552	804	603	15%
Gastrointestinal	468	154	286	481	12%
Breast	160	95	218	406	10%
Urology	357	190	228	134	3%
Head & Neck	9	3	15	95	2%
Gynecologic	68	32	151	84	2%
All Other	72	80	88	75	2%
Skin	63	36	94	58	1%
Endocrine	42	35	27	58	1%
Neurological	26	41	41	54	1%
Grand Total	**3,797**	**3,285**	**3,985**	**4,130**	**100%**

As discussed above, the cascading effect that a project of this nature has in increasing access to cancer care is meaningful. Consider the type of care that is facilitated by access to 24 additional chairs in which patients can received infusion therapy, the onsite medical oncology clinic supported by the installation of a brand-new linear accelerator, not to mention the supportive services provided by the laboratory, pharmacy, procedure rooms, and imaging. Whether it be the comfort of a diagnosis that a circumstance is benign or the access to care represented by the ongoing commitment to ensure meaningful access to world-class cancer care, the benefits extend well beyond the physical location of the medical office building. This is best evidenced by the service area outlined below. Moreover, it is speculative to know how many patients would have considered foregoing or delaying care because the requisite travel to a farther away site made obtaining care too burdensome (time and expense of, additional time off work, etc.) this project reduces the potential of those circumstances occurring. Moreover, those very patients being forced to make those decisions are the very same patients the certificate of need program is designed to protect – to ensure meaningful access to indigent and underserved patients. These patients will now have sustainable access to this care in or nearer to their communities, meaningfully benefiting patient access to quality care. This project embodies the principles the program exists to advance.

Attachment 15
Project Services Utilization

Attachment 15
Project Services Utilization



Attachment 15
Project Services Utilization

The facility proposed to acquire a Varian True Beam Linear Accelerator. This device was selected because it is designed to enable clinicians to treat a wider array of cancer cases using a diverse range of radiation therapies. Clinical cases in head and neck cancers, lung, breast, prostate, liver, and more are addressed by TrueBeam using SRS, stereotactic body radiation therapy (SBRT), HyperArc, volumetric modulated radiation therapy (VMAT), intensity- modulated radiation therapy (IMRT), image-guided radiotherapy (IGRT) and RapidArc radiotherapy.

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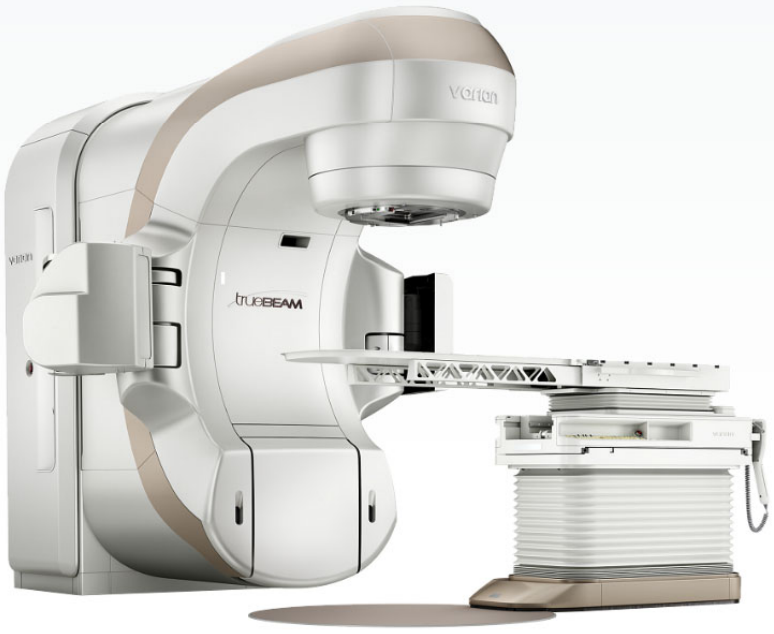

Attachment 15
Project Services Utilization

Ideally, this section would discuss the tenuous need for a linear accelerator and the potential that its utilization would soon be obsolete. Unfortunately, as evidenced below, this does not appear to be the case within our near future. The clear utilization of the linear accelerator is demonstrated below and as outlined, there will reach a point if the utilization simply holds a slow and steady growth, that the need for treatment will exceed the capacities of a single linear accelerator, even one as advanced as the Varian True Beam Linear Accelerator. Should, as expected, the approval of this project successfully increases the comfort level of those on the outer reaches of the service area to pursue and obtain cutting-edge front-line cancer care, the likely utilization will exceed what is outlined below. Moreover, as circumstances allow, utilization of a second linear accelerator can both extend the lifecycle of the device, but also having staggered devices of differing ages reduces the ultimate potential of interruption for care of those patients undergoing a series of treatments. Obviously, no decisions will be made until the relevant information can be collected, and unquestionably, the applicant will comply with any and all notification and approval requirements. However, it seemed worthwhile to point out that this project was designed with potential future expansion as a possibility and undertaken in a way that will enable the applicant to provide long-term uninterrupted care to the patient population that will rely on these services for life-saving cancer care.

Lisle Rad Onc Projections	**Yr 1**	**Yr 2**	**Yr 3**	**Yr 4**	**Yr 5**	**Yr 6**	**Yr 7**	**Yr 8**	**Yr 9**	**Yr 10**
Total Treatments per yr	3,663	3,920	4,210	4,539	4,914	5,342	5,836	6,407	7,071	7,848
Cases per day (@254 days per yr)	14.42	15.43	16.58	17.87	19.35	21.03	22.98	25.22	27.84	30.90
Lin Accs needed @ 25 treatments/linacc/day	0.58	0.62	0.66	0.71	0.77	0.84	0.92	1.01	1.11	1.24

Attachment 31
Need Determination Establishment

The medical office building has a primary purpose to provide care to the residents of the Lisle community and surrounding areas with Rush's excellent cancer patient care. According to the Illinois Department of Health Projected Cancer Incident report, DuPage County projects a steady increase in cancer rates based on average annual count of incident rates.[12] The five-year average for cancer rates (all ages, all sexes) in DuPage County shows an increase in the 5-year count of cancer rates from 2016-2020 through 2019-2023.

Further, Rush has projected an increased need for LINAC services and Infusion services, both which will be offered at the Lisle Cancer Care Center. Specifically, Rush projects a LINAC projected capacity use to rise to 100% utilization by Year 8.[13]

Lisle Rad Onc Projections	Yr 1	Yr 2	Yr 3	Yr 4	Yr 5	Yr 6	Yr 7	Yr 8	Yr 9	Yr 10
Total Treatments per yr	3,663	3,920	4,210	4,539	4,914	5,342	5,836	6,407	7,071	7,848
Cases per day (@254 days per yr)	14.42	15.43	16.58	17.87	19.35	21.03	22.98	25.22	27.84	30.90
Lin Accs needed @ 25 treatments/linacc/day	0.58	0.62	0.66	0.71	0.77	0.84	0.92	1.01	1.11	1.24

[12] Illinois Department of Public Health, Illinois State Cancer Registry, County Cancer Incidence Projections 2020-2023 (April 2022).
[13] Tumor Registry, RUMC Analytic Cases Receiving Chemo / Radiation as Part of 1st Course of Treatment.

Attachment 33
Availability of Funds

The total estimated project cost is $51,193,592. The applicants will fund the projects costs with cash and cash equivalents/method of funding. Rush University System for Health has sufficient internal resources to fund its hare of necessary working capital as demonstrated in its letter of proof of funding and its most recent audited financial statements which are enclosed with this attached.

Additionally, enclosed are letters confirming proof of project funding and the most recent audited financial statements for Rush University System for Health.

Attachment 33
Availability of Funds – Audited Financial Statements

Rush System for Health

Consolidated Financial Statements as of and for the
Years Ended June 30, 2021 and 2020,
Single Audit Supplementary Report as of and
for the Year Ended June 30, 2021, and
Independent Auditors' Report

RUSH

Attachment 33
Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH

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INDEPENDENT AUDITORS' REPORT

To the Board of Trustees of Rush System for Health:

We have audited the accompanying consolidated financial statements of Rush System for Health (the "System"), which comprise the consolidated balance sheets as of June 30, 2021 and 2020, and the related consolidated statements of operations, changes in net assets and cash flows for the years then ended, and the related notes to the financial statements.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these consolidated financial statements in accordance with accounting principles generally accepted in the United States of America; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of consolidated financial statements that are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

Our responsibility is to express an opinion on these consolidated financial statements based on our audit. We conducted our audit in accordance with auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the consolidated financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the consolidated financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the consolidated financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the consolidated financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the consolidated financial position of the System as of June 30, 2021 and 2020, and the changes in its net assets and its

Attachment 33
Availability of Funds – Audited Financial Statements

cash flows for the years then ended in accordance with accounting principles generally accepted in the United States of America.

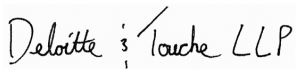
Other Matters

Other Information

Our audit was conducted for the purpose of forming an opinion on the consolidated financial statements as a whole. The accompanying schedule of expenditures of federal awards, as required by Title 2 U.S. Code of Federal Regulations Part 200, *Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards* is presented for purposes of additional analysis and is not a required part of the consolidated financial statements. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the consolidated financial statements. The information has been subjected to the auditing procedures applied in the audit of the consolidated financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the consolidated financial statements or to the consolidated financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the information is fairly stated, in all material respects, in relation to the consolidated financial statements as a whole.

Other Reporting Required by Government Auditing Standards

In accordance with *Government Auditing Standards*, we have also issued our report dated October 28, 2021 on our consideration of the System's internal control over financial reporting and on our tests of its compliance with certain provisions of laws, regulations, contracts, and grant agreements and other matters. The purpose of that report is solely to describe the scope of our testing of internal control over financial reporting and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the System's internal control over financial reporting or on compliance. That report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the System's internal control over financial reporting and compliance.



Chicago, IL

October 28, 2021, except with respect to the in-relation-to opinion on the schedule of expenditures of federal awards, as to which the date is September 28, 2022

Attachment 33
Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH

CONSOLIDATED BALANCE SHEETS
(Dollars in thousands)

	As of June 30, 2021	As of June 30, 2020
ASSETS		
CURRENT ASSETS:		
Cash and cash equivalents	$ 441,652	$ 578,478
Accounts receivable for patient services	364,311	348,019
Other accounts receivable	55,769	59,102
Self-insurance trust—current portion	43,670	30,629
Other current assets	103,854	105,047
Total current assets	1,009,256	1,121,275
ASSETS LIMITED AS TO USE AND INVESTMENTS:		
Investments	1,738,921	1,241,061
Limited as to use by donor or time restriction or other	748,897	560,763
Self-insurance trust—less current portion	131,177	105,509
Total assets limited as to use and investments	2,618,995	1,907,333
PROPERTY AND EQUIPMENT—NET	1,619,887	1,611,645
OPERATING LEASE RIGHT-OF-USE ASSETS	131,459	157,785
POSTRETIREMENT AND PENSION BENEFIT ASSETS	65,694	-
OTHER NONCURRENT ASSETS	92,478	93,603
TOTAL ASSETS	$5,537,769	$4,891,641
LIABILITIES AND NET ASSETS		
CURRENT LIABILITIES:		
Accounts payable	$ 64,183	$ 77,663
Accrued expenses	455,323	368,241
Postretirement and pension benefit liabilities	2,275	-
Estimated third-party settlements payable and advances payable	393,910	415,706
Current portion of accrued liability under self-insurance programs	59,227	44,135
Current portion of long-term debt	12,216	11,775
Short-term operating lease liability	26,027	26,342
Total current liabilities	1,013,161	943,862
LONG-TERM LIABILITIES:		
Accrued liability under self-insurance programs—less current portion	242,975	222,279
Postretirement and pension benefit liabilities	92,941	95,924
Long-term debt—less current portion	921,802	900,160
Line of credit	-	75,000
Obligations under financing leases and other financing arrangements	3,226	41,499
Long-term operating lease liabilities	108,467	133,120
Other long-term liabilities	159,132	89,841
Total long-term liabilities	1,528,543	1,557,823
Total liabilities	2,541,704	2,501,685
NET ASSETS:		
Without donor restrictions	1,980,607	1,568,626
With donor restrictions	1,015,458	821,330
Total net assets	2,996,065	2,389,956
TOTAL LIABILITIES AND NET ASSETS	$5,537,769	$4,891,641

See notes to the consolidated financial statements.

Attachment 33
Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH

CONSOLIDATED STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS
(Dollars in thousands)

	For the Years Ended June 30, 2021	2020
REVENUE:		
Patient service revenue	$ 2,574,590	$ 2,233,576
Tuition and educational programs revenue	87,235	81,530
Research revenue and net assets released from restriction and used for research and other operations	155,870	164,949
Other revenue	181,366	176,538
Total revenue	2,999,061	2,656,593
EXPENSES:		
Salaries, wages and employee benefits	1,516,253	1,425,626
Supplies, utilities and other	903,588	810,953
Insurance	70,484	66,163
Purchased services	217,905	257,076
Depreciation and amortization	149,422	156,862
Interest and fees	33,234	28,437
Total expenses	2,890,886	2,745,117
OPERATING INCOME (LOSS)	108,175	(88,524)
NON-OPERATING INCOME (LOSS)		
Investment income and other—net	193,926	15,917
Contributions without donor restrictions	3,944	901
Fundraising expenses	(9,926)	(12,995)
Pension settlement expense	-	(40,445)
Debt rate lock settlement	-	(62,500)
Change in fair value of interest rate swaps	4,668	(3,896)
Loss on debt refunding	-	(75)
Total non-operating income (loss)	192,612	(103,093)
EXCESS (DEFICIT) OF REVENUES OVER EXPENSES	$ 300,787	$ (191,617)

(Continued)

Attachment 33
Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH

CONSOLIDATED STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS
(Dollars in thousands)

	For the Years Ended June 30, 2021	2020
NET ASSETS WITHOUT DONOR RESTRICTIONS:		
Excess (deficit) of revenues over expenses	$ 300,787	$ (191,617)
Net assets released from restrictions used for the purchase of property and equipment	41,385	2,021
Postretirement related changes other than net periodic postretirement cost	64,215	(12,794)
Cumulative effect of change in accounting principle—Adoption of ASU No. 2016—02, *Leases*	-	34,532
Other	5,059	9,416
Increase/(decrease) in net assets without donor restrictions	411,446	(158,442)
NET ASSETS WITH DONOR RESTRICTIONS:		
Pledges, contributions and grants	110,377	162,349
Net assets released from restrictions	(141,240)	(162,045)
Net realized and unrealized gains (losses) on investments	225,526	(16,651)
Increase/(decrease) in net assets with donor restrictions	194,663	(16,347)
INCREASE/(DECREASE) IN NET ASSETS	606,109	(174,789)
NET ASSETS—Beginning of period	2,389,956	2,564,745
NET ASSETS—End of period	$ 2,996,065	$ 2,389,956

See notes to the consolidated financial statements. (Concluded)

Attachment 33
Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH

CONSOLIDATED STATEMENTS OF CASH FLOWS
(Dollars in thousands)

	For the Years Ended June 30, 2021	2020
OPERATING ACTIVITIES:		
Increase (decrease) in net assets	$ 606,108	$ (174,789)
Adjustments to reconcile change in net assets to net cash provided by operating activities:		
Depreciation and amortization	149,422	156,862
Non-cash operating lease expense	1,316	1,497
Cumulative effect of change in accounting principle	-	(34,532)
Postretirement related changes other than net periodic postretirement cost	(64,215)	12,794
Change in fair value of interest rate swaps	(4,668)	3,896
Net unrealized and realized (gains) losses on investments	(407,123)	13,983
Restricted contributions and investment income received	(26,544)	(24,593)
Investment (gains) losses on trustee held investments	(7,299)	54
Gain on sale of property and equipment	4,434	25,004
Changes in operating assets and liabilities:		
Accounts receivable for patient services	(16,292)	45,025
Accounts payable and accrued expenses	91,023	38,336
Estimated third-party settlements payable	(21,796)	228,431
Pension and postretirement costs	(2,187)	35,406
Accrued liability under self-insurance programs	35,788	18,169
Other changes in assets and liabilities	88,281	(19,698)
Net cash provided by operating activities	426,248	325,845
INVESTING ACTIVITIES:		
Additions to property and equipment	(173,502)	(220,640)
Acquisition of Rush Oak Brook Orthopaedic Center	(13,205)	-
Acquisition of of physician practices	-	(605)
Investment in Joint Venture	(6,678)	-
Purchase of investments	(3,238,677)	(4,165,767)
Sale of investments	2,928,398	4,135,096
Net cash used in investing activities	(503,664)	(251,916)
FINANCING ACTIVITIES:		
Proceeds from restricted contributions and investment income	26,544	24,593
Payment on line of credit	(75,000)	(36,500)
Proceeds from issuance of long-term debt	-	75,000
Proceeds from debt issuance	-	(27,460)
Proceeds from capital lease	-	366,500
Payment of long-term debt	(12,768)	(14,270)
Payment of obligations on finance lease liabilities	(896)	(2,524)
Proceeds from other financing arrangements	2,710	271
Net cash (used in) provided by financing activities	(59,410)	385,610
NET (DECREASE) INCREASE IN CASH AND CASH EQUIVALENTS	(136,826)	459,539
CASH AND CASH EQUIVALENTS—Beginning of period	578,478	118,939
CASH AND CASH EQUIVALENTS—End of period	$ 441,652	$ 578,478
SUPPLEMENTAL DISCLOSURE OF CASH FLOW INFORMATION:		
Right of use assets obtained in exchange for new operating lease liabilities	$ 2,319	$ 3,556
Cash paid for interest	$ 38,794	$ 30,574
Net asset transfer of newly affiliated entity	$ -	$ 8,651
Noncash additions to property and equipment	$ 18,471	$ 20,829

See notes to consolidated financial statements.

Attachment 33
Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH

NOTES TO CONSOLIDATED FINANCIAL STATEMENTS
AS OF AND FOR THE YEARS ENDED JUNE 30, 2021 AND 2020
(Dollars in thousands)

1. ORGANIZATION AND BASIS OF CONSOLIDATION

Rush System for Health ("RUSH") is a multihospital health system with operations that consist of several diverse activities with a shared mission of patient care, education, research, and community service. RUSH consists of an academic medical center, Rush University Medical Center ("RUMC"), two community hospitals, Rush Copley Medical Center ("RCMC") and Rush Oak Park Hospital ("ROPH"), that each serve distinct markets in the Chicago, Illinois, metropolitan area and Rush Health, a physician hospital organization and clinically integrated network. RUMC, RCMC, and ROPH are all Illinois not-for-profit corporations exempt from federal income taxes under Section 501(c)(3) of the Internal Revenue Code. Effective March 1, 2017, RUMC and RCMC reorganized their operations under a common corporate parent. Rush System for Health, d/b/a Rush University System for Health (the "System Parent"), an Illinois not-for-profit corporation, which is exempt from federal income taxes under Section 501(c)(3) of the Code. The System Parent, RUMC, RCMC and certain of its subsidiaries, and ROPH comprise the RUSH Obligated Group (the "RUSH Obligated Group" or the "Obligated Group") pursuant to the Master Trust Indenture, dated as of May 29, 2020, as amended and as entered into by each member of the Obligated Group. The members of the RUSH Obligated Group are jointly and severally liable for all debt issued under the Master Trust Indenture.

Rush University Medical Center

RUMC, the largest member of RUSH, is an academic medical center comprising Rush University Hospital ("RUH") and Rush University, located in Chicago, Illinois, and ROPH, located in Oak Park, Illinois.

RUH—A 727-licensed bed acute care, rehabilitation, and psychiatric hospital in Chicago, Illinois. RUH also includes a faculty practice plan, Rush University Medical Group, which employed 687 physicians as of June 30, 2021.

Rush University—A graduate health sciences university that educates students in health-related fields. This includes over 2,800 students in Rush Medical College, the College of Nursing, the College of Health Sciences, and the Graduate College. Rush University also includes a research operation with $192,421 and $192,885 in annual research expenditures during fiscal years 2021 and 2020, respectively.

ROPH—A 185-licensed bed acute care hospital located in Oak Park, Illinois, eight miles west of RUH. ROPH includes an employed medical group, Rush Oak Park Physicians Group (ROPPG), which employed 70 physicians as of June 30, 2021. RUMC is the sole corporate member of ROPH.

Rush Copley Medical Center

RCMC is the sole corporate member of Copley Memorial Hospital, Inc. ("CMH"), Rush Copley Medical Group NFP ("RCMG"), Copley Ventures, Inc. ("Ventures"), and Rush Copley Foundation, Inc. ("Foundation").

CMH—A 210-bed licensed acute care hospital located in Aurora, Illinois. CMH provides inpatient, outpatient, and emergency care services for residents of Aurora and surrounding communities in the far western suburbs of Chicago, Illinois.

RCMG—Established to own, operate, control, and otherwise coordinate the activities of physician practice health and medical services and to provide certain physician billing and administrative services. As of June 30, 2021, RCMG employed 101 physicians.

Attachment 33
Availability of Funds – Audited Financial Statements

Ventures—Holds title to property for rental purposes and holds ownership of the Rush Copley Healthplex, a health and fitness center.

Foundation—Solicits contributions to support health care activities in the market area, including, but not limited to, those of CMH.

Rush Health

Rush Health is RUSH's physician hospital organization and clinically integrated network that is comprised of both RUSH related and owned entities, which includes RUMC, ROPH, RCMC, and non-related independent providers such as Riverside Healthcare in Kankakee. Non-related independent providers comprise 10% of the organization's membership. Rush Health has approximately 2,200 affiliated providers (1,792 physicians and 470 Advanced Practice Providers). Effective August 12, 2019, the System Parent became the sole corporate member of Rush Health, an Illinois-not-for-profit taxable corporation that provides payor and employer contracting, data aggregation and analysis, care coordination, and quality and process improvement services to its members. Prior to this, Rush Health was treated as a joint venture and any income was recorded using the equity method of accounting. Rush Health and Riverside Health System are not members of the Obligated Group.

COVID -19 Pandemic Update

The Novel Corona Virus 2019 ("COVID-19") pandemic has materially impacted the hospitals and operations that comprise the system for which RUSH serves, and has impacted the business and financial condition of the RUSH Obligated Group. On March 18, 2020, the Centers for Medicare & Medicaid Services formally recommended that health care providers delay all elective surgeries and non-essential medical, surgical, and dental procedures during the pandemic. Governor Pritzker's Executive Order no. 2020-19 then required a cancellation of all elective surgeries and non-emergency care through May 11, 2020. Beginning May 11, 2020, the Illinois Department of Public Health ("IDPH") provided updated guidelines that hospitals and Ambulatory Surgical Treatment Centers may begin to perform elective procedures. RUSH followed IDPH guidelines and began the process of performing such elective and non-emergency procedures. Management continues to monitor the developments with respect to the COVID-19 pandemic and intends to follow requirements from the Centers for Disease Control and other applicable federal, state, and local regulatory agencies.

RUSH has been provided some relief based on payments made to hospitals as a result of the Coronavirus Aid, Relief, and Economic Security ("CARES") Act. CARES payments of $61,200 and $86,000 were recorded as other revenue in the consolidated statements of operations and changes in net assets during the years ended June 30, 2021 and 2020, respectively. In fiscal year 2020, RUSH also received advanced payments from Medicare of $231,700 which has been recorded within estimated third-party settlements and advances payable in the consolidated balance sheets. During fiscal year 2021, RUSH has paid back $39,228 of advanced payments from Medicare and $192,472 remains outstanding as of June 30, 2021. Of this amount, $149,441 is estimated to be repaid in fiscal year 2022 and is recorded within estimated third-party settlements and advances payable. The remaining $43,031 will be repaid in fiscal year 2023 and is recorded within other long-term liabilities in the consolidated balance sheet.

As of October 8, 2021, the Johns Hopkins University Corona Virus Resource Center Tracker reported the United States to have the largest number of confirmed cases at approximately 44.4 million. Of the United States counties, Cook County, Illinois has the fourth largest number of confirmed cases at approximately 625,647. RUSH continues its efforts to mitigate the financial impacts as it works to increase elective surgical cases and manage non-COVID related expenses. During fiscal year 2021, volumes returned to pre-pandemic levels in August 2020 and have remained relatively consistent since then.

RUSH continues to work with local and city officials to deliver the COVID-19 vaccine to our community, patients and employees, following the guidelines outlined by the state and local departments of public health.

Attachment 33
Availability of Funds – Audited Financial Statements

2. SUMMARY OF SIGNIFICANT ACCOUNTING POLICIES

Basis of Presentation

The accompanying consolidated financial statements have been presented in conformity with accounting principles generally accepted in the United States of America (GAAP).

Basis of Consolidation

Included in RUSH's consolidated financial statements are all of its wholly owned or controlled subsidiaries. All significant intercompany transactions have been eliminated in consolidation.

The supplemental consolidating balance sheet and consolidating statement of operations and changes in net asset as of and for the year ended June 30, 2021, are presented for the purpose of additional analysis of RUSH's fiscal year 2021 consolidated financial statements taken as a whole.

Use of Estimates

The preparation of consolidated financial statements in conformity with GAAP requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities, disclosure of contingent assets and liabilities at the date of the consolidated financial statements, and the reported amounts of revenue and expenses during the reporting period. Actual results could differ from those estimates.

New Accounting Pronouncements

Effective July 1, 2020, RUSH adopted ASU No. 2018-13, *Fair Value Measurement* (Topic 820): *Disclosure Framework-Changes to the Disclosure Requirements for Fair Value Measurement*. The ASU removes, modifies, and adds certain disclosure requirements on fair value required by Topic 820. The ASU did not have a material impact on the consolidated financial statements.

Effective July 1, 2020, RUSH adopted ASU No. 2018-15, *Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract.* This aligns the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract with the requirements for capitalizing implementation costs incurred to develop or obtain internal-use software. The ASU did not have a material impact to the consolidated financial statements.

In March 2021, the FASB issued ASU No. 2021-03—*Intangibles—Goodwill and Other (Topic 350): Accounting Alternative for Evaluating Triggering Events,* which provides not-for-profit entities with an accounting alternative to perform the goodwill impairment triggering event evaluation as required in Subtopic 350-20 as of the end of the reporting period, whether the reporting period is an interim or annual period. An entity that elects this alternative is not required to monitor for goodwill impairment triggering events during the reporting period but, instead, should evaluate the facts and circumstances as of the end of each reporting period to determine whether a triggering event exists and, if so, whether it is more likely than not that goodwill is impaired. An entity that does not elect the accounting alternative for amortizing goodwill and that performs its annual impairment test as of a date other than the annual reporting date should perform a triggering event evaluation only as of the end of the reporting period. RUSH is planning to adopt this ASU in fiscal year 2022 and does not expect that it will have a material impact on the consolidated financial statements.

In June 2016, the FASB issued ASU No. 2016-13, *Financial Instruments - Credit Losses (Topic 326): Measurement of Credit Losses on Financial Instruments* which requires the application of a current expected credit loss ("CECL") impairment model to financial assets measured at amortized cost (including trade accounts receivable), net investments in leases, and certain off-balance-sheet credit exposures. Under the CECL model, lifetime expected credit losses on such financial assets are measured and recognized at each reporting date based on historical, current, and forecasted information. Furthermore, the CECL model requires financial assets with similar risk characteristics to be analyzed on a collective basis. ASU No. 2016-13 was originally effective on July 1, 2021. However, ASU No. 2019-10, *Financial Instruments – Credit Losses*

Attachment 33
Availability of Funds – Audited Financial Statements

(Topic 326), Derivatives and Hedging (Topic 815), and Leases (Topic 842), delayed the effective date of this new standard for RUSH to July 1, 2023. RUSH is currently reviewing the requirements of the standard and evaluating the impact of the standard.

In September 2020, the FASB issued ASU No. 2020-07, *Not-for-Profit Entities (Topic 958): Presentation and Disclosures by Not-for-Profit Entities for Contributed Nonfinancial Assets* ASU No. 2020-07 requires contributed nonfinancial assets to be presented as a separate line item in the statement of activities. Additional disclosures around qualitative information and any policies on monetization, description of any donor-imposed restrictions and a description of valuation techniques are also required. ASU No. 2020-07 is effective for RUSH beginning on July 1, 2021. RUSH is currently reviewing the requirements of the standard and evaluating the impact of the standard.

In January 2017, the FASB issued ASU No. 2017-04, *Intangibles—Goodwill and Other* (Topic 350): *Simplifying the Test for Goodwill Impairment*. The ASU No. 2017-04 eliminates Step 2 from the goodwill impairment test. The annual, or interim, goodwill impairment test is performed by comparing the fair value of a reporting unit with its carrying amount. An impairment charge should be recognized for the amount by which the carrying amount exceeds the reporting unit's fair value; however, the loss recognized should not exceed the total amount of goodwill allocated to that reporting unit. The ASU also eliminates the requirements for any reporting unit with a zero or negative carrying amount to perform a qualitative assessment and, if it fails that qualitative test, to perform Step 2 of the goodwill impairment test. RUSH will still have the option to perform the qualitative assessment for a reporting unit to determine if the quantitative impairment test is necessary. RUSH is currently reviewing the requirements of the standard and evaluating the impact of the standard, which is required to be implemented in fiscal year 2022.

In August 2018, the FASB issued ASU No. 2018-14, Compensation-*Retirement Benefits-Defined Benefit Plans*. The ASU modifies the disclosure requirements for employers that sponsor defined benefit pension or other postretirement plans. The ASU allows entities to remove disclosures over accumulated comprehensive income and certain information about plan assets. The ASU also requires entities to add disclosures over reasons for significant gains and losses affecting the benefit obligation and any explanation for other significant changes in the benefit obligation or plan assets. RUSH is currently reviewing the requirements of the standard and evaluating the impact of the standard, which is required to be implemented in fiscal year 2022.

Cash and Cash Equivalents

Cash and investments having an original maturity of 90 days or less when purchased are considered to be cash and cash equivalents. These securities are so near maturity that they present insignificant risk of changes in value.

Patient Service Revenue and Patient Accounts Receivable

Patient service revenue is reported at the amount that reflects the consideration to which RUSH expects to be entitled in exchange for providing patient care. These amounts are due from patients, third-party payors (including health insurers and governmental programs), and others, and includes variable consideration for retroactive revenue adjustments due to settlement of audits, review, and other investigations. Revenue is recognized as performance obligations are satisfied. Performance obligations are determined based on the nature of the services provided by RUSH. Revenue for performance obligations satisfied over time is recognized based on actual charges incurred in relation to total expected charges. RUSH believes that this method provides a faithful depiction of the transfer of services over the term of the performance obligation based on the inputs needed to satisfy the obligation. Generally, performance obligations satisfied over time relate to patients at RUSH receiving inpatient acute care services. For outpatient services, the performance obligation is satisfied as the patient simultaneously receives and consumes the benefits provided as the services are performed. In the case of these outpatient services, recognition of the obligation over time yields the same result as recognizing the obligation at a point in time. RUSH measures the performance obligation from inpatient admission, or the commencement of an outpatient service, to the point when it is no longer required to provide services to that patient, which is generally at the time of discharge or completion of the outpatient services. RUSH also sells certain goods to patients and customers in a retail setting. The performance obligation is satisfied at a point in time, and revenue is generally recognized when goods are provided to the customer. Any

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unsatisfied or partially unsatisfied performance obligations at the end of the period are primarily related to inpatient acute care services at the end of the reporting period. The performance obligations for these contracts are completed when the patients are discharged, which generally occurs within days or weeks of the end of the reporting period. Amounts related to health care services provided to patients which have not been billed and that do not meet the conditions of an unconditional right to payment at the end of the reporting period are contract assets. Contract asset balances consist primarily of health care services provided to patients who are still receiving inpatient care at RUSH at the end of the year. Such amounts totaled $18,135 and $20,025 at June 30, 2021 and 2020, respectively, and are included within other current assets in the accompanying consolidated balance sheets.

Consistent with RUSH's mission, care is provided to patients regardless of their ability to pay. RUSH provides care without charge or at amounts less than its established rates to patients meeting certain criteria under its charity care policy. Such amounts determined to qualify as charity care are not reported as revenue.

RUSH determines the transaction price based on standard charges for goods and services provided, reduced by explicit price concessions which consist of contractual adjustments provided to third-party payors and discounts provided to uninsured patients in accordance with RUSH's policy as well as implicit price concessions provided to patients. RUSH determines its estimates of contractual adjustments and discounts based on contractual agreements, published rates, its discount policies and historical experience. RUSH determines its estimate of implicit price concessions based on its historical collection experience. Generally, patients who are covered by third-party payors are responsible for related deductibles and coinsurance, which vary in amount. RUSH determines its estimate of implicit price concessions for patients with deductibles and coinsurance and from those who are uninsured based on historical experience and current market conditions. The initial estimate of the transaction price is determined by reducing the standard charge by any contractual adjustments, discounts and implicit price concessions. RUSH has determined it has provided implicit price concessions to uninsured patients and patients with other uninsured balances, such as copays and deductibles. The implicit price concessions included in estimating the transaction price represent the difference between amounts billed to patients and the amounts RUSH expects to collect based on its collection history with those patients. For the years ended June 30, 2021 and 2020, implicit price concessions totaled approximately $117,017 and $95,277, respectively.

RUSH uses a portfolio approach to account for categories of patient contracts as a collective group rather than recognizing revenue on an individual contract basis. The portfolios consist of major payor classes for inpatient revenue and major payor classes and types of services provided for outpatient revenue. Based on historical collection trends and other analysis, RUSH believes that revenue recognized by utilizing the portfolio approach approximates the revenue that would have been recognized if an individual contract approach were used.

Inventory

Medical supplies, pharmaceuticals, and other inventories are stated at the lower of cost or net realizable value and are included in other current assets in the accompanying consolidated balance sheets.

Fair Value of Financial Instruments

Financial instruments consist of cash and cash equivalents, investments, derivative instruments, accounts receivable, accounts payable, accrued expenses, estimated third-party settlements, and debt. The fair value of cash and cash equivalents, accounts receivable, accounts payable, accrued expenses, and estimated third-party settlements approximated their financial statement carrying amount as of June 30, 2021 and 2020 because of their short-term maturity.

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Assets Limited as to Use and Investments

Assets limited as to use consist primarily of investments limited as to use by donors, assets held by trustees under debt or other agreements and for self-insurance, and board designated assets set aside for a specified future use. Investments in equity and debt securities with readily determinable fair values are measured at fair value using quoted market prices or model-driven valuations.

Alternative investments consist of limited partnerships that invest primarily in marketable securities (hedge funds), real estate, limited partnerships that invest in nonmarketable securities (private equity) and private debt. Investments in hedge funds and private equity funds are generally not marketable and may be divested only at specified times. Alternative investments are reported at net asset value (NAV) which approximates fair value.

Investment income or loss (including interest, dividends, realized and unrealized gains and losses, and changes in cost-based valuations) is reported within non-operating income (loss) within the accompanying consolidated statements of operations and changes in net assets, net of investment related expenses, unless the income or loss is restricted by donor or interpretation of law. Investment gains and losses on RUSH's endowment and trustee-held funds are recognized within net assets with donor restrictions. Income earned on tax-exempt borrowings for specific construction projects is offset against interest expense capitalized for such projects.

Derivative Instruments

Derivative instruments, specifically interest rate swaps, are recorded in the consolidated balance sheets as either assets or liabilities at their respective fair values. The change in the fair value of derivative instruments is reflected in non-operating income (loss) in the accompanying consolidated statements of operations and changes in net assets. Net cash settlements and payments, representing the realized changes in the fair value of the interest rate swaps, are included in interest expense in the accompanying consolidated statements of operations and changes in net assets and as operating cash flows in the accompanying consolidated statements of cash flows.

Property and Equipment

Property and equipment are recorded at cost or, if donated, at fair value at the date of receipt. Expenditures that substantially increase the useful life of existing property and equipment are capitalized. Routine maintenance and repairs are expensed as incurred. Depreciation expense, including amortization of finance lease assets, is recognized over the estimated useful lives of the assets using the straight-line method. Buildings and building service equipment assets have an estimated useful life of 10 to 80 years, moveable equipment assets have an estimated useful life of 5 to 10 years, and computer software and hardware assets have an estimated useful life of 5 to 7 years.

Assets derived from finance leases are included in property and equipment with the related liability classified in either other current liabilities or other long-term liabilities in the consolidated balance sheets according to the expected timing of lease payments.

Operating Lease Right of Use Assets and Lease Liabilities

RUSH determines if an arrangement is a lease or contains a lease at inception through review of the underlying agreement and determination of whether an identifiable asset exists that RUSH has the right to control. Leases result in the recognition of Right-of-Use (ROU) assets and lease liabilities in the consolidated balance sheets. ROU assets represent the right to use an underlying asset for the lease term, and lease liabilities represent the obligation to make lease payments arising from the lease, measured on a discounted basis. RUSH determines lease classification as operating or finance at the lease commencement date.

At lease inception, the lease liability is measured at the present value of the lease payments over the lease term. The ROU asset equals the lease liability adjusted for any initial direct costs, prepaid or deferred rent, and lease incentives. RUSH has made a policy election to use a risk-free rate using a period comparable with the lease term for the initial and

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subsequent measurement of all lease liabilities. RUSH has also elected a policy to combine lease and non-lease components in its measurement of ROU assets and lease liabilities.

The lease term will include options to extend or to terminate the lease only if RUSH is reasonably certain to exercise the option. Lease expense is generally recognized on a straight-line basis over the lease term.

RUSH has elected not to record leases with an initial term of twelve months or less in the consolidated balance sheets. Lease expense on such leases is recognized on a straight-line basis over the lease term.

Asset Retirement Obligations

RUSH recognizes the fair value of a liability for legal obligations associated with asset retirements in the period in which it is incurred if a reasonable estimate of the fair value of the obligation can be made. When the liability is initially recorded, RUSH capitalizes the cost of the asset retirement obligation by increasing the carrying amount of the related long-lived asset. The liability is accreted to its present value each period, and the capitalized cost associated with the retirement obligation is depreciated over the useful life of the related asset. Upon settlement of the obligation, any difference between the cost to settle an asset retirement obligation and the liability recorded is recognized as a gain or loss in the consolidated statements of operations and changes in net assets. Asset retirement obligations are reported in other long-term liabilities in the accompanying consolidated balance sheets and amounted to $24,576 and $23,383 as of June 30, 2021 and 2020, respectively.

Ownership Interests in Other Health-Related Entities

RUSH has a majority ownership interest in a number of subsidiaries, which provide outpatient surgical services. An ownership interest of more than 50% in another health-related entity in which RUSH has a controlling interest is consolidated. As of June 30, 2021 and 2020, noncontrolling interests in consolidated subsidiaries amounted to $2,617 and $5,403, respectively. The amounts related to noncontrolling interests are recorded in net assets without donor restrictions, and as the amounts are not material, they are not separately presented in the accompanying consolidated financial statements. RUSH also has affiliations with and interests in other organizations that are not consolidated. These organizations primarily provide outpatient health care and managed care contracting services. An ownership interest in another health-related entity of at least 20%, but not more than 50%, in which RUSH has the ability to exercise significant influence over the operating and financial decisions of the investee, is accounted for on the equity basis, and the income (loss) is reflected in other revenue. An ownership interest in a health-related entity of less than 20%, in which RUSH does not have the ability to exercise significant influence over the operating and financial decisions of the investee, is carried at cost or estimated net realizable value and reported within other assets, which is not material to the consolidated financial statements.

Debt issuance Costs

Debt issuance costs, net of amortization, is computed using the effective interest method over the life of the related debt and is reported within long-term debt in the consolidated balance sheets. Unamortized debt issuance costs amounted to $7,483 and $6,875 as of June 30, 2021 and 2020, respectively.

Other Assets

Other assets include investments in joint ventures accounted for on the equity basis, unconditional promises to contribute, goodwill, insurance recoveries, and other intangible assets. RUSH continually evaluates the recoverability of the carrying value of long-lived assets, such as goodwill, by assessing assets for impairment.

Other Long-term Liabilities

Other long-term liabilities include asset retirement obligations, employee benefit plan liabilities for certain defined contribution and supplemental retirement plans other than defined benefit pension plans, liabilities for derivative instruments, and other long-term obligations.

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Net Assets

Net assets are classified based on the existence or absence of donor or grantor imposed restrictions. Accordingly, net assets and changes therein are classified and reported as follows:

Net Assets Without Donor Restrictions—Net assets without donor restrictions are resources available to support operations. The only limits on the use of these assets are the broad limits resulting from the nature of the organization, the environment in which it operates, the purposes specified in its corporate documents and its application for tax-exempt status, and any limits resulting from contractual agreements with creditors and others that are entered into in the course of business. The net assets without donor restrictions of RUSH are primarily derived from annual excess of revenue over expenses and net assets released from donor restrictions for operations. Voluntary resolutions by the Board to designate a portion of its net assets without donor restrictions for specific purposes are presented as board-designated. Because these designations are voluntary and may be reversed by the Board at any time, board-designated net assets are included under the caption "without donor restriction."

Net Assets With Donor Restrictions—Net assets with donor restrictions are resources that are restricted by a donor for use for a particular purpose or in a particular future period. Some donor-imposed restrictions are temporary in nature, and the restriction will expire when the resources are used in accordance with the donor's instructions or when the stipulated time has passed. Other donor-imposed restrictions are perpetual in nature, whereby the organization must continue to use the resources in accordance with the donor's instructions.

Contributions

Unconditional contributions and promises to contribute cash and other assets (pledge receivable) are reported at fair value at the date the promise is received. Fair value is estimated as the net present value of the estimated future cash flows of such awards. Estimated future cash flows due after one year are discounted using interest rates commensurate with the time value of money concept. Net unconditional promises to contribute are reported in current assets and other noncurrent assets in the accompanying consolidated balance sheets and amounted to $9,402 and $12,174 and $28,071 and $31,730 as of June 30, 2021 and 2020, respectively.

Conditional contributions are recorded as revenue when the conditions are met. Contributions are conditional when there are barriers that RUSH must overcome to be entitled to the funds. RUSH has received approximately $124,526 and $102,481 of conditional contributions whose conditions have not been met as of June 30, 2021 and 2020, respectively. Of the fiscal 2021 amount, approximately $98,974 relates to federal, state, and local grant awards where RUSH expects to meet the condition of incurring allowable expenditures under the various grants within the next twelve months. Another $25,552 is related to awards from foundations and other not-for-profit organizations where RUSH expects to recognize the contribution once the conditions have been met.

Unconditional contributions and conditional contributions whose conditions have been met are reported as net assets with donor restrictions if they are received with donor stipulations that limit the use of the donated assets. When a donor restriction expires, the restricted net assets are released as net assets without restrictions and reported in the consolidated statements of operations as other revenue (if time restricted or restricted for operating purposes) or reported in the consolidated statements of changes in net assets as net assets released from restrictions used for purchase of property and equipment (if restricted for capital acquisitions). Donor-restricted contributions for operating purposes whose restrictions are met within the same year as either received or the same year as the condition is met are reported as other revenue in the accompanying consolidated statements of operations and changes in net assets.

RUSH is the beneficiary of several split-interest agreements, primarily perpetual trusts held by others, which are recorded in assets limited as to use within the accompanying consolidated balance sheets. RUSH recognizes its interest in these trusts based on either RUSH's percentage of the fair value of the trust assets or the present value of expected future cash flows to be received from the trusts, as appropriate, based on each trust arrangement.

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Excess (Deficit) of Revenues over Expenses

The consolidated statements of operations and changes in net assets include excess (deficit) of revenues over expenses as a performance indicator. Excess (deficit) of revenues over expenses includes all changes in net assets without donor restrictions, net of investment related expenses, except for contributions of (and assets released from donor restrictions related to) long-lived assets, and other items that are required by GAAP to be reported separately (such as postretirement-related changes other than net periodic postretirement costs, and the cumulative effect of changes in accounting principle).

Non-Operating Income (Loss)

Non-operating income (loss) includes items not directly associated with patient care or other core operations of RUSH. Non-operating income (loss) consists primarily of investment returns without donor restrictions, endowment investment income appropriated for use, the difference between total investment return and amount allocated to operations for investments designated for self-insurance programs, investment income or loss (including interest, dividends, and realized and unrealized gains and losses), net of investment related expenses, on all other investments unless restricted by donor or interpretation of law, changes in the fair value of interest rate swaps, gains and losses on derivative contracts, pension settlement expenses, losses on extinguishment of debt, contributions without donor restrictions, and fundraising expenses.

Consideration of Events Subsequent to the Consolidated Balance Sheet Date

RUSH has evaluated events occurring subsequent to the consolidated balance sheet date through October 28, 2021, the date the consolidated financial statements were issued. There were no significant subsequent events through this date, with the exception of the item below.

Announced September 28, 2021, RUSH and DispatchHealth entered into an arrangement to bring high-acuity, in-home medical care to Chicago. The arrangement is focused on expanding care delivery options and giving patients access to convenient acute healthcare in the home at a lower cost. The DispatchHealth and RUSH arrangement will bring acute care to those patients who often struggle with access to care in their time of need. Beginning October 7, 2021 patients will have access to care that can treat common to complex injuries and illnesses in the home.

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3. PATIENT SERVICE REVENUE

The mix of patient service revenue recognized during the years ended June 30, 2021 and 2020, by major payor source and by lines of business, was as follows:

	June 30, 2021						
	RUH	ROPH	CMH	Physician Groups	Clinical Joint Ventures & Other	Total	
Medicare	$ 337,984	$ 35,167	$ 86,770	$ 57,389	$ 17,514	$ 534,823	20.8%
Medicare Managed Care	85,077	11,452	34,517	11,734	-	142,780	5.5%
Medicaid	44,718	1,437	7,263	10,854	3,698	67,970	2.6%
Medicaid Managed Care	226,402	16,963	40,143	34,851	17,127	335,486	13.0%
Managed Care	240,290	26,766	72,408	76,818	27,677	443,959	17.2%
Blue Cross	535,016	42,359	119,066	81,539	19,272	797,253	31.0%
Commercial, Self-Pay, and Other	175,767	24,697	20,698	19,147	12,010	252,319	9.8%
Total Patient Service Revenue	$ 1,645,254	$ 158,841	$ 380,865	$ 292,332	$ 97,298	$ 2,574,590	100.0%

	June 30, 2020						
	RUH	ROPH	CMH	Physician Groups	Clinical Joint Ventures & Other	Total	
Medicare	$ 319,399	$ 33,148	$ 69,057	$ 49,081	$ 12,226	$ 482,911	21.6%
Medicare Managed Care	57,201	6,726	23,651	8,488	-	96,066	4.3%
Medicaid	45,813	1,391	9,755	4,131	2,199	63,289	2.8%
Medicaid Managed Care	159,105	10,490	35,395	32,356	19,618	256,964	11.5%
Managed Care	484,678	36,597	99,584	54,631	7,065	682,555	30.6%
Blue Cross	217,509	22,450	71,965	64,798	13,999	390,721	17.5%
Commercial, Self-Pay, and Other	183,716	21,973	15,600	26,498	13,283	261,070	11.7%
Total Patient Service Revenue	$ 1,467,421	$ 132,775	$ 325,007	$ 239,983	$ 68,390	$ 2,233,576	100.0 %

Agreements with third-party payors typically provide for payments at amounts less than established charges. A summary of the payment arrangements with major third-party payors follows:

Medicare and Medicare Managed Care: Certain inpatient acute care services are paid at prospectively determined rates per discharge based on clinical, diagnostic, and other factors. Certain services are paid based on cost-reimbursement methodologies subject to certain limits. Physician services are paid based upon established fee schedules. Outpatient services are paid using prospectively determined rates.

Medicaid and Medicaid Managed Care: Medicaid services are generally paid at prospectively determined rates per discharge, per occasion of service.

Blue Cross, Managed Care, Commercial, and Other: Payment agreements with certain commercial insurance carriers, health maintenance organizations, and preferred provider organizations provide for payment using prospectively determined rates per discharge, discounts from established charges, and prospectively determined daily rates.

The health care industry is subject to numerous laws and regulations of federal, state, and local governments. Compliance with these laws and regulations, specifically those relating to the Medicare and Medicaid programs, can be

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subject to review and interpretation, as well as regulatory actions unknown and unasserted at this time. Federal government activity continues with respect to investigations and allegations concerning possible violations of regulations by health care providers, which could result in the imposition of significant fines and penalties, as well as significant repayment of previously billed and collected revenues from patient services. Management believes that RUSH is in substantial compliance with current laws and regulations.

Laws and regulations governing payment programs are complex and subject to interpretation. Settlements with third-party payors for retroactive adjustments due to audits, reviews or investigations are considered variable consideration and are included in the determination of the estimated transaction price for providing patient care using the most likely outcome method. These settlements are estimated based on the terms of the payment agreements with the payor, correspondence from the payor and historical settlement activity, including an assessment to ensure that it is probable that a significant reversal in the amount of cumulative revenue recognized will not occur when the uncertainty associated with the retroactive adjustment is subsequently resolved. Estimated settlements are adjusted in future periods as new information becomes available or as years are settled or are no longer subject to such audits, reviews and investigations. As a result, there is a reasonable possibility that recorded estimated third-party settlements could change by a material amount.

RUSH has filed formal appeals relating to the settlement of certain prior-year Medicare cost reports. The outcome of such appeals cannot be determined at this time. Any resulting gains will be recognized in the consolidated statements of operations and changes in net assets when realized.

4. CHARITY CARE

RUSH has an established charity care policy and maintains records to identify and monitor the level of charity care it provides.

RUMC patients with a family income between 201% and 400% of the current federal poverty level are eligible to apply for charity care and receive a discount of either 100% or 75%, depending on their family income. Additionally, uninsured patients with family income between 201% and 600% of the current federal poverty level automatically receive a 68% discount while uninsured patients with a family income above 600% of the current federal poverty level receive a 50% discount. RUMC also provides free care to all uninsured patients whose family income is 200% or less of the current federal poverty level.

RCMC provides free care to all patients who apply and provide documents supporting income and asset levels of less than 200% of the current-year federal poverty level, a 30% discount to all uninsured patients regardless of ability to pay, and discounts balances to patients under 600% of the poverty level. Interest-free payment plans are also provided.

Charity care includes the estimated cost of unreimbursed services provided and supplies furnished under its charity care policy and the excess of cost over reimbursement for Medicaid patients. The estimated cost of charity care provided is determined using a ratio of cost to gross charges and multiplying that ratio by the gross unreimbursed charges associated with providing care to charity patients.

In December 2008, the Centers for Medicare and Medicaid Services approved the Illinois Hospital Assessment Program (the "Program") to improve Medicaid reimbursement for Illinois hospitals. This Program increased net patient service revenue in the form of additional Medicaid payments and increased supplies, utilities, and other expense through a tax assessment from the State of Illinois. In fiscal year 2014, the State of Illinois approved a new enhanced assessment program providing additional funding to RUSH. The net benefit to RUSH from the Program was $51,229 and $43,162 during the years ended June 30, 2021 and 2020, respectively. For the years ended June 30, 2021 and 2020, the Medicaid payment of $123,248 and $106,576 was included in patient service revenue, representing 5% of the patient service revenue for fiscal years 2021 and 2020, respectively, and the tax assessment of $72,019 and $63,414, respectively, was included in supplies, utilities, and other expenses within the consolidated statements of operations and changes in net assets.

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The following table presents the level of charity care and unreimbursed Medicaid services provided for the years ended June 30, 2021 and 2020:

	2021	2020
Excess of allocated cost over reimbursement for services provided to hospital Medicaid patients—net of net benefit under the Program	$ 136,869	$ 163,821
Estimated costs and expenses incurred to provide charity care in the hospitals	24,286	32,024
Total	$ 161,155	$ 195,845

Beyond the cost to provide charity care and unreimbursed services to hospital Medicaid patients, RUSH also provides substantial additional benefits to the community, including educating future health care providers, supporting research into new treatments for disease, and providing subsidized medical services in response to community and health care needs, as well as other volunteer services. These community services are provided free of charge or at a fee below the cost of providing them.

5. ASSETS LIMITED AS TO USE AND INVESTMENTS

Assets limited as to use and investments consist primarily of marketable equity and debt securities, which are held in investment pools to satisfy the investment objectives for which the assets are held or to satisfy donor restrictions. RUSH also holds certain investments in alternative investments consisting of hedge funds, real estate investments, private equity funds, and private debt.

Following is a summary of the composition of assets limited as to use and investments as of June 30, 2021 and 2020:

	2021	2020
Marketable securities and short-term investments	$ 288,742	$ 57,663
Fixed income securities	682,072	518,924
Public equity securities	359,729	206,368
Fund investments (mutual/commingled)	1,017,055	920,591
Alternative investments	272,019	199,758
Other	6,063	4,973
Total investments	2,625,680	1,908,277
Beneficial interest in trusts	36,985	29,685
Total assets limited as to use and investments	2,662,665	1,937,962
Less amount reported as current assets	(43,670)	(30,629)
Assets limited as to use and investments—noncurrent	$ 2,618,995	$ 1,907,333

As of June 30, 2021 and 2020, RUSH has commitments to additional alternative investments totaling $81,465 and $94,429, respectively.

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It is RUMC's intent to maintain a long-term investment portfolio to support its self-insurance program. Accordingly, the total return on investments restricted for the self-insurance program is reported in the consolidated statements of operations and changes in net assets in three separate line items. The investment return allocated to operations, reported in other revenue, is determined by a formula designed to provide a consistent stream of investment earnings to support the self-insurance provision reported in insurance expense in the accompanying consolidated statements of operations and changes in net assets. This allocated return, 4.5% for the years ended June 30, 2021 and 2020, approximates the real return that RUSH expects to earn on its investments over the long term and totaled $6,741 and $6,718 for the years ended June 30, 2021 and 2020, respectively. The difference between the total investment return and the amount allocated to operations is reported in nonoperating income (loss) and totaled $16,851 and ($4,206) for the years ended June 30, 2021 and 2020, respectively. There is no guarantee that the investment return expected by management will be realized. For the years ended June 30, 2021 and 2020, the total annual investment return was approximately 7.2% and 1.5%, respectively.

The composition and presentation of investment income and the realized and unrealized gains and losses on all investments, net of investment related expenses, for the years ended June 30, 2021 and 2020, are as follows:

	2021	2020
Interest and dividends	$ 31,137	$ 42,884
Net realized gains on sales of securities	101,925	62,147
Unrealized gains (losses) — without donor restrictions	135,910	(61,267)
Unrealized gains (losses) — with donor restrictions	151,469	(38,268)
	$ 420,441	$ 5,496
Reported as:		
Other operating revenue	$ 989	$ 6,230
Nonoperating income	193,926	15,917
Net assets with donor restrictions — net realized and unrealized gains (losses) on investments	225,526	(16,651)
	$ 420,441	$ 5,496

6. FAIR VALUE MEASUREMENTS

As of June 30, 2021 and 2020, RUSH held certain assets and liabilities that are required to be measured at fair value on a recurring basis, including marketable securities and short-term investments, certain restricted, trusteed and other investments, derivative instruments, and beneficial interests in trusts.

Valuation Principles

Under FASB Accounting Standard Codification 820, *Fair Value Measurement*, fair value is defined as an exit price, representing the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The valuation techniques used to measure fair value are based upon observable and unobservable inputs. Observable inputs generally reflect market data from independent sources and are supported by market activity, while unobservable inputs are generally unsupported by market activity. The three-level valuation hierarchy, which prioritizes the inputs used in measuring fair value of an asset or liability at the measurement date, includes:

Level 1 inputs—Quoted prices (unadjusted) for identical assets or liabilities in active markets. Securities typically priced using Level 1 inputs include listed equities and exchange-traded mutual funds.

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Level 2 inputs—Quoted prices for similar assets or liabilities in active markets, quoted prices for identical or similar assets and liabilities in nonactive markets, and model-driven valuations whose inputs are observable for the asset or liability, either directly or indirectly. Securities typically priced using Level 2 inputs include government bonds (including US treasuries and agencies), corporate and municipal bonds, collateralized obligations, interest rate swaps, commercial paper, currency options and pending transactions.

Level 3 inputs—Unobservable inputs for which there is little or no market data available are based on the reporting entity's own judgment or estimation of the assumptions that market participants would use in pricing the asset or liability. The fair values for securities typically priced using Level 3 inputs are determined using model-driven techniques, which include option-pricing models, discounted cash flow models, and similar methods. The Level 3 classification includes beneficial interests in trusts.

Fair Value Measurements at the Consolidated Balance Sheet Date

The following tables present RUSH's fair value hierarchy for its financial assets and liabilities measured at fair value or NAV, which approximates fair value, on a recurring basis as of June 30, 2021 and 2020:

Fair Value Measurements as of June 30, 2021	Level 1	Level 2	Level 3	Valued @ NAV	Total Fair Value
Marketable securities and short-term investments	$ 64,597	$ 224,145	$ -	$ -	$ 288,742
Fixed Income Securities:					
U.S. Government and Agency securities	-	358,521	-	-	358,521
Corporate Bonds	-	311,623	-	-	311,623
Asset Backed Securities and Other	1,020	10,909	-	-	11,929
Public Equity Securities	359,729	-	-	-	359,729
Fund Investments (Mutual/Commingled):					
Fixed Income Funds	79,219	161,036	-	-	240,255
Public Equity Funds	267,510	-	-	429,955	697,465
Multi Asset Class Funds	19,816	-	-	59,518	79,334
Alternative Investments:					
Hedge Funds	-	-	-	-	-
Private Equity Partnerships	-	-	-	153,308	153,308
Private Debt	-	-	-	118,711	118,711
Other:					
Derivative Assets	156	1,315	-	-	1,471
Trustee-held Investments	-	-	36,985	-	36,985
Pending Transactions	-	(10,777)	-	-	(10,777)
Total investments	$ 792,047	$ 1,056,772	$ 36,985	$ 761,492	$ 2,647,296
Obligations under interest rate swap agreements	$ -	$ (14,009)	$ -	$ -	$ (14,009)
Other derivative liabilities	-	(253)	-	-	(253)
Total liabilities at fair value	$ -	$ (14,262)	$ -	$ -	$ (14,262)

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Fair Value Measurements as of June 30, 2020	Level 1	Level 2	Level 3	Valued @ NAV	Total Fair Value
Marketable securities and short-term investments	$ 32,518	$ 5,026	$ -	$ 20,119	$ 57,663
Fixed Income Securities:					
U.S. Government and Agency securities	-	160,114	-	-	160,114
Corporate Bonds	-	302,372	-	-	302,372
Asset Backed Securities and Other	-	56,438	-	-	56,438
Public Equity Securities	206,368	-	-	-	206,368
Fund Investments (Mutual/Commingled):					
Fixed Income Funds	151,267	-	-	-	151,267
Public Equity Funds	182,583	138,316	-	311,983	632,882
Multi Asset Class Funds	100,487	-	-	35,955	136,442
Alternative Investments:					
Hedge Funds	-	-	-	6,091	6,091
Private Equity Partnerships	-	1,469	-	112,904	114,373
Private Debt	-	-	-	79,294	79,294
Other:					
Derivative Assets	-	335	-	-	335
Trustee-held Investments	-	-	29,685	-	29,685
Pending Transactions	-	(4,245)	-	-	(4,245)
Total investments	$ 673,223	$ 659,825	$ 29,685	$ 566,346	$ 1,929,079
Obligations under interest rate swap agreements	$ -	$ (18,678)	$ -	$ -	$ (18,678)
Total liabilities at fair value	$ -	$ (18,678)	$ -	$ -	$ (18,678)

Level 3 Rollforward

A rollforward of the amounts in the consolidated balance sheets for financial instruments classified by RUSH within Level 3 of the fair value hierarchy is as follows:

	Interest in Trusts
Fair value — June 30, 2019	$ 29,739
Actual return on investments — Realized and unrealized losses	(54)
Purchases	-
Sales	-
Fair value — June 30, 2020	29,685
Actual return on investments — Realized and unrealized losses	7,300
Purchases	-
Sales	-
Fair value — June 30, 2021	$ 36,985

During the fiscal year 2021 and 2020, there were no transfers in Level 3 investments.

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Investments in Entities that Report Fair Value Using NAV

Included within the fair value table above are investments in certain entities that report fair value using a calculated NAV or its equivalent. These investments consist of public equity funds within fund Investments and hedge fund of funds, private equity partnerships, and private debt within alternative investments. The NAV instruments listed in the fair value measurement tables use the following valuation techniques and inputs as of the valuation date:

Marketable Securities and Short-Term Investments—Marketable securities and short-term investments classified as NAV are invested in a short-term collective fund that serves as an investment vehicle for cash reserves. Fair value was determined using the calculated NAV as of the valuation date, based on a constant price. These funds are invested in high quality and short-term money market instruments with daily liquidity.

Fund Investments—Investments within this category consist of fixed income, public equity, and multi-asset funds. The fair value of fixed income and public equity funds classified at NAV are primarily determined using the calculated NAV at the valuation date under a market approach. This includes investments in commingled funds that invest primarily in domestic and foreign equity securities whose underlying values have a readily determinable market value or based on a NAV. Multi-asset funds include investments in fund of funds that seek to provide both capital appreciation and income by investing in both traditional and alternative asset funds. The asset allocation is driven by the fund manager's long-range forecasts of asset-class real returns. Investments in this category classified as NAV are held in a commingled fund that invests primarily in global equity and bond mutual funds. Included in this category is a multistrategy hedge fund, priced on the last business day of each calendar month. The values for underlying investments are estimated based on many factors, including operating performance, balance sheet indicators, growth, and other market and business fundamentals. The underlying investment strategies can include long-short, global macro, fixed-income and currency hedges, and other tactical opportunity-related strategies.

Alternative Investments—Investments within this category consist primarily of hedge fund of funds, private equity partnerships, and private debt. The hedge fund of funds consists of diversified investments including equity long/short, credit long/short, event-drive, relative value, global opportunities, and other multistrategy funds. Hedge fund of funds investments are valued based on RUSH's ownership interest in the NAV of the respective fund as estimated by the general partner, which approximates fair value. Private equity and private debt partnerships are valued based on the estimated fair values of the nonmarketable private equity and private debt partnerships in which it invests, which is an equivalent of NAV.

The following table summarizes RUSH's unfunded commitments that report fair value using NAV as of June 30, 2021:

Entities that Report Fair Value Using NAV	Unfunded Commitments (In Thousands)	Redemption Frequency (If Currently Eligible)	Redemption Notice Period
Fund Investments (Mutual/Commingled)	None	Daily/Monthly	1-15 days
Alternative Investments:			
Hedge Funds	None	Quarterly	65-95 days
Private Equity Partnerships	$ 29,932	Not currently redeemable	N/A
Private Debt	51,533	Not currently redeemable	N/A
Total	$ 81,465		

7. ENDOWMENT FUNDS

RUSH's endowment consists of more than 400 individual funds, which are established for a variety of purposes. As required by GAAP, net assets associated with endowment funds are classified and reported based on the existence or absence of donor-imposed restrictions.

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Interpretation of Relevant Law

RUSH has interpreted the Uniform Prudent Management of Institutional Funds Act (UPMIFA) as requiring preservation of the original value of the gift as of the gift date absent explicit donor stipulations to the contrary. As a result of this interpretation, RUSH classifies as net assets with donor restrictions (a) the original value of gifts donated to the permanent endowment, (b) the original value of any subsequent gifts to the permanent endowment, and (c) accumulations to the permanent endowment made in accordance with the direction of the applicable gift instrument at the time the accumulation is added to the fund. In accordance with UPMIFA, RUSH considers the following factors in making a determination to appropriate or accumulate donor-restricted funds:

a. The duration and preservation of the fund
b. The purposes of the organization and the donor-restricted endowment fund
c. General economic conditions
d. The possible effect of inflation and deflation
e. The expected total return from income and the appreciation of investments
f. Other resources of the organization
g. The investment policies of the organization

Endowment Investment and Spending Policies

RUSH has adopted endowment investment and spending policies to preserve purchasing power over the long term and provide stable annual support to the programs supported by the endowment, including professorships, research and education, free care, student financial aid, scholarships, and fellowships. Approximately 16% and 18% of RUSH's endowment is available for general purposes for the years ended June 30, 2021 and 2020, respectively.

RUMC has an Investment Committee with the authority discharged from the RUMC Board of Trustees to oversee its investment portfolio and approve the investment policy for RUMC and ROPH. RCMC has a Finance Committee with the authority to oversee its investment portfolio and approve its investment policy. The System Parent Board of Trustees, as a whole, maintains ultimate oversight and control over the investment policies and practices of its subsidiaries, through the discharge of its reserved powers over RUMC, RCMC, and ROPH.

The asset allocation policy reflects the objective with allocations structured for capital growth and inflation protection over the long term. The current asset allocation targets and ranges as well as the asset allocation as of June 30, 2021 and 2020, are as follows:

	Target Allocation and Range	Percentage of Endowment Assets	
Asset Class		**2021**	**2020**
Global equity	60% (+/- 5%)	65 %	57 %
Multi Asset Fund	10% (+/- 5%)	8	6
Private equity	15% (+/- 5%)	19	18
Fixed income	15% (+/- 5%)	9	18
Cash	--	0	1

To achieve its long-term rate of return objectives, RUSH relies on a total return strategy in which investment returns are achieved through both capital appreciation (realized and unrealized) and current income (interest and dividends). The expected long-term rate of return target of the endowment given its current asset allocation structure is approximately 7.0%. Actual returns in any given year may vary from this amount. RUSH has established market-related benchmarks to evaluate the endowment fund's performance on an ongoing basis.

The System Parent Board of Trustees approves the annual spending policy for program support. In establishing the annual spending policy, RUSH's main objectives are to provide for intergenerational equity over the long term, the concept that future beneficiaries will receive the same level of support as current beneficiaries on an inflation-adjusted

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basis, and to maximize annual support to the programs supported by the endowment. The spending rate was 4.0% for the fiscal years ended June 30, 2021 and 2020, and income from the endowment fund provided $22,056 and $21,089 of support for RUSH's programs during the fiscal years ended June 30, 2021 and 2020, respectively.

Composition of Endowment Fund and Reconciliation

The endowment net asset composition by type of fund as of June 30, 2021, consisted of the following:

	Without Restrictions	With Restrictions	Total
Donor-restricted endowment funds	$ -	$ 827,939	$ 827,939
Board-designated endowment funds	14,074	-	14,074
Total funds	$ 14,074	$ 827,939	$ 842,013

Changes in endowment net assets for the fiscal year ended June 30, 2021, consisted of the following:

	Without Restrictions	With Restrictions	Total
Endowment net assets — June 30, 2020	$ 12,719	$ 639,377	$ 652,096
Contributions	-	11,225	11,225
Net investment return	1,656	199,798	201,454
Transfer of endowment appreciation	(301)	(22,461)	(22,762)
Endowment net assets — June 30, 2021	$ 14,074	$ 827,939	$ 842,013

The endowment net asset composition by type of fund as of June 30, 2020, consisted of the following:

	Without Restrictions	With Restrictions	Total
Donor-restricted endowment funds	$ -	$ 639,377	$ 639,377
Board-designated endowment funds	12,719	-	12,719
Total funds	$ 12,719	$ 639,377	$ 652,096

Changes in endowment net assets for the fiscal year ended June 30, 2020, consisted of the following:

	Without Restrictions	With Restrictions	Total
Endowment net assets — June 30, 2019	$ 13,026	$ 640,339	$ 653,365
Contributions	-	12,858	12,858
Net investment return	(126)	7,296	7,170
Transfer of endowment appreciation	(181)	(21,116)	(21,297)
Endowment net assets — June 30, 2020	$ 12,719	$ 639,377	$ 652,096

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Fund Deficiencies

RUSH monitors the accumulated losses on investments within net assets with donor restriction to be maintained in perpetuity to determine whether the endowment corpus has been impaired. The endowment funds are invested in an investment pool, which also includes investments with net assets restricted by donors for a specific time period or purpose and investments within net assets without donor restrictions. Endowments were not impaired for the fiscal year ended June 30, 2021 and impaired by $536 for the fiscal year ended and 2020.

8. PROPERTY AND EQUIPMENT—NET

Property and equipment—net as of June 30, 2021 and 2020 consisted of the following:

	2021	2020
Land and buildings	$ 2,255,444	$ 2,251,906
Equipment	1,010,051	975,529
Construction in progress	229,663	133,989
Total	3,495,158	3,361,424
Less accumulated depreciation	(1,875,271)	(1,749,779)
Property and equipment — net	$ 1,619,887	$ 1,611,645

Property and equipment—net includes financing leases of $4,891 and $2,854 in equipment as of June 30, 2021 and 2020, respectively. Accumulated depreciation on leased equipment amounted to $1,774 and $936 as of June 30, 2021 and 2020, respectively.

RUSH continues to make campus improvements and has a number of construction projects planned with a Master Facility Plan that began in fiscal year 2017. As of June 30, 2021 and 2020, RUSH had construction commitments outstanding of $186,598 and $187,045, respectively.

In October 2018, RUMC received approval by the Illinois Health Facilities & Services Review Board to build an eleven-story building of approximately 530,000 square feet, for the provision of outpatient services plus an attached 900-space parking facility (the "Joan and Paul Rubschlager Building" or the "Rubschlager Building"). An enclosed, fourth-floor walkway will connect it to RUMC's tower hospital building. The Rubschlager Building will further the mission to improve health of the individuals and diverse communities it serves through the integration of outstanding patient care, education, research, and community partnerships. Among the outpatient clinical services to be provided are radiation therapy, infusion therapy, integrative medicine, and imaging. The Rubschlager Building will also serve as a primary site for clinical research and teaching programs offered through Rush University; with medical students, residents, and fellows as well as nursing students, imaging and radiation therapy technology students and physicists actively engaged in the building's patient care and research activities. Construction and the groundbreaking occurred on June 12, 2019, and the Rubschlager Building is projected to open in fiscal year 2022. The approved cost of the Rubschlager Building is approximately $473,000.

9. LONG-TERM DEBT AND CREDIT ARRANGEMENTS

RUSH's long-term debt is issued under a Master Trust Indenture, which established the Obligated Group composed of RUMC, RCMC, and the System Parent. The Obligated Group is jointly and severally liable for the obligations issued under the Master Trust Indenture. Each Obligated Group member is expected to pay its allocated share of the debt issued on its behalf. As of June 30, 2021 and 2020, such issuances are secured by a pledge of gross receipts, as defined, of the Obligated Group members.

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A summary of RUSH's long-term debt as of June 30, 2021 and 2020, is as follows:

Illinois Finance Authority Revenue Bonds	Interest Rates	Final Maturity Date	Amount Outstanding at June 30, 2021	Amount Outstanding at June 30, 2020
Fixed-rate revenue bonds:				
Series 2015 A/B	5.00%	November 15, 2039	$ 438,315	$ 448,175
Variable-rate revenue bonds:				
Series 2016	Average of 1.09% and 2.24% in FY2021 and FY2020, respectively	November 1, 2045	50,000	50,000
Total tax-exempt debt			488,315	498,175
Other Debt:				
2020 Taxable Bonds	3.92%	November 15, 2029	330,000	330,000
ROBOC	4.75%	March 5, 2026	38,930	-
Series 2019	1.78%	September 1, 2045	35,818	36,752
Line of Credit	3.20%	December 31, 2022	-	75,000
Mortgage loan, collateralized by fitness center	4.40%	May 2021	-	980
Total par value of debt			893,063	940,907
Less current portion of long-term debt			(12,216)	(11,775)
Debt Issuance Costs			(6,440)	(6,875)
Less unamortized premium			47,395	52,903
Long-term debt			$ 921,802	$ 975,160

In the third quarter of fiscal year 2020, the Obligated Group marketed a $330,000 taxable bond offering for the purposes of funding the construction of the Joan and Paul Rubschlager Building, retiring the Series 2011 bonds, and general corporate purposes. On February 14, 2020, RUSH entered into a $250,000 Treasury Interest rate lock with a reference yield of 2.06% and 30 years with its lead underwriting bank with the purpose of protecting RUSH from an adverse increase in interest rates. Subsequent to the rate lock but preceding the pricing of the bond offering, the breakout of COVID-19 pandemic precipitated the second largest two-month decline in 30-year rates over the last 30 years. The resulting decline in rates led to an adverse outcome whereas the rate lock was unwound on April 16, 2020, at a loss of $62,500 at a 30-year rate of 1.196%. The rate lock was a cash outflow and was recorded as a one-time non-operating loss within the consolidated statement of operations and changes in net assets in fiscal year 2020.

Under its various indebtedness agreements, the Obligated Group is subject to certain financial covenants, including maintaining a minimum historical debt service coverage and maximum annual debt service coverage ratios; maintaining minimum levels of days cash on hand; limitations on selling, leasing, or otherwise disposing of Obligated Group property; and certain other nonfinancial covenants. Management believes the Obligated Group was in compliance with its financial covenants as of June 30, 2021 and 2020.

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Annual maturities of outstanding long-term debt are as follows:

Years Ending June 30	
2022	$ 12,216
2023	12,703
2024	13,510
2025	14,143
2026	20,866
Thereafter	819,625
Total	$ 893,063

Lines of Credit Arrangements

In fiscal year 2020, the Obligated Group executed a $25,000 line of credit, with a maturity date of April 2021. No amounts were drawn on the $25,000 line of credit as of June 30, 2020 and 2021. In fiscal year 2020, the Obligated Group also had an existing three-year line of credit of $75,000 that was fully drawn. On October 9, 2020, the Obligated Group repaid its $75,000 line of credit that was due on December 31, 2022. As of June 30, 2021, no amounts were drawn or outstanding on this line of credit and the full amount of the line of credit was available for use.

10. DERIVATIVES

Derivatives Policy

The Obligated Group uses derivative instruments, specifically interest rate swaps, to manage its exposure to changes in interest rates on variable rate borrowings. The use of derivative instruments exposes the Obligated Group to additional risks related to the derivative instrument, including market, credit, and termination, as described below, and the Obligated Group has defined risk management practices to mitigate these risks.

Market risk represents the potential adverse effect on the fair value and cash flow of a derivative instrument due to changes in interest rates or rate spreads. Market risk is managed through ongoing monitoring of interest rate exposure based on set parameters regarding the type and degree of market risk that the Obligated Group will accept. Credit risk is the risk that the counterparty on a derivative instrument may be unable to perform its obligations during the term of the contract. When the fair value of a derivative contract is positive (an asset to the Obligated Group), the counterparty owes the Obligated Group, which creates credit risk. Credit risk is managed by setting stringent requirements for qualified counterparties at the date of execution of a derivative transaction and requiring counterparties to post collateral in the event of a credit rating downgrade or if the fair value of the derivative contract exceeds a negotiated threshold. Termination risk represents the risk that the Obligated Group may be required to make a significant payment to the counterparty if the derivative contract is terminated early. Termination risk is assessed at onset by performing a statistical analysis of the potential for a significant termination payment under various scenarios designed to encompass expected interest rate changes over the life of the proposed contract. The test measures the ability to make a termination payment without a significant impairment to the Obligated Group's ability to meet its debt or liquidity covenants.

Board approval is required to enter or modify any derivative transaction. Management periodically reviews existing derivative positions as its risk tolerance and cost of capital changes over time.

Interest Rate Swap Agreements

The Obligated Group has two interest rate swap agreements (the "Swap Agreements"), which were designed to synthetically fix the interest payments on its Series 2006A Bonds. Under the Swap Agreements, the Obligated Group makes fixed-rate payments equal to 3.945% to the swap counterparties and receives variable-rate payments equal to 68% of London InterBank Offered Rate (0.0631% and 0.066% as of June 30, 2021 and 2020, respectively) from the swap counterparties, each calculated on the notional amount of the Swap Agreements. As of June 30, 2021 and 2020, the

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Swap Agreements had a notional amount of $67,400 and $71,500, respectively ($33,700 in notional amount with each counterparty). Following the refinancing of the Series 2006A Bonds into the Series 2016 Bonds, the Obligated Group used $50,000 in notional amount of the Swap Agreements to synthetically fix the interest on the Series 2016 Bonds. The Swap Agreements each expire on November 1, 2035, and amortize annually commencing in November 2012. The Swap Agreements are secured by obligations issued under the Master Trust Indenture.

The Swap Agreements also require either party to post collateral in the form of cash and certain cash equivalents to secure potential termination payments. The amount of collateral that is required to be posted is based on the relevant party's long-term credit rating. Based on its current rating, the Obligated Group is required to post collateral with the swap counterparties in the event that the market value of the Swap Agreements exceeds $(30,000) or $(15,000) for each Swap Agreement. As of June 30, 2021 and 2020, the Obligated Group had no collateral posted under Swap Agreements.

The fair value of the Swap Agreements as of June 30, 2021 and 2020, was as follows:

		June 30	
	Reported As	2021	2020
Obligations under Swap Agreements	Other long-term liabilities	$ (14,009)	$ (18,678)
Collateral posted under Swap Agreements	Other current assets	-	-
Obligations under Swap Agreements — net		$ (14,009)	$ (18,678)

The fair value of the Swap Agreements reported in RUSH's consolidated balance sheets in other long-term liabilities as of June 30, 2021 and 2020, includes an adjustment for the Obligated Group's credit risk and may not be indicative of the termination value that RUSH would be required to pay upon early termination of the Swap Agreements.

Management has not designated the Swap Agreements as hedging instruments. Amounts recorded in the accompanying consolidated statements of operations and changes in net assets for the Swap Agreements allocated to RUSH for the fiscal years ended June 30, 2021 and 2020, were as follows:

		Fiscal Years Ended June 30	
	Reported As	2021	2020
Change in fair value of interest rate swaps	Nonoperating (loss) income	$ (4,668)	$ 3,896
Net cash payments on interest rate swaps	Interest expense	2,843	2,129

11. LEASES AND OTHER FINANCING ARRANGEMENTS

RUSH has entered into the following lease arrangements:

Finance Leases

RUMC is party to certain financing leases and long-term financing arrangements relating to medical and office equipment and buildings. Expiration of leases ranges from 2021 to 2026. Assets acquired under financing lease arrangements are included in property and equipment—net in the accompanying consolidated balance sheets. Termination of the leases generally are prohibited unless there is a violation under the lease agreement.

Total financing lease assets and liabilities in the consolidated balance sheets were $3,136 and $1,713 at June 30, 2021 and 2020, respectively.

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Operating Leases

RUSH leases office space and medical space that expire in various years through 2033. These leases generally contain renewal options for periods ranging from 5 to 10 years and require RUSH to pay all executory costs (property taxes, maintenance, and insurance). Lease payments generally have an escalating fee schedule, which range from a 1.0% to 3.0% increase each year. Termination of these leases is generally prohibited unless there is a violation under the lease agreement. A portion of the leased space is subleased under leases expiring over the next five years.

Short-Term Leases

RUSH leases certain equipment, medical space, and office space with a lease term of less than twelve months. Short-term lease expense is not material to RUSH and is recognized when paid within supplies, utilities, and other in the accompanying statements of operations and changes in net assets.

All Leases

RUSH's lease agreements do not contain any material residual value guarantees or material restrictive covenants.

As of June 30, 2021, RUSH has not entered into any additional operating and finance leases for equipment, office space or medical space that have not yet commenced.

Lease cost and other required information related to operating leases for the year ended June 30, 2021 are as follows:

	2021	2020
Lease cost:		
Operating lease cost	$ 27,556	$ 30,729
Short-term and variable lease cost	14,924	345
Total operating, short-term, and variable lease cost	$ 42,480	$ 31,074
Other information:		
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows from operating leases	$ (26,563)	$ (29,233)
Right-of-use assets obtained in exchange for new operating lease liabilities	2,319	3,556
Operating leases		
Weighted-average remaining lease term	6.33	7.00
Weighted-average discount rate	1.89 %	1.88 %

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Annual maturities of lease liabilities at June 30, 2021, are as follows:

	Operating Leases
2022	$ 27,692
2023	25,095
2024	23,645
2025	18,979
2026	13,186
Thereafter	34,451
Total future undiscounted lease payments	143,048
Less interest	8,554
Lease liabilities	$ 134,494

12. PENSION AND OTHER POSTRETIREMENT BENEFIT PLANS

RUMC maintains a defined benefit pension plan, defined contribution plans, and other postretirement benefit plans that together cover substantially all of RUMC's employees.

Prior to January 1, 2012, RUMC had two defined benefit pension plans, the Retirement Plan and the Pension Plan (collectively, the "Defined Benefit Pension Plans"), covering substantially all of its employees. Benefits are based on the years of service and the employee's final average earnings, as defined. Plan assets and obligations are measured as of June 30 (the "Measurement Date") each year.

Effective as of the close of business on December 31, 2011, the Pension Plan, representing certain union employees, was amended to freeze benefit accruals for all participants. No additional benefits will accrue, and no additional individuals will become plan participants in the Pension Plan as of January 1, 2012. Also, effective December 31, 2011, the Pension Plan was merged into the Retirement Plan with all accrued benefits of the Pension Plan participants preserved as part of the merger. Effective January 1, 2012, the Retirement Plan was amended to include eligible union members previously covered by the Pension Plan.

Effective January 1, 2015 (the "effective date"), a new defined benefit plan was established. This new plan (the "Pre-2015 Separations Plan" or the "Pre-2015 Plan"), is a spin-off of the current Retirement Plan. The Retirement Plan's benefit obligation and assets attributable to participants who terminated employment prior to January 1, 2015, with a vested benefit were transferred to the Pre-2015 Plan as of the effective date.

RUMC offered an enhanced retirement opportunity ("ERO") to certain RUMC and ROPH employees meeting eligibility requirements during fiscal year 2019. Some of these employee settlements occurred in fiscal year 2020 with a cash payout of $691. During fiscal year 2020, RUMC, on behalf of the defined benefit plans for RUMC and ROPH, continued to de-risk its open defined benefit plan for certain eligible employees. RUMC completed a risk transfer of certain retiree liabilities to an insurance company that went into effect June 1, 2020. In fiscal year 2020, the risk transfer was for $125,900 of plan assets and liabilities that resulted in a one-time non-cash settlement of $40,445. The settlement is included in non-operating losses within the consolidated statement of operations and changes in net assets. In fiscal year 2021, there were no settlements, curtailments or changes to the plan.

In addition to the pension programs, RUMC also provides postretirement health care benefits for certain employees (the "Postretirement Healthcare Plans"). Further benefits under the Postretirement Healthcare Plans have been curtailed since 2010.

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Obligations and Funded Status

The tables below set forth the accumulated benefit obligation, the change in the projected benefit obligation, and the change in the plan assets of the Defined Benefit Pension Plans and Postretirement Healthcare Plans (collectively, the "Plans"). The tables also reflects the funded status of the Plans as of the Measurement Date and amounts recognized in the consolidated balance sheets as of June 30, 2021 and 2020.

Obligations and Funded Status Year ended June 30, 2021	Defined Benefit Pension Plans Retirement Pension Plan	 Supplemental Pension Plan	 Retirement Plan Pre 2015	Postretirement Healthcare Plan
Actuarial present value of benefit obligations — accumulated benefit obligation	$ 606,423	$ 4,440	$ 431,733	$ 6,145
Change in projected benefit obligations:				
Projected benefit obligation — beginning of measurement period	$ 613,370	$ 4,052	$ 442,875	$ 6,008
Service costs	27,544	-	-	228
Interest costs	18,902	121	12,655	184
Employee contributions	-	-	-	104
Special termination benefits	-	-	-	-
Plan settlements	-	-	-	-
Actuarial gain (loss)	8,789	267	(30)	123
Benefits paid	(21,355)	-	(23,767)	(502)
Projected benefit obligation — end of measurement period	$ 647,250	$ 4,440	$ 431,733	$ 6,145
Change in plan assets:				
Fair value of plan assets — beginning of measurement period	$ 477,281	$ -	$ 492,691	$ -
Actual return on plan assets	83,223	-	28,503	-
Employer contributions	23,000	-	-	398
Plan participant contributions	-	-	-	104
Plan settlements	-	-	-	-
Benefits paid	(21,355)	-	(23,767)	(502)
Fair value of plan assets — end of measurement period	$ 562,149	$ -	$ 497,427	$ -
Accrued benefit liability (asset)	$ 85,101	$ 4,440	$ (65,694)	$ 6,145

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Obligations and Funded Status Year ended June 30, 2020	Defined Benefit Pension Plans	Postretirement Healthcare Plan
Actuarial present value of benefit obligations — accumulated benefit obligation	$ 1,023,587	$ 6,008
Change in projected benefit obligations:		
Projected benefit obligation — beginning of measurement period	$ 1,079,493	$ 6,296
Service costs	23,765	221
Interest costs	38,678	236
Employee contributions	-	250
Special termination benefits	-	-
Plan settlements	(128,817)	-
Actuarial gain (loss)	100,474	(471)
Benefits paid	(53,296)	(524)
Projected benefit obligation — end of measurement period	$ 1,060,297	$ 6,008
Change in plan assets:		
Fair value of plan assets — beginning of measurement period	$ 1,037,654	$ -
Actual return on plan assets	96,266	-
Employer contributions	18,164	274
Plan participant contributions	-	250
Plan settlements	(128,817)	-
Benefits paid	(53,296)	(524)
Fair value of plan assets — end of measurement period	$ 969,971	$ -
Accrued benefit liability	$ 90,326	$ 6,008

The actuarial cost method used to compute the Defined Benefit Pension Plans liabilities and expenses is the projected unit credit method.

The components of net periodic pension cost for the Plans were as follows:

Components of Net Periodic Pension Cost Year Ended June 30, 2021	Defined Benefit Pension Plans			Postretirement Healthcare Plan
	Retirement Pension Plan	Supplemental Pension Plan	Retirement Plan Pre 2015	
Net periodic pension cost comprised of the following:				
Service cost	$ 27,544	$ -	$ -	$ 228
Interest cost on projected benefit obligation	18,901	120	12,654	185
Expected return on plan assets	(26,750)	-	(22,982)	-
Amortization of prior service cost and other actuarial amounts	(665)	-	-	-
Recognized actuarial loss (gain)	9,656	80	3,057	(756)
Special termination benefit recognized	-	-	-	-
Recognized settlement loss	-	-	-	-
Net periodic pension cost (credit)	$ 28,686	$ 200	$ (7,271)	$ (343)

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Components of Net Periodic Pension Cost Year Ended June 30, 2020	Defined Benefit Pension Plans	Postretirement Healthcare Plan
Net periodic pension cost comprised of the following:		
Service cost	$ 23,765	$ 221
Interest cost on projected benefit obligation	38,678	236
Expected return on plan assets	(58,989)	-
Amortization of prior service cost and other actuarial amounts	(665)	-
Recognized actuarial loss (gain)	10,546	(548)
Special termination benefit recognized	-	-
Recognized settlement loss	40,445	-
Net periodic pension cost (credit)	$ 53,780	$ (91)

The tables below sets forth the change in the accrued benefit liability of the Plans:

	Defined Benefit Pension Plans			
Accrued Benefit Liability As of June 30, 2021	Retirement Pension Plan	Supplemental Pension Plan	Retirement Plan Pre 2015	Postretirement Healthcare Plan
Accrued benefit liability — beginning of measurement period	$ 136,090	$ 4,050	$ (49,815)	$ 6,008
Fiscal year activity:				
Net periodic pension cost	28,686	201	(7,271)	(343)
Employer contributions	(23,000)	-	-	(399)
Postretirement-related changes and other net periodic postretirement costs:				
Actuarial gain (loss)	(47,684)	267	(5,551)	123
Reclassification adjustment for losses reflected in periodic expen:	(8,991)	(79)	(3,057)	756
Accrued benefit liability (asset) — end of measurement period	$ 85,101	$ 4,439	$ (65,694)	$ 6,145
Recognized in the consolidated balance sheets as follows:				
Noncurrent assets	$ -	$ -	$ (65,694)	$ -
Current liabilities	-	$ 2,275	-	$ 469
Noncurrent liabilities	85,101	2,164	-	5,676
	$ 85,101	$ 4,439	$ (65,694)	$ 6,145

Accrued Benefit Liability As of June 30, 2020	Defined Benefit Pension Plans	Postretirement Healthcare Plan
Accrued benefit liability — beginning of measurement period	$ 41,839	$ 6,296
Fiscal year activity:		
Net periodic pension cost	53,780	(91)
Employer contributions	(18,164)	(274)
Postretirement-related changes and other net periodic postretirement costs:		
Actuarial gain (loss)	63,196	(471)
Reclassification adjustment for losses reflected in periodic expense	(50,325)	548
Accrued benefit liability — end of measurement period	$ 90,326	$ 6,008
Recognized in the consolidated balance sheets as follows:		
Accrued expenses	$ -	$ -
Noncurrent liabilities	90,326	6,008
	$ 90,326	$ 6,008

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In accordance with FASB guidance regarding accounting for defined benefit pension and other postretirement plans, all previously unrecognized actuarial losses and prior service costs are reflected in the consolidated balance sheets. The postretirement-related charges other than net periodic benefit cost related to the Defined Benefit Pension Plans and Postretirement Healthcare Plans are included as a separate (decrease) increase to net assets without donor restrictions and total $64,215 and $(12,794) for fiscal years 2021 and 2020, respectively. For fiscal year 2021, this amount includes actuarial gains arising during fiscal year 2020 of $52,845 and a reclassification adjustment for losses reflected in periodic expense in fiscal year 2021 of $11,371. For fiscal year 2020, this amount includes actuarial gains arising during fiscal year 2019 of $62,727 and a reclassification adjustment for losses reflected in periodic expense in fiscal year 2020 of $49,778.

The Defined Benefit Pension Plans and Postretirement Healthcare Plans items not yet recognized as a component of periodic pension and postretirement medical plan expense, but included within net assets without donor restrictions as of and for the years ended June 30, 2021 and 2020, are as follows:

	Defined Benefit Pension Plans			
Year ended June 30, 2021	**Retirement Pension Plan**	**Supplemental Pension Plan**	**Retirement Plan Pre 2015**	**Postretirement Healthcare Plan**
Unrecognized prior service credit	$ 599	$ -	$ -	$ -
Unrecognized net actuarial (loss) gain	(103,547)	(938)	(119,644)	346
Total	$ (102,948)	$ (938)	$ (119,644)	$ 346

Year ended June 30, 2020	**Defined Benefit Pension Plans**	**Postretirement Healthcare Plan**
Unrecognized prior service credit	$ 1,264	$ -
Unrecognized net actuarial (loss) gain	(289,890)	1,226
Total	$ (288,626)	$ 1,226

Assumptions

The actuarial assumptions used to determine benefit obligations at the measurement date and net periodic benefit cost for the Plans are as follows:

Assumptions Used to Determine Benefit Obligations and Net Periodic Benefit Cost				
	Defined Benefit Pension Plans			Postretirement
As of June 30, 2021	**Retirement Pension Plan**	**Supplemental Pension Plan**	**Retirement Plan Pre 2015**	**Postretirement Healthcare Plan**
Discount rate — benefit obligation	3.10 %	3.10 %	2.95 %	3.10 %
Discount rate — pension expense	3.05	3.05	2.95	3.05
Rate of increase in compensation levels	5.57	-	-	-
Expected long-term rate of return on plan assets	5.75	-	4.80	-
Health care cost trend rate (initial)	-	-	-	5.80
Health care cost trend rate (ultimate)	-	-	-	4.50
Year the rate reaches ultimate trend rate	-	-	-	2037

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Assumptions Used to Determine
Benefit Obligations and Net Periodic Benefit Cost

	Defined Benefit Pension Plans		
As of June 30, 2020	Retirement Pension Plans	Retirement Plan Pre 2015	Postretirement Healthcare Plan
Discount rate — benefit obligation	3.05 %	2.95 %	3.05 %
Discount rate — pension expense	3.75	3.65	3.75
Rate of increase in compensation levels	5.57	-	-
Expected long-term rate of return on plan assets	6.75	5.25	-
Health care cost trend rate (initial)	-	-	6.00
Health care cost trend rate (ultimate)	-	-	4.50
Year the rate reaches ultimate trend rate	-	-	2038

The discount rate used is based on a spot interest rate yield curve based on a broad group of corporate bonds rated AA or better as of the Measurement Date. RUMC uses this yield curve and the estimated payouts of the Plans to develop an aggregate discount rate. The estimated payouts are the sum of the payouts under the Defined Benefit Pension Plan(s) and the Postretirement Healthcare Plans. For fiscal years 2021 and 2020, the discount rate was estimated under a bond model approach, which is based on a hypothetical bond portfolio whose cash flow from coupons and maturities match the year-by-year Plans' cash flows using bonds rated AA or better.

For the years ended June 30, 2021 and 2020, the actual rate of return on plan assets was 2.7% and 10.1%, respectively.

Plan Assets

RUMC's investment objective for its Defined Benefit Pension Plans is to achieve a total return on plan assets that meets or exceeds the return on the plan's liability over a full market cycle with consideration of the plan's current funded status. Investment risk is effectively managed through diversification of assets for a mix of capital growth and capital protection across various investment styles. The asset allocation policy reflects this objective with allocations to return generating assets (e.g., equity and alternative investments, consisting of hedge funds and limited partnerships) and interest rate hedging assets (e.g., fixed-income securities).

All of the plan's assets are measured at fair value. Fair value methodologies used to assign plan assets to levels of FASB's valuation hierarchy are consistent with the inputs described in Note 6. Fair value methodologies used to value interests in public equity funds and private equity limited partnerships that hold restricted securities and are not publicly traded are based on RUMC's ownership interest in the NAV of the respective fund as estimated by the general partner, which approximates fair value. RUMC routinely monitors and assesses methodologies and assumptions used in valuing these interests.

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The fair value of the Defined Benefit Pension Plan assets as of June 30, 2021 and 2020, is as follows:

Fair Value Measurements as of June 30, 2021	Level 1	Level 2	Level 3	Valued @ NAV	Total Fair Value
Marketable securities and short-term investments	$ 12,534	$ 283	$ -	$ -	$ 12,817
Fixed Income Securities:					
U.S. Government and Agency securities	-	322,727	-	-	322,727
Corporate Bonds	-	390,886	-	-	390,886
Asset Backed Securities and Other	-	27,453	-	-	27,453
Public Equity Securities	98,856	1,080			99,936
Fund Investments (Mutual/Commingled):					
Fixed Income Funds	-	77,650	-	-	77,650
Public Equity Funds	10,633	-	-	222,241	232,874
Multi Asset Class Funds	-	-	-	-	-
Alternative Investments:					
Hedge Funds	-	-	-	-	
Private Equity Partnerships	-	-	-	16,405	16,405
Other:					
Derivative Assets	-	3,365	-	-	3,365
Pending Transactions	-	(125,868)	-	-	(125,868)
Total Plan Assets	$ 122,023	$ 697,576	$	$ 238,646	$ 1,058,245
Liabilities					
Derivative Liabilities	$ -	$ (4,055)	$ -	$ -	$ (4,055)
Total Liabilities at Fair Value	$ -	$ (4,055)	$ -	$ -	$ (4,055)

Fair Value Measurements as of June 30, 2020	Level 1	Level 2	Level 3	Valued @ NAV	Total Fair Value
Marketable securities and short-term investments	$ -	$ -	$ -	$ 16,454	$ 16,454
Fixed Income Securities:					
U.S. Government and Agency securities	-	358,733	-	-	358,733
Corporate Bonds	103,611	387,855	-	-	491,466
Asset Backed Securities and Other	-	34,382	-	-	34,382
Public Equity Securities	61,915	-	-	-	61,915
Fund Investments (Mutual/Commingled):					
Public Equity Funds	51,559	1,082	-	98,796	151,437
Multi Asset Class Funds	9,480	-	-	-	9,480
Alternative Investments:					
Private Equity Partnerships	-	-	-	14,259	14,259
Other:					
Derivative Assets	-	2,866	-	-	2,866
Pending Transactions	432	(164,484)	-	(23)	(164,075)
Total Plan Assets	$ 226,997	$ 620,434	$ -	$ 129,486	$ 976,917
Liabilities					
Derivative Liabilities	$ -	(6,946)	-	-	(6,946)
Total Liabilities at Fair Value	$ -	$ (6,946)	$ -	$ -	$ (6,946)

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As of June 30, 2021 and 2020, the defined benefit pension plan's commitments for additional contributions to alternative investments totaled $5,049 and $4,960, respectively.

Cash Flows

RUMC expects to make estimated contributions to and benefit payments from its Defined Benefit Pension Plans and Postretirement Healthcare Plans for the years ending June 30 as follows:

	Defined Benefit Pension Plans	Postretirement Healthcare Plans
Expected contributions in 2022	$ 24,775	$ 349
Estimated Benefit Payments		
2022	$ 62,344	$ 349
2023	59,301	396
2024	62,076	443
2025	62,095	468
2026	63,361	485
2027 through 2031	325,105	2,493
Total	$ 634,282	$ 4,634

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Other Postretirement Benefit Plans

Both RUMC and RCMC maintain a voluntary tax-deferred retirement savings plan. Under these defined contribution plans, employees may elect to contribute a percentage of their salary, which may be matched in accordance with the provisions of the plans. Other provisions of the plans may provide for employer contributions to the plans based on eligible earnings, regardless of whether the employee elects to contribute to the plan. Maximum annual contributions are limited by federal regulations. Employer contributions to these Plans were $18,121 and $25,358 for the years ended June 30, 2021 and 2020, respectively.

RUMC also sponsors a noncontributory defined contribution plan covering selected employees ("457(b) Plan"). Contributions to the 457(b) Plan are based on a percentage of qualifying compensation up to certain limits as defined by the provisions of the 457(b) Plan. The 457(b) Plan assets and liabilities totaled $40,526 and $31,350 as of June 30, 2021 and 2020, respectively, and are included in investments—less current portion and other long-term liabilities in the accompanying consolidated balance sheets. The assets of the 457(b) Plan are subject to the claims of the general creditors of RUMC.

Both RUMC and RCMC also sponsor supplemental retirement plans for certain management employees (the "Plans"). The RUMC plans include a supplemental plan, which was frozen as of December 31, 2014, and replaced with the Executive Retirement Plan. The Plans are noncontributory and annual benefits are credited to each participant's account based on a percentage of qualifying compensation, as defined by the provisions of the plan. Assets set aside to fund the supplemental plans amounted to $9,948 and $10,154 as of June 30, 2021 and 2020, respectively, and are included in investments—less current portion in the accompanying consolidated balance sheets. These supplemental retirement plans are currently funded at 91% of benefits accrued.

RUMC also maintains a frozen nonqualified supplemental defined benefit retirement plan for certain management employees, which is unfunded. Benefits under the supplemental defined benefit plan, which were curtailed as of December 31, 2004, are paid when incurred from operating funds.

It is RUSH's policy to meet the requirement of the Employee Retirement Income Security Act of 1974 and the RUMC's policy to meet the requirements of the Pension Protection Act of 2006.

13. CONCENTRATION OF CREDIT RISK

RUSH grants credit without collateral to its patients, most of whom are local residents and are insured under third-party payor agreements. The mix of patient accounts receivable from patients and third-party payors as of June 30, 2021 and 2020, was as follows:

	2021	2020
Medicare	14 %	14 %
Medicare Managed Care	6	6
Medicaid	4	11
Medicaid Managed Care	16	17
Managed Care	23	23
Blue Cross	31	23
Commercial	3	3
Self-pay	3	3
Total	100 %	100 %

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14. COMMITMENTS AND CONTINGENCIES

Professional Liability

RUSH maintains insurance programs, including both self-insured and purchased insurance arrangements, for certain professional liability claims. Self-insured risks are retained in varying amounts according to policy year and entity. For fiscal years from 2020 to 2021, RUMC maintained a general liability self-insurance risk of $5,000 each and every claim and a professional liability self-insurance risk of $10,000 each and every claim, with a $15,000 annual aggregate buffer, excess the $10,000. For the fiscal year ending June 30, 2021, self-insured retentions are now uniform across the RUSH, with RCMC paying its own self-insured retention as part of this overall self-insured retention. RUSH also maintains excess liability insurance coverage with combined reinsured limits of $130,000 per occurrence and in the aggregate for general liability, professional liability, and other lines of liability coverage. RUMC has an established irrevocable trust fund to pay claims and related costs, which is recorded within the self-insurance trust in the accompanying consolidated balance sheets.

Starting on January 1, 2010, RCMC implemented a self-insurance program for professional and general liability claims. RCMC self-insured risks are retained at $2,000 per claim and $10,000 annual aggregate with a $1,000 per claim and $1,000 aggregate buffer. RCMC also maintains excess liability insurance coverage utilizing the RUMC self-insurance risk of $10,000 each and every claim, with a $15,000 annual aggregate buffer, excess the $10,000. Amounts above these specified self-insured limits are insured through the RUSH excess liability insurance coverage with combined reinsured limits of $130,000 per occurrence and in the aggregate.

RUSH has employed an independent actuary to estimate the ultimate costs of claim settlements. Self-insured liabilities are based on the actuarial estimate of losses using RUSH's actual payout patterns and various other assumptions. RUSH's self-insured liabilities of $288,099 and $266,066 as of June 30, 2021 and 2020, respectively, are recorded as noncurrent and current liabilities in the accompanying consolidated balance sheets, as appropriate, and based on the estimated present value of self-insured claims that will be settled in the future. If the present value method was not used, RUSH's liability for self-insured claims would be approximately $45,184 and $22,510 higher than the amounts recorded in the consolidated balance sheets as of June 30, 2021 and 2020, respectively. The discount rates used in calculating the present value by RUSH was 4% for fiscal years ended June 30, 2021 and 2020. Insurance recoveries are presented separately within noncurrent and current assets in the accompanying consolidated balance sheets, as appropriate. As of June 30, 2021 and 2020, no insurance recoveries were recorded.

Senate Bill 72 was signed and passed into law imposing a prejudgment interest on all personal injury and wrongful death cases in Illinois, effective July 1, 2021 at a rate of 6% per year. RUSH's financial impact based on actuarial valuation is an increase in professional liability reserves by $14,510 for fiscal year ended June 30, 2021.

RUSH is subject to various other regulatory investigations, legal proceedings, and claims that are incidental to its normal business activities. In the opinion of management, the amount of ultimate liability with respect to professional liability matters and other actions will not have a material adverse effect on the consolidated financial position or results of operations of RUSH.

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15. UNCONDITIONAL PROMISES TO CONTRIBUTE

Included in other assets are the following unconditional promises to contribute as of June 30, 2021 and 2020:

	2021	2020
Unconditional promises to contribute before unamortized discount and allowance for uncollectibles	$ 42,622	$ 50,250
Less unamortized discount	(184)	(359)
Less allowance for uncollectibles	(4,965)	(5,987)
Net unconditional promises to contribute	$ 37,473	$ 43,904
Amounts due in:		
Less than one year	$ 17,894	$ 21,121
One to five years	23,793	28,589
More than five years	935	540
Total unconditional promises to contribute	$ 42,622	$ 50,250

16. NET ASSETS

Net assets without donor restrictions as of June 30, 2021 and 2020, consist of the following:

Net Assets Without Donor Restrictions	2021	2020
Non-Board designated	$ 1,966,534	$ 1,555,907
Board designated	14,073	12,719
Total net assets without donor restrictions	$ 1,980,607	$ 1,568,626

Net assets with donor restrictions as of June 30, 2021 and 2020, were available for the following purposes:

Net Assets With Donor Restrictions	2021	2020
Restricted for specified purpose:		
Construction and purchase of equipment	$ 17,419	$ 54,602
Health education	17,243	20,453
Research, charity and other	580,861	391,292
Unappropriated endowment appreciation available for operations	84,709	58,052
Total funds designated for specified purpose	$ 700,232	$ 524,399
Endowments, perpetual in nature, the income from which is expendable for the following specified purposes:		
Health education	$ 192,901	$ 182,187
Research, charity and other	79,240	75,350
Operations	43,085	39,394
Total endowment net assets	315,226	296,931
Total net assets with donor restrictions	$ 1,015,458	$ 821,330

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During fiscal years 2021 and 2020, net assets were released from donor restrictions for purchasing property and equipment of $41,385 and $2,021, respectively, and incurring expenses of $99,855 and $160,024, respectively, both of which satisfied the restricted purposes of the donors. Net assets released from restriction used in operations are included in other revenue in the accompanying consolidated statements of operations and changes in net assets.

17. JOINT VENTURES AND OTHER AFFILIATIONS

Investments in unconsolidated joint ventures, accounted for using the equity method, totaled $15,494 and $8,383 as of June 30, 2021 and 2020, respectively, and are included in other noncurrent assets in the accompanying consolidated balance sheets. Income recognized from these joint ventures, reported in other revenue, was $5,971 and $4,029 during the years ended June 30, 2021 and 2020, respectively.

Effective December 1, 2020, RUMC entered into a new joint venture with Select Medical Corporation to form RUSH-SELECT, LLC. RUMC contributed capital of $6,678 for a 26.5% ownership interest in the RUSH-SELECT,LLC joint venture. The investment in the joint venture is accounted for using the equity method.

Effective December 15, 2020, RUMC purchased the additional interest in the Rush Oak Brook Orthopaedic Center, LLC joint venture for $13,205 which increased our investment from 65% to 100%. In fiscal years 2021 and 2020, the joint venture was consolidated into RUSH's results given our ownership in both years.

Effective February 1, 2021, RUSH and Ann & Robert H. Lurie Children's Hospital of Chicago ("Lurie Children's") executed agreements to form a clinical affiliation to advance pediatric care for the children of the Chicago area. RUSH and Lurie Children's will jointly manage RUMC's pediatric inpatient services, which include the pediatric intensive care unit, neonatal intensive care unit and newborn services, inpatient and outpatient pediatric cardiology services, and inpatient and outpatient pediatric hematology/oncology services, as well as outpatient pediatric services at other Rush locations, excluding RCMC.

18. FUNCTIONAL EXPENSES

The consolidated financial statements present certain expenses that are attributed to more than one program or supporting function. Operating expenses directly attributable to a specific functional area are reported as expenses of those functional areas. Certain expenses are attributable to more than one functional area, and are therefore allocated on a reasonable basis that is consistently applied. Employee benefits are allocated based on factors of either salary expenses or hours worked. General and administrative expenses primarily include legal, finance, and human resources activities. Overhead costs that include items such as professional services, office expenses, information technology, interest, insurance, occupancy and other similar expenses are allocated on a variety of factors, including relative costs, square footage, full-time equivalents, and direct labor costs among others.

The expenses reported in the consolidated statement of operations for the year ended June 30, 2021, supported the following programs and functions:

	Healthcare Services	Academic & Research Activity	General & Administrative Support	Total
Salaries, Wages & Employee Benefits	$ 1,188,497	$ 173,045	$ 154,711	$ 1,516,253
Supplies, Utilities & Other	757,347	91,702	54,539	903,588
Insurance	68,436	-	2,048	70,484
Purchased Services	151,474	17,823	48,608	217,905
Depreciation and Amortization	149,136	-	286	149,422
Interest	33,032	-	202	33,234
Total	$ 2,347,922	$ 282,570	$ 260,394	$ 2,890,886

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The expenses reported in the consolidated statement of operations for the year ended June 30, 2020, supported the following programs and functions:

	Healthcare Services	Academic & Research Activity	General & Administrative Support	Total
Salaries, Wages & Employee Benefits	$ 1,123,369	$ 163,428	$ 138,829	$ 1,425,626
Supplies, Utilities & Other	661,619	103,713	45,621	810,953
Insurance	62,828	-	3,335	66,163
Purchased Services	181,343	9,142	66,591	257,076
Depreciation and Amortization	156,700	-	162	156,862
Interest	28,404	-	33	28,437
Total	$ 2,214,263	$ 276,283	$ 254,571	$ 2,745,117

19. GOODWILL

The changes in the carrying amount of goodwill, included in other assets in the consolidated balance sheets, for the years ended June 30, 2021 and 2020, were as follows:

	2021	2020
Beginning balance	$ 19,835	$ 20,730
Acquisition of goodwill	-	605
Impairment charge	-	(1,500)
Ending balance	$ 19,835	$ 19,835

There was no goodwill impairment change during the year ended June 30, 2021. A goodwill impairment charge for $1,500 was recorded during the year ended June 30, 2020, related to deteriorating operating results caused by the pandemic.

20. LIQUIDITY

RUSH's financial assets available within one year of the consolidated balance sheet date for general expenditures are as follows:

	2021	2020
Current Assets:		
Cash and cash equivalents	$ 441,652	$ 578,477
Accounts receivable for patient services	364,311	348,019
Other accounts receivable	28,769	33,605
Other current assets	19,147	20,909
Total current assets	853,879	981,010
Investments	855,551	900,170
Total	$ 1,709,430	$ 1,881,180

RUSH has a policy to structure its financial assets to be available as its general expenditures, liabilities, and other obligations come due. Certain other current assets within the accompanying consolidated balance sheets have been excluded from the liquidity table above due to the inability to either liquidate those assets or use them for general

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expenditures and other obligations, such as prepaid assets, grant related receivables, and tuition loan receivables. As described in Note 7, RUSH's endowment consists of donor restricted funds established for a variety of purposes, with income from endowments being restricted for specific purposes. The Finance Committee of the Board of Trustees for RUMC and ROPH and the Finance Committee for RCMC approves the annual endowment spending rate to be used for general purposes for each entity, respectively. As described in Note 9, RUSH also has a $75,000 line of credit available for working capital.

21. INFORMATION USED IN DETERMINING DEPARTMENT OF EDUCATION'S FINANCIAL RESPONSIBILITY COMPOSITE SCORE

Section 498(c) of the Higher Education Act of 1965, as amended, requires for-profit and non-profit institutions to annually submit audited financial statements to the Department of Education (ED) to demonstrate they are maintaining the standards of financial responsibility necessary to participate in the Title IV programs. One of many standards which ED utilizes to gauge the financial responsibility of an institution is a composite of three ratios derived from an institution's audited financial statements.

The financial information below provides the correspondence between certain values presented in RUSH's consolidated financial statements and the values as they are included in the determination of the ratios used by ED to gauge RUSH's financial responsibility:

Land, building and equipment, net	
Net book value of assets in service after June 30, 2019	**Total**
(Pre-implementation):	
Land/Bldg	$ 1,010,876
Equipment	105,579
Total	$ 1,116,455
Net book value of assets in service after June 30, 2020	
(Post-implementation):	
Land/Bldg	$ 130,946
Equipment	142,823
Total	$ 273,769
Construction in Progress	$ 229,663
Land, Building and equipment, net	$ 1,619,887
Intagible Assets as of June 30, 2021	$ 74
Unsecured related party receivables as of June 30, 2021	$ 822

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SUPPLEMENTAL INFORMATION

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REPORT ON INTERNAL CONTROL OVER FINANCIAL REPORTING AND ON COMPLIANCE AND OTHER MATTERS BASED ON AN AUDIT OF FINANCIAL STATEMENTS PERFORMED IN ACCORDANCE WITH *GOVERNMENT AUDITING STANDARDS*

To the Board of Trustees of Rush System for Health:

We have audited, in accordance with the auditing standards generally accepted in the United States of America and the standards applicable to financial audits contained in *Government Auditing Standards* issued by the Comptroller General of the United States, the consolidated financial statements of Rush University System for Health (the "System"), which comprise the consolidated balance sheets as of June 30, 2021 and 2020, and the related consolidated statements of operations, changes in net assets and cash flows for the years then ended, and the related notes to the financial statements, and have issued our report thereon dated October 28, 2021.

Internal Control Over Financial Reporting

In planning and performing our audit of the consolidated financial statements, we considered the System's internal control over financial reporting (internal control) as a basis for designing audit procedures that are appropriate in the circumstances for the purpose of expressing our opinion on the consolidated financial statements, but not for the purpose of expressing an opinion on the effectiveness of the System's internal control. Accordingly, we do not express an opinion on the effectiveness of the System's internal control.

A *deficiency in internal control* exists when the design or operation of a control does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, misstatements on a timely basis. A *material weakness* is a deficiency, or a combination of deficiencies, in internal control, such that there is a reasonable possibility that a material misstatement of the entity's consolidated financial statements will not be prevented, or detected and corrected on a timely basis. A *significant deficiency* is a deficiency, or a combination of deficiencies, in internal control that is less severe than a material weakness, yet important enough to merit attention by those charged with governance.

Our consideration of internal control was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control that might be material weaknesses or significant deficiencies. Given these limitations, during our audit we did not identify any deficiencies in internal control that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

Compliance and Other Matters

As part of obtaining reasonable assurance about whether the System's consolidated financial statements are free from material misstatement, we performed tests of its compliance with certain

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provisions of laws, regulations, contracts, and grant agreements, noncompliance with which could have a direct and material effect on the consolidated financial statements. However, providing an opinion on compliance with those provisions was not an objective of our audit, and accordingly, we do not express such an opinion. The results of our tests disclosed no instances of noncompliance or other matters that are required to be reported under *Government Auditing Standards*.

Purpose of this Report

The purpose of this report is solely to describe the scope of our testing of internal control and compliance and the results of that testing, and not to provide an opinion on the effectiveness of the System's internal control or on compliance. This report is an integral part of an audit performed in accordance with *Government Auditing Standards* in considering the entity's internal control and compliance. Accordingly, this communication is not suitable for any other purpose.

Deloitte & Touche LLP

Chicago, IL

October 28, 2021

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REPORT ON COMPLIANCE FOR EACH MAJOR FEDERAL PROGRAM AND REPORT ON INTERNAL CONTROL OVER COMPLIANCE IN ACCORDANCE WITH OMB UNIFORM GUIDANCE

To the Board of Trustees of Rush System for Health:

Report on Compliance for Each Major Federal Program

We have audited Rush University System for Health's (the "System") compliance with the types of compliance requirements described in the *OMB Compliance Supplement* that could have a direct and material effect on the System's major federal programs for the year ended June 30, 2021. The System's major federal programs are identified in the summary of auditor's results section of the accompanying schedule of findings and questioned costs.

Management's Responsibility

Management is responsible for compliance with federal statutes, regulations, and the terms and conditions of its federal awards applicable to its federal programs.

Auditor's Responsibility

Our responsibility is to express an opinion on compliance for each of the System's major federal programs based on our audit of the types of compliance requirements referred to above. We conducted our audit of compliance in accordance with auditing standards generally accepted in the United States of America; the standards applicable to financial audits contained in *Government Auditing Standards*, issued by the Comptroller General of the United States; and the audit requirements of Title 2 U.S. Code of Federal Regulations Part 200, *Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Awards* (Uniform Guidance). Those standards and the Uniform Guidance require that we plan and perform the audit to obtain reasonable assurance about whether noncompliance with the types of compliance requirements referred to above that could have a direct and material effect on a major federal program occurred. An audit includes examining, on a test basis, evidence about the System's compliance with those requirements and performing such other procedures as we considered necessary in the circumstances.

We believe that our audit provides a reasonable basis for our opinion on compliance for each major federal program. However, our audit does not provide a legal determination of the System's compliance.

Opinion on Each Major Federal Program

In our opinion, the System complied, in all material respects, with the compliance requirements referred to above that could have a direct and material effect on its major federal program for the year ended June 30, 2021.

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Report on Internal Control Over Compliance

Management of the System is responsible for establishing and maintaining effective internal control over compliance with the types of compliance requirements referred to above. In planning and performing our audit of compliance, we considered the System's internal control over compliance with the types of requirements that could have a direct and material effect on each major federal program to determine the auditing procedures that are appropriate in the circumstances for the purpose of expressing an opinion on compliance for each major federal program and to test and report on internal control over compliance in accordance with the Uniform Guidance, but not for the purpose of expressing an opinion on the effectiveness of internal control over compliance. Accordingly, we do not express an opinion on the effectiveness of the System's internal control over compliance.

A *deficiency in internal control over compliance* exists when the design or operation of a control over compliance does not allow management or employees, in the normal course of performing their assigned functions, to prevent, or detect and correct, noncompliance with a type of compliance requirement of a federal program on a timely basis. A *material weakness in internal control over compliance* is a deficiency, or a combination of deficiencies, in internal control over compliance, such that there is a reasonable possibility that material noncompliance with a type of compliance requirement of a federal program will not be prevented, or detected and corrected, on a timely basis. A *significant deficiency in internal control over compliance* is a deficiency, or a combination of deficiencies, in internal control over compliance with a type of compliance requirement of a federal program that is less severe than a material weakness in internal control over compliance, yet important enough to merit attention by those charged with governance.

Our consideration of internal control over compliance was for the limited purpose described in the first paragraph of this section and was not designed to identify all deficiencies in internal control over compliance that might be material weaknesses or significant deficiencies. We did not identify any deficiencies in internal control over compliance that we consider to be material weaknesses. However, material weaknesses may exist that have not been identified.

The purpose of this report on internal control over compliance is solely to describe the scope of our testing of internal control over compliance and the results of that testing based on the requirements of the Uniform Guidance. Accordingly, this report is not suitable for any other purpose.

Deloitte & Touche LLP

Chicago, IL

September 28, 2022

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RUSH SYSTEM FOR HEALTH
SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS
YEAR ENDED JUNE 30, 2021

Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal ALN Number	Federal Grantor/ Pass-through Grantor's Number	Federal Expenditures	Sub recipients
Research and Development:				
U.S. Department of Health and Human Services:				
National Institute of Health	93.RD		$ 56,962,694	$ 10,189,906
National Institute of Health:COVID				
COVID-Chicago Prevention and Intervention Epicenter II CPIE-II	93.084		599,479	108,083
Alcohol misuse: An independent risk factor that increases the incidence and severity of COVID-19	93.273		164,652	
COVID-Great Lakes Node of the Drug Abuse Clinical Trials Network	93.279		88,799	28,370
Mitigating COVID-19 transmission in U.S. jails	93.855		70,660	
Alive Church Network: Increasing COVID-19 Testing in Chicago African American testing deserts	93.310		360,630	10,210
Passed through Age Options:				
Mental Health Services	93.RD	402-03-2419	73,094	
Passed through Adaptive Health:				
Integrating a Suite of Mental Health Apps for Depression in a Healthcare Setting	93.242	2R44MH114725	7,557	
Passed through Altius Institute:				
ENCODE mapping center—A comprehensive catalog of DNaseI Hypertension Sites	93.172	UM1HG009444	6,820	
Passed through Argus Cognitive Inc:				
ARGUS-MDS: Automated, Quantitative and Scalable System for Social Processes in Behavioral Health	93.242	R44MH121965	71,034	
ARGUS-MDS: Automated, Quantitative and Scalable System for Social Processes in Behavioral Health	93.242	R44MH121965	34,807	
Passed through Augusta University:				
Mechanisms of Estrogen Signaling and Neuroprotection	93.853	R56NS109908	61,323	
Passed through University of Alabama:				
Identifying therapeutic targets that confer synaptic resilience to Alzheimer's disease	93.866	R01AG061800	154,068	
Role of vitamin D in the prevention and progression of urinary incontinence	93.847	R01DK115473	31,457	
Passed through University of Arizona:				
Building a Novel Predictive Networks for High-throughput, In-silico Key Driver Prioritization to Enhance Drug Target Discovery in Amp-AD and M2OVE-AD	93.866	RF1AG057457	7,468	
Passed through Broad Institute:				
A Catalog of Cell Types and Genomic Elements in Tissues, Organoids and Disease	93.172	UM1HG009390	27,128	
Passed through Banner Health:				
Neurobiology of Mild Cognitive Impairment in the Elderly	93.866	P01AG014449	58,648	
Passed through Children's Hospital:				
Impact of Well-Timed vs. Mis-timed Sleep Extension on Adolescents' Dietary Intake	93.837	R01HL147915	16,659	
Passed through Social and Scientific Systems:				
A Multicenter Platform Trial of Putative Therapeutics for the Treatment of COVID-19 in Hospitalized Adults (BFT)	93.RD	75N91019D00024	3,796	
Passed through University of Minnesota:				
Restore: Improving Sexual Outcomes of Gay and Bisexual Prostate Cancer Survivors	93.393	R01CA218657	9,838	
Passed through University of Miami:				
Mechanisms of Early Recurrence in Intracranial Atherosclerotic Disease (MyRIAD)	93.853	R01NS084288	2,325	
Passed through MCHC:				
MCHC - Chicago Hospital Council Subaward Agreement	93.889	12102602	8,000	
Passed through National Fragile Foundation:				
FORWARD Registry and Database	93.RD	NA	12,678	
Passed through New York University:				
Developmental Origins of Kidney Function in Early Life and Environmental Risks.	93.113	R01ES032214	28,888	
Passed through Purdue University:				
Childhood Misfortune and Adult Health among Black, White, and Hispanic Americans	93.866	R01AG043544	15,062	
Disparities in the Life Course Origins of Cognitive Decline	93.866	RF1AG068388	11,170	

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal ALN Number	Federal Grantor/ Pass-through Grantor's Number	Federal Expenditures	Sub recipients
Passed through University of Pennsylvania:				
Impact of Daytime vs. Delayed Eating Schedule on Weight and Metabolic Markers Among Obese Persons: An Examination of Circadian Mechanisms.	93.847	5R01DK117488	$ 157,674	$ -
CONNECT—TBI	93.853	U54NS115322-02	3,577	
Passed through Wake Forest University Health:				
US POINTER Imaging Ancillary Study	93.866	R01AG062689	47,275	
POINTER-zzz: Sleep Ancillary to U.S. Study to Protect Brain Health through Lifestyle Intervention to Reduce Risk of Alzheimer's Disease	93.866	R01AG064440	6,359	
Passed through University of Texas:				
Clinical Pathological Study of Cognitive Impairment in Essential Tremor	93.853	R01NS086736	18,961	
Passed through City of Hope:				
PA-20-070 "Development of evidence-based decision support for the management of COVID19"	93.226	R01HS024917	67,448	
Passed through Hektoen:				
MACS/WIHS Combined Cohart Study; Cook County Clinical Research Site (CC_CRS)	93.837	U01HL146245	12,122	
MACS/WIHS Combined Cohort Study; Cook County Clinical Research Site (CC_CRS)	93.837	U01HL146245	28,164	
Passed through University of Hawaii:				
Profiling genome-wide circulating ncRNAs for the early detection of lung cancer	93.394	R01CA223490	90,206	
Passed through University of Mississippi:				
Jackson Heart Study Coordinating Center	93.RD	HHSN268201800010I	14,647	
Passed through Van Andel Research Institute:				
Promoting survival of dopamine neurons in models of Parkinson disease using a novel transcriptional regulator	93.853	R21NS105436	230	
Combining synucleinopathy and mitochondrial deficits in a novel mouse model of Parkinsons disease	93.853	R21NS106078	61,713	
Passed through University of Utah:				
Circadian and sleep pathways to cardiometabolic disease risk: role of neurobehavioral processes	93.233	R01HL141706	28,854	
Center For the Structural Biology of Cellular Host Elements in Egress, Trafficking, and Assembly of HIV (CHEETAH Center)	93.859	P50AI1150464	88,800	
Passed through Loyola University:				
METS-Sleep: Sleep timing, gut microbiota and cardiometabolic risk across the Epidemiologic Transition	93.233	R01HL148271	22,662	
Passed through Dignity Health:				
Neurobiology of Mild Cognitive Impairment in the Elderly	93.866	P01AG014449	32,586	
Passed through DePaul University:				
Preventing Suicide in African American Adolescents	93.242	1R01MH118382	216,208	
Passed through Fox Chase Chem Diversity Center:				
Riluzole prodrugs for melanoma and ALS	93.395	2R44CA156781	76,377	
Passed through Heartland Health Center:				
Advanced Nursing Education Nurse Practitioner Residency	93.247	T14HP33133	251,128	
Passed through University of Kentucky:				
Prebiotics Intervention to Reduce Alzheimer's Disease Risk via Brain-Gut Axis in an APOE4 Mouse Model	93.866	RF1AG062480	4,317	
Role of impaired cognitive states & risk factors in conversion to mixed dementias	93.866	R01AG038651	73,721	
Passed through Wright State University:				
Differential clearance of pyroglutamate a beta through arachnoid meningeal lymphatics in AD	93.866	R01AG064226	39,350	
Passed through Wistar Institute:				
Role of Intestinal Barrier Integrity in Modulating the Host Glycome During COVID-19	93.847	R01DK123733	98,345	
SialicnAcid Modulation of HIV-associated Chronic Inflammaging	93.866	R01AG062383	12,489	
Glycomic Modulation of Gut Microbiome During HIV Infection	93.847	R01DK123733	90,377	
Passed through Hennepin Healthcare Research:				
ASPirin in Reducing Events in the Elderly eXTensionASPREE	93.866	U19AG062682	224,851	
ASPirin in Reducing Events in the Elderly eXTensionASPREE	93.866	U19AG062682	35,037	

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YEAR ENDED JUNE 30, 2021

Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal ALN Number	Federal Grantor/ Pass-through Grantor's Number	Federal Expenditures	Sub recipients
Passed through CDC:				
Evaluating emergence of resistance and changes in dinical pathogens following introduction of chlorhexidine bathing	93.RD	75D30119C06549	$ 208,711	$ 163,794
Innovative Support for Patients with SAR SARSCOV2 Infections(INSPIRE) Registry	93.RD	75D30120C08008	1,960,300	
Innovative Support for Patients with SAR SARSCOV2 Infections (INSPIRE) Registry	93.RD	75D30120C08008	412,527	398,277
Innovative Support for Patients with SAR SARSCOV2 Infections (INSPIRE) Registry	93.RD	75D30120C08008	127,223	127,223
Evaluating SARS-CoV-2 vaccine effectiveness among healthcare personnel during early phase, post-introduction vaccination	93.RD	75D30121F00001	13,345	
Passed through Hektoen Institute:				
MACS/WIHS combined cohort study: cook county clinical research site (CC_CRS)	93.837	U01HL146245	57,846	
Passed through Columbia University:				
Pathway Discovery, Validation for Alzheimer's Disease and Compound Identification for Alzheimer's Disease	93.866	U01 AG046152	15,503	
Pathway Discovery, Validation and Compound Identification for Alzheimer's Disease	93.866	U01 AG046152	(11,213)	
NIA Late Onset of Alzheimer's Disease (LOAD) Family Based Study	93.866	U24AG056270	44,777	
Pathway Discovery, Validation for Alzheimer's Disease and Compound Identification for Alzheimer's Disease	93.866	U01 AG046152	1,856	
Deconstructing and modeling the single cell architecture of the Alzheimer brain	93.866	1RF1AG057473	602	
Convergence of myeloid susceptibility protein function in Alzheimer's disease	93.866	R01AG058852	38,877	
Metformin in Alzheimer's dementia Prevention (MAP)	93.866	R01AG062624	18,785	
Blood Pressure and ADRD in African Americans The Jackson Heart Study	93.866	R01AG066134	19,591	
Multi-omic network directed proteoform discovery, dissection and functional validation to prioritize novel AD therapeutic targets	93.866	U01AG061356	462,593	
Discovery and validation of genetic variants affecting microglial activation in Alzheimer's disease	93.866	RF1AG070438	28,069	
Metformin in Alzheimer's dementia Prevention (MAP)	93.866	R01AG062624	17,905	
Passed through Northwestern University:				
The effects of capsinoids on brown adipose tissue recruitment and activation in obesity	93.847	R01DK112281	8,138	
Functionally Defining HIV-Host Interactions During the Early HIV-1 Lifecycle	93.855	R01AI150998	208,093	
Glutamate receptor signaling pathways in the circuit integration of adult-born neurons.	93.853	R01 NS115471	26,098	
Technology Enabled Services for Coordinated Care of Depression in Healthcare settings	93.242	P50MH119029	56,016	
PA-20-072: Supplement to A Chicago center of excellence in learning health systems research training (ACCELERAT)	93.226	K12HS026385	4,969	
Expansion of SARS-CoV-2 Testing Supplement, Chicago Clinical Trials Unit	93.855	UM1AI069471	299,900	
Successful Clinical Response In Pneumonia Therapy (SCRIPT) Systems Biology Center	93.855	U19AI135964	14,387	
Chicago Clinical Trial Unit	93.855	UM1AI069471	1,210	
Myocardial Vulnerability to Ischemia-Induced Dysfunction and Heart Failure: The Impact of HIV/SIV, ART and Targeted Immunotherapy	93.837	R01HL154862	22,806	
Genetic modifiers of the Mediterranean-DASH dieton MRI Amongst a Diverse Population with Cognitive Complaint Intervention for Neurodegenerative Delay (MIND) response	93.866	R01AG065398	26,450	
Effects of Spaceflight on Gastrointestinal Microbiota in Mice: Mechanisms and Impact on Multi-System Physiology	43.007	NNX15AL05G	6,104	
Chicago Clinical Trials Unit	93.855	UM AI069471	342,535	
SPORE in Prostate Cancer	93.397	P50CA180995	5,170	
Food Allergy Outcomes Related to White and African American Racial Differences (FORWARD)	93.855	R01AI130348	118,229	
A Family Genetic Study of Language in Autism	93.173	R01DC010191	50,339	

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal ALN Number	Federal Grantor/ Pass-through Grantor's Number	Federal Expenditures	Sub recipients
Synaptic Substrates of Age-Dependent Memory Deficits	93.866	2RF1AG017139	$ (33,405)	$ -
Core Center for Clinical Research at NU	93.846	P30AR072579	9,201	
Molecular mechanisms underlying behavioral and psychological symptoms in Alzheimer's disease	93.866	R01AG062249	168,856	
Lupus Intervention Fatigue Trial (LIFT)	93.846	R01AR071091	1,721	
A Chicago center of excellence in learning health systems research training (ACCELERAT)	93.226	K12HS026385	61,757	
A Family-Genetic Study of Autism and Fragile X Syndrome	93.242	R01 MH91131	73,648	
Predoctoral and postdoctoral training program in aging and dementia	93.866	T32AG020506	(4,297)	
Passed through University of Chicago:				
ITM 2.0: Advancing Translational Science in Metropolitan Chicago	93.350	TL1TR002388	155,823	
Targeted Healthcare Engineering for Systems Interventions In Stroke (THESIS)	93.226	R18HS027264	12,888	
ITM 2.0: Advancing Translational Science in Metropolitan Chicago	93.350	UL1TR002389	61,876	
ITM 2.0: Advancing Translational Science in Metropolitan Chicago	93.350	UL1TR002389	126,823	
ITM 2.0: Advancing Translational Science in Metropolitan Chicago	93.350	UL1TR002389	46,751	
Chicago Center for Youth Violence Prevention	93.136	U01CE002712	51,198	
Advancing Translational Science in Metropolitan Chicago-KL2 Component	93.350	KL2TR002387	393,065	
ITM 2.0: Advancing Translational Science in Metropolitan Chicago	93.350	UL1TR002389	779,563	
Chicago Metropolitan Asthma Consortium for Severe/exacerbation-prone Asthma	93.838	1UG1HL139125	47,532	
Adaptive testing of cognitive function based on multidimensional item response theory	93.866	R56AG066127	100,537	
Predictive Analytics Applied to Integrated Administrative Emergency Response Datasets in Chicago	93.242	1R01MH117168	12,204	
Illinois Precision Medicine Consortium	93.368	OT2OD026557	707,159	
CTSA Grant	93.350	UL1TR002389	9,343	10,000
Passed through University of Illinois:				
Discovery of novel smHDACS inhibitors for the treatment of schistosomiasis	93.855	R21AI46512	2,659	
The Role of Mid-life Psychosocial Stressors, Social Resources and Physiological Dysregulation	93.866	R21AG065654	1,204	
Leadership Education in Neurodevelopmental and Related Disorders Training Program	93.110	T73MC11047	5,022	
The Effect of Penile Microbiome on BV, GUD and Genital Epithelial Trauma	93.855	R01 AI110369	(5,258)	
Plasticity Circuits in Alzheimer's Disease	93.866	R01 AG033570	109	
Integrated Mechanisms of Cardiac Maladaptation	93.837	P01HL062426	121,395	
Diet Modulation of Bacterial Sulfur & Bile Acid Metabolism and Colon Cancer Risk	93.393	1R01CA204808	104,194	
Mediterranean Diet, Weight Loss, and Cognition in Obese Older Adults	93.837	R01HL129153	15,672	
Leadership Education in Neurodevelopmental and Related Disabilities Training Program	93.110	T73 MC11047-09-00	62	
Center for Health Equity Research (CHER)	93.307	U54MD012523	9,337	
AHEC Point of Service Maint & Enhancement	93.107	U77HP26847	27,840	12,776
A Dynamic Environmental Exposure Approach to Study Behaviors in Mid-Life.	93.866	R01AG062180	14,982	
Investigation of CXCR7 Signaling in EGFR TK1 resistant NSCLC	93.396	R01CA230778	16,892	
An innovative mobile health intervention to improve self-care in patients with heart failure	93.361	R1NR0118281	1,383	
Center for Health Equity Research (CHER)	93.307	U54MD012523	75	
Diet Modulation of bacterial sulfur & bile acid metabolism and colon cancer risk	93.393	R01CA204808	28,660	

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal ALN Number	Federal Grantor/ Pass-through Grantor's Number	Federal Expenditures	Sub recipients
Passed through Westat Inc:				
NICHD International and domestic Pediatric and Maternal HIV Studies Coordinating Center	93.RD	HHSN275201300003C HHSN275201800001I	$ 111,020	$ -
NICHD International and Domestic Pediatric and Maternal HIV Studies Coordinating Center	93.RD	HHSN275201300003C HHSN275201800001I	37,828	37,828
Passed through Yale University:				
Molecular Networks Underlying Resilience to Alzheimer's Disease Among APOE E4 Carriers	93.866	R01AG057912	103,401	
Passed through University of Montreal:				
Exploring the role of IL-32 as a potential biomarker an therapeutic target in premature cardio-vascular diseases during HIV-infection	93.866	R01AG054324	26,891	
Passed through University of California: USC, UC Davis, California Institute of Technology, Children Hosp LA, UCLA				
AIDS Clinical Trials Group - PROTOCOL	93.855	UM1AI068636	390,000	
AIDS Clinical Trials Group - PROTOCOL PIFA5401	93.855	UM1AI068636	274,278	
Global Alzheimer's Platform Trial-Ready Cohort for Preclinical/Prodromal Alzheimer's Disease	93.866	R01AG053798	35,350	
Life course exposure to community violence and risk of cognitive decline, Alzheimer's Disease, and related dementias among African-Americans	93.866	R01AG067525	9,310	
The Clinical Significance of Incidental White Matter Lesionson MRI Amongst a Diverse Population with Cognitive Complaint (INDEED)	93.853	U19NS120384	10,221	
A Cognitive Test Battery for Intellectual Disabilities	93.865	R01HD076189	81,073	
UC Davis Alzheimer's Disease Core Center	93.866	P30AG010129	71,362	
The Clinical Significance of Incidental White Matter Lesions on MRI Amongst a Diverse Population with Cognitive Complaint	93.853	U19NS120384	58,982	
CD40 Autoantibody and FSGS Recurrence	93.847	R01DK109720	31,169	
Evaluating Changes in Skin Cultures and Skin Microbiome Due to Chlorhexidine vs. Soap Bathing in Patients Requiring Acute or Long Term Care in Healthcare Facilities	93.RD	75D30119C06582	11,160	
Alzheimer's Disease Neuroimaging Initiative (ADN13)	93.866	U19AG24904	127,211	
Ethnic-specific Effects of Mitochondrial DNA Variants and Environmental Factors on Cognitive Functioning and Dementia	93.866	R01AG068405	32,217	
Alzheimer's Disease Neuroimaging Initiative 2 (ADNI2)	93.866	U01AG024904	44,604	
Alzheimer's Disease Cooperative Study - A4 Study	93.866	U19 AG010483	24,985	
AKAP-dependent regulation of Cardiac SR Ca handling	93.837	R01HL133832	117,743	
CD40 Autoantibody and FSGS Recurrence	93.847	R01DK109720	166,386	
Racial Differences in Decision Making among Older Adults	93.866	R01AG055430	362,605	
Nonlinear Models of Cognition Preceding AD and non-AD in a Biracial Population Sample	93.866	R01AG051635	34,770	
Laboratory Center, AIDS Clinical Trails Group (ACTG) LC2/3	93.855	UM1AI106701	160,252	
Alzheimer's Clinical Trial Consortium (ACTC)	93.866	U24AG057437	147,786	
Early vascular contributions to dementia risk in African-Americans	93.866	RF1AG050782	31,692	
Preserving Cognitive Resilience: A Biracial Parent-Offspring Study	93.866	R01AG058679	173,826	
Factors Influencing Decline in AD Trends in a Biracial Population Study	93.866	RF1AG057532	37,977	
Laboratory Center, AIDS Clinical Trials Group (ACTG)LC 2/3	93.855	UM1AI106701	25,615	
Leadership and Operations Center, Aids Clinical Trials Group	93.855	UM1AI068636	58,815	
Global Alzheimer's Platform Trial-Ready Cohort for Preclinical/Prodromal AD	93.866	R01AG053798	24,660	
Passed through University of Washington:				
Literacy Development for Preschoolers with Hearing Loss	93.172	R01DC017984	28,482	
AIDS and Aging Research Platform (AARP)	93.866	R33AG067069	18,755	
ADNI Psychometrics	93.866	R01AG029672	29,644	
Passed through Emory University:				
Novel Bayesian statistical tools for integrating multi-omics data to help elucidate the genomic etiology of complex phenotypes	93.859	R35GM138313	9,230	

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Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal ALN Number	Federal Grantor/ Pass-through Grantor's Number	Federal Expenditures	Sub recipients
Roybal Translational Research Center to Promote Context-Spec Caregiving of Community-Dwelling Persons Living with Alzheimer's Disease or Related Disorders (Pilot Core)	93.866	P30AG064200	$ 106,838	$ -
Clinical Studies of Dystonia and Related Disorders	93.853	U54 NS065701	8,812	
Understanding the Molecular Mechanisms of Depression and Psychological Well-being in Alzheimer's Disease	93.866	R01AG056533	88,863	
Preparation for End-of-Life Decision Making in Mild Alzheimer's Disease	93.866	R01AG057714	29,429	
Brain - Plasma Proteomics Biomarker Discovery and Validation int eh US and UK	93.866	RF1AG057471	5,989	
Roybal Translational Research Center to Promote Context-Specific Caregiving Master	93.866	P30AG064200	22,003	
Elucidating the Role of Plasma Cholesterol in Alzheimer's Alzheimer's Disease using Mendelian	93.866	R56AG062633	75,382	
The Mechanism of Arenavirus Entry into Cells	93.855	R01AI053668	94,151	
Passed through Albert Einstein College of Medicine:				
Integrated Analysis of CVD Risk in HIV: GutMicrobiota, Immune Function and Metabolites	93.837	R01HL140976	29,269	
Immunophenotyping for precision medicine for cardiovascular disease in people living wit HIV	93.837	R01HL148094	22,622	
Passed through Johns Hopkins:				
HOPE in Action: A clinical trial of HIV-to-HIV deceased donor kidney transplantation	93.855	U01AI134591	12,475	
LOC - IMPAACT Leadership Group	93.855	UM1 AI068632	157,732	
ADalimumab Vs. conventional ImmunoSupprEssion for uveitis (ADVISE) Trial	93.867	UG1EY028091	5,495	
LOC - IMPAACT Leadership Group	93.855	UM1AI068632	104,331	
Older American Independence Center	93.866	P30AG021334	1,403	
Passed through Brigham and Women's Hospital:				
AIDS Clinical Trial Group Network	93.855	AI068636	1,246,533	
Fractal motor activity regulation and the risk for Alzheimer's disease in middle to old age adults	93.866	R01AG059867	28,366	
Integrative Motor Activity Biomarker for the Risk of Alzheimer's Risk	93.866	RF1AG064312	69,830	
Alliance for Clinical Trials in Oncology Operations Center	93.395	U10CA180821	55,545	
Passed through Massachusetts General Hospital:				
Randomized Trial to Prevent Vascular Events in HIV - REPRIEVE	93.837	U01 HL23336	35,659	
Recurrent Hemorrhagic Stroke in Minority Populations	93.853	R01NS093870	46,177	
Dynamin, actin and microtubules: cystiskeletal crosstalk in podocytes	93.847	R01DK093773	35,879	
Passed through Great Lakes Hemophilia:				
Regional Program	93.184	H30 MC24052	36,381	
Public Health Surveillance for Bleeding Disorders	93.080	NU27 DD001155-01-00	35,458	
Passed through University of Florida:				
The role of elevated BIN1 expression in Alzheimer's disease	93.866	RF1AG056061	162,031	
Genome-wide Profiling of Brain DNA Hydroxymethylome in Alzheimer's Disease	93.866	RF1AG052476	247,022	
Dignity Therapy RCT led by Nurses of Chaplains for Elderly Cancer Outpatients	93.395	R01CA200867	104,740	
Neuroimaging Biomarkers in Parkinsonism:Differentiating Subtypes and Tracking Disease Progression	93.853	U01NS102038	186	
Genome-wide profiling of brain 6mA methylome in AD	93.866	R01AG064786	79,718	
Passed through University of Pittsburgh:				
The Study of Women's Health Across the Nation (SWAN): The Impact of Midlife and the Menopause Transition on Health and Functioning in Early Old Age preaward approved 7/2/20	93.866	U19AG063720	450,033	
Building Up	93.310	U01GM132133	24,946	
Signaling Mechanisms of Focal Adhesion Protein Kindlin-2 in Chondrogenesis	93.846	R01 AR068950	1,261	
SIV Pathogenesis in African Green Monkeys and Pigtailed Macaques	93.837	R01HL117715-13A1	38,324	

(continued)

Attachment 33
Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH
SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS
YEAR ENDED JUNE 30, 2021

Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal ALN Number	Federal Grantor/ Pass-through Grantor's Number	Federal Expenditures	Sub recipients
Passed through University of Michigan/Michigan State:				
Role of SuPAR in the Intersection between Cardiovascular and Kidney Disease	93.837	R01HL153384	$ 18,876	$ -
COVID-C3PO: Clinical Trial of COVID-19 Convalescent Plasmain outpatients.	93.RD	OT2HL156812	4,648	
Systems Biology of Clostridium Difficile Infection	93.855	U01AI124255	136,271	
Genetic Silencing of Striatal CaV1.3 Calcium Channels as a Potent Antidyskinetic Therapy for PD	93.853	R01NS110398	193,844	
Bright light treatment at home to improve symptom management of fibromyalgia syndrome	93.361	R21NR016930	3,167	
SWAN Genomic Analyses and SWAN Legacy	93.866	U01AG017719	4,809	
Passed through Vanderbilt University:				
BRAIN-ICU 2 Study: Bringing to light the risk factors and incidence of neuropsychological dysfunction (dementia) in ICU Survivors, 2nd study	93.866	R01AG058639	176,717	
Genetic Drivers of Resilience to Alzheimer's Disease	93.866	R01AG059716	47,185	
Neuroprotective Effects of Vascular Endothelial Growth Factor in Alzheimer's Disease	93.866	R01AG061518	35,950	
A randomized, double-blind, placebo-controlled trial of urate-elevating inosine treatment to slow clinical decline in early Parkinson disease.	93.866	R01AG058639	169,466	
Proteomics of Hypertension and Alzheimer's Disease in African American	93.866	R01AG064950	61,066	
Passed through Sunnybrook Research Institute:				
Sleep, Cicadian Rhythms, and Mechanisms of Cognitive Decline in the Human Brain	93.866	R01AG052488	188,040	
Passed thru Washington University:				
Washington University & BJC Epicenter for Prevention of Healthcare Associated Infections	93.084	U54CK000482	26,643	
Exploiting Integrin Signaling to Overcome Resistance to Immunotherapy	93.395	R01CA244938	124,924	
Passed thru University of North Carolina at Chapel Hill:				
Data, Modeling, and Coordination Center for PrecISE Network	93.838	U24HL138998	1,205	
Oxidative Stress and the Development of Osteoarthritis	93.866	R01 AG044034	32,442	
The Role of Human Gut Microbiota in HIV-1 Rectal Acquisition, Replication and Pathogenesis	93.855	R01AI123010	12,378	
Passed thru Harvard School of Public Health:				
Optimism and Exceptional Longevity	93.866	R01AG053273	36,583	
Optimism and Exceptional Longevity (SUPPLEMENT)	93.866	R01AG053273	41,335	
Safety and Healthcare Epidemiology Prevention Research Development (SHEPheRD) Program	93.823	200-2011-24037/2011-N-13526	(16,891)	
Passed thru University of Indiana:				
National Cell Repository for Alzheimer's Disease (NCRAD)	93.866	U24 AG021886	22,373	
Passed through Baylor College of Medicine:				
Functional Validation of the CD1AP Susceptibility Network in Alzheimer's Disease	93.866	R01AG050631	96,215	
Mechanisms of couplon-linked skeletal muscle myopathies	93.846	R01AR072602	162,106	
Passed through Boston University/Boston Childrens Hospital:				
Air Pollution and Alzheimer's Dementia: Neuropathologic and Olfactory Mechanisms in Multi-Ethnic Longitudinal Cohorts	93.866	R01AG067497	105,302	
Air pollution and noise exposures in relation to dementia:from brain imaging markers to clinical disease	93.866	R01AG065359	89,403	
Passed through Boston Childrens Hospital:				
Development of Synaptopathies associated with TSC, PTEN and SHANK3	93.853	U54 NS092090	(988)	
Development of Synaptopathies Associated with TSC, PTEN, SHANK3 Mutations	93.853	2U54NS092090	23,946	
Passed through Oregon Health and Science Institute:				
ORCATECH Collaborative Aging (in Place) Research Using Technology (CART)	93.866	1U2CAG054397-01	(37,463)	
Personality and Health: A Longitudinal Study	93.866	R01AG020048	33,987	
Passed through Rutgers University:				
Asian Resource Centers for Minority Aging Research RCMAR	93.866	P30AG059304	4,240	

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RUSH SYSTEM FOR HEALTH
SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS
YEAR ENDED JUNE 30, 2021

Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal ALN Number	Federal Grantor/ Pass-through Grantor's Number	Federal Expenditures	Sub recipients
Passed through Lurie Childrens Hospital:				
Employing eSBI in a Community-based HIV Testing Environment for at-risk Youth	93.279	R01 DA041071	$ 60,549	$ -
Passed through NeuroNext - Novartis and Massachusetts General Hospital:				
Effects of AFQ056 on Language Learning in Young Children with Fragile X Syndrome (FXS)	93.853	U01NS096767	14,902	
Effects of AFQ056 on Language Learning in Young Children with Fragile X Syndrome (FXS)	93.853	U01NS096767	234,622	
Passed through NCI-NCTN (ECOG, ALLIANCE, NRG, SWOG)				
DART: Dual Anti-CTLA-4 and ANTI-PD-1 Blockade in Rare Tumors	93.RD	S1609	(2,584)	
Androgen Deprivation Therapy and High Dose Radiotherapy with or without whole-pelvic in Unfavorable Intermediate or favorable High Risk Prostate Cancer: A Phase III Randomized Trial	93.RD	RTOG-0924	42	
A Phase I Study with an Expansion Cohort of the Combination of Ipilimumab and Brentuximab Vedotin in Patients with Relapsed/Refractory Hodgkin	93.RD	E4412	43	
A Randomized Double Blind Phass III Study of Ibrutinib During and Following autologous Stem Cell Transplantation vs Placebin Patients with Relapsed or Refractory Diffuse Large B-cell Lymphoma of the Activated B-cell Subtype	93.RD	A051301	1,368	
Phase III Randomized Trial of Standard Systemic Therapy vs Standard Systemic Therapy plus Definitive Treatment of the Primary Tumor in Metastatic Prostate Cancer	93.RD	S1802	39	
A Phase III, Randomized Study of Nivolumab (Opdivo) or Brentuximab Vedotin (Adcetris) Plus AVD in Patients (Age >/= 12 Years) With Newly Diagnosed Advanced Stage Classical Hodgkin Lymphoma	93.RD	S1826	1,119	
A Randomized Phase II Study of Nivolumab after combined modality therapy in high risk anal cancer	93.RD	EA2165	4,500	
Randomized Phase II/III study of venetoclax (ABT 199) plus chemoimmunotherpay for MYC/BCL2 double-hit and doubleexpressing lymphomas	93.RD	A051701	124	
Phase III randomized trial of hypofrationated post mastectomy radiation with breast reconstruction	93.RD	A221505	18	
Phase III randomized adjuvant study of pembrolizumab in muscle invasive and locally advanced urothelial carcinoma (AMBASSADOR) versus observation	93.RD	A031501	66	
A Phase II Study of Cabozantinib Combination with Nivolumab and Ipilimumab in Rare Genitourinary Tumors	93.RD	A031702	761	
Phase III Trial of Enzalutamide versus Enzalutamide, Abriaterone and Prednisone for Castration Resistant Metastic Prostate Cancer	93.RD	A031201	(1,513)	
A Phase III Randomized Trial Comparing High Dose Interferonto MK-3475 (Pembrolizumab) in Patients with High Risk Resected Melanoma	93.RD	S1404	83	
A Randomized Phase III Trial of Dabrafenib + Trametinib Followed by Ipilimumab + Nivolumab at Progression vs Ipilimumab + Nivolumab followed by Dabrafenib + Trametinib at Progression in Patients with Advanced BRAFV600 Mutant Melano	93.RD	EA6134	69	
A Randomized Phase II/III Study of the Combination of Cediranib & Olaparib Compared to Cediranib or Olaparib Alone or Standard of Care Chemo in Women with Recurrent Platinum-Resistant or Refractory Ovarian, Fallopian tube or	93.RD	NRG-GY005	390	
Phase II/III Trial of Adjuvant Radiotherapy and Androgen Deprivation Following Radical Prostatectomy with or without Adjuvant Docetaxel	93.RD	NRG-GU002	97	
A Phase I and Expansion Cohort Study of Adjuvant Cisplatin, Intensity-Modulated Radiotherapy, and MK-3475 in High-RiskHead and Neck Squamous Cell Carcinoma	93.RD	NRG-HN003	(510)	

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Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH
SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS
YEAR ENDED JUNE 30, 2021

Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal ALN Number	Federal Grantor/ Pass-through Grantor's Number	Federal Expenditures	Sub recipients
Randomized phase III trial evaluating the role of weight los in adjuvant treatment of overweight and obese women with early breast cancer	93.RD	A011401	$ 126	$ -
A Randomized trial of Regional Radiotherapy in Biomarker Low Risk Node Positive Breast Cancer	93.RD	CCTG MA.39	1,475	
ALCHEMIST: Adjuvant Lung Cancer Enrichment Marker Identification and Sequencing Trial	93.RD	COG ARST1321	(312)	
Phase III Comparison of Thoracic Radiotherapy Regimens in Patients with Limited Small Cell Lung Cancer Also Receiving Cisplatin and Etoposide	93.RD	CALBG-30610	183	
A Randomized Phase II Study Comparing Single-agent Olaparib single agent cediranib and the combo of cediranib/olaparib in women with recurrent, persistent or metastic endometrial cancer	93.RD	NRG-GY012	97	
A Phase IB Trial of Neoadjuvant AMG232 Concurrent with Preoperative Radiotherapy in Wild-type P53 Soft Tissue Sarcoma (STS)	93.RD	NRG-DT001	717	
A Randomized, Phase III trial to Evaluate the Efficacy and Safety of MK-3475 as Adjuvant Therapy for Triple Receptor Negative Breast Cancer with >1 CM Residual Invasive Cancer or Positive Lymph Nodes After Neoadjuvant Chemotherapy	93.RD	S1418	3,721	
Phase III to trial to evaluate the efficacy of addition of inotuzumab ozogamin to frontline therapy in young adults with newly diagnosed precurso B-cell ALL	93.RD	A041501	1,260	
A Randomized Phase III Study of a targeted therapy comboversus ibrutinib and obinutuzumab in Untreated Younger Patients with Chrinuc Lymphocytic Leukemia (CLL)\	93.RD	EA9161	6,174	
A Randomized Phase III Clinical Trial Evaluating Post-Mastectomy Chestwall and Regional Nodal XRT and Post-Lumpectomy Regional Nodal XRT in Patients with Positive AxilNodes before Neoadjuvant Chemo who Convert to Pathologically	93.RD	NSABP-B-51/RTOG-1304	13	
Colorectal Cancer Metastatic dMMRImmuno-Therapy (COMMIT) Study	93.RD	NRG-GI004	58	
Randomized phase II/III trail of radiotherapy with concurredurvalumab vs radiotherapy with concurrent cetuximab inpatients with stage III-IVB head and neck cancer with acontraindiction to cisplatin	93.RD	NRG-HN004	245	
Randomized phase II trial in early relapsing orrefractory follicular lymphoma	93.RD	S1608	(231)	
Passed through IIT:				
Clinical Test of an Intracortical Visual Prothesis System	93.853	UH3NS095557	54,754	
Comprehensive Probabilistic Atlas of the Brain of Older Adults without Dementia	93.866	R01AG052200	86,798	
In-vivo MRI-based prediction of TDP43 pathology in aging	93.866	R01AG064233	198,378	
Passed through Tufts University:				
Vitamins D and K Neuropathologically-Defined Alzheimer and Other Dementias in Older Persons	93.866	AG051641	291,930	
Passed through Mt. Sinai:				
Understanding the molecular mechanisms that contribute ton europsychiatric symptoms in Alzheimer Disease	93.866	R01AG067025	56,060	
A multiscale investigation of the living human brain	93.866	R01AG069976	21,856	
Elucidating Genetic and Environmental Second Hits in Racial and Ethnic Minorities with APOL1 High-Risk Genotypes	93.847	R01DK127139	8,131	
Peripheral and Brain Levels of Advanced Glycation End Products AGEs and Incident Alzheimer's Disease and Neuropathy	93.866	R01AG053446	270,800	
Integrative Network Modeling of Cognitive Resilience to Alzheimer's Disease	93.866	R01AG057907	56,020	
Leveraging Existing Aging Research Networks to Investigate TBI and AD/ADRD risk (LEARN TBI & AD)	93.866	R01AG061028	214,465	

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Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH
SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS
YEAR ENDED JUNE 30, 2021

Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal ALN Number	Federal Grantor/ Pass-through Grantor's Number	Federal Expenditures	Sub recipients
Passed through University of Wisconsin:				
Data Driven Strategies for Substance Misuse Identification in Hospitalized Patients	93.279	R01DA051464	$ 162,269	$ -
The Neighborhoods Study: Contextual Disadvantage and Alzheimer's Disease and Related Dementias (ADRD)	93.866	R01AG070883	7,070	
Center for Financial Security Retirement and Disability Research Consortium	96.007	RDR18000001	112,958	
FMR1 Premutation Phenotypes in Population-Based and Clinically-Ascertained Samples	93.865	R01HD082110	13,021	
APOLLO - Upper Midwest	93.847	U01DK116092	37,140	
Passed through Mclean Hospital:				
Human iPSC-based Personalized Cell Therapy of PD	93.853	R01NS070577	43,810	
Passed through University of Kansas:				
The Effects of Parenting on the Development and Behavior of FXS Adolescents	93.865	R01HD084563	7,954	
Passed through Thomas Jefferson:				
Optimizing Ultrasound Enhanced Delivery of Therapeutics	93.394	R01CA199646	8,218	
Passed through Hospital for Special Surg:				
Mechnobiological Risk Factors for Initiation of Post Traumatic Osteoarthritis	93.846	R01 AR066635	22,557	
Passed through Duke University:				
Metabolomic signatures for disease sub-classification and target prioritization in AMP-AD	93.866	U01AG061359	41,940	
Alzheimer's Gut Microbiome Project	93.866	U19AG063744	267,875	110,533
Pragmatic Evaluation of events and Benefits of Lipid-lowering in older Adults (PREVENTABLE)	93.866	U19AG065188	31,781	
Clinical Research Steering Committee agreement (PREVENTABLE)	93.866	U19AG065188	3,521	
Passed through Cleveland Clinic:				
Dementia with Lewy Bodies Consortium	93.853	U01NS100610	99,894	
Passed through California Pacific Medical Center:				
Trial of Parkinson's And Zoledronic Acid (TOPAZ)	93. RD	P-165	7,590	
Total U.S. Department of Health and Human Services			79,050,887	11,197,000
U.S. Army Medical Research Acquisition Activity:				
Objective Phenotyping in Cervical Dystonia	12.420	W81XWH-17-1-0394	96,596	
Targeting Diet-Microbiome Interactions in the Pathogenesis of Parkinson's Disease	12.420	W81XWH-17-1-0587	125,307	
Passed through National Science Foundation:				
Collaborative Research:RAPID:Molecular underpinnings that define volatile compound signature of the lung	47.074	2031754	63,543	
Passed through NASA:				
Single-Source, Biomarkers as Predictors of Resiliency and Susceptibility to Stress in Space Flight	43.003	80NSSC20K0243	161,876	
Passed through University of California:				
Effects of traumatic brain injury and post traumatic stress disorder on Alzheimer's disease in Veterans using ADNI	12.420	W81XWH-12-2-0012	11,269	
Passed through University of Melbourne:				
The Role of an Aggrecan 32mer Fragment in Post-Traumatic Osteoarthritis	12.420	W81XWH-16-1-0706	154,895	
Total U.S. Army Medical Research Acquisition/NASA/NSF			613,486	-
Department of Education:				
Validation of a Spanish-Language Social Reasoning Assessment for Spanish-Speaking English Language Learners	84.305	R305A200463	92,151	41,704
Web-based assessment of social-emotional skills in middle school	84.305	R305A200220	215,366	

(continued)

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Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH
SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS
YEAR ENDED JUNE 30, 2021

Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal ALN Number	Federal Grantor/ Pass-through Grantor's Number	Federal Expenditures	Sub recipients
Web-Based Assessment of Social-Emotional Learning in Grades Four to Six	84.305	R305A160053	$ 147,669	$ -
VESIP: Virtual Environment for Social information processing assessment tool for Upper Elementary and Middle School Children	84.305	R305A150189	90,957	
Total Department of Education			546,143	41,704
TOTAL RESEARCH AND DEVELOPMENT			80,210,516	11,238,704
Stimulus Act:				
Provider Relief Fund	93.498		85,841,836	
Higher Education Emergency Relief Fund: Student Portion	84.425E	P425E202465	491,502	
Higher Education Emergency Relief Fund: Institutional Portion	84.425F	P425F200797	454,035	
Uninsured Covid Testing and Treatment	93.461		8,508,324	
			95,295,697	
Student Financial Assistance:				
U.S. Department of Education:				
Stafford Loan	84.268	P268K5336	41,189,488	
Grad Plus	84.268	P268K5336	20,476,208	
Parent Loans for Undergraduate Students	84.268	P268K5336	61,593	
Perkins Loan	84.038	P038A031271		
Perkins Loan-outstanding loan bal. at measurement date	84.038			
Pell Grant Program	84.063	P063P125336	202,246	
Supplemental Educational Opportunity Grant	84.007	P007A121271	219,377	
Federal Work Study	84.033	P033A121271	467,181	
Total U.S. Dept of Education			62,616,093	
U.S. Department of Health and Human Services:				
Loans for Disadvantaged Students-outstanding loan bal. at measurement date	93.342		740,183	
Nursing Student Loan-Undergraduate-outstanding loan bal. at measurement date	93.364		24,638	
Nursing Student Loan-Graduate-outstanding loan bal. at measurement date	93.364		447,919	
Primary Care Loan/HPSL-outstanding loan bal. at measurement date	93.342		436,545	
Nurse Faculty Loan Program-outstanding loan bal. at measurement date-ARRA	93.408		105,602	
Nurse Faculty Loan Program-outstanding loan bal. at measurement date	93.264		825,342	
Nursing Student Loan	93.364	E4 DHP19180	87,238	
Nurse Faculty Loan Program	93.264	E01 HP28838	63,610	
Total U.S. Department of Health and Human Services			2,731,077	
TOTAL STUDENT FINANCIAL ASSISTANCE			65,347,170	
Other Federal Assistance:				
U.S. Department of Health and Human Services:				
Nurse Anesthetist Traineeships	93.124		45,488	
Passed through State of Illinois Department of Human Services:				
Opioid SOR Program	93.788	43CZC03497	1,014,983	
Opioid SOR 2 Program	93.788	43CZC03652	829,536	
Passed through City of Chicago-Department of Family and Support Services:				
City of Chicago Health Promotion Services	93.044	68760-3	11,947	
City of Chicago Health Promotion Services for Older Adults Program	93.043	142384	4,763	
Health Promotion-Nutrition Program	93.044	72269	3,578	
Health and Wellness Promotion	14.218	85553	5,011	
Health and Wellness Promotion	14.218	97697	720	

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Attachment 33
Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH
SCHEDULE OF EXPENDITURES OF FEDERAL AWARDS
YEAR ENDED JUNE 30, 2021

Federal Grantor/Pass-through Grantor/Program or Cluster Title	Federal ALN Number	Federal Grantor/ Pass-through Grantor's Number	Federal Expenditures	Sub recipients
Passed through City of Chicago-Chicago Department of Public Health:				
Regional Innovative Public Health Laboratory (RIPHL)	93.323	1209639	$ 485,564	$ -
CDPH-DATAHUB	93.323	140117	350,797	
ELC Program Contact Tracing	93.323	138120	468,881	
IHA - Hospital Preparedness Program	93.889	138615	199,460	
Expanded HIV Testing for Disproportionately affected populations	93.940	30597	65,211	
ASPR Hospital Preparedness Program Ebola Response Program	93.817	32949	240,768	
Passed through State of Illinois Department of Public Health:				
School Based Health Center	93.667	06380038H	20,502	
Total Other Federal Assistance			3,747,209	
TOTAL EXPENDITURES OF FEDERAL AWARDS			$ 244,600,592	$ 11,238,704

(concluded)

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Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH
SCHEDULE OF EXPENDITURES OF STATE AWARDS
FOR THE YEAR ENDED JUNE 30, 2021

State Grantor/Pass-through Grantor/Program or Cluster Title	State Grantor/ Pass-through Grantor's Number	State Expenditures
Passed through the Illinois Department of Public Health:		
SBHC-Crane	16380085I	$ 22,911
SBHC-Simpson	16380086I	23,470
SBHC-OrrKipp	16380087I	24,225
Family Planning Program	06180067H	118,027
School Based Health Center	06380038H	294,778
Genetic Counseling/Clinical Services	13788111I	72,000
Sickle Cell Program	13788304I	19,577
Regional Perinatal Network	06380007H	327,587
Total Illinois Department of Public Health		902,575
Passed through City of Chicago-Chicago Department of Public Health:		
Community Breast Health Services	PO 124631	5,393
Community Breast Health Services	PO 124632	962
Total Illinois Department of Public Health		6,355
Passed through the Illinois Department of Human Services:		
Child Care Restoration Grant Program	B25232	407,223
Early Intervention Services	1FCSZO05147	3,840,558
Total Illinois Department of Human Services		4,247,781
Passed through the Illinois Department of Transportation:		
State and Community Highway Safety	343-16439	78,179
State and Community Highway Safety	343-20895	182,998
		261,177
TOTAL EXPENDITURES OF STATE AWARDS		$ 5,417,888
TOTAL EXPENDITURES FEDERAL AND STATE AWARDS		$ 250,018,480

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Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH

NOTES TO THE SCHEDULES OF EXPENDITURES OF FEDERAL AWARDS AND STATE AWARDS FOR THE YEAR ENDED JUNE 30, 2021

1. BASIS OF PRESENTATION

The accompanying Schedules of Expenditures of Federal Awards and State Awards (the "Schedules") include the federal and state grant activity of Rush System for Health (the "System" or "Rush"). The information in the Schedules is presented in accordance with the requirements of U.S. Office of Management and Budget Uniform Guidance, Uniform Administrative Requirements, Cost Principles, and Audit Requirements for Federal Award.

2. SUMMARY OF SIGNIFICANT ACCOUNTING PRINCIPLES

Expenditures reported on the Schedules are presented on the accrual basis of accounting. Such expenditures are recognized following cost principles contained in OMB Uniform Guidance in 2 CFR Part 200 wherein certain types of expenditures are not allowable or are limited as to reimbursement. Pass-through entity identifying numbers are presented where available. Rush did not elect to utilize the de minimis indirect cost rate as allowed under Uniform Guidance.

3. LOANS WITH CONTINUING REQUIREMENTS

The outstanding balances as of June 30, 2021 for those loan programs for which the Federal Government imposes continuing compliance requirements are as follows:

Perkins Loan	$ 1,983,889
Loans for Disadvantaged Students	526,327
Nursing Student Loan-Undergraduate	23,765
Nursing Student Loan-Graduate	396,571
Primary Care Loan/HPSL	149,998
Nurse Faculty Loan Program—ARRA	71,906
Nurse Faculty Loan Program	701,868

4. NONCASH ASSISTANCE

Rush did not receive any noncash federal awards or in-kind contributions during fiscal year 2021. In addition, Rush did not have any federal insurance in effect during the year ended June 30, 2021, to specifically cover federal expenditures.

5. PROVIDER RELIEF FUNDING BY PROVIDER AND TIN

Rush received Provider Relief Funding for the following subsidiaries and Tax Identification Numbers ("TIN"):

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Provider	TIN
Affiliated Plastic Surgery	74-3222564
Associates in Internal Medicine	91-2022080
Consultants in Endocrinology	91-1780046
Copley Memorial Hospital	36-2170840
Department of Behavioral Sciences	26-2555993
Dermatology Patient Services	91-1779986
Geriatric Care Partners (Rush Senior Care Group)	91-1780037
Gynecological Care Group	91-1780163
Health Delivery Management	36-4085751
Lifetime Medical Associates	91-1961419
Pulmonary Critical Care Medicine	91-1780143
Road Home Program-Center for Veterans and their Families	46-4718530
Rush Alzheimer's Disease Center	91-1780140
Rush Ambulatory Behavioral Health	26-0517095
Rush Associates in Women's Health	36-4115908
Rush Breast Imaging Services	91-2135545
Rush Center for Congenital & Structural Heart Disease	26-0388296
Rush Copley Cardiovascular Consultants, LLC	27-3234201
Rush Copley Hospitalists	61-1787188
Rush Copley Medical Group	36-3235315
Rush Copley Orthopedics	61-1801175
Rush Copley Surgicenter	38-4012268
Rush Oak Park ER Physicians	36-4576174
Rush Oak Park Hospital	36-2183812
Rush Oak Park Hospital (SNF)	36-2183812
Rush Oak Park Nocturnists	90-0633182
Rush Oak Park Physicians Group Family Medicine	45-4089626
Rush Oak Park Physicians Group Adult Medicine	45-4089582
Rush Oak Park Physicians Group Anchor	80-0771998
Rush Oak Park Physicians Group Elmwood Park	45-4083432
Rush Oak Park Physicians Group for Diabetes and Endocrine	45-4089823
Rush Oak Park Physicians Group Lake Street	46-2117612
Rush Oak Park Physicians Group North Riverside	45-4083503
Rush Otolaryngology Head and Neck Surgery	20-5493250
Rush Pediatric Medical Service Plan	91-1780120
Rush University Critical Care Specialists	91-2146399
Rush University Emergency Services Phys. Group	91-1779996
Rush University Family Physicians formerly Neighborhood Family Practice	91-1780148
Rush University Hypertension Center (RPSLMC)	91-1780115
Rush University Internists	91-1780160

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Provider	TIN
Rush University Medical Center	36-2174823
Rush University Medical Center Division of Hematology Oncology and Section of Medical Oncology	91-1780102
Rush University Pediatric Cardiac Surgeons	26-2000614
Rush University Primary Care	30-0118339
Rush University Primary Care - Lincoln Park	91-2022072
Rush University Surgeons	91-1937384
Rush University Urology	27-2813809
Rush Universtiy Internal Medicine (Hedburg & Assoc)	91-1780109
Surgicenter	36-3853026
University Cardiologists	36-3588450
University Cardiovascular Surgeons	91-1930476
University Consultants in Allergy & Immunology	91-1780088
University Family Physicians Southwest	91-1874166
University Gastroenterologists	91-2020018
University Hepatologists	91-2020017
University Infectious Diseases	91-1924293
University Nephrologists	90-0102849
University Neurologists	91-1780074
University Neurosurgery	51-0562695
University Physical Medicine & Rehabilitation	20-4672892
University Radiation Medicine	91-1780071
University Rheumatologists	91-1780068
University Thoracic Surgeons	20-5260309
University Transplant Program	91-1897100

Attachment 33
Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH

SCHEDULE OF FINDINGS AND QUESTIONED COSTS
FOR THE YEAR ENDED JUNE 30, 2021

Part I—Summary of Auditors' Results

Financial Statements

Type of auditors' report issued: unmodified Internal control over financial reporting:

- Material weakness(es) identified? ____ Yes X no
- Significant deficiency(ies) identified that are not considered to be material weaknesses? ____ Yes X none reported
- Noncompliance material to consolidated financial statements noted? ____ Yes X no

Federal Awards

Internal control over major programs:

- Material weakness(es) identified? ____ Yes X no
- Significant deficiency(ies) identified that are not considered to be material weakness(es)? ____ Yes X none reported

Type of auditors' report issued on compliance for major programs: unmodified

Any audit findings disclosed that are required to be reported in accordance with 2 CFR 200.516 of OMB Uniform Guidance? ____ Yes X no

Identification of major programs:

CFDA Numbers	Name of Federal Program or Cluster
Various	Research and Development
93.461	Uninsured Covid Testing and Treatment
93.498	Provider Relief Fund
84.425	Higher Education Emergency Relief Fund

Dollar threshold used to distinguish between type A and type B programs: $3,000,000

Auditee qualified as low-risk auditee? X Yes ____ no

Attachment 33
Availability of Funds – Audited Financial Statements

Part II—Financial Statement Findings

None noted

Part III—Federal Award Findings and Questioned Costs

None noted

Attachment 33
Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH

SUMMARY SCHEDULE OF PRIOR AUDIT FINDINGS
FOR THE YEAR ENDED JUNE 30, 2021

Part II—Financial Statement Findings

The following schedule contains the finding reference number and title for each of the findings included in the June 30, 2020 report. The letters under the heading Corrective Action indicates the following:

F - Prior Year finding was fully remediated in the Current Year; R -Repeated during Current Year

Reference Number		Title		Corrective Action
2020-001		Accounting and management of fixed assets		F

Part III—Federal Award Findings and Questioned Costs

None noted.

Attachment 33
Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH

SUPPLEMENTAL SCHEDULE—FINANCIAL RESPONSIBILITY SCHEDULE
AS OF AND FOR THE YEAR ENDED JUNE 30, 2021

Financial Statement Reference	Primary Reserve Ratio Expendable Net Assets Financial Statement Line Item Reference	Amounts	Amounts
Consolidated Balance Sheet—Net assets without donor restrictions	Net assets without donor restrictions	$ -	$ 1,980,607
Consolidated Balance Sheet—Total net assets with donor restrictions	Net assets with donor restrictions	-	1,015,458
Note 21 to the Consolidated Balance Sheet—Related party receivable and related party note disclosure	Secured and Unsecured related party receivable	822	-
Note 21 to the Consolidated Balance Sheet—Related party receivable and related party note disclosure	Unsecured related party receivable	-	822
Consolidated Balance Sheet—Land, buildings, and equipment—net	Land, building and equipment—net (includes Construction in progress)	1,619,887	-
Note 21 to the Consolidated Balance Sheet—Land, building and Equipment—pre-implementation	Land, building and equipment pre-implementation	-	1,116,455
Note 21 to the Consolidated Balance Sheet—Land, building and Equipment—post-implementation without outstanding debt for original purchase	Land, building and equipment post-implementation without	-	273,769
Note 21 to the Consolidated Balance Sheet—Land, Building and Equipment—Net—Construction in progress	Construction in progress	-	229,663
Consolidated Balance Sheet—Lease right-of-use assets—net	Lease right-of-use asset—net	131,459	-
Note 21 to Consolidated Balance Sheet—Goodwill	Intangible assets	-	74
Consolidated Balance Sheet—Accrued postretirement benefit obligation	Post-employment and pension liabilities	-	92,941
Consolidated Balance Sheet—Loans and bonds payable	Long-term debt—for long term purposes	921,802	-
Consolidated Balance Sheet—Loans and bonds payable	Long-term debt—for long term purposes pre-implementation	-	523,465
Consolidated Balance Sheet—Loans and bonds payable (current year), Less Consolidated Balance Sheet—Loans and bonds payable (prior year)	Long-term debt—for long term purposes post-implementation	-	398,337
Consolidated Balance Sheet—Lease right-of-use of asset liability	Lease right-of-use asset liability	108,467	-

(Continued)

Attachment 33
Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH

SUPPLEMENTAL SCHEDULE—FINANCIAL RESPONSIBILITY SCHEDULE
AS OF AND FOR THE YEAR ENDED JUNE 30, 2021

Financial Statement Reference	Primary Reserve Ratio Total Expenses and Losses Financial Statement Line Item Reference	Amounts	Amounts
Consolidated Statement of Operations and Changes in Net Assets—Total Operating Expenses (Total from Consolidated Statement of Activities prior to adjustments)	Total expenses without donor restrictions—taken Consolidated Statement of Operations and Changes	$ -	$ 2,890,886
Consolidated Statement of Operations and Changes in Net Assets—Without Donor Restrictions—Total operating expenses, Loss on disposal of property and equipment, Change in fair value of interest rate swap agreements, Other components of net periodic postretirement benefit cost	Non-Operating gain	-	192,612
Consolidated Statement of Operations and Changes in Net Assets Fundraising expenses, Debt rate lock settlement, and loss on debt refunding	Other losses	-	(9,926)
Consolidated Statement of Operations and Changes in Net Assets—Pension-related changes other than periodic pension	Pension-related changes other than net periodic costs	-	64,215

Financial Statement Reference	Equity Ratio Modified Net Assets Financial Statement Line Item Reference	Amounts	Amounts
Consolidated Balance Sheet—Net Assets Without Donor Restrictions	Net Assets Without Donor Restrictions	$ -	$ 1,980,607
Consolidated Balance Sheet—Total Net Assets With Donor	Net Assets With Donor Restrictions	-	1,015,458
Note 21 to the Consolidated Balance Sheet—Goodwill	Intangible assets	-	74
Note 21 to the Consolidated Balance Sheet—Related party receivable and Related party note disclosure	Secured and Unsecured related party receivables	822	-
Note 21 to the Consolidated Balance Sheet—Related party receivable and Related party note disclosure	Unsecured related party receivables	-	822

(Continued)

Attachment 33
Availability of Funds – Audited Financial Statements

RUSH SYSTEM FOR HEALTH

SUPPLEMENTAL SCHEDULE—FINANCIAL RESPONSIBILITY SCHEDULE
AS OF AND FOR THE YEAR ENDED JUNE 30, 2021

Financial Statement Reference	Equity Ratio Modified Assets Financial Statement Line Item Reference	Amounts	Amounts
Consolidated Balance Sheet—Total Assets	Total Assets	$ -	$ 5,537,769
Consolidated Balance Sheet—Lease right-of-use asset pre-implementation	Lease right-of-use asset pre-implementation	-	131,459
Note 21 to the Consolidated Balance Sheet—Goodwill	Intangible assets	-	74
Note 21 to the Consolidated Balance Sheet—Related party receivable and Related party note disclosure	Secured and Unsecured related party receivables	822	-
Note 21 to the Consolidated Balance Sheet—Related party receivable and Related party note disclosure	Unsecured related party receivables	-	822

Financial Statement Reference	Net Income Ratio Financial Statement Line Item Reference	Amounts	Amounts
Consolidated Statement of Operations and Changes in Net Donor Restrictions—Change in Net Assets	Change in Net Assets Without Donor Restrictions	$ -	$ 411,446
Consolidated Statement of Operations and Changes in Net Assets—Without Donor Restrictions—Total operating revenues, Contributions for nonoperating purpose, Allocation of endowment income to operations, Change in value of split interest agreements, Other nonoperating activities, Net assets released from restriction, Postretirement benefit plan related changes, other than net periodic postretirement benefit cost	Total Revenues and Gains Without Donor Restrictions	-	2,999,061
			(Concluded)

Attachment 35
Financial Viability

FitchRatings

RATING ACTION COMMENTARY

Fitch Affirms Rush System for Health's (IL) IDR at 'AA-'; Outlook Stable

Thu 17 Feb, 2022 - 4:47 PM ET

Fitch Ratings - Chicago - 17 Feb 2022: Fitch Ratings has affirmed Rush System for Health's (RUSH) Issuer Default Rating (IDR) at 'AA-' and the 'AA-' ratings on series 2015A&B fixed rate tax-exempt revenue bonds issued by the Illinois Finance Authority on behalf of RUSH and series 2020 taxable fixed rate revenue bonds issued directly by RUSH.

The Rating Outlook is Stable.

SECURITY

Bond payments are secured by a pledge of the gross revenues of the obligated group. The obligated group includes the vast majority of RUSH operating assets, including the Rush University Medical Center (RUMC) flagship academic medical center (AMC) and the two community hospitals, Rush Oak Park Hospital (ROPH) and Rush Copley Medical Center (RCMC).

ANALYTICAL CONCLUSION

The 'AA-' IDR reflects RUSH's strong financial profile in the context of its midrange revenue defensibility and strong operating risk profile assessments. Despite pressure from the coronavirus pandemic, RUSH has maintained strong capital-related ratios. While operating

https://www.fitchratings.com/research/us-public-finance/fitch-affirms-rush-system-for-health-il-idr-at-aa-outlook-stable-17-02-2022

Attachment 36
Economic Feasibility

Finance Department
1725 W. Harrison Street
Suite 364
Chicago, IL 60612

Tel: 312-942-5647
Fax: 312-942-5729
www.rush.edu
patricia_s_oneil@rush.edu

Patricia S. O'Neil
RUSH Senior Vice President
and System Chief Financial
Officer

RUSH

December 21, 2022

John Kniery
Board Administrator
Health Facilities and Services Review Board
525 W Jefferson Street, Floor 2
Springfield, IL 62761

Re: Rush Lisle Cancer Center
Ill. Admin. Code Section 1120.120(a) Available Funds Certification
Ill. Admin. Code Section 1120.140(a) Reasonableness of Financing Arrangements

Dear Mr. Kniery:

As a representative of Rush Lisle Cancer Center I, Patricia O'Neil, hereby attest that the project costs will be $51,193,592. Rush University Medical Center will fund the entirety of the construction of the project with cash and existing securities. Rush University Medical Center has sufficient and readily accessible internal resources to fund the obligation required by the project, and to fully fund other ongoing obligations.

I further certify that our analysis of the funding options for this project reflected that the funding strategy outlined herein is the lowest net cost option available.

Sincerely,

Patricia S. O'Neil

Patricia O'Neil
Senior Vice President and Chief Financial Officer
Rush University System for Health

Attachment 37
Safety Net Information

RUSH UNIVERSITY MEDICAL CENTER

Charity (# of patients)	2018	2019	2020
Inpatient	476	349	587
Outpatient	12,224	11,035	16,564
Total	12,700	11,384	17,111
Charity (cost in dollars)			
Inpatient	$7,388,724	$8,667,696	$8,427,871
Outpatient	$10,645,902	$11,728,611	$11,613,380
Total	$18,034,626	$20,396,307	$20,041,251
MEDICAID			
Medicaid (# of patients)	**2018**	**2019**	**2020**
Inpatient	8,134	7,665	7,509
Outpatient	114,735	120,775	111,222
Total	122,869	128,440	118,731
Medicaid (Revenue)			
Inpatient	$112,923,000	$125,248,000	$106,210,677
Outpatient	$30,265,000	$40,102,000	$57,023,218
Total	$143,188,000	$165,350,000	$163,233,895

Attachment 38
Charity Care Information

RUSH UNIVERSITY MEDICAL CENTER

Charity (# of patients)	2018	2019	2020
Inpatient	476	349	587
Outpatient	12,224	11,035	16,564
Total	12,700	11,384	17,111
Charity (cost in dollars)			
Inpatient	$7,388,724	$8,667,696	$8,427,871
Outpatient	$10,645,902	$11,728,611	$11,613,380
Total	$18,034,626	$20,396,307	$20,041,251

Attachment 39
Flood Plain Letter

Rush University System for Health
1725 West Harrison Street
Suite 364
Chicago, IL 60612

RUSH

December 27, 2022

John Kniery
Board Administrator
Health Facilities and Services Review Board
525 W Jefferson Street, Floor 2
Springfield, IL 62761

Re: Rush Lisle Cancer Center - Flood Plain Requirements

Dear Mr. Kniery:

As representative of Rush University System for Health, I, Carl Bergetz, affirm that the proposed relocation for the facility complies with Illinois Executive Order #2005-5. The facility location at 2455 Corporate West Drive, Lisle, IL 60532 is not located in a flood plain, as evidence please find enclosed a map from the Federal Emergency Management Agency ("FEMA").

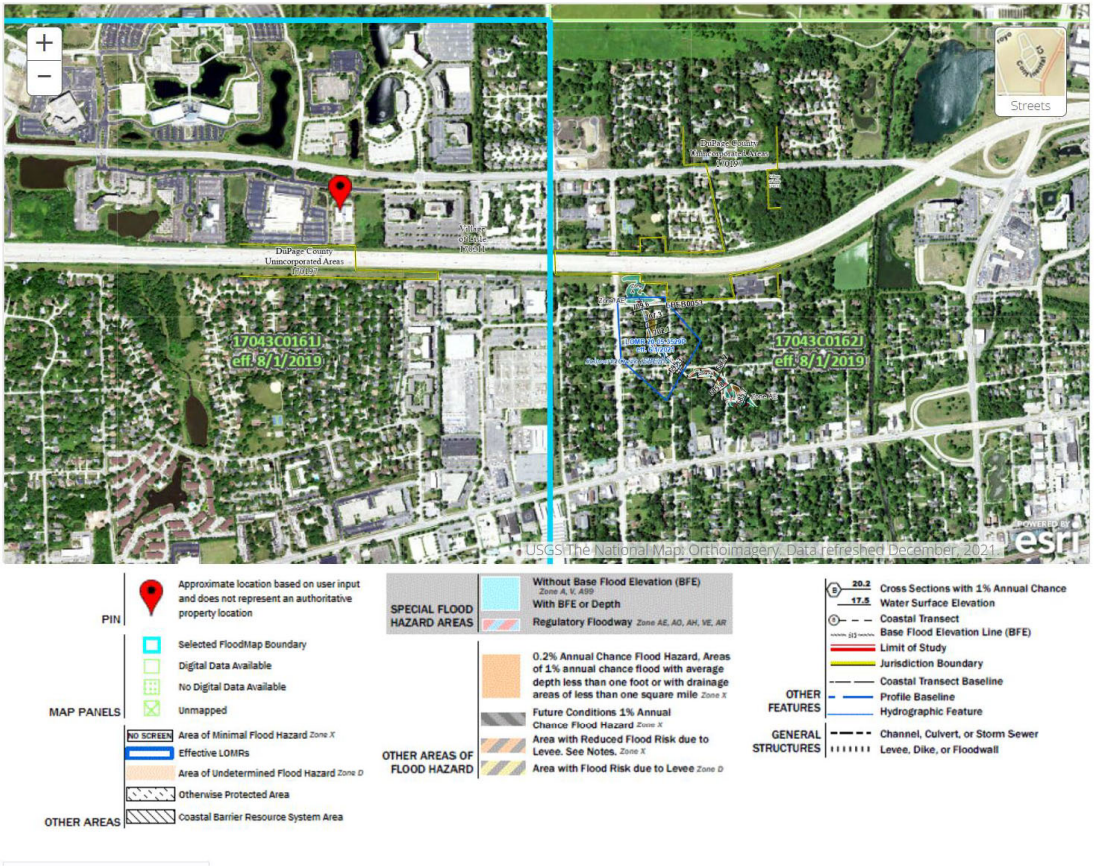
I hereby certify this true and is based upon my personal knowledge under penalty of perjury and in accordance with 735 ILCS 5/1-109.

Sincerely,

Carl Bergetz, JD
Chief Legal Officer
Rush University System for Health

RUSH is an academic health system comprising Rush University Medical Center, Rush University, Rush Copley Medical Center and Rush Oak Park Hospital.

Attachment 39
Flood Plain Letter



After paginating the entire completed application indicate, in the chart below, the page numbers for the included attachments:

INDEX OF ATTACHMENTS