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: River Oaks Surgery Center LLC
Street Address: 7941 S. Western Avenue
City and Zip Code: Chicago 60620
County: Cook Health Service Area: 06 Health Planning Area: 030

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

Exact Legal Name: River Oaks Surgery Center LLC
Street Address: 1700 East West Road
City and Zip Code: Calumet City 60409
Name of Registered Agent: CT Corporation System
Registered Agent Street Address: 208 S. LaSalle Street, Suite 814
Registered Agent City and Zip Code: Chicago 60604
Name of President: Shoeb Mohiuddin, M.D.
President Street Address: 1700 East West Road
President City and Zip Code: Calumet City 60409
President Telephone Number: (312) 300-3882

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: Juan Morado, Jr. and Mark J. Silberman
Title: CON Counsel
Company Name: Benesch Friedlander Coplan & Aronoff, LLP
Address: 71 S. Wacker Drive, Suite 1600, Chicago, IL 60606
Telephone Number: (312) 212-4967 and (312) 212-4952
E-mail Address: JMorado@beneschlaw.com and MSilberman@beneschlaw.com
Fax Number: (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: Shoeb Mohiuddin, M.D.
Title: President
Company Name: River Oaks Surgery Center LLC
Address: 1700 East West Road, Calumet City, 60409
Telephone Number: (312) 300-3882
E-mail Address: shoeb@rpspine.com
Fax Number: (312) 300-3426

Site Ownership [Provide this information for each applicable site]

Exact Legal Name of Site Owner: Davita Hemod
Address of Site Owner: P.O. Box 3046, Federal Way, WA 98003
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 [Provide this information for each applicable facility and insert after this page]

Exact Legal Name: River Oaks Surgery Center LLC
Address: 7941 S. Western Avenue, Chicago, IL 60620

☐ 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.

River Oaks Surgery Center LLC, located at 7941 S. Western Avenue in Chicago, Illinois 60620 ("Applicant") seeks to establish a two operating room ambulatory surgical treatment center ("ASTC") and provide Orthopedic Surgery and Pain Management.

This project is classified as substantive, in that it involves the establishment of an ambulatory surgical treatment center pursuant to 77 Ill. Admin. Code 1110.20(c)(1)(A)(i).

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	$11,917	$4,083	$16,000
Site Survey and Soil Investigation	-	-	-
Site Preparation	-	-	-
Off Site Work	-	-	-
New Construction Contracts	$2,081,078	$712,973	$2,794,051
Modernization Contracts	-	-	-
Contingencies	$125,000	$145,000	$270,695
Architectural/Engineering Fees	$188,296	$64,510	$252,806
Consulting and Other Fees	$90,000	$30,000	$120,000
Movable or Other Equipment (not in construction contracts)	$614,480	$210,520	$825,000
Bond Issuance Expense (project related)	-	-	-
Net Interest Expense During Construction (project related)	$63,310	$21,690	$85,000
Fair Market Value of Leased Space or Equipment	$843,886	$289,114	$1,133,000
Other Costs to Be Capitalized	-	-	-
Acquisition of Building or Other Property (excluding land)	-	-	-
TOTAL USES OF FUNDS	$4,017,968	$1,477889	$5,495,857
SOURCE OF FUNDS	**CLINICAL**	**NONCLINICAL**	**TOTAL**
Cash and Securities	$111,724	$38,276	$150,000
Pledges	-	-	-
Gifts and Bequests	-	-	-
Bond Issues (project related)	-	-	-
Mortgages	$3,062,358	$1,150,499	$4,212,857
Leases (fair market value)	$843,886	$289,114	$1,133,000
Governmental Appropriations	-	-	-
Grants	-	-	-
Other Funds and Sources	-	-	-
TOTAL SOURCES OF FUNDS	$4,017,968	$1,477,889	$5,495,857
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: $ N/A

Fair Market Value: $ N/A

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 $ $5,495,857

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): December 31, 2027

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 **NOT APPLICABLE**

☐ APORS **NOT APPLICABLE**

☐ All formal document requests such as IDPH Questionnaires and Annual Bed Reports been submitted **NOT APPLICABLE**

☐ All reports regarding outstanding permits **NOT APPLICABLE**

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	-	-	-	-	-	-	-
Medical Surgical (Surgical Suite)	$4,017,968	-	5,181	5,181	-	-	-
Total Clinical	4,017,968	-	5,181	5,181	-	-	-
	-	-	-	-	-	-	-
NON-REVIEWABLE	-	-	-	-	-	-	-
Administrative	$1,477,889	-	1,775	1,775	-	-	-
Total Non-clinical	$1,477,889	-	1,775	1,775	-	-	-
TOTAL	**$5,495,857**	**-**	**6,965**	**6,956**	**-**	**-**	**-**
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 River Oaks Surgery Center LLC 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.

Shoeb Mohiuddin
SIGNATURE

Shoeb Mohiuddin, MD
PRINTED NAME

PRINTED TITLE

Notarization:
Subscribed and sworn to before me
this 2nd day of April

Signature of Notary

Seal

Official Seal
ERICA L BRODERICK
Notary Public, State of Illinois
Commission No. 906011
My Commission Expires December 18, 2027

SIGNATURE

PRINTED NAME

PRINTED TITLE

Notarization:
Subscribed and sworn to before me
this _____ day of _____

Signature of Notary

Seal

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?**
ASTC (2 Operating Rooms)	**5,181**	**2750-GSF Per Operating Room**	**-319**	**YES**

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	**ASTC**	**1,872 Patients**	**1,560 Hours**	**>1500**	**YES**
YEAR 2	**ASTC**	**1,928 Patients**	**1,607 Hours**	**>1500**	**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.

G. Non-Hospital Based Ambulatory Surgery

Applicants proposing to establish, expand and/or modernize the Non-Hospital Based Ambulatory Surgery category of service must submit the following information.

ASTC Service
☐ **Cardiovascular**
☐ **Colon and Rectal Surgery**
☐ **Dermatology**
☐ **General Dentistry**
☐ **General Surgery**
☐ **Gastroenterology**
☐ **Neurological Surgery**
☐ **Nuclear Medicine**
☐ **Obstetrics/Gynecology**
☐ **Ophthalmology**
☐ **Oral/Maxillofacial Surgery**
☒ **Orthopedic Surgery**
☐ **Otolaryngology**
☒ **Pain Management**
☐ **Physical Medicine and Rehabilitation**
☐ **Plastic Surgery**
☐ **Podiatric Surgery**
☐ **Radiology**
☐ **Thoracic Surgery**
☐ **Urology**
☐ **Other**_____

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

APPLICABLE REVIEW CRITERIA	Establish New ASTC or Service	Expand Existing Service
1110.235(c)(2)(B) – Service to GSA Residents	X	X
1110.235(c)(3) – Service Demand – Establishment of an ASTC or Additional ASTC Service	X	
1110.235(c)(4) – Service Demand – Expansion of Existing ASTC Service		X
1110.235(c)(5) – Treatment Room Need Assessment	X	X
1110.235(c)(6) – Service Accessibility	X	
1110.235(c)(7)(A) – Unnecessary Duplication/Maldistribution	X	
1110.235(c)(7)(B) – Maldistribution	X	
1110.235(c)(7)(C) – Impact to Area Providers	X	
1110.235(c)(8) – Staffing	X	X
1110.235(c)(9) – Charge Commitment	X	X
1110.235(c)(10) – Assurances	X	X
APPEND DOCUMENTATION AS ATTACHMENT 25, 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]:**

$150,000	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.
_____	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.
_____	c) Gifts and Bequests − verification of the dollar amount, identification of any conditions of use, and the estimated timetable of receipts.
$5,345,857	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.
_____	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.
_____	f) Grants − a letter from the granting agency as to the availability of funds in terms of the amount and time of receipt.
_____	g) All Other Funds and Sources − verification of the amount and type of any other funds that will be used for the project.
$5,495,857	**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

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 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 New	Mod.	Gross Sq. Ft. New	Circ.*	Gross Sq. Ft. Mod.	Circ.*	Const. $ (A x C)	Mod. $ (B x E)	
ASC	$401.67	-	5,181	-	-	-	$2,081,078	-	$2,081,078
Contingency	$24.32	-	5,181	-	-	-	$125,000	-	$125,000
TOTALS	$425.80	-	5,181		-	-	$2,206,078	-	$2,206,078

* 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 – NOT APPLICABLE

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)	**2020**	**2021**	**2022**
Inpatient	-	-	-
Outpatient	-	-	-
Total	-	-	-
Charity (cost in dollars)			
Inpatient	-	-	-
Outpatient	-	-	-
Total	-	-	-
MEDICAID			
Medicaid (# of patients)	**2022**	**2022**	**2022**
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 – NOT APPLICABLE

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			
	2020	**2021**	**2022**
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: River Oaks Surgery Center LLC (Name) 7941 S Western Avenue (Address)

Chicago (City) Illinois (State) 60620 (ZIP Code) (312) 300-3882 (Telephone Number)

2. Project Location: 7941 S. Western Avenue (Address) Chicago (City) Illinois (State)

Cook (County) Lake (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 Applicant

Included with this attachment is:

1. The Certificate of Good Standing for the Applicant, River Oaks Surgery Center LLC.

ATTACHMENT 1
Certificate of Good Standing
River Oaks Surgery Center LLC

File Number 1617793-8

STATE OF ILLINOIS
OFFICE OF
THE SECRETARY OF STATE

To all to whom these Presents Shall Come, Greeting:

I, Alexi Giannoulias, *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*

RIVER OAKS SURGERY CENTER LLC, HAVING ORGANIZED IN THE STATE OF ILLINOIS ON MAY 05, 2025, APPEARS TO HAVE COMPLIED WITH ALL PROVISIONS OF THE LIMITED LIABILITY COMPANY ACT OF THIS STATE, AND AS OF THIS DATE IS IN GOOD STANDING AS A DOMESTIC LIMITED LIABILITY COMPANY 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* 2ND *day of* APRIL ***A.D.*** 2026 .

SEAL OF THE STATE OF ILLINOIS
AUG. 26TH 1818

Authentication #: 2609202344 verifiable until 04/02/2027
Authenticate at: https://www.ilsos.gov

Alexi Giannoulias
SECRETARY OF STATE

ATTACHMENT 2
Site Ownership

Attached as evidence of control over the site is an executed Letter of Intent for the property.

ATTACHMENT 2
Site Ownership

LEE & ASSOCIATES
COMMERCIAL REAL ESTATE SERVICES

September 5, 2025

Greg Melanson
Melanson Real Estate Group
Cell: (603) 651-6351
Email: greg@melansonreg.com

RE: ***Letter of Intent (LOI)***
7941 S Western Ave. Chicago, IL 60620

Dear Greg:

This letter will serve as an outline of the terms and conditions under which my client Dr. Shoeb Mohiuddin (or Nominee) would purchase the above referenced property.

Purchaser:	Dr. Shoeb Mohiuddin (or Nominee)
Seller:	Owner of Record
Property Description:	The real property commonly known as ***7941 S Western Ave. Chicago, IL 60620*** County of Cook State of Illinois, which contains a building of approximately 7,449 square feet and includes all rights, easements, and appurtenances thereto (collectively, "the Property").
Purchase Price:	$1,875,000 (One Million Eight Hundred Seventy Five thousand)
Earnest Money:	$100,000 (One Hundred Thousand Dollars)to be deposited with title company as escrowee upon execution by both Purchaser and Seller of a Purchase and Sale Agreement ("PSA").
Due Diligence Period:	Purchaser shall have Ninety (90) days from the date of receipt of the Due Diligence materials, complete physical inspection, and give written disapproval. If Purchaser does not deliver written disapproval, the contingency shall be deemed waived by purchaser. **Due Diligence Materials:** a. Sellers Books and Records: Seller shall deliver to Purchaser the following items within Five (5) business days of the effective contract date. b. Existing environmental report(s), title commitment, and survey that are in the Sellers possession. c. Sellers operating statements for calendar years 2023, 2024, 2025.

ATTACHMENT 2
Site Ownership

d. Copies of rent payment records, estimated operating expenses, and other payments made by the tenants pursuant to leases, specifying the amounts charged to each tenant for calendar years 2023, 2024,2025
e. Copies of records for all delinquent tenant balances for each tenant calendar years 2023, 2024, and 2025.
f. Copies of statements of repairs to the Property for the calendar years 2023, 2024, and 2025.
g. All service contracts and agreements.

Closing Date:	On or About Thirty (30) Days following the expiration of the Due Diligence Period
Closing Costs:	Seller and Purchaser shall remit the closing costs based on what is customary and normal in the location of the Property.
Purchaser's Broker:	Lee & Associates of Illinois, LLC.
Seller's Broker:	Melanson Real Estate Group Inc, with Broker of Record Solutions Inc. serving as Illinois Broker of Record
Brokerage Commission:	Lee & Associates of Illinois, LLC and Melanson Real Estate Group Inc, are Broker of Record and shall be compensated a real estate sales commission pursuant to a separate agreement.
Non-Binding Statement of Terms:	This "letter of intent" contains a collection of certain business understandings which Seller and Purchaser have reached, and which may become part of a PSA, if the parties eventually enter into such Contract. Standing on its own, however, this document is not intended to impose any binding obligation whatsoever on either party, with the sole exceptions of the obligation of each party to negotiate in good faith based on the business understandings contained in this "letter of intent" and the duty of exclusive negotiation as described further below. Parties do not intend to be bound by any other agreement except as aforesaid, until both agree to and actually execute a formal written PSA. Neither party may reasonably rely on any promises inconsistent with this section. This paragraph supersedes all other language in this document which may appear to conflict with this section, except the duty of exclusive negotiation described immediately below.
Exclusivity and Good Faith Negotiations:	Upon execution of this Letter of Intent, Seller agrees that, through the expiration of the Due Diligence Period, it shall not solicit, negotiate, or accept any offers, letters of intent, or proposals relating to the sale, lease, or other transfer of the Property from any other party.During this period, both parties agree to work in good faith to negotiate and execute a mutually acceptable Purchase and Sale Agreement reflecting the terms set forth herein, along with other customary provisions. If the parties do not execute a definitive agreement prior to

ATTACHMENT 2
Site Ownership

the expiration of the Due Diligence Period, this Letter of Intent shall automatically terminate unless extended by mutual written agreement, and neither party shall have any further obligation to the other, except for those that expressly survive.

Expiration: This Letter of Intent shall expire 14 days from the date of this letter.

Purchaser will provide to Seller its proposed PSA within 7 days of Seller's acceptance of these terms. The letter of intent shall not be deemed a contract between the parties, but rather solely as an expression of their intent to execute a PSA on the terms and conditions expressed herein and this letter of intent shall not, in itself, be binding on either party.

Thank you for your timely response to this letter. If you have any questions or need further information, please contact me at 630.885.3994

Sincerely,

Peter Cangialosi
Principal
Lee & Associates of Illinois, LLC
630-885-3994
pcangialosi@lee-associates.com

Purchaser:

Agreed & Accepted this _____ day of _____ 20__.

By: _____

Its: _____

Seller:

Agreed & Accepted this _____ day of _____ 20__.

By: _____

Its: _____

ATTACHMENT 3
Operating Entity/Licensee

River Oaks Surgery Center LLC will seek licensure by the Illinois Department of Public Health upon approval of this project. Attached as evidence of the owner 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
River Oaks Surgery Center LLC

File Number 1617793-8

To all to whom these Presents Shall Come, Greeting:

I, Alexi Giannoulias, *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*

RIVER OAKS SURGERY CENTER LLC, HAVING ORGANIZED IN THE STATE OF ILLINOIS ON MAY 05, 2025, APPEARS TO HAVE COMPLIED WITH ALL PROVISIONS OF THE LIMITED LIABILITY COMPANY ACT OF THIS STATE, AND AS OF THIS DATE IS IN GOOD STANDING AS A DOMESTIC LIMITED LIABILITY COMPANY IN THE STATE OF ILLINOIS.

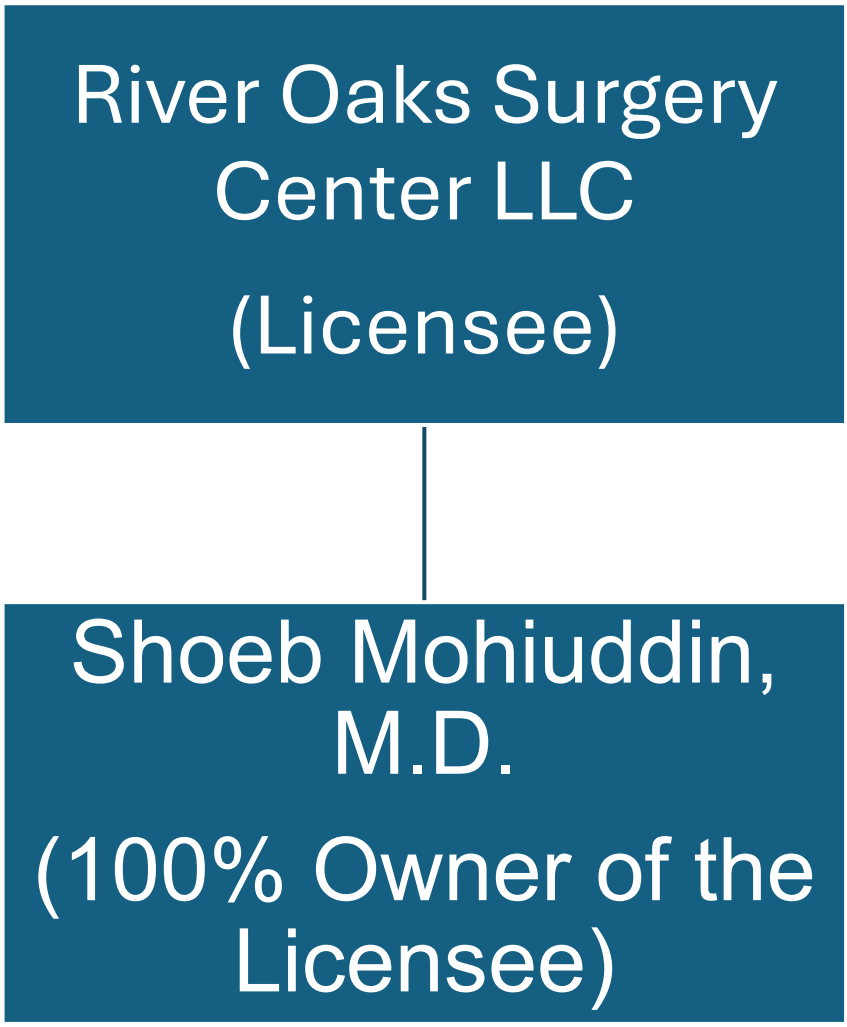
In Testimony Whereof, *I hereto set my hand and cause to be affixed the Great Seal of the State of Illinois, this* 2ND *day of* APRIL ***A.D.*** 2026 .

Authentication #: 2609202344 verifiable until 04/02/2027
Authenticate at: https://www.ilsos.gov

Alexi Giannoulias
SECRETARY OF STATE

ATTACHMENT 4
Organizational Relationships

The facility will be owned by Shoeb Mohiuddin, M.D., as identified in the organizational chart below.



ATTACHMENT 5
Flood Plain Requirements

REGENERATIVE
PAIN & SPINE

2335 W. Fullerton Ave
Suite B
Chicago, IL 60647

March 16, 2026

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

Re: River Oaks Surgery Center LLC - Flood Plain Requirements

Dear Mr. Kniery:

As representative of River Oaks Surgery Center LLC, I, Shoeb Mohiuddin, MD, affirm that our facility complies with Illinois Executive Order #2005-5. The facility location at 7941 S. Western Avenue, Chicago, IL 60620 is not located in a flood plain, as evidence, please find enclosed a map from the Federal Emergency Management Agency ("FEMA").

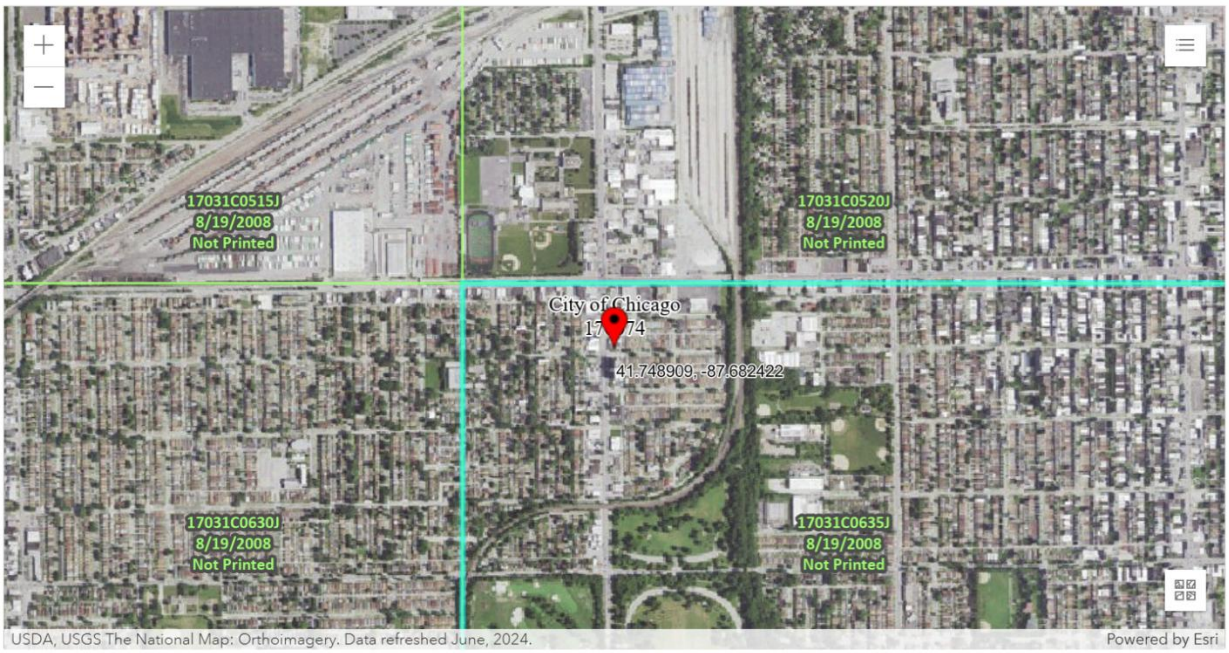
I hereby certify this is true and is based upon my personal knowledge under penalty of perjury and in accordance with 735 ILCS 5/1-109.

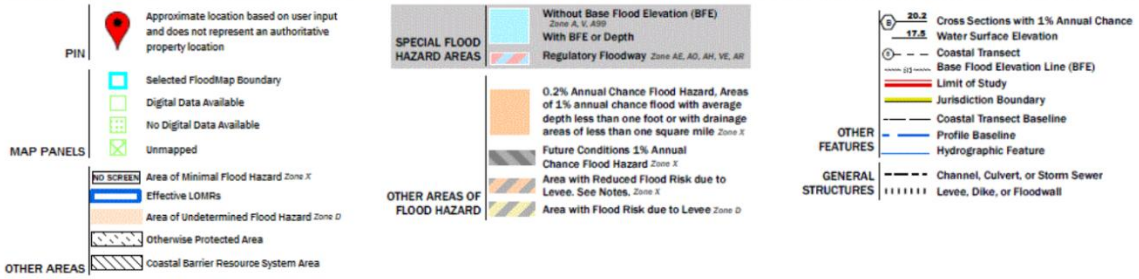
Sincerely,

Shoeb Mohiuddin, MD
Managing Member
River Oaks Surgery Center LLC

SHOEB@RPSPINE.COM 312-300-3418 WWW.RPSPINE.COM

ATTACHMENT 5
Flood Plain Requirements





ATTACHMENT 6
Historic Preservation Act Requirements

The Applicant submitted a request for determination to the Illinois Department of Natural Resources – Preservation Services Division on March 25, 2026. A final determination has not been received. The Applicant through the execution of the certification accompanying this application will not financially commit the project until the letter of clearance has been received.

ATTACHMENT 6
Historic Preservation Act Requirements

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

March 25, 2026

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
SHPO.Review@illinois.gov

Re:Certificate of Need Application for the Establishment of an Ambulatory Surgical Treatment Center – River Oaks Surgery Center, LLC

Dear Jeffrey:

I am writing on behalf of my client, River Oaks Surgery Center, LLC ("River Oaks") 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.). River Oaks is submitting an application for a Certificate of Need from the Illinois Health Facilities and Services Review Board. River Oaks is proposing to establish an Ambulatory Surgical Treatment Center, to be located at 7941 S. Western Ave., Chicago, IL 60620 (the "Project").

The proposed Project will occupy approximately 6,956 square feet in an existing building and will contain a patient waiting room, physician office space, nursing station, examination rooms, mechanical space, and two operating rooms. For your reference, we have included pictures of the topographic maps, areal maps, and existing lot images (Attachments 1-3) showing the general location of the project.

ATTACHMENT 6
Historic Preservation Act Requirements

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,

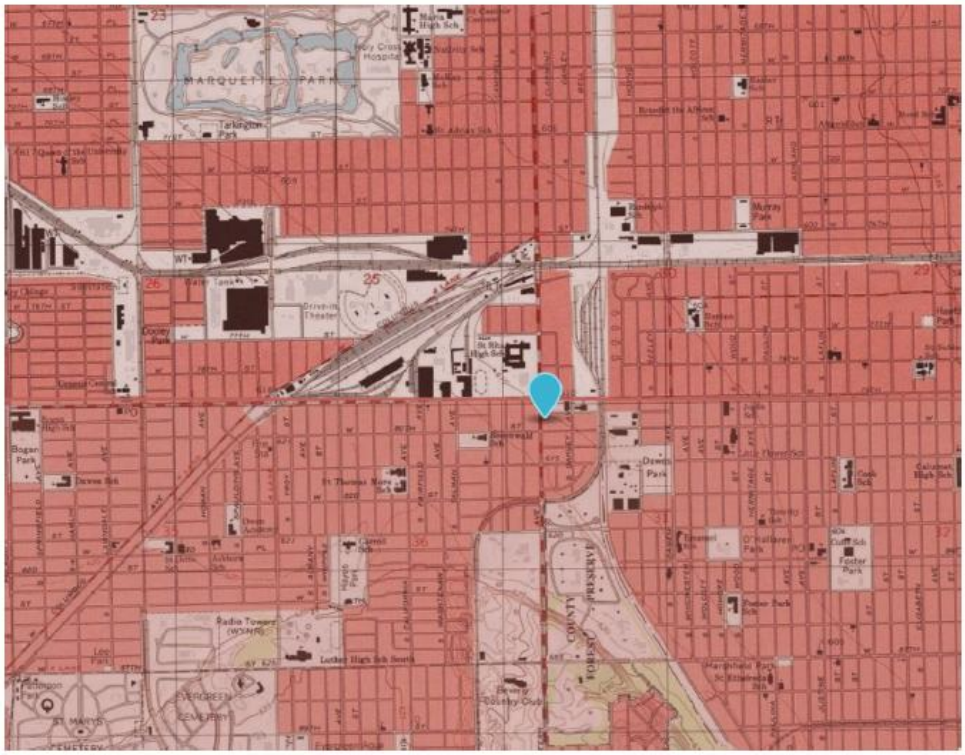
BENESCH, FRIEDLANDER,
COPLAN & ARONOFF LLP

Juan Morado, Jr.

JM:
Enclosures

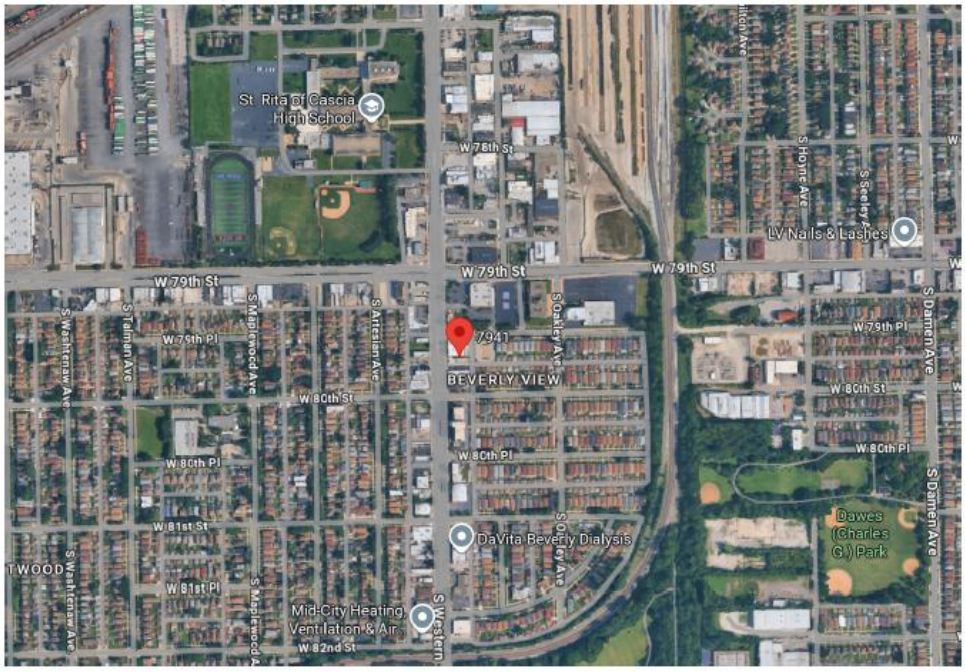
ATTACHMENT 6
Historic Preservation Act Requirements

Topographic Map (7941 S. Western Ave., Chicago, IL 60620)



ATTACHMENT 6
Historic Preservation Act Requirements

3D Aerial Map of 7941 S. Western Ave., Chicago, IL 60620



ATTACHMENT 6
Historic Preservation Act Requirements

Street View of 7941 S. Western Ave., Chicago, IL 60620

ATTACHMENT 7
Project Costs and Sources of Funds

Project Costs and Sources of Funds			
USE OF FUNDS	**CLINICAL**	**NONCLINICAL**	**TOTAL**
Preplanning Costs	$11,917	$4,083	$16,000
Site Survey and Soil Investigation	-	-	-
Site Preparation	-	-	-
Off Site Work	-	-	-
New Construction Contracts	$2,081,078	$712,973	$2,794,051
Modernization Contracts	-	-	-
Contingencies	$125,000	$145,000	$270,695
Architectural/Engineering Fees	$188,296	$64,510	$252,806
Consulting and Other Fees	$90,000	$30,000	$120,000
Movable or Other Equipment (not in construction contracts)	$614,480	$210,520	$825,000
Bond Issuance Expense (project related)	-	-	-
Net Interest Expense During Construction (project related)	$63,310	$21,690	$85,000
Fair Market Value of Leased Space or Equipment	$843,886	$289,114	$1,133,000
Other Costs to Be Capitalized	-	-	-
Acquisition of Building or Other Property (excluding land)	-	-	-
TOTAL USES OF FUNDS	$4,017,968	$1,477889	$5,495,857
SOURCE OF FUNDS	**CLINICAL**	**NONCLINICAL**	**TOTAL**
Cash and Securities	$111,724	$38,276	$150,000
Pledges	-	-	-
Gifts and Bequests	-	-	-
Bond Issues (project related)	-	-	-
Mortgages	$3,062,358	$1,150,499	$4,212,857
Leases (fair market value)	$843,886	$289,114	$1,133,000
Governmental Appropriations	-	-	-
Grants	-	-	-
Other Funds and Sources	-	-	-
TOTAL SOURCES OF FUNDS	$4,017,968	$1,477,889	$5,495,857
NOTE: ITEMIZATION OF EACH LINE ITEM MUST BE PROVIDED AT ATTACHMENT 7, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.			

ATTACHMENT 7
Project Costs and Sources of Funds

Preplanning Costs

Preplanning costs include expenses incurred prior to construction related to initial project development, feasibility analysis, and early-stage planning activities. These costs reflect consulting, administrative coordination, and preliminary design considerations necessary to evaluate and initiate the proposed ASTC project. The clinical costs associated with this line item is $11,917, which is reasonable and consistent with the scope and size of the project.

New Construction Contracts

New construction costs represent the costs for all labor and materials required to build out the clinical and non-clinical space. The clinical costs are $2,081,078 or $401.67 per GSF. These costs are consistent with industry standards for ambulatory surgical facilities and reflect current market conditions for construction in the Chicago metropolitan area.

Contingencies

Contingency costs are included to account for unforeseen conditions or changes during construction, including material cost fluctuations, minor design modifications, or unexpected site conditions. The clinical contingency costs are $125,000 and represent and are reasonable and consistent with a project of this scope and size.

Architectural/Engineering Fees

Architectural and engineering fees include costs associated with the design, planning, and technical development of the facility. These services include preparation of construction drawings, engineering systems design (mechanical, electrical, plumbing), and compliance with applicable building codes and healthcare regulations. The clinical costs associated with this line item is $188,296 and the amount is reasonable and proportionate to the size and complexity of the project.

Consulting and Other Fees

Consulting fees include costs for project management, regulatory consulting, legal support, and other professional services necessary to develop and implement the project. This includes assistance with the Certificate of Need application, permit fees, and compliance with regulatory requirements. The clinical costs for Consulting and Other Fees is $90,000.

Movable or Other Equipment

Movable and other equipment costs include all clinical and non-clinical equipment necessary to support the operation of the proposed two-operating-room ambulatory surgical treatment center. Clinical costs amount to $614,480 and that equipment includes, but is not limited to, surgical tables, anesthesia machines, patient monitoring systems, procedure lighting, imaging support equipment, and specialized instruments required for orthopedic and interventional pain management procedures.

The equipment budget is further supported by the underlying construction scope, which includes significant investment in building systems necessary to operate a modern ambulatory surgical facility. Non-clinical equipment includes administrative systems, information technology infrastructure, furnishings, and other operational equipment necessary to support patient registration, scheduling, medical records management, and overall facility operations.

ATTACHMENT 7
Project Costs and Sources of Funds

Clinical Equipment List

- Surgical Tables (2) – $110,000, High-quality, multi-position surgical tables suitable for orthopedic and interventional procedures.
- Surgical Lights (2 sets) – $60,000, Ceiling-mounted LED surgical lighting systems for each operating room.
- Anesthesia Machines (2) – $140,000, Fully integrated anesthesia workstations with ventilators and monitoring capabilities.
- Patient Monitoring Systems (2) – $50,000, Multi-parameter monitors for intraoperative patient monitoring.
- C-Arm Fluoroscopy Unit (1) – $140,000, Mobile imaging system essential for interventional pain and minimally invasive orthopedic procedures.
- Ultrasound Unit (1) – $35,000, Used for guided injections and regional anesthesia.
- Autoclave / Sterilizer – $25,000, For sterilization of surgical instruments.
- Instrument Washer / Disinfector – $18,000, Supports infection control and sterile processing workflow.
- Stretchers / Gurneys (4) – $20,000, For patient transport between pre-op, OR, and recovery.
- PACU Monitoring Equipment (2 stations) – $10,000, Post-anesthesia care monitoring systems.
- Crash Cart & Emergency Equipment – $8,000, Includes defibrillator and emergency response supplies.
- Orthopedic Instrument Sets – $25,000, Pain Management Procedure Kits & Instruments – $15,000, IV Poles, Mayo Stands, Back Tables, Equipment Stands – $8,480

TOTAL CLINICAL EQUIPMENT: $614,480

Net Interest Expense During Construction

The amount of $85,000 represents interest incurred on borrowed funds during the construction period prior to the facility becoming operational. The estimate is based on the anticipated construction timeline and financing structure and is consistent with standard financial practices.

Fair Market Value of Leased Space or Equipment

This line item reflects the fair market value of leased space and/or equipment utilized for the project. The valuation is based on commercially reasonable lease terms for comparable medical office and surgical space within the Chicago market and ensures compliance with regulatory requirements regarding fair market value. The amount is based on a 10 year lease with a 1.030% annual escalator.

		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Rent		150,000	154,500	159,135	163,909	168,826	173,891	179,108	184,481	190,016	195,716
TI Contribution- Landlord	$0	-	-	-	-	-	-	-	-	-	-
		150,000	154,500	159,135	163,909	168,826	173,891	179,108	184,481	190,016	195,716
		$ 21.56	$ 22.21	$ 22.88	$ 23.56	$ 24.27	$ 25.00	$ 25.75	$ 26.52	$ 27.32	$ 28.14

Net Present Value	$1,132,520
Rounded	1,133,000

ATTACHMENT 8
Project Status and Completion Schedules

The proposed project does not involve construction and no change to the physical layout of the facility as it currently exists. The proposed project completion date is upon approval by the Illinois Department of Public Health of the facility to perform Orthopedic Surgery and Pain Management on or by December 31, 2027.

ATTACHMENT 8
Project Status and Completion Schedules

Proposed ASC Suite - Western Ave.
Chicago, IL

AMB Design Associates

10/28/2025

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	-	-	-	-	-	-	-
Medical Surgical (Surgical Suite)	$4,017,968	-	5,181	5,181	-	-	-
Total Clinical	4,017,968	-	5,181	5,181	-	-	-
	-	-	-	-	-	-	-
NON-REVIEWABLE	-	-	-	-	-	-	-
Administrative	$1,477,889	-	1,775	1,775	-	-	-
Total Non-clinical	$1,477,889	-	1,775	1,775	-	-	-
TOTAL	**$5,495,857**	**-**	**6,965**	**6,956**	**-**	**-**	**-**
APPEND DOCUMENTATION AS ATTACHMENT 9, IN NUMERIC SEQUENTIAL ORDER AFTER THE LAST PAGE OF THE APPLICATION FORM.							

ATTACHMENT 11
Background of the Applicant

The following information is provided to illustrate the qualifications, background and character of the Applicant, and to assure the Health Facilities and Services Review Board that the new ASTC will provide a proper standard of health care services for the community.

River Oaks Surgery Center LLC

1. The proposed project is brought forth by River Oaks Surgery Center LLC. Shoeb Mohiuddin, M.D., is the sole and majority owner of River Oaks Surgery Center LLC. The ownership of facility is reflected in Attachment 4.

2.Dr. Mohiuddin does not have a direct ownership interest in any other health care facility in Illinois. The Applicant certifies that there have been no adverse actions taken during the three (3) years prior to filing of this application. A letter certifying to the above information is included at Attachment 11.

3.We have included a letter authorizing access to the HFSRB and IDPH to verify information contained in the application at Attachment 11.

River Oaks Surgery Center LLC filed its Articles of Organization with the Secretary of State of Illinois on May 5, 2025. River Oaks Surgery Center LLC is located at 7941 S Western Ave. Chicago, IL 60620. The new ASTC will provide Orthopedic Surgery and Pain Management Services in the South Chicago area.

Shoeb Mohiuddin, M.D.

Shoeb Mohiuddin, M.D., will serve as the Medical Director of River Oaks Surgery Center. Dr. Mohiuddin is board-certified in pain management and specializes in minimally invasive, non-surgical solutions designed to reduce pain, restore function, and enhance patients' overall quality of life.

Dr. Mohiuddin's practice philosophy centers on delivering attentive, evidence-based care in a supportive and professional environment. He integrates cutting-edge regenerative therapies, image-guided procedures, and a collaborative, multidisciplinary approach to create individualized treatment plans for each patient. With over a decade of experience in anesthesiology and interventional pain management, Dr. Mohiuddin is recognized for his commitment to advancing patient-centered pain care.

Currently, Dr. Mohiuddin serves as Chief Medical Officer of Regenerative Pain and Spine, with locations in Bucktown, South Holland, and Chicago's South Side. He leads and collaborates closely with a team of Physician Assistants to provide advanced non-surgical pain management and regenerative therapies to patients throughout the Chicago area.

Between April 2024 and April 2025, Dr. Mohiuddin provided care at 13 different ambulatory surgery centers across the Chicagoland area. The establishment of River Oaks Surgery Center will allow for a more centralized, efficient, and coordinated approach to care delivery, enhancing continuity, accessibility, and the overall patient experience under Dr. Mohiuddin's leadership.

ATTACHMENT 11
Background of the Applicant

REGENERATIVE
PAIN & SPINE

2335 W. Fullerton Ave
Suite B
Chicago, IL 60647

March 16, 2026

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

Re: River Oaks Surgery Center LLC - Certification and Authorization

Dear Mr. Kniery:

As a representative of River Oaks Surgery Center LLC, I, Shoeb Mohiuddin, MD, 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 River Oaks Surgery Center LLC, has no ownership interest in any other healthcare facility.

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,

Shoeb Mohiuddin, M.D.
Managing Member
River Oaks Surgery Center LLC

SHOEB@RPSPINE.COM 312-300-3418 WWW.RPSPINE.COM

ATTACHMENT 12
Purpose of the Project

The Applicant seeks approval from the Health Facilities and Services Review Board to establish River Oaks Surgery Center LLC, an Ambulatory Surgical Treatment Center ("ASTC") at 7941 S. Western Ave., Chicago, IL 60620 and provide Orthopedic Surgery and Pain Management Services. The market area is consistent with the Board-defined geographic service area which is 10-mile radius from the existing facility. More generally, the patient base resides in Cook County.

The ASTC will offer new pathways to the highest-quality orthopedic and pain management services available, providing services to patients who would otherwise not have access to outpatient surgical procedures. Some of the licensed ASTC's in the geographic service area are either operating at or near target utilization, some do not offer the same services proposed here, and yet others are affiliated with hospitals and service its own patients. Though there is some available capacity for surgical services in the geographic service area, the proposed facility will not increase maldistribution and will have no quantifiable effect on other health care facilities in the GSA.

Data for outpatient procedures by patient origination zip code indicates the 2 operating room ASTC unit is set to operate at over 80% capacity utilization in year 1 of operations. This projected utilization of these 2 operating rooms meets the state's target utilization standards for an optimal and sustainable operating level for inpatient behavioral health services.

No nearby facility involves the comprehensive and minimally-invasive approach proposed here. These procedures involve smaller incisions and specialized instruments. Minimally invasive surgery has been shown to reduce postoperative pain, shorten recovery time, and mitigate the risk of post-surgical infection.

Additionally, these techniques often allow patients to return to their regular activities more quickly, which is particularly beneficial in an outpatient setting. Advancements in anesthesia techniques have made outpatient general surgery and podiatric surgery safer and more comfortable for patients. Regional anesthesia, such as peripheral nerve blocks and epidurals, allows for pain control without the need for general anesthesia. This reduces the risk of complications associated with general anesthesia and accelerates the patient's postoperative recovery.

Performing surgical procedures in an outpatient setting is generally more cost-effective than hospital-based surgery. Patients incur fewer expenses for overnight stays, and healthcare systems benefit from reduced overhead costs. Generally, ambulatory surgery center care and outpatient podiatric surgery result in significant cost savings compared to inpatient procedures, making it a more financially sustainable option for healthcare organizations.

Outpatient settings are also typically associated with lower rates of hospital-acquired infections. Patients undergoing surgery in a hospital may be at higher risk due to exposure to various pathogens, longer hospital stays, and more frequent contact with healthcare providers. The faster recovery time associated with outpatient podiatric surgery is a significant benefit for patients.

Reports from the National Center for Health Statistics clearly demonstrate a growing and unmet demand for orthopedic and pain management across the nation and in metropolitan areas such as Cook County. In 2023, approximately 24.3% of U.S. adults experienced chronic pain and 8.5% experienced high-impact chronic pain, representing the highest levels recorded and affecting an estimated 60 million adults nationwide. Chronic pain prevalence increases with age and is common among individuals with musculoskeletal conditions, functional limitations, and prior injuries. These characteristics are well represented within the proposed service area and underscore the need for accessible outpatient facilities that can deliver timely orthopedic and pain management services close to where patients live.

ATTACHMENT 12
Purpose of the Project

Post-pandemic trends further accentuate this need. Longitudinal national studies show that chronic and high-impact pain rose sharply between 2019 and 2023, reflecting not only demographic aging but also delayed access to care and disruptions in routine surgical and procedural services. While long COVID accounts for a portion of this increase, researchers emphasize that deferred treatment of orthopedic and musculoskeletal conditions contributed meaningfully to disease progression and functional decline. An expanded outpatient surgical presence such as the proposed River Oaks Surgery Center is well positioned to address these gaps by enabling earlier intervention, reducing reliance on hospital-based care, and helping prevent the transition from acute to chronic pain.

The outpatient setting is particularly well suited to meet this evolving demand. Evidence consistently shows that ambulatory surgical treatment centers provide high-quality orthopedic and pain procedures in a cost-effective and efficient manner, with faster recovery times for patients. When procedures are performed earlier and in appropriate outpatient environments, patients experience fewer delays, reduced exposure to hospital-acquired conditions, and quicker returns to daily activities. By offering orthopedic surgery and pain management services within the community, River Oaks Surgery Center will expand access without contributing to maldistribution or unnecessary duplication of services.

Clinical guidelines and specialty literature further support this care model. The American Society of Anesthesiologists and related professional organizations emphasize that effective pain management should be multimodal, individualized, and focused on functional improvement. These approaches incorporate regional anesthesia, non-opioid pharmacologic therapies, and targeted interventional procedures when appropriate. Studies of ambulatory surgery centers also demonstrate that inadequate postoperative pain control is a primary cause of delayed discharge and unplanned hospital admissions, particularly among patients with preexisting chronic pain. Facilities designed around comprehensive and individualized care strategies are therefore better equipped to achieve optimal outpatient outcomes.

The innovations and benefits of orthopedic and pain management surgical procedures in an outpatient setting represent a significant advancement in healthcare. Minimally invasive techniques, advanced imaging technology, improved anesthesia methods, cost-effectiveness, reduced hospital-acquired infections, faster recovery, enhanced patient satisfaction, and optimized resource utilization have collectively revolutionized the field of podiatry and general surgery. These developments have not only improved the outcomes and experiences of patients but have also offered cost savings and resource efficiency for healthcare systems.

In summary, the proposed River Oaks Surgery Center responds directly to documented increases in orthopedic and pain-related conditions, aligns with nationally recognized clinical guidelines, and fills a clear gap in outpatient access within the geographic service area. By combining minimally invasive surgical techniques, evidence-based pain management, and an efficient ambulatory care model, the project will enhance patient outcomes, improve access to care, and support broader public health goals. Approval of this application will allow River Oaks Surgery Center to meaningfully contribute to the health care infrastructure of Cook County without adversely impacting existing providers.

ATTACHMENT 12
Purpose of the Project

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Review

Pain Management in Ambulatory Surgery—A Review

Jan G. Jakobsson

Department of Anaesthesia & Intensive Care, Institution for Clinical Science, Karolinska Institutet, Danderyds Hospital, 182 88 Stockholm, Sweden; Mail: jan.jakobsson@ki.se

Received: 18 April 2014; in revised form: 27 June 2014 / Accepted: 9 July 2014 / Published: 24 July 2014

Abstract: Day surgery, coming to and leaving the hospital on the same day as surgery as well as ambulatory surgery, leaving hospital within twenty-three hours is increasingly being adopted. There are several potential benefits associated with the avoidance of in-hospital care. Early discharge demands a rapid recovery and low incidence and intensity of surgery and anaesthesia related side-effects; such as pain, nausea and fatigue. Patients must be fit enough and symptom intensity so low that self-care is feasible in order to secure quality of care. Preventive multi-modal analgesia has become the gold standard. Administering paracetamol, NSIADs prior to start of surgery and decreasing the noxious influx by the use of local anaesthetics by peripheral block or infiltration in surgical field prior to incision and at wound closure in combination with intra-operative fast acting opioid analgesics, e.g., remifentanil, have become standard of care. Single preoperative 0.1 mg/kg dose dexamethasone has a combined action, anti-emetic and provides enhanced analgesia. Additional α-2-agonists and/or gabapentin or pregabalin may be used in addition to facilitate the pain management if patients are at risk for more pronounced pain. Paracetamol, NSAIDs and rescue oral opioid is the basic concept for self-care during the first 3–5 days after common day/ambulatory surgical procedures.

Keywords: ambulatory surgery; analgesia; multi-modal analgesia; balanced analgesia; postoperative pain

1. Introduction

Day or ambulatory surgery; coming and leaving the hospital the same day or within 23-hours after surgery is becoming increasingly adopted. There are several potential benefits associated with the avoidance of in-hospital care. The risk for hospital acquired infections and the potential negative

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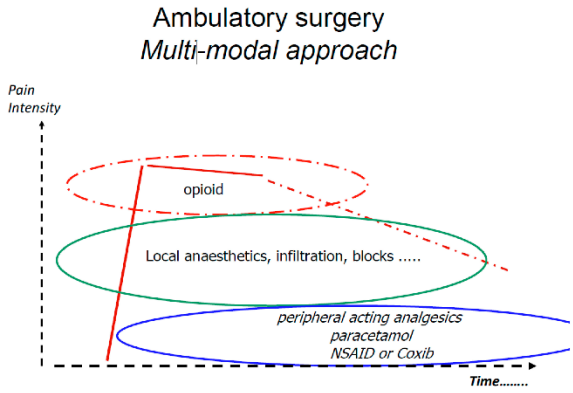
Purpose of the Project

effects of increased immobilization and subsequent risk for thrombo-embolic and anenergetic sequalae are also lowered. Enhanced recovery and shortened hospital stay has also been shown to reduce the risk for cognitive side effects.

Early discharge demands a rapid recovery and low incidence and intensity of surgery and anaesthesia related side-effects; such as pain, nausea and fatigue. Patients must be fit enough and symptom intensity so low that self-care is a feasible in order to secure quality of care. Multi-modal or balanced analgesia [1] has become increasingly adopted as a opioid sparing pain management strategy. The multimodal approach was introduced to ambulatory surgery in the mid 1990ties more or less at the same time by the group in Helsinki (Finland) lead by Professor Kari Korrtila [2] and group in Toronto (Canada) under the lead of Professor Francis Chung [3]. In consists of combining analgesics with different mode of action and side-effect profile in order to achieve additive or preferentially synergistic analgesic effect but with a minimum of side effects, reducing the need for opioid analgesics and opioid related side effects. The basic concept includes analgesics such as paracetamol, NSAID/Coxibs and local anaesthetics (Figure 1), but there are numerous drug combinations, routes of administration and timing for administration that have been tested. The analgesic effects assessed as the number need to treat has been extensively analysed by the Bandolier team and is presented at their home page [4]. This paper aim at review the evidence-base for the concept of multi-modal analgesia for pain management following ambulatory surgery/anaesthesia.

Figure 1. The basic principle for preventive multi-modal analgesia.



2. Paracetamol

Paracetamol is one of most commonly used analgesics and antipyretics. Graham *et al.* [5] addressed the pharmacology. Paracetamol is, on average, a weaker analgesic than NSAIDs or COX-2 selective inhibitors but is often preferred because of its better tolerance. Despite the similarities to NSAIDs, the mode of action of paracetamol has been uncertain, but it is now generally accepted that it inhibits COX-1 and COX-2 through metabolism by the peroxidase function of these isoenzymes. Paracetamol, NSAIDs and selective COX-2 inhibitors all have central and peripheral effects. As is the case with the NSAIDs, including the selective COX-2 inhibitors, the analgesic effects of paracetamol are reduced by inhibitors of many endogenous neurotransmitter systems including serotonergic, opioid and cannabinoid

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systems. There is considerable debate about the hepatotoxicity of therapeutic doses of paracetamol. Much of the toxicity may result from overuse of combinations of paracetamol with opioids which are widely used, particularly in USA. It is available as over-the-counter medication in many countries. It is known to be associated with negative health effects when used in higher doses and or for prolonged time [6]. Recently FDA recommended dose limitation in drug combinations to 325 mg paracetamol [7]. There are today several different formulations of paracetamol. The dose effect for standard oral administration was shown by Qi *et al.* [8]. They found 1,000 mg paracetamol to provide clinically meaningful and statistically significantly greater efficacy in treating postsurgical dental pain compared with paracetamol 650 mg and placebo. Yue *et al.* [9] sought to investigate the dose-response efficacy and speed of onset of pain relief of a fast-dissolving paracetamol formulation compared with lower doses of paracetamol and placebo in dental patients after impacted third molar extraction. They found onset of first perceptible relief in subjects treated with FD-APAP 1,000 mg was 15 min, which was 32% and 25% significantly shorter than onset of pain relief of fast-dissolving paracetamol formulation 500 mg (22 min) and standard paracetamol 650 mg (20 min), respectively. Fast-dissolving paracetamol formulation 500 mg and the standard paracetamol 650 mg demonstrated efficacy over placebo for most of the measurements; however, their effects were significantly lower and lasted for a shorter period of time than for fast-dissolving paracetamol formulation 1,000 mg.

Holmer-Petterson *et al.* [10] have shown that immediate post-operative oral administration of paracetamol as part of multimodal pain management resulted in a huge and unpredictable variation in plasma concentration compared with intravenous administration. Brett *et al.* [11] found that only a minority of patients receiving the 1.0 g oral dose preoperatively had plasma levels in the therapeutic analgesic range. McNicol *et al.* [12] have made a meta-analysis around the effects of intravenous paracetamol. They found that patients receiving propacetamol or paracetamol required 30% less opioid over 4 h and 16% less opioid over 6 h than those receiving placebo. However, this did not translate into a reduction in opioid-induced adverse events (AEs). Apfel *et al.* [13] determined the effect IV paracetamol has on patient satisfaction, a pooled analysis from methodologically homogenous studies. The primary endpoint was "excellent" satisfaction and the secondary endpoint was "good" or "excellent" satisfaction at 24 h after first study drug administration. Patients receiving IV paracetamol were more than twice as likely as those who received placebo to report "excellent" patient satisfaction ratings (32.3% *vs.* 15.9%, respectively). Of all variables that remained statistically significant in the multivariable analysis (*i.e.*, type of surgery, duration of anaesthesia, last pain rating, and opioid consumption), IV paracetamol had the strongest positive effect on "excellent" patient satisfaction with an odds ratio of 2.76 (95% CI 1.81–4.23). Results for "excellent" or "good" satisfaction were similar. When given as part of a perioperative analgesic regimen, IV paracetamol was associated with significantly improved patient satisfaction. Bailey *et al.* [14] conducted a meta-analysis around ibuprofen and/or paracetamol (acetaminophen) for pain relief after surgical removal of lower wisdom teeth. They found in a total of 2,241 participants were enrolled in these trials. Ibuprofen was found to be a superior analgesic to paracetamol at several doses with high quality evidence suggesting that ibuprofen 400 mg is superior to 1,000 mg paracetamol based on pain relief (estimated from TOTPAR data) and the use of rescue medication meta-analyses. They concluded that ibuprofen is superior to paracetamol at doses of 200 mg to 512 mg and 600 mg to 1,000 mg respectively based on pain relief and use of rescue medication data collected at six hours postoperatively. The majority of this evidence

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(five out of six trials) compared ibuprofen 400 mg with paracetamol 1,000 mg, these are the most frequently prescribed doses in clinical practice.

3. NSAIDS and Coxibs

The Coxibs have become an interesting option in postoperative pain management. The less pronounced effect on platelet function and subsequent lower risk for impaired hemeostasis makes them, in theory, a preferred option to the non-selective traditional NSAIDs. The benefit *versus* risk for a more generalized use of Coxibs must, however, be based on a thorough evaluation of the overall benefits and risks for the use of NSAIDs and a further evaluation on whether the specific therapeutic features of the Coxibs provide benefits outweighing their increased cost [15].

Kawano *et al.* [16] investigated the effects of postoperative analgesia with ketoprofen on cognitive functions in aged animals and compared its effectiveness to morphine. Rats were randomly allocated to one of four groups: isoflurane anesthesia without surgery (group C), isoflurane anesthesia with laparotomy (group IL), and isoflurane anesthesia with laparotomy plus postoperative analgesia with ketoprofen or morphine. There was no difference in postoperative locomotor activity among groups. In group IL, postoperative pain levels assessed by the Rat Grimace Scale significantly increased until 8 h after surgery, which was similarly inhibited by both ketoprofen and morphine. Cognitive function was assessed using radial arm maze testing for 12 consecutive days from postoperative day 3. Cai *et al.* [17] conducted a study in rabbits, and found that a 7-day regimen of appropriate doses of diclofenac sodium and parecoxib did not adversely affect osseointegration of dental implants and bone healing in calvaria, neither short nor long term (12 weeks). The meta-analysis by Clarke *et al.* [18] published in 2012 around Single dose oral etoricoxib for acute postoperative pain in adults showed that at least 50% pain relief was reported by 66% with etoricoxib 120 mg and 12% with placebo (NNT 1.8 (1.7 to 2.0)). For dental studies only the NNT was 1.6 (1.5 to 1.8). Although the new study almost doubled the number of participants in included studies it added only about 25% more data for the 120 mg dose and the result was unchanged. Other doses (60, 90, 180, and 240 mg) were each studied in only one treatment arm and we did not undertake pooled analysis. Significantly fewer participants used rescue medication over 24 h when taking etoricoxib 120 mg than placebo (NNT to prevent remedication 2.2 (1.9 to 2.8)), and the median time to use of rescue medication was 20 h for etoricoxib and two hours for placebo. Adverse events were reported at a similar rate to placebo, with no serious events.

The potential negative effects, risk for myocardial infarct, thromboembolic and cardiovascular events associated to the long-term use of NSAIDs and Coxibs most of course be considered [19]. The risk *vs.* benefit during short term postoperative use seems reasonably positive. Whether the more selective COX-II-inhibitors provide clinically important benefits, reduced effect of platelet and lower risk for GI-irritation is still a matter of discussion [20].

4. Combination NSAID and Paracetamol

There is an increasing amount of data supporting the combination of paracetamol and an NSAID. There is a recent meta analysis by Derry *et al.* [21] showing that ibuprofen plus paracetamol combinations provided better analgesia than either drug alone (at the same dose), with a smaller

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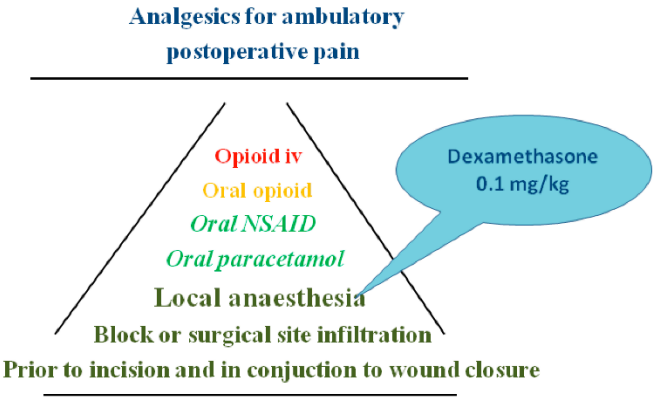
chance of needing additional analgesia over about eight hours, and with a smaller chance of experiencing an adverse event.

5. Local Anaesthesia

Local anaesthesia has been used in conjunction to ambulatory surgery since long and was part of the initial successful studies by the Helsinki and Chung groups. It may be administered at the surgical site or as nerve block. Local anaesthesia provided prior to start of surgery is a most fundamental part of the multi-modal analgesia strategy see Figure 2.

Figure 2. Multi-modal analgesia; the basic and escalating addition of drugs.



Ultrasound guided nerve blocks have become increasingly adopted in many centres and provide without doubt effect analgesia during the duration of the block and may be used also for intraoperative anaesthesia with or without sedation [22,23]. It may replace the need for general anaesthesia. So called walking spinal [24], infraclavicular block for low arm surgery [25] or the paravertable blocks for breast surgery are just some examples.

Liu *et al.* [26] conducted a meta-analysis published in 2005. Only major conduction blocks were considered to be regional anaesthesia. Regional anaesthesia was further separated into central neuraxial block and peripheral nerve block. Fifteen (1,003 patients) and seven (359 patients) trials for central neuraxial block and peripheral nerve block were included in the meta-analysis. Both central neuraxial block and peripheral nerve block were associated with increased induction time, reduced pain scores, and decreased need for postanaesthesia care unit analgesics. However, central neuraxial block was not associated with decreased postanaesthesia care unit bypass or time or reduced nausea despite reduced analgesics, and it was associated with a 35-min increase in total ambulatory surgery unit time. In contrast, peripheral nerve block was associated with decreased postanesthesia care unit need and decreased nausea but, again, not with decreased ambulatory surgery unit time. This meta-analysis indicates potential advantages for regional anaesthesia, such as decreased postanaesthesia care unit use, nausea, and postoperative pain. Although these factors have been proposed to reduce ambulatory surgery unit stay, neither central neuraxial block nor peripheral nerve block were associated with reduced ambulatory surgery unit time.

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There are two more recent meta-analysis with a focus on the effects of paravertable block. Tahiri *et al.* [27] reviewed available studies comparing thoracic paravertebral block (TPVB) to general anaesthesia (GA) for ambulatory breast surgery. They found that was used instead of GA, pain scores were significantly decreased at 1 and 6 h postoperatively (mean difference of 2.48 (95%confidence interval (CI): 2.20–2.75) and 1.71 (95%CI: 1.64–1.78), respectively). Furthermore, postoperative analgesic consumption was significantly lower in patients who received TPVB compared with GA (relative risk (RR) 0.23, (95%CI: 0.15–0.37)). TPVB was also associated with significantly less postoperative nausea and vomiting (RR 0.27 (95%CI: 0.12–0.61)). Increased patient satisfaction and a shorter hospital stay also favoured TPVB over GA. Similar result was found in reviews by Thavaneswaran *et al.* [28] and Schnabel *et al.* [29].

There is a recent meta-analysis by De Oliviera *et al.* [30] around the effects of Transversus Abdominal Plane (TAP) blocks on pain course following laparoscopic surgery. It shows a significant effect of TAP block in the reduction of postoperative pain outcomes for laparoscopic surgical procedures. TAP block reduced early pain at rest, late pain at rest, and postoperative opioid consumption.

It seems reasonable to conclud that nerve blocks do provide effective analgesia and reduced need for rescue analgesia during the duration of its effect. Several adjuncts have been suggested in order to prolonged single block technique. Choi *et al.* [31] conducted a meta-analysis showing beneficial prolongation for dexamethasone. Dexamethasone prolonged the analgesic duration for long-acting local anaesthetic from 730 to 1306 min [mean difference 576 min, 95% confidence interval (CI) 522–631] and for intermediate from 168 to 343 min (mean 175, 95% CI 73–277). Motor block was prolonged from 664 to 1102 min (mean 438, 95% CI 89–787). The most recent trial demonstrated equivalent prolongation with perineural or systemic administration of dexamethasone compared with placebo.

Abdallah *et al.* [32] reviewed current public domain literature on the effects of local anaesthesia supplementation with dexmedetomidine for peripheral block. They found that dexmedetomidine is a potential LA adjuvant that can exhibit a facilitatory effect when administered intrathecally as part of spinal anaesthesia or peripherally as part of a brachial plexus block.

There is an increasing interest in ultra-sound guided blocks. The possibility to objectively view the needle placement is an interesting option. Schnabel *et al.* [33] published in the October 2013 issue of *BJA* and meta-analysis that show that there is evidence that ultra sound guided peripheral nerve catheters show a higher success rate and a lower risk for an accidental vascular puncture compared with nerve stimulated guidance. However, this difference resulted only in marginally lower postoperative pain scores at rest.

Lidocaine may have effects beyond the classical nerve blocking. It has been shown that systemic lidocaine posses clinical effects, reducing pain and discomfort. McCarthy *et al.* [34] conducted in 2010 a meta-analysis. They concluded that intravenous lidocaine infusion in the perioperative period is safe and has clear advantages in patients undergoing abdominal surgery. Patients receiving lidocaine infusion had lower pain scores, reduced postoperative analgesic requirements and decreased intraoperative anaesthetic requirements, as well as faster return of bowel function and decreased length of hospital stay.

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6. Adjuncts Facilitating the Analgesic Effects

6.1. Dexamethasone

Single intra venous 0.1 mg per kilogram preoperative dose of dexamethasone has been shown to have combined anti-emetic and enhance analgesia [35]. De Olivera *et al.* [36] concluded from a meta-analysis published in 2011 that dexamethasone at doses more than 0.1 mg/kg is an effective adjunct in multimodal strategies to reduce postoperative pain and opioid consumption after surgery. The preoperative administration of the drug produces less variation of effects on pain outcomes. Halderon *et al.* [37] conducted a meta-analysis published in *BJA* in 2013. It concluded that a single i.v. perioperative dose of dexamethasone had small but statistically significant analgesic benefits. Forty-five studies involving 5,796 patients receiving dexamethasone 1.25–20 mg were included. Patients receiving dexamethasone had lower pain scores at 2 h {mean difference (MD) −0.49 [95% confidence interval (CI): −0.83, −0.15]} and 24 h [MD −0.48 (95% CI: −0.62, −0.35)] after surgery. Dexamethasone-treated patients used less opioids at 2 h [MD −0.87 mg morphine equivalents (95% CI: −1.40 to −0.33)] and 24 h [MD −2.33 mg morphine equivalents (95% CI: −4.39, −0.26)], required less rescue analgesia for intolerable pain [relative risk 0.80 (95% CI: 0.69, 0.93)], had longer time to first dose of analgesic [MD 12.06 min (95% CI: 0.80, 23.32)], and shorter stays in the post-anaesthesia care unit [MD −5.32 min (95% CI: −10.49 to −0.15)]. There was no dose-response with regard to the opioid-sparing effect. There was no increase in infection or delayed wound healing with dexamethasone, but blood glucose levels were higher at 24 h [MD 0.39 mmol L^{-1} (95% CI: 0.04, 0.74)]. Higher dose, 0.2 mg may however increase the risk for postoperative cognitive dysfunction as suggested in a study by Fang *et al.* [38].

6.2. Alfa-2-agonists

Clonidine and Dexmedetomidine

Both clonidine and dexmedetomidine has been studied as adjutants to paediatric general anaesthesia in order to reduce and ameliorate emergence agitation. A meta-analysis by Dahmani *et al.* [39] from 2010 showed that premedication with clonidine is superior to midazolam in producing sedation, decreasing post-operative pain and emergence agitation. However, the superiority of clonidine for PONV prevention remains unclear while other factors such as nausea prevention might interfere with this result. Bharti *et al.* [40] found in a recent study that clonidine 3 μg kg^{-1} provided effective postoperative analgesia and reduced morphine requirement when administered intravenously or in wound infiltration with bupivacaine. However, the incidence of complications was less with wound infiltration. Patients receiving i.v. clonidine had more hypotension ($p < 0.01$) and sedation ($p < 0.001$) compared with other groups.

He *et al.* [41] found in a systematic review that intraoperative use of dexmedetomidine was as effective as opioids in preventing postoperative pain and emergence agitation in children who had undergone tonsillectomy and adenoidectomy.

Dexmedetomidine has been studies not only as an adjunct to nerve block but as an alternative to propofol for sedation. Na *et al.* [42] studied outpatients undergoing cataract surgery. Dexmedetomidine

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was administered in group D at 0.6 μg/kg/h, and propofol and alfentanil was infused concomitantly in group P at a rate of 2 mg/kg/h and 20 μg/kg/h respectively. Sedation was titrated at Ramsay sedation score 3. They found postoperative that patients self-rating of satisfaction with sedation was 50.3 (6.2) in group D and 42.7 (8.7) in group P, which was statistically significant ($p < 0.001$). Systolic blood pressure was significantly lower in group D compared with group P from the beginning of the operation. HR, RR, and SpO(2) were comparable between the two groups. There were 8 cases (25.8%) of hypertension in group P, and 1 case (3.2%) in group D ($p < 0.05$). In contrast, 1 case (3.2%) of hypotension and 1 case (3.2%) of bradycardia occurred in group D. Whether the favourable effects seen from the use of dexmedetomidine as a complement to anaesthesia for cardiac surgery can be translated into day surgery for the elderly needs much further studies. Ji *et al.* [43] recently showed that perioperative dexmedetomidine use was associated with a decrease in postoperative mortality up to 1 year and decreased incidence of postoperative complications and delirium in patients undergoing cardiac surgery. The potential clinical impact of the decrease in systemic inflammatory response associated to dexmedetomidine administered during cholecystectomy needs also further studies. Kang *et al.* [44] found showed that patients that received following induction of anaesthesia a loading dose of dexmedetomidine (1.0 μg/kg), followed by infusion of dexmedetomidine at 0.5 μg/kg/h had significantly less inflammatory response following surgery as compared to saline-treated controls.

There is a meta-analysis evaluating the addition of α-2-agonists on postopetive pain not explicitly following day surgery by Blaudszun *et al.* [45]. This review concluded that perioperative systemic α-2-agonists decrease postoperative opioid consumption, pain intensity, and nausea. Recovery times are not prolonged. Common adverse effects are bradycardia and arterial hypotension. The impact of these agents on chronic pain or hyperalgesia remains unclear because valid data are lacking.

6.3. Ketamine

Tawfic [46] made a review around ketamine and summarised that it has gained interest in patients with opioid tolerance, acute hyperalgesia, and neuropathic pain. It also has a role in the management of chronic pain including both cancer and noncancer pain. Its role in multi-modal analgesia following ambulatory surgery is however seemingly minor. Elia and Tramer [47] conducted a meta-analysis in 2005 and concluded that despite many published randomised trials, the role of ketamine, as a component of perioperative analgesia, remains unclear.

6.4. Gabapentin and Pregabalin

Peng *et al.* [48] did not find any benefit from the addition of 50 or 75 mg pregabalin as supplementary part of multi-modal pain management following cholecystectomy. On the day of surgery, patients received standard premedications as per our institution protocol: naprosyn 500 mg and acetaminophen 1,000 mg 1 h before surgery in the preadmission unit. Patients received standardized general anaesthesia. Induction of general anaesthesia was achieved with i.v. propofol 1–2 mg/kg and fentanyl 2–5 mg/kg. The surgeon administered local anaesthetic (bupivacaine 0.25% with epinephrine 1 in 200,000 to a volume of 30 mL) around the gall bladder bed and the laparoscopy port sites (10 mL of the same solution). Patients took their pregabalin medication or oral placebo 12 and 24 h after the first dose regardless of the level of pain they were experiencing. Patients who experienced insufficient pain

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relief were allowed to take supplementary combination tablets of acetaminophen 325 mg and codeine 30 mg 1–2 tablets orally every 4–6 h as needed (maximum of 12 tablets per day). Thus all patients followed the classic multi-modal pain strategy. Pegabalin in a dose of 150 mg administered preoperatively and further twice daily has been shown to have beneficial effects on pain following cholecystectomy. Balaban *et al.* [49] found 150 and 300 mg single dose Pregabalin administered prior to surgery to decrease pain scores and postoperative fentanyl consumption in patients after laparoscopic cholecystectomy in a dose-dependent manner, without any differences between the groups in side effects. Bekawi *et al.* [50] studied 150 mg pregabalin capsules administered two hours preoperative, 12 h postoperative and twice daily for 2 days. They found that the 24 hour-pethidine consumption was significantly lower ($p < 0.001$) in Pregabalin *versus* control. Pregabalin was also associated to significantly less ($p < 0.001$) patients with postoperative nausea, vomiting, sedation and dizziness *versus* control. Overall patient satisfaction with pain management was significantly higher ($p < 0.001$) in the pregabalin group. Sarakatsianou *et al.* [51] found likewise a reduced pain score, morphine consumption but a higher incidence of dizziness associated to a 300 mg dose provided the night before surgery and 1 h preoperatively. Yu *et al.* [52] showed in a meta-analysis that gabapentin as well as pregabalib were significantly more effective than place for the management of pain after spine surgery.

There is rather sparse data around the use, benefits from gabapentin as part of the pain management after ambulatory surgery. Kazak *et al.* [53] found beneficial effects from the addition of gabapentin 600 mg in conjunction with monitored anaesthesia care for nose surgery. Sen *et al.* [54] found a single-dose 1.2 g oral gabapentin 1 h before surgery to decreases the intensity of acute postoperative pain, tramadol consumption and the incidence and intensity of pain in the first 6 months after inguinal herniorrhaphy.

Duari *et al.* [55] conducted a meta-analysis of studies evaluating the effects of pregabalin and gabapentin. They concluded that gabapentin and pregabalin reduce pain and opioid consumption after surgery in confront with placebo, but comparisons with other standard post-operative regimens are not sufficient. Gabapentin and pregabalin seem not to have any influence on the prevention of PONV.

6.5. More Experimental

There are also other drugs, substances, that have been studied showing potential positive effects. Magnesium sulphate ($MgSO_4$ 50 mg/kg in 100 mL of normal saline over 15 min before anesthesia induction, followed by an infusion of 15 mg/kg/h) has been shown by De Oliveiera *et al.* [56] to have positive effects. The authors concluded that systemic magnesium improves postoperative quality of recovery in patients undergoing outpatient segmental mastectomy. Systemic magnesium is a safe, inexpensive, efficacious strategy to improve quality of recovery after ambulatory surgery. Nitroglycerine ointment has been shown to have positive effects reducing pain after hemorroidectomy [57].

7. Discussion

The concept of multi-modal analgesia was shown effective for cholecystectomi already in 1996 by the Chung group in Toronto [3]. Patients were randomized to a treatment (n = 24) or control (n = 25) group and studied using a prospective, double-blind design. Preoperatively, at 45 min before induction

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of anesthesia, the treatment group received an intramuscular (IM) bolus injection of meperidine 0.6 mg/kg and ketorolac 0.5 mg/kg. The control group received two bolus IM injections of placebo (normal saline). Ten minutes before incision, local anesthesia (treatment group) or saline (control group) was infiltrated into the skin of each patient. Anesthetic management, postoperative pain, and nausea treatment were standardized. Pain and nausea assessment were done 1 h preoperatively, 0, 0.5, 1, 2, 3, and 4 h postoperatively, at discharge, and 10, 24, and 48 h postoperatively. Postoperatively, significantly more patients in the treatment group were without pain on arrival in the postanaesthesia care unit (PACU), 12/21 (57.1%) *vs.* 1/24 (4.2%) in the control group ($p < 0.001$). Similarly, the severity of pain was six-fold less in the treatment group than in the control group. The incidence of nausea in the PACU was significantly less in the treatment group; 4.7% *vs.* 29.5% in the control group ($p < 0.05$). Patients from the treatment group satisfied Postanaesthesia Discharge Score significantly earlier than those in the control group (281 +/− 12 min *vs.* 375 +/− 19 min; $p < 005$). They concluded that concomitant use of local anaesthetic, NSAID and opioid drugs proved to be highly effective in our patients, resulting in faster recovery and discharge. One of the goals is to reduce opioid related side effects and subsequently facilitate adequate pain relief but with a minimum of side effects. Zhao *et al.* [58] from the Chung group showed that the additional need for any morphine dose caused patient distress following ambulatory surgery; Once daily Morphine Equivalent Dose reaches a threshold, every 3–4 mg increase will be associated with 1 additional clinically meaningful opioid-related symptom, or 1 additional patient-day with an opioid-related Clinically Meaningful Event on the predefined opioid-related Symptom Distress Scale (SDS) questionnaire. The Kehlet group [59] one of the strongest promoters of opioid sparing postoperative analgesia tested a preventive therapy following breast surgery. The prevention regimen included a package consisting of preoperative paracetamol, dextromethorphan, celecoxib, gabapentin, dexamethasone, total intravenous anaesthesia and intraoperative ondansetron. The patients were prospectively scored according to PONV, pain during rest and mobilization and major side effects. Of 200 consecutive breast cancer patients, 191 received the full package. During the first 36 postoperative hours, 79.1% reported no PONV at all and only 3.7% reported severe PONV. At rest, 69.6% reported no or light pain and 3.1% reported severe pain, with corresponding values of 59.7% and 8.9% during arm mobilization. Mean postoperative morphine consumption was 2.2 mg. The only significant side effect was transient dizziness.

There is still no strong evidence for a pre-emptive effect from preoperative start of analgesia administration in clinical practice. Providing pain relief in order to secure adequate concentrations, effect after surgery, preventing pain to become severe is sound. Thus starting administration of paracetamol and an oral NSAID as premed has subsequently become well-accepted practice in many day surgical programs [60]. The aim of an analgesic technique should be not only to lower the pain scores but also to facilitate earlier mobilization and reduce perioperative complications [61].

Aluri *et al.* [62] conducted an Obstetric Anaesthetists' Association approved electronic survey of all the UK lead obstetric anaesthetists between March and May 2013. They had a response rate of 81% was achieved with 96% of those who responded supporting the concept of enhanced recovery. Only 4% of units routinely discharged their patients on day one. There were a number of practices consistent with enhanced recovery. Postoperative pain was controlled by regular paracetamol (97%) and non-steroidal anti-inflammatory drugs (100% when not contraindicated), with oral opioids (68%) being used for breakthrough pain.

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Multi modal analgesia has also been shown safe and effective for the management of pain following major surgery. Rafiq *et al.* [63] studied if an opiate sparing multimodal regimen consisting of dexamethasone, gabapentin, ibuprofen and paracetamol had better analgesic effect, less side effects and was safe compared to a traditional morphine and paracetamol regimen after cardiac surgery. Patients in the multimodal group demonstrated significantly lower average pain scores from the day of surgery throughout the third postoperative day. Extensive nausea and vomiting, was found in no patient in the multimodal group but in 13 patients in the morphine group, $p < 0.001$. Postoperative rise in individual creatinine levels demonstrated a non-significant rise in the multimodal group, 33.0 ± 53.4 *vs.* 19.9 ± 48.5, $p = 0.133$. Patients in the multimodal group suffered less major in-hospital events in crude numbers: myocardial infarction (MI) (1 *vs.* 2, $p = 0.54$), stroke (0 *vs.* 3, $p = 0.075$), dialysis (1 *vs.* 2, $p = 0.54$), and gastrointestinal (GI) bleeding (0 *vs.* 1, $p = 0.31$). 30-day mortality was 1 *vs.* 2, $p = 0.54$. The authors conclude that in patients undergoing cardiac surgery, a multimodal regimen offered significantly better analgesia than a traditional opiate regimen. Nausea and vomiting complaints were significantly reduced. No safety issues were observed with the multimodal regimen.

Although the classical papers by Eriksson *et al.* [2] and Michaloliakou et al [3] suggest benefits improved recovery a recent Cochrane Systematic Review by Gurusamy *et al.* [64] around pharmacological interventions for prevention or treatment of postoperative pain in people undergoing laparoscopic cholecystectomy states that there is a need for more high quality studies. A modest reduction in pain was found however effects on the proportion of participants who were discharged as day-surgery, the length of hospital stay, or the time taken to return to work were imprecise in all the comparisons in which these outcomes were reported (very low quality evidence). There was no mortality in any of the groups in the two trials that reported mortality (183 participants, very low quality evidence). Differences in serious morbidity outcomes between the groups were imprecise across all the comparisons (very low quality evidence). None of the trials reported patient quality of life or time taken to return to normal activity. Still the benefits from a procedural specific multi-modal opioid sparing analgesic approach seems reasonably well supported as presented by the Postoperative pain Org [65].

In conclusion, a multi-modal procedure specific analgesic strategy facilitates the postoperative course following day surgery; improves quality of care, reduce experience of PONV and shorten time to discharge. The exact impact of multi-modal—balanced analgesia on resumption of daily living and quality of life is not well-documented. Providing paracetamol in standard dose, adding an NSAID when feasible and not contra-indicated in lowest effective dose fort short period [66] and further providing an oral opioid for rescue medication is base therapy. The use of local anaesthesia in conjunction to surgery as infiltration, peripheral or central block provide several benefits.

Conflicts of Interest

The authors declare no conflict of interest.

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Chronic Pain and High-impact Chronic Pain in U.S. Adults, 2023

Jacqueline W. Lucas, M.P.H., and Inderbir Sohi, M.S.P.H.

Key findings

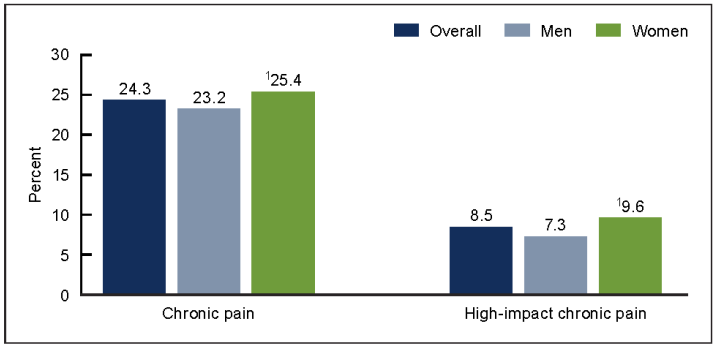
Data from the National Health Interview Survey

- In 2023, 24.3% of adults had chronic pain, and 8.5% of adults had chronic pain that frequently limited life or work activities (referred to as high-impact chronic pain) in the past 3 months.
- Chronic pain and high-impact chronic pain both increased with age.
- American Indian and Alaska Native non-Hispanic adults were significantly more likely to have chronic pain (30.7%) compared with Asian non-Hispanic (11.8%) and Hispanic (17.1%) adults.
- The percentage of adults with chronic pain and high-impact chronic pain increased with decreasing urbanization level.

Chronic pain (1) and pain that often restricts life or work activities, referred to in this report as high-impact chronic pain (2), are the most common reasons adults seek medical care (3), and are associated with decreased quality of life (2,4), opioid misuse (5), increased anxiety and depression (6), and unmet mental health needs (7). In 2019, 20.4% of adults had chronic pain, and 7.4% of adults had high-impact chronic pain (8). This report uses data from the 2023 National Health Interview Survey (NHIS) to provide updated percentages of adults who experienced chronic pain and high-impact chronic pain in the past 3 months by selected demographic characteristics and urbanization level.

The percentage of adults who had chronic pain and high-impact chronic pain in the past 3 months was higher in women than men.

Figure 1. Percentage of adults age 18 and older with chronic pain and high-impact chronic pain in the past 3 months, overall and by sex: United States, 2023



[1]Significantly different from men ($p < 0.05$).
NOTES: Chronic pain is based on responses of "most days" or "every day" to the survey question, "In the past 3 months, how often did you have pain? Would you say never, some days, most days, or every day?" High-impact chronic pain is defined as adults who have chronic pain and who responded "most days" or "every day" to the survey question, "Over the past 3 months, how often did your pain limit your life or work activities? Would you say never, some days, most days, or every day?" Estimates are based on household interviews of a sample of the U.S. civilian noninstitutionalized population.
SOURCE: National Center for Health Statistics, National Health Interview Survey, 2023.

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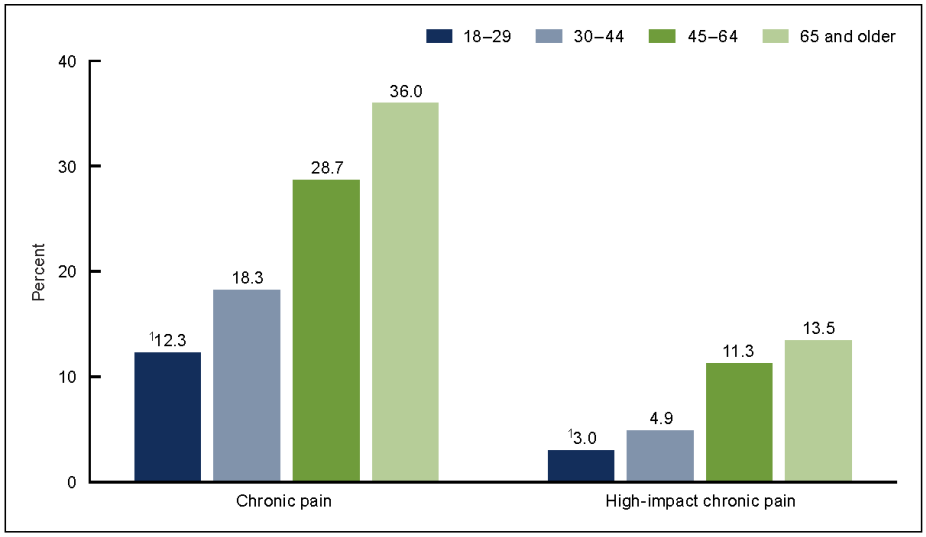
- In 2023, 24.3% of adults had chronic pain, and 8.5% of adults had high-impact chronic pain (Figure 1, Table 1).
- Women were more likely to have chronic pain (25.4%) and high-impact chronic pain (9.6%) than men (23.2% and 7.3%, respectively).

The percentage of adults who had chronic pain and high-impact chronic pain increased with age.

- The percentage of adults who had chronic pain in the past 3 months increased with age, from 12.3% among those ages 18–29 to 36.0% among those age 65 and older (Figure 2, Table 2).
- Similarly, the percentage of adults who had high-impact chronic pain in the past 3 months increased with age, from 3.0% among those ages 18–29 to 13.5% among those age 65 and older.

Figure 2. Percentage of adults age 18 and older with chronic pain and high-impact chronic pain in the past 3 months, by age group: United States, 2023



[1]Significant linear trend by age group ($p < 0.05$).
NOTES: Chronic pain is based on responses of "most days" or "every day" to the survey question, "In the past 3 months, how often did you have pain? Would you say never, some days, most days, or every day?" High-impact chronic pain is defined as adults who have chronic pain and who responded "most days" or "every day" to the survey question, "Over the past 3 months, how often did your pain limit your life or work activities? Would you say never, some days, most days, or every day?" Estimates are based on household interviews of a sample of the U.S. civilian noninstitutionalized population.
SOURCE: National Center for Health Statistics, National Health Interview Survey, 2023.

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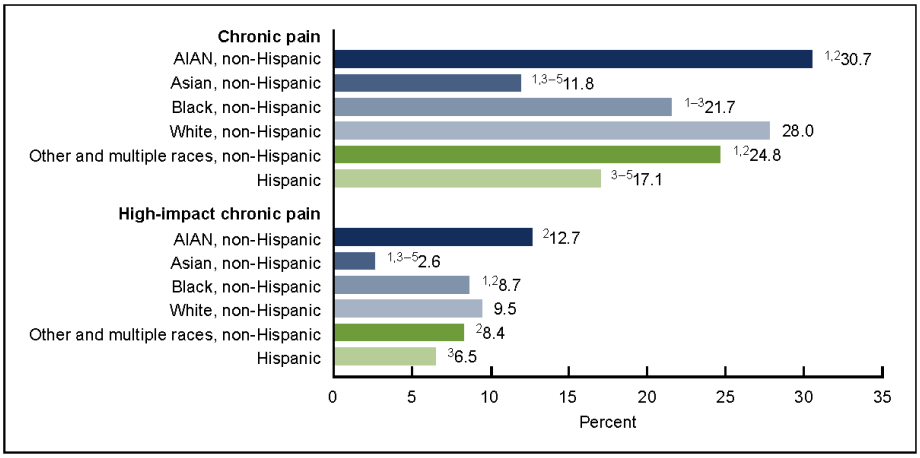
The percentage of adults who had chronic pain and high-impact chronic pain varied by race and Hispanic origin.

- American Indian and Alaska Native non-Hispanic (subsequently, American Indian and Alaska Native) adults were more likely to have chronic pain in the past 3 months (30.7%) compared with Asian non-Hispanic (subsequently, Asian) (11.8%) and Hispanic (17.1%) adults (Figure 3, Table 3). The observed differences between American Indian and Alaska Native adults and the other race and Hispanic-origin groups were not significant.
- American Indian and Alaska Native adults were more likely to have high-impact chronic pain in the past 3 months (12.7%) compared with Asian adults (2.6%). Observed differences with all other race and Hispanic-origin groups were not significant.
- Asian adults were least likely to have both chronic pain (11.8%) and high-impact chronic pain (2.6%) compared with adults of other races and Hispanic-origin groups.

Figure 3. Percentage of adults age 18 and older with chronic pain and high-impact chronic pain in the past 3 months, by race and Hispanic origin: United States, 2023



[1]Significantly different from Hispanic adults ($p < 0.05$). [2]Significantly different from Asian non-Hispanic adults ($p < 0.05$).
[3]Significantly different from White non-Hispanic adults ($p < 0.05$). [4]Significantly different from AIAN non-Hispanic adults ($p < 0.05$).
[5]Significantly different other single and multiple races ($p < 0.05$).
NOTES: AIAN is American Indian and Alaska Native. Categories shown for non-Hispanic adults are for those who selected only one racial group. Adults categorized as Hispanic may be of any race or combination of races. Other and multiple races non-Hispanic includes those who did not identify as American Indian and Alaska Native, Asian, Black, White, or Hispanic, and those who identified as more than one race. Chronic pain is based on responses of "most days" or "every day" to the survey question, "In the past 3 months, how often did you have pain? Would you say never, some days, most days, or every day?" High-impact chronic pain is defined as adults who have chronic pain and who responded "most days" or "every day" to the survey question, "Over the past 3 months, how often did your pain limit your life or work activities? Would you say never, some days, most days, or every day?" Estimates are based on household interviews of a sample of the U.S. civilian noninstitutionalized population.
SOURCE: National Center for Health Statistics, National Health Interview Survey, 2023.

The percentage of adults who had chronic pain and high-impact chronic pain increased with decreasing urbanization.

- The percentage of adults with chronic pain in the past 3 months increased with decreasing urbanization level, from 20.5% in large central metropolitan areas to 31.4% in nonmetropolitan areas (Figure 4, Table 4).

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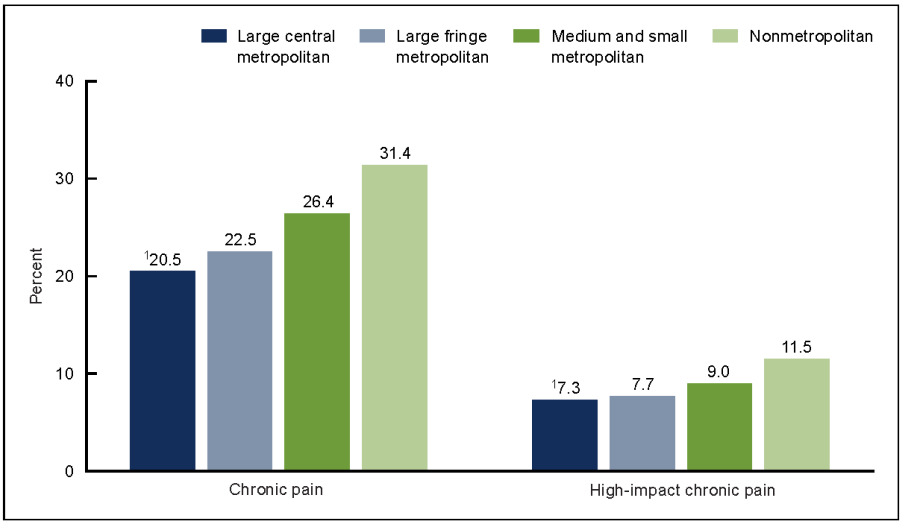
- The percentage of adults with high-impact chronic pain in the past 3 months also increased with decreasing urbanization level, from 7.3% in large central metropolitan areas to 11.5% in nonmetropolitan areas.

Figure 4. Percentage of adults age 18 and older with chronic pain and high-impact chronic pain in the past 3 months, by urbanization level: United States, 2023



[1]Significant quadratic trend by urbanization level ($p < 0.05$).
NOTES: Chronic pain is based on responses of "most days" or "every day" to the survey question, "In the past 3 months, how often did you have pain? Would you say never, some days, most days, or every day?" High-impact chronic pain is defined as adults who have chronic pain and who responded "most days" or "every day" to the survey question, "Over the past 3 months, how often did your pain limit your life or work activities? Would you say never, some days, most days, or every day?" Estimates are based on household interviews of a sample of the U.S. civilian noninstitutionalized population.
SOURCE: National Center for Health Statistics, National Health Interview Survey, 2023.

Summary

In 2023, 24.3% of adults experienced chronic pain, and 8.5% of adults experienced high-impact chronic pain (or 34.9% of adults who had chronic pain). Women were more likely than men to experience chronic pain. Chronic pain was also generally higher in American Indian and Alaska Native adults and those age 65 and older. Similarly, high-impact chronic pain was higher in women, American Indian and Alaska Native adults, and those age 65 and older. Percentages of adults who had chronic pain and high-impact chronic pain in the past 3 months increased with decreasing urbanization level. NHIS continues to be an important source of chronic pain and high-impact chronic pain data (9).

Definitions

Chronic pain: Based on responses of "most days" or "every day" to the survey question, "In the past 3 months, how often did you have pain? Would you say never, some days, most days, or every day?"

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High-impact chronic pain: Defined as adults who have chronic pain and who responded "most days" or "every day" to the survey question, "Over the past 3 months, how often did your pain limit your life or work activities? Would you say never, some days, most days, or every day?"

Race and Hispanic origin: Categories shown for non-Hispanic adults are for those who selected only one racial group. Adults categorized as Hispanic may be of any race or combination of races. The category other and multiple races non-Hispanic includes those who did not identify as American Indian and Alaska Native, Asian, Black, White, or Hispanic, and those who identified as more than one race.

Urbanization level: Metropolitan status and size were determined using the 2013 National Center for Health Statistics Urban–Rural Classification Scheme for counties (10). Large metropolitan areas are metropolitan statistical areas of 1 million people or more and are categorized into central and fringe counties. Medium and small metropolitan areas are counties in metropolitan statistical areas of 250,000–999,999 people and less than 250,000 people, respectively. Nonmetropolitan areas are counties in micropolitan statistical areas and noncore counties.

Data source and methods

This analysis used data from the Sample Adult module of the 2023 NHIS, a nationally representative household survey of the U.S. civilian noninstitutionalized population. NHIS is conducted continuously throughout the year by the National Center for Health Statistics. Interviews are typically initiated face-to-face in respondents' homes with follow-ups conducted by telephone as needed. The Sample Adult response rate was 47% (11). For more information about the survey, visit: https://www.cdc.gov/nchs/nhis.htm. Point estimates and corresponding confidence intervals for this analysis were calculated using SAS-callable SUDAAN software (12) to account for the complex sample design of NHIS. All estimates meet National Center for Health Statistics data presentation standards for proportions (13). Differences between percentages were evaluated using two-sided significance tests at the 0.05 level. Linear and quadratic trends by age group and urbanization level were evaluated using orthogonal polynomials.

About the authors

Jacqueline W. Lucas and Inderbir Sohi are with the National Center for Health Statistics, Division of Health Interview Statistics.

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Figure Tables

Data table for Figure 1. Percentage of adults age 18 and older with chronic pain and high-impact chronic pain in the past 3 months, overall and by sex: United States, 2023

Characteristic	Chronic pain		High-impact chronic pain	
	Percent (95% confidence interval)	Standard error	Percent (95% confidence interval)	Standard error
Total	24.3 (23.7–24.9)	0.31	8.5 (8.1–8.9)	0.20
Sex				
Men	23.2 (22.4–24.1)	0.42	7.3 (6.8–7.8)	0.25
Women	25.4 (24.6–26.2)	0.42	9.6 (9.1–10.2)	0.28

NOTES: Chronic pain is based on responses of "most days" or "every day" to a survey question asking how often the respondent had pain in the past 3 months. High-impact chronic pain includes all respondents who have chronic pain and responded "most days" or "every day" to a survey question asking how often they had pain that limited their life or work activities in the past 3 months. Estimates are based on household interviews of a sample of the U.S. civilian noninstitutionalized population.

SOURCE: National Center for Health Statistics, National Health Interview Survey, 2023.

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Data table for Figure 2. Percentage of adults age 18 and older with chronic pain and high-impact chronic pain in the past 3 months, by age group: United States, 2023

Age group	Chronic pain		High-impact chronic pain	
	Percent (95% confidence interval)	Standard error	Percent (95% confidence interval)	Standard error
18–29	12.3 (11.1–13.5)	0.59	3.0 (2.4–3.8)	0.34
30–44	18.3 (17.2–19.4)	0.54	4.9 (4.3–5.6)	0.31
45–64	28.7 (27.6–29.8)	0.56	11.3 (10.5–12.1)	0.39
65 and older	36.0 (34.9–37.1)	0.57	13.5 (12.7–14.3)	0.41

NOTES: Chronic pain is based on responses of "most days" or "every day" to a survey question asking how often the respondent had pain in the past 3 months. High-impact chronic pain includes all respondents who have chronic pain and responded "most days" or "every day" to a survey question asking how often they had pain that limited their life or work activities in the past 3 months. Estimates are based on household interviews of a sample of the U.S. civilian noninstitutionalized population.

SOURCE: National Center for Health Statistics, National Health Interview Survey, 2023.

Data table for Figure 3. Percentage of adults age 18 and older with chronic pain and high-impact chronic pain in the past 3 months, by race and Hispanic origin: United States, 2023

Race and Hispanic origin	Chronic pain		High-impact chronic pain	
	Percent (95% confidence interval)	Standard error	Percent (95% confidence interval)	Standard error
American Indian and Alaska Native, non-Hispanic	30.7 (18.3–45.5)	6.60	12.7 (7.0–20.6)	3.25
Asian, non-Hispanic	11.8 (10.0–13.8)	0.95	2.6 (1.8–3.6)	0.43
Black, non-Hispanic	21.7 (19.9–23.5)	0.91	8.7 (7.6–10.0)	0.60
White, non-Hispanic	28.0 (27.2–28.8)	0.38	9.5 (9.0–10.0)	0.25
Other and multiple races, non-Hispanic	24.8 (20.4–29.7)	2.30	8.4 (5.7–11.8)	1.50
Hispanic	17.1 (15.8–18.5)	0.67	6.5 (5.6–7.5)	0.48

NOTES: Categories shown for non-Hispanic adults are for those who selected only one racial group. Adults categorized as Hispanic may be of any race or combination of races. Other and multiple races non-Hispanic includes those who did not identify as American Indian and Alaska Native, Asian, Black, White, or Hispanic, and those who identified as more than one race. Chronic pain is based on responses of "most days" or "every day" to a survey question asking how often the respondent had pain in the past 3 months. High-impact chronic pain includes all respondents who have chronic pain and responded "most days" or "every day" to a survey question asking how often they had pain that limited their life or work activities in the past 3 months. Estimates are based on household interviews of a sample of the U.S. civilian noninstitutionalized population.

SOURCE: National Center for Health Statistics, National Health Interview Survey, 2023.

Data table for Figure 4. Percentage of adults age 18 and older with chronic pain and high-impact chronic pain in the past 3 months, by urbanization level: United States, 2023

Urbanization level	Chronic pain		High-impact chronic pain	
	Percent (95% confidence interval)	Standard error	Percent (95% confidence interval)	Standard error
Large central metropolitan	20.5 (19.5–21.6)	0.53	7.3 (6.6–7.9)	0.32
Large fringe metropolitan	22.5 (21.3–23.7)	0.61	7.7 (6.9–8.4)	0.38
Medium and small metropolitan	26.4 (25.3–27.5)	0.56	9.0 (8.3–9.7)	0.36
Nonmetropolitan	31.4 (29.4–33.3)	0.99	11.5 (10.3–12.8)	0.65

NOTES: Chronic pain is based on responses of "most days" or "every day" to a survey question asking how often the respondent had pain in the past 3 months. High-impact chronic pain includes all respondents who have chronic pain and responded "most days" or "every day" to a survey question asking how often they had pain that limited their life or work activities in the past 3 months. Estimates are based on household interviews of a sample of the U.S. civilian noninstitutionalized population.

SOURCE: National Center for Health Statistics, National Health Interview Survey, 2023.

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Centers for Disease Control and Prevention
National Center for Health Statistics
3311 Toledo Road, Room 4551, MS P08
Hyattsville, MD 20782–2064

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REVIEW

Challenges of pain control and the role of the ambulatory pain specialist in the outpatient surgery setting

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Nalini Vadivelu[1]
Alice M Kai[2]
Vijay Kodumudi[3]
Jack M Berger[4]

[1]Department of Anesthesiology, Yale University School of Medicine, New Haven, CT, [2]Stony Brook University School of Medicine, Stony Brook, NY, [3]Department of Molecular and Cell Biology, College of Liberal Arts and Sciences, University of Connecticut, Storrs, CT, [4]Department of Anesthesiology, Keck School of Medicine, University of Southern California, Los Angeles, CA, USA

Abstract: Ambulatory surgery is on the rise, with an unmet need for optimum pain control in ambulatory surgery centers worldwide. It is important that there is a proportionate increase in the availability of acute pain-management services to match the rapid rise of clinical patient load with pain issues in the ambulatory surgery setting. Focus on ambulatory pain control with its special challenges is vital to achieve optimum pain control and prevent morbidity and mortality. Management of perioperative pain in the ambulatory surgery setting is becoming increasingly complex, and requires the employment of a multimodal approach and interventions facilitated by ambulatory surgery pain specialists, which is a new concept. A focused ambulatory pain specialist on site at each ambulatory surgery center, in addition to providing safe anesthesia, could intervene early once problematic pain issues are recognized, thus preventing emergency room visits, as well as readmissions for uncontrolled pain. This paper reviews methods of acute-pain management in the ambulatory setting with risk stratification, the utilization of multimodal interventions, including pharmacological and nonpharmacological options, opioids, nonopioids, and various routes with the goal of preventing delayed discharge and unexpected hospital admissions after ambulatory surgery. Continued research and investigation in the area of pain management with outcome studies in acute surgically inflicted pain in patients with underlying chronic pain treated with opioids and the pattern and predictive factors for pain in the ambulatory surgical setting is needed.

Keywords: outpatient surgery analgesia, ambulatory surgery pain control, acute pain, ambulatory surgery center, opioids, substance abuse

Introduction

Pain is a critical component of patient management that often not only consists of physical disability but also necessitates care to address the psychological, emotional, and economic strain it places on patients and their caretakers. It places a significant economic strain on society in the form of disability, loss in productivity, and health care costs.[1] Moderate-to-severe pain continues to be experienced by up to 70 percent of patients after surgery.[2–4] Optimum management of pain is crucial in the outpatient as well as in the inpatient surgery setting. Ambulatory surgery is on the rise in the US. In fact, there has been more than 100% increase in the number of ambulatory surgery centers since 1990 in the US.[5] Perioperative pain control is vital, since ineffective pain control can lead to increased morbidity and mortality.[6] Optimum pain control in the ambulatory setting is complex and challenging, and includes the implementation of interventions to manage and prevent flare-ups in patients with a history of preexisting chronic pain and in those with a history of substance abuse. Uncontrolled pain

Correspondence: Nalini Vadivelu
Department of Anesthesiology, Yale University School of Medicine,
TMP 3, 333 Cedar Street, New Haven, CT 06519, USA
Tel +1 203 785 2802
Fax +1 203 785 6664
Email Nalini.vadivelu@yale.edu

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and nausea are the two most common reasons for delayed discharge and unexpected admissions to the hospital, necessitating the focus on control of pain in the ambulatory setting leading to an implementation of opioid-sparing analgesia in ambulatory surgery.[7–9]

Nausea and respiratory depression are common side effects of pain medications, so prevention and management of side effects of nausea and respiratory depression are essential as well. The challenges of pain control in ambulatory pain control have become increasingly recognized in recent times,[1,2,10] and research on solutions to provide adequate pain control in ambulatory surgery centers is ongoing.

Challenges for the ambulatory care pain specialist

It is important to provide safe and optimum pain management for ambulatory surgery patients preoperatively, intraoperatively, and postoperatively for their acute-pain issues, ensure prevention of pain flare-ups and withdrawal syndromes, and ensure safe discharge from the ambulatory surgery center. Effective analgesia can often be achieved with medications causing less nausea and/or with utilization of regional anesthesia techniques in conjunction with nonopioid therapies. Traditional sections of the division of a pain service in medical centers include acute-pain service, regional or block service, and a chronic-pain service, but not an ambulatory pain service in ambulatory surgery centers. These services could be facilitated by the presence of an ambulatory care pain specialist overseeing a clinical program for pain control in every ambulatory surgery center, who is a practicing anesthesiologist on site with a special interest in pain management at the ambulatory surgery center, which is a new concept. By virtue of clinical training, orientation, and experience through daily clinical practice at the ambulatory surgery center, the ambulatory pain-management specialist would be particularly suited to address the unmet needs of ambulatory pain management in the unique setting of ambulatory surgery, where the majority of surgery is performed in the US. The ambulatory pain-management specialist could typically take care of patients in the ambulatory surgery center, providing safe anesthesia to patients with a history of pain-control issues, substance abuse, and chronic pain. The ambulatory pain specialist would work to provide safe and optimum pain management preoperatively, intraoperatively, and postoperatively for acute-pain issues of patients at the same time, preventing pain flare-ups and withdrawal syndromes, thereby ensuring safe discharge from the ambulatory surgery center.

In addition to having direct oversight of clinical trainees in the operating rooms and being a resource offering consultation for optimum perioperative pain control for patients undergoing ambulatory surgery, the ambulatory pain specialist would be in charge of the clinical program of ambulatory pain control in each ambulatory center, oversee quality-of-care initiatives to intervene early, oversee implementation of a treatment plan for pain at the ambulatory surgery center in patients with complex pain issues, and prompt intervention to control nausea and vomiting and prevention of pain flare-ups and withdrawal symptoms in patients who are opioid-dependent and taking part in substance-abuse programs. The ambulatory pain specialist would also oversee the formulation of clinical protocols in an ambulatory postanesthesia care unit (PACU), which is designed to improve teaching as well as patient satisfaction.

Setting standards of care for the treatment of pain at the ambulatory surgery center by the pain specialist would include the identification of patients at increased risk of perioperative pain and the implementation of a broad and cost-effective multimodal analgesia protocol, as well as instituting other rescue interventions when the implemented plan falls short. Goals are to be identified. These could include preoperative chronic pain, reduction of opioid exposure, prevention of hyperalgesia, and the minimization of side effects and risks from nonopioids. Laying out plans for additional analgesics in the recovery room, rescue blockage, and postoperative regional anesthetic blocks would be helpful. Additional preoperative and postoperative contingencies may be employed for patients with higher than baseline risk. Gerbershagen et al studied whether the severity of preoperative chronic pain was a good predictor of acute postoperative pain in patients who had undergone radical prostatectomy.[11] The study observed that patients with greater preoperative chronic pain complained of more intense acute pain postoperatively. Additional contingencies could include intravenous acetaminophen, increased-potency opioids, such as oxycodone, or supplemental regional techniques for patients with uncontrolled pain or opioid tolerance, where a two- to threefold increase in opioid requirement can be seen.

Pain-management medications are often abused, which complicates the management of pain in the ambulatory setting. Substance abuse and opioid addiction is on the rise, and patients with substance abuse can pose a supreme challenge

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for pain control. Prescription pain-management medications are often abused and used nonmedically, which complicates the management of pain in the ambulatory setting. The abuse of prescription drugs, such as opioids, stimulants, such as amphetamine–dextroamphetamine and methylphenidate, and central nervous system depressants, such as benzodiazepines, has grown to epidemic proportions.[12,13]

An ambulatory care pain specialist could ensure that patients with a history of substance abuse and opioid dependence who are undergoing treatment for substance abuse (such as methadone and buprenorphine) do not develop substance-withdrawal syndromes or pain flare-ups, while receiving optimum pain control, thereby facilitating safe discharge. Long-term administration of opioids may necessitate an increase in the dosage of opioids needed to maintain the appropriate level of analgesia.

Studies with human subjects suggest that patients who are maintained on methadone are hyperalgesic in comparison to individuals who were previously addicted[14] and significantly more hyperalgesic than control subjects.[15,16] An increasing number of studies suggest that long-term use of opioids causes changes in pain sensitivity. It has been seen that patients abusing or addicted to opioids presenting for ambulatory surgery will often have coexisting psychiatric disorders. For instance, patients addicted to heroin have an increased prevalence of personality disorders, anxiety, psychosis, and depression.[17,18]

The ambulatory pain specialist would be available for consultation by surgeons and anesthesiologists on a daily basis to review cases and assist in providing safe and optimum pain management for all patients. The ambulatory care specialist would also be responsible for advanced pain care in both the preoperative holding areas and PACUs. Endoscopic procedures, such as gastroduodenoscopy, ultrasound, colonoscopies, and endoscopic retrograde cholangiopancreatography performed for stones or for cancer of the gastrointestinal system, such as pancreatic cancer, and other imaging studies are now often performed as outpatient procedures in patients with painful states, potentially increasing the need for ambulatory pain specialists and pain control in ambulatory surgery centers. Advanced pain care and multidisciplinary communication and coordination may be needed in patients with implanted intrathecal drug-delivery systems, which deliver intrathecal opioids and other medications, as well as patients with implanted dorsal column stimulators who are to undergo surgery in the ambulatory surgery center with a history of pain-control issues, substance abuse, and chronic pain. This systematic approach in the ambulatory surgery center would decrease the rate of delayed discharge from the PACU and unanticipated hospital admissions, and improve pain outcomes in ambulatory surgery centers (Table 1).

Table 1 Role of the ambulatory pain specialist overseeing the clinical program of ambulatory pain control

1. Develop standards of care for treatment of pain at the ambulatory surgery center
2. Identification of patients at risk for increased pain
3. Provide consultation for advanced pain care at the ambulatory surgery center
4. Pain control in patients with history of substance abuse to prevent flare-up of pain and withdrawal syndromes
5. Utilization of early rescue techniques for pain control
6. Implementation of multimodal analgesia
   - Multiple medications acting at different sites on the pain pathway and different mechanisms of action
   - Medications include nonopioids, opioids, $\alpha_2\delta$-modulators, and corticosteroids
   - Multiple techniques, such as local anesthesia infiltration, regional anesthesia techniques, peripheral nerve-block catheters
7. Control of nausea and vomiting
8. Planning of discharge medications, weaning, and follow-up for control of pain by primary care providers

Real-world challenges in implementing the change to include the role of the ambulatory pain specialist

The implementation of the change to integrate an ambulatory pain specialist is associated with real-world challenges. The integration of an ambulatory pain specialist into an ambulatory surgery center is a necessary but not an easy task. It involves clinical, economic, and noneconomic integration. This would entail detailed planning, assessment of human resources, and financial considerations by physicians and hospital management. The clinical integration of any new clinical program, such as the integration of an ambulatory pain specialist, would need good hospital–physician relationships, be executed with care as a collaborative arrangement, and with evaluation of every minute detail, including discussions on cost of staffing, acquisition of special training requirements, and skills.[19]

The integration of an ambulatory pain could also potentially impact on the requirement of future skills needed in ambulatory or general anesthesiologists to provide optimum postoperative pain control, with the current shift toward greater numbers of patients undergoing surgery as outpatients than inpatients.

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In addition, the feasibility of a single pain specialist to provide the bandwidth for all advanced regional anesthesia and pain planning in an ambulatory surgery center needs to be analyzed for each ambulatory center. Perhaps the ambulatory pain specialist in larger ambulatory surgery centers would need assistance from other anesthesiologists in the group with a special interest in pain control as well.

Pain is subjective

It is important to work to develop a systematic approach to the subjective phenomenon of pain in the ambulatory surgery center. The International Association for the Study of Pain states that actual or potential damage to tissues can lead to emotional and sensory experiences.[20] It is important then to understand that both sensory and emotional experiences that are unpleasant need to be addressed. Pain is subjective, with varying thresholds in different individuals. Pain appears to have a sociopsychobiological perspective, and it is important to understand this to achieve optimum pain control.[21]

Unpleasant sensory and emotional experiences (pain) are felt with the same afferent nociceptive impulse, which in the somatosensory cortex enables the patient to feel the sensation of pain while eliciting an emotional response at the limbic structures.[22] There could thus be a demarcation between nociception, pain, and suffering according to the biopsychological model of pain proposed by Mack et al.[23]

It is important also to make the distinction between several pain states that are encountered in patients presenting for surgery in the ambulatory care setting. Pain control depends greatly on individual pain states, the pain characteristics, and the injury or surgical insult, all of which result in making the experience of pain a very subjective phenomenon.[24]

Postoperative pain is a common reason for unanticipated hospital admission after outpatient surgery

It is important to understand the pattern and predicting factors of postoperative pain in the ambulatory surgery setting,[25] in order to provide optimal pain control and prevent delayed discharges and unanticipated hospital admission. The pattern and predicting factors for severe pain were studied in a prospective study involving 10,008 consecutive ambulatory surgical patients. It was seen that certain types of surgery and body mass index were significant predictors of pain in the recovery room. For example, of the surgeries studied, orthopedic patients had the highest incidence of severe pain, at 16.1%, while urologic, general, and plastic surgery had 13.4%, 11.5%, and 10%, respectively. Younger males, those with a higher body mass index, and patients with longer duration of anesthesia also had a higher incidence of severe pain. The duration of stay in the recovery room and longer time to discharge from the recovery room were also seen in patients with severe pain.[25] Preoperative screening for risk stratification should include the pattern and predictive factors of postoperative pain in ambulatory surgery while developing a pain-treatment plan for prophylactic analgesic regimens and other analgesic approaches. In order to prevent delayed discharges and unanticipated hospital admissions, an opioid-sparing analgesic approach has also been suggested.[7–9]

Assessment and treatment planning according to risk for pain control in ambulatory surgery

A detailed preoperative pain history is extremely important for risk stratification and planning-treatment strategies to deliver optimal pain control perioperatively in the ambulatory setting.[24,26] It is ideal to obtain this information a few days earlier than the planned surgery, and a thoughtful pain questionnaire would make it easy to gather this information for the patient and the caregivers. This questionnaire could include questions on site of pain, its frequency, durations of pain, types of medications, and dosages taken for the pain. Additional questions on history of substance abuse, depression and anxiety, sleep issues, poor pain control, and patient expectations, and patient caregivers would help to risk-stratify patients and develop a plan for treatment of pain preoperatively, intraoperatively, and postoperatively in the ambulatory surgery center. This questionnaire should be directed to enable the health care practitioner to get a sense of aberrant pain states due to abnormal processing, such as tolerance, substance abuse, partial-agonist therapy, history of chronic pain, and uncontrolled postoperative pain in the past, which would help in customized treatment planning to provide optimal pain relief perioperatively for each patient. It is advisable that the ambulatory pain specialist confer with the surgical team, the patients, and their families, as well as medical personnel, to gather input from all concerned to make a cohesive and effective plan for effective pain control before implementation of the pain-treatment plan in the ambulatory surgery center.

Once the risk of postoperative uncontrolled pain is determined, the next step would be to develop a plan for the provision of effective multimodal analgesia. To achieve optimum pain management, it is important first to determine the expectation of the patients in the form of goals to enable the caregiver to work closely with their patients

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to obtain patient satisfaction. These goals often could be to decrease risks associated with nonopioids, as well as to reduce the exposure to opioids, prevention of hyperalgesia, availability of additional analgesics for breakthrough pain, and implementation of regional anesthesia preoperatively or postoperatively.

Implementation of effective multimodal analgesic interventions and interventions for pain rescue

As per American Society of Anesthesiologists recommendations, patients having ambulatory surgery could take oral nonopioids, such as acetaminophen, gabapentin, and diclofenac or celecoxib with a sip of water before surgery to decrease the need for intravenous medications. These oral premedications combined with a regional anesthetic technique where applicable can result in optimum pain control. In addition to providing a safe anesthetic in the ambulatory surgery center, the health care providers should incorporate multimodal analgesia to provide a short and comfortable recovery-room stay, facilitate early discharge rehabilitation, and improve home recovery. The pain treatment, in addition to the implementation of multimodal analgesic interventions that would include rescue interventions, in the ambulatory care setting is often necessary to achieve optimum pain relief depending on the complexities of the pain problems, patient comorbidities, the type of surgery, and patient expectations. It is also always important to consider the cost of the interventions that may be needed after implementation of multimodal analgesic and rescue interventions to make the strategies viable in the long term in the ambulatory surgery center. Costs include services by personnel and supplies.[26,27] It is important, however, to consider lowering costs without sacrificing patient safety. Appropriate control of acute pain with multimodal techniques would preemptively mitigate the development of chronic pain. There are medical and economic burdens associated with the transition of acute to chronic pain and the severity of chronic pain. Chronic pain leads to decreased functionality, greater work absences, and associated conditions, such as depression.[28] In addition, chronic pain also impacts quality of life, with escalation of costs and utilization of health care resources.[29] It is thus compelling to prevent chronic pain preemptively with optimum control of acute pain with multimodal approaches.

Interventions to control anxiety

Interventions to control severe anxiety can be with medications such as gabapentinoids preoperatively and benzodiazepines perioperatively.[30] It is also worth noting that psychological factors also play a large role in the development of chronic pain following surgery.[31,32] The National Center for Health Statistics in 2006[33] approximated that about a quarter of the population in the US experience recurring or chronic pain, of which 40% report suffering moderate-to-severe degrading impact. The majority of patients with chronic pain complain of multiple foci of pain. Rates of chronic pain increase with advancing age, ranging from 25% to 50%.[34] A number of factors predict worse pain control and amplified analgesic demands in postoperative patients: psychological states, such as neuroticism, depression, and anxiety; age and sex; preoperative opioid use; and preexisting conditions of pain.[35,36] Furthermore, some of the psychological conditions, namely depression, have been found to increase the probability of heightened perioperative pain experienced and opioid consumption.[37]

Interventions in patients with history of chronic pain

It has been approximated that in the US, chronic pain not only affects functionality but is also a significant socioeconomic health problem, with an annual cost estimated to be as high as $100 billion.[1] There remains a dispute and lack of general agreement about the utilization of opioids for treating chronic nonmalignant pain.

The majority of the debate revolves around reservations regarding the long-term analgesic efficacy of opioids, the risk of side effects, potential for abuse, and dependence, and the capability of physicians in determining suitable patients to receive this form of treatment.[3] Regardless, numerous guidelines for the treatment of chronic nonmalignant pain include opioids as a choice for therapy, particularly if more conventional treatment options have been ineffective.[38–40]

At present, approximately two-thirds of all surgeries are performed in the ambulatory care setting. With the increase in the volume of ambulatory surgeries, there has been an increase in the number of patients with a history of chronic pain presenting for surgery in ambulatory surgery centers as well. Though most studies on the management of perioperative pain in patients with a history of chronic pain have been done in the inpatient setting, similar challenges could be faced in the management of chronic-pain patients in the ambulatory surgery setting.

The management of acute surgically inflicted pain in patients with underlying chronic pain treated with opioids is an area of pain management that needs to addressed and investigated. Gerbershagen et al[11] studied whether the

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severity of preoperative chronic pain was a good predictor of acute postoperative pain in patients who had undergone radical prostatectomy. The study observed that patients with greater preoperative chronic pain complained of more intense acute pain postoperatively. With the belief and consideration that opioid drugs can help alleviate chronic pain, recover mood, and help recover daily functionality, many physicians have encouraged opioid pharmacotherapy for the management of chronic pain. In part because alternative methods for chronic-pain management remain limited, the utilization of opioid pharmacotherapy has outpaced the advance and progress of studies substantiating the benefits of opioid pharmacotherapy.[41] A number of studies have been conducted that suggest that the use of opioids can cause perioperative hyperalgesia and overall increased animal and human sensitivity to noxious insult,[38,42,43] while an evidence-based literature review regarding opioid-induced hyperalgesia was inconclusive.[44]

Chapman et al[45] studied the severity of postoperative pain for 6 days in two groups of patients: those with preexisting chronic pain with opioid pharmacotherapy, and a matched control group, both undergoing general surgery and orthopedic surgery. The study found that the group of patients with preexisting chronic pain using opioids reported considerably greater levels of postoperative pain than the second group, and they also experienced a relatively delayed rate of resolution of the pain. A follow-up observational study followed 55 patients with preexisting chronic pain 2 weeks following surgery, of which 25 subjects did not utilize opioid pharmacotherapy and 30 subjects did.[42] Daily postoperative pain with rest and movement was reported. The study found that there was a substantially greater level of pain throughout the study among the patients on opioid pharmacotherapy. There was no significant difference between the rates of pain resolution between the two groups of chronic-pain patients. The findings of this study thus supported evidence provided by animal studies that opioid-induced hyperalgesia is produced by the extended use of opioids.[46,47] Patients suffering from chronic pain therefore require distinctive consideration for the management of their postoperative pain when they undergo surgical procedures.

Greater postoperative pain has been associated with a greater risk of chronic pain as a result of surgery.[48] Consequently, aggressive management of postoperative pain may be particularly critical in patients with chronic pain, since they characterize a group that is especially at risk for and susceptible to complications and chronic postoperative pain.[38]

Patients with chronic pain are frequently treated preoperatively with COX inhibitors, opioids, coanalgesics, anticonvulsants, and antidepressants. Many of them have extended sedentary lifestyles and neurological deficits that may be associated with the adverse events, and complications of perioperative management, due to a combination of drug interactions, side effects, and issues with tolerability and tolerance. Overadministration and unsuitable doses of drugs are frequently seen issues among chronic-pain patients.[49] Often, these patients also have decreased functionality of various organ systems, and are thus at greater risk for adverse physiological reactions of the neuroendocrine system to pain.[50] In addition, patients suffering from chronic pain often underreport and undervalue their usage of drugs. This propensity is more predominantly observed in female patients and in patients taking opioid analgesics in comparison to other drugs.[51] Caretakers may also tend to overemphasize addiction, tolerance, and sedation due to analgesics, but underestimate the effect of COX inhibitors and coanalgesics on pain.[52] On the day of the procedure, some patients may neglect to take their daily opioid dose, either due to instructions to not take medications on the day of the surgery or because they erroneously think that they should not take their oral opioid dose since oral intake of liquids and solids are discouraged.

Giving partial-opioid agonists, including nalbuphine or buprenorphine, to patients chronically on opioids may cause sudden opioid withdrawals and should be avoided. Though minimal doses of partial-opioid agonists are helpful in patients who are opioid-naïve for the purpose of relieving side effects, such as nausea and pruritus, commonly caused by full agonists, their utilization in chronic-pain patients dependent on opioids remains complex and necessitates close observation and constant management.[38] It would be prudent to consider inpatient admission for complicated opioid-dependent patients to determine the amount of oral opioid necessary to control their pain.

Interventions in chronically opioid-consuming patients

There is a dearth of information on the management of patients chronically on opioids perioperatively when presenting for surgery in the ambulatory setting. Preoperatively, the preoperative clinic personnel, surgical team, and anesthesia team participating in the care of the patients should identify patients who are administered opioids chronically. Since the lowest daily opioid dose that appreciably increases postoperative requirements for opioids remains undetermined, all patients should be educated about the possibility of increased opioid needs and intensified pain postoperatively. Furthermore, they should be notified of other available analgesic

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methods that complement opioids. Patients who chronically consume opioids should not forgo their daily dose of opioid on the day of the procedure, particularly if significant doses of long-acting opioids are regularly taken, in order to prevent withdrawal.[38]

However, it goes without question that the patient will need their preoperative opioid dose or opioid equivalent as the starting dosage to which additional opioid must be added according to the patient's need to avoid withdrawal and to cover the nociception created by the surgical intervention.[38] This could be as much as three times higher than the expected opioid dose in nonchronic pain (opioid-naïve) patients.[35] It must be remembered that epidural opioids do not cover the systemic need created by chronic oral opioid administration.

Underreporting the usage of drugs is more predominate in female patients and in patients taking opioid analgesics in comparison to other drugs.[51] As a result, inadequate management perioperatively may go overlooked and may cause withdrawal.[50] Preoperative history-taking by the caretakers may also tend to overemphasize addiction, tolerance, and sedation due to analgesics, but underestimate the effect of COX inhibitors and coanalgesics on pain and underestimate dependence.[52] Intraoperatively throughout the procedure, the necessary amount of opioid is made up of the preoperative daily dose of opioid taken regularly and the dose of opioid required by surgical stimulation. The most suitable opioids to administer to replace the opioid dose taken chronically appear to be long-acting opioids, since reasonably steady plasma concentrations of opioids are attainable. Frequently, the utilization of a continuous opioid infusion is the optimal method to deliver a stable serum concentration in cases where the oral route is not available perioperatively. Though the utilization of short-acting opioids can be sufficient for relieving short-lasting stimulation inflicted by the surgical procedure, their sole administration in chronic-pain patients on opioids may potentially cause withdrawal or inadequately controlled pain postoperatively. Postoperatively, it can be challenging to catch up on opioid dosing, due to unavoidable delays in procuring and giving opioids at the bedside, the potential hesitance of staff in the recovery room to dispense an adequately high dose of opioid, and the high intensity of pain that patients may feel. It must be remembered that patients who chronically take even modest amounts of opioids preoperatively (such as <50 mg/day oral morphine equivalents) will usually need their baseline opioid dose in addition to two- or more-fold the dose of opioids regularly given for well-controlled pain in opioid-naïve patients.[35,50] It would be prudent to consider inpatient admission for patients with chronic use of opioids after ambulatory surgery, if presenting a challenge for pain control, for approximately 24 hours to determine the amount of oral opioid to be administered.

In chronically opioid-consuming patients, the shift to an oral opioid requires particular attentiveness. Inpatients need opioids for a comparatively extended duration of time epidurally or intravenously relative to those required in opioid-naïve patients.[4] There is no widely acknowledged guideline as to the method in which postoperative transition to an oral opioid regimen is optimally accomplished in outpatients. Carroll et al[3] recommended (for inpatients) converting the intravenous dose into its equivalent oral dose, giving half to two-thirds of this amount as a long-acting opioid, and keeping the remaining dose available as an administered short-acting opioid as needed. In effect, short-acting opioids can address any breakthrough pain, and long-acting opioids can function as a stable baseline of pain management. As postoperative pain begins to diminish, reducing the dosage of a short-acting opioid seems to be an effective method in reducing the total dose of opioids administered daily.

Because such opioids as methadone with long half-lives can gradually accumulate, titration of the drugs should be done with care, in order to avoid overdose. Postoperatively, administering 1.5-fold the preoperative opioid dose orally, in addition to patient-controlled analgesic intravenous opioids for breakthrough pain, until the surgical pain begins to diminish has proved an effective method. Otherwise, patients can also be given the option of taking patient-controlled intravenous opioids for the initial 24–48 hours postoperatively, during which opioid demands are altering most quickly. Following that window, the total amount of opioids given intravenously can be changed to a daily dose administered orally appropriate for managing the pain, as mentioned earlier.[3]

The perioperative management of patients who are chronically consuming opioids for pain management needs to be considered with caution for a number of reasons. First, administration of opioids continues to be an integral part of postoperative pain-management regimens, even with a history of significant chronic use. Also, the change from preoperative to postoperative opioids can be quite challenging to manage. It is also important to keep in mind that a sufficient dose of opioids needs to be sustained in order to avoid opioid withdrawal.[3] Long-term administration of opioids may necessitate an increase in the dosage of opioids

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needed to maintain the appropriate level of analgesia. This phenomenon is most commonly attributed to the development of tolerance, but increases in dosage may also be explained by a variety of factors, including the advancement of the underlying disease that is causing the chronic pain. The literature has also demonstrated that patients on opioids chronically report greater postoperative pain, despite also consuming threefold more opioids postoperatively in a case-controlled retrospective study of 360 patients who had nonmalignant or malignant pain.[5]

Interventions in patients with opioid-induced hypersensitivity

An increasing number of studies suggest that long-term use of opioids causes changes in pain sensitivity. Recent literature offers a reason for the adverse effect of opioids, which must be taken into consideration: opioid-induced hyperalgesia. This body of literature asserts that the administration of opioids may prompt hypersensitivity to pain.[3] Animal studies have shown that allodynia (pain caused by a stimulus that does not normally elicit pain) and hyperalgesia (heightened pain in response to a normally painful stimulus) can develop following continuous[6] and repetitive[7] administration of opioids. The literature also indicates that hyperalgesia is seen with acute opioid withdrawal and resolves rapidly following termination of the opioid administration.[8] Studies with human subjects suggest that patients who are maintained on methadone are hyperalgesic in comparison to individuals who were previously addicted,[9,10] and significantly more hyperalgesic than control subjects.[12,13] Hyperalgesia has also been recorded in patients on other opioid-dependent populations and patients who are on slow-release oral morphine.[14]

Despite the extensive literature on opioid-induced hyperalgesia in patients maintained on methadone, there is minimal knowledge on the modifications of pain sensitivity in chronic-pain patients given opioids, though studies suggest that these patients experience reformed sensitivity to acute pain,[15,16] with hyperalgesia and allodynia being manifestations of neuropathic pain in the clinical setting.[17] Notably, studies suggest that there is no significant difference in values of threshold of pain when patients treated with nonopioid analgesics are compared to patients with chronic pain receiving opioid treatment.[18,19]

However, an initial prospective pilot study based on patients with chronic low-back pain found that administration of oral morphine for a month was associated with decreased cold-pressor tolerance times.[20] Hay et al[21] conducted an observational study to determine whether pain sensitivity in patients maintained on methadone for dependence therapy was comparable to that in patients with noncancerous chronic pain on either morphine or methadone, relative to pain sensitivity reported in a control group via cold-pressor tests and electrical stimulation. The study found that chronic-pain patients managed with methadone and opioids demonstrated hyperalgesia when gauged by the cold-pressor test, but not by the electrical stimulation test.

Interventions of wound injection and lavage

Direct delivery of local analgesics to the surgical wound site can diminish postoperative opioid demands, and can be considered a management option when other regional methods are not appropriate. Subjects of a study by Goldstein et al,[22] who underwent laparoscopic gynecological procedures and were given local anesthetics to their intraperitoneal wound site followed by wound lavage, utilized four to 17 times less opioid throughout the initial 24 hours postoperatively relative to patients who were given a saline placebo.[22] Another study conducted on patients undergoing microdiskectomy and given direct local anesthetics at the surgical site did not observe any substantial opioid-sparing effects.[23] Therefore, the success found in the literature in administering local anesthetics directly to the surgical site seemingly is dependent on the specific technique utilized for administration – the dose, concentration, and kind of local anesthetic given – and the kind of surgery being performed.[3]

Interventions of regional anesthesia for opioid sparing

The use of regional anesthesia provides numerous benefits, especially in patients taking opioids chronically. However, patients who have developed a dependence on opioids will still require regularly administered doses of opioid in order to avoid withdrawals and cover their chronic-pain needs, which may not be affected by the surgery. For instance, patients who chronically take opioids for low-back pain and are undergoing knee surgery will need analgesia for both after the surgical procedure. Studies have shown that the joint use of epidural opioids and intravenously administered opioids for breakthrough pain was adequate for counteracting any potential withdrawals.[24–26] In a number of other studies on inpatients, the joint use of intravenously administered opioids and epidural opioids for breakthrough pain was adequate for counteracting any potential withdrawals.[3,4,27]

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Opioid-sparing effects have been observed when a number of regional techniques have been employed, such as in the lower extremities, including femoral, lumbar plexus, paravertebral, and sciatic nerve blocks. Methods that utilize continuous catheters are especially attractive for delivering continuous pain control postoperatively. In the ambulatory setting, substantial opioid-sparing effects and optimal pain management have been demonstrated in patients given a continuous femoral nerve block that utilizes bupivacaine in those undergoing repair of the anterior cruciate ligament.[28] It has been most commonly studied in the 3-in-1 and femoral nerve blocks. For instance, a study based on 1,338 patients who underwent total hip arthroplasty demonstrated analogous pain control in those treated with intravenous patient-controlled opioid analgesia, patient-controlled epidural analgesia, and those given a continuous 3-in-1 block. Of note, the patients who were administered a 3-in-1 block reported the best satisfaction.[29] Substantial opioid-sparing effects and optimal pain management have been demonstrated in patients given a continuous femoral nerve block that utilizes bupivacaine in those undergoing repair of the anterior cruciate ligament.[28] Comparable observations regarding the femoral block have been found in patients undergoing popliteal bypass surgery.[30]

For upper-extremity surgeries, opioid-sparing effects have been seen with the use of supraclavicular, interscalene, and axillary blocks. Though the majority of anesthesiologists are accustomed to single-bolus methods for peripheral nerve blocks, the insertion of catheters for extended administration of local anesthetics is becoming more common. Pain control has been found to be better in patients receiving blocks such as continuous interscalene or axillary blocks than in patients receiving intramuscular or intravenous opioids. There was improved patient satisfaction and reduced opioid consumption in the patients receiving blocks in the post operative period as compared to those patients receiving intramuscular or intravenous opioids.[31,32] Though regional methods that utilize catheters can offer several days of pain management, injection of a single bolus may still be effective if insertion of a catheter is not possible. Other studies have observed opioid-sparing effects in single-injection methods in the immediate postoperative period.[33,34]

The use of regional anesthesia provides numerous benefits, and could be especially helpful in chronically opioid-consuming patients. For instance, patients who chronically take opioids for low-back pain and are undergoing knee surgery will need analgesia for both after the surgical procedure. A number of studies have reported cases of opioid withdrawal postoperatively when intrathecal opioids or epidurals were utilized solely for the purpose of perioperative pain management in patients who have developed an opioid dependence.[24,25] On the other hand, in a number of other studies on inpatients, the joint use of intravenously administered opioids and epidural opioids for breakthrough pain was adequate for counteracting any potential withdrawals.[27,35] Carroll et al[3] asserted that routine day-to-day systemic delivery of minimally half of the dose of opioid given preoperatively is adequate to avoid withdrawal when regional anesthesia is utilized.

Interventions to control postoperative nausea and vomiting

In addition to pain, postoperative nausea and vomiting (PONV) are the most common complaints after general anesthesia.[36] PONV could be due to a number of factors. These include pharmacological agents, such as inhalational anesthetics and opioids, patient-related factors, such as migraine, anxiety, motion sickness, and female sex, and the extent and nature of the surgery. Commonly used antiemetics include dopaminergic and cholinergic antagonists, such as prochlorperazine, promethazine, diphenhydramine, 5-HT_3 and 5-HT_4 serotonin blockers, and glucocorticoids. It is important preoperatively to identify patients at high risk of PONV, provide PONV prophylaxis with the most effective antiemetic single-therapy and combination-therapy regimens, including nonpharmacologic approaches and plan for strategies for treatment of PONV[37] to prevent delay in discharge from hospital and unexpected admissions.

Conclusion

Notwithstanding the established acknowledgment that the management of postoperative pain is both undertreated and common, a significant number of patients continue to report moderate-to-severe pain postoperatively.[38,39] Severe postoperative pain is associated with a greater risk of cardiovascular and pulmonary complications and longer recovery periods following inpatient procedures, and is the most commonly seen cause of unanticipated admissions to the hospital after ambulatory surgery and postponed discharge.[40,41]

With the continuing rise in the number of ambulatory surgeries, attention to the perioperative pain management of patients in the ambulatory setting is crucial.

The intricacies of evaluation and optimum treatment of pain within a short period in the setting of ambulatory surgery of a variety of medical and sometimes serious conditions make optimum pain control in the ambulatory care setting truly challenging. The concept of an ambulatory pain-management provider overseeing care for patients with a history

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of pain issues, substance abuse, and/or chronic pain, as well as overseeing pain control in the PACU of the ambulatory surgery center, could be critical to the ever-growing community we serve. Ambulatory pain control can be highly complex, and is probably best accomplished through risk stratification, multidisciplinary communication, the use of multimodal analgesia, which can include regional anesthesia also, and other interventions when strategies fall short preoperatively.

There is a need for increased clinical research on quality of care in the ambulatory surgery setting, such as early intervention when problematic pain issues are recognized, in order to prevent emergency room visits, delayed discharges, and unplanned admissions. Interventions include control of anxiety, managing patients with a history of chronic pain, chronic opioid use, and the prevention of pain flare-ups in patients who are opioid-dependent and/or taking part in substance-abuse programs. New interventions will also be necessary when current multimodal analgesia modalities are insufficient or ineffective. It is always important to consider the cost of the interventions that may be needed after implementation of multimodal analgesia to make the strategies viable in the long term. Immediate hospital costs include services by personnel, supplies, and other resources. However, the cost of unplanned hospital admissions, returns to the emergency room for pain that is out of control, and the development of chronic pain as a result of poorly controlled acute pain is much more costly to the patient, society, and the health care system.

With the increasing need for optimum pain control in ambulatory surgery centers, the authors recommend a new concept wherein an ambulatory pain specialist oversees a clinical program of ambulatory pain control in each ambulatory center to facilitate the implementation of customized treatment plans to provide optimum pain control to all patients undergoing outpatient surgery. In addition, more research in the patterns and predictive factors of severe pain in ambulatory surgery and the multimodal management of acute surgically inflicted pain in patients with underlying chronic pain treated with opioids is needed.

Disclosure

The authors report no conflicts of interest in this work.

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Research Paper

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Pain among US adults before, during, and after the COVID-19 pandemic: a study using the 2019 to 2023 National Health Interview Survey

Anna Zajacova[a,*], Hanna Grol-Prokopczyk[b], Richard L. Nahin[c]

Abstract

The unprecedented disruption of the COVID-19 pandemic raises crucial questions about its impact on chronic pain levels in the US population. We present a comprehensive analysis of chronic pain (CP), high-impact chronic pain (HICP), and site-specific pain prevalence before, during, and after the pandemic, and investigate key contributing factors. We analyze a nationally representative sample of 90,769 community-dwelling adults aged 18 years and older from 3 cross-sectional waves of the National Health Interview Survey (2019, 2021, and 2023). Outcomes are CP and HICP; we also present findings for 6 site-specific pain measures. We include an extensive range of covariates (demographics, socioeconomic status, health behaviors, health conditions, mental health, and health insurance type); additional analyses also explore the role of long COVID. Chronic pain prevalence increased from 20.5% (95% confidence interval: 19.9%-21.2%) in 2019 to 20.9% (20.3%-21.6%) in 2021 and 24.3% (23.7%-25.0%) in 2023, representing an 18% increase over the study period. High-impact chronic pain prevalence, which was 7.5% (7.1%-7.8%) in 2019, declined to 6.9% (6.6%-7.3%) in 2021 before rising to 8.5% (8.1%-8.9%) in 2023, a 13% overall increase. The 2023 pain increases were widespread: they occurred for all examined body sites except tooth/jaw pain and all population subgroups. Long COVID accounted for approximately 13% of the observed 2019 to 2023 increase in both CP and HICP. In 2023, an estimated 60 million Americans experienced CP and 21 million experienced HICP, the highest prevalence ever recorded in the National Health Interview Survey. These findings suggest a significant escalation in the population burden of pain, with crucial implications for public health policy.

Keywords: Chronic pain, High-impact chronic pain, US adults, Trends, Epidemiology, COVID-19

1. Introduction

Chronic pain affects millions of US adults, constituting a public health crisis with profound economic and social consequences. The annual cost of pain was estimated at $560-$635 billion annually (in 2010 dollars), surpassing the costs of heart disease, cancer, or diabetes.[13] Pain affects physical, mental, and cognitive health.[2,27,33] It also profoundly affects all other life domains such as employment,[31] family relationships,[38] sexual function,[12] and sleep,[19] and contributes significantly to opioid use and misuse, which remain a major public health challenge.[41] Given the pain's role as a barometer of population health,[48] monitoring pain levels in the United States is one of the Healthy People 2030 goals.[30]

During the early years of the 21st century, chronic pain increased steadily among US adults,[43,47,50,51] but the upward trends slowed or even reversed by 2020 or 2021.[22,34] This encouraging change coincided with the start of the COVID-19 pandemic, however, when pain researchers warned of potential widespread pain-related consequences of COVID-19.[6,20] Pain might increase as a direct consequence of the viral infection[25,36] or due to stress, anxiety, depression, and loneliness linked to social distancing[26,45]; increases in detrimental health behaviors[39,49]; disrupted health care[37]; or economic hardships during the pandemic.[42] In recent years, emerging literature has documented pain-related consequences of COVID-19 infection, especially of long COVID.[10,21,25,35,44] Despite these concerns, little is known about chronic pain prevalence at the population level after the pandemic.

To date, only 2 brief government reports have provided pain prevalence estimates among US adults during this period—one during the pandemic[34] and one postpandemic.[24] These reports document a 2021 chronic pain prevalence comparable with that of prior years and a higher prevalence in 2023. These studies are purely descriptive, however, offering only unadjusted prevalence for selected population groups without systematic comparisons over time or examination of potential drivers, such as pandemic-linked social and economic disruptions or long COVID.

Our study provides the first comprehensive assessment of chronic pain in a nationally representative sample of US adults before (2019), during (2021), and after (2023) the COVID-19

Sponsorships or competing interests that may be relevant to content are disclosed at the end of this article.

[a] *University of Western Ontario, London, ON, Canada,* [b] *University at Buffalo, SUNY, Buffalo, NY, United States,* [c] *National Center for Complementary and Integrative Health, NIH, Bethesda, MD, United States*

**Corresponding author. Address: 5330 Social Science Centre, University of Western Ontario, London ON N6A 5C2, Canada. E-mail address: anna.zajacova@uwo.ca (A. Zajacova).*

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pandemic. Using data from the National Health Interview Survey, we examine trends in multiple chronic pain measures, including high-impact chronic pain[32] and 6 location-specific pain indicators, in the total population and across key population subgroups. Importantly, we explore potential mechanisms underlying the observed changes, with particular attention to the role of long COVID in the postpandemic pain landscape.

2. Methods

2.1. Data

We analyzed trends in pain using data from the 2019, 2021, and 2023 National Health Interview Survey (NHIS) harmonized by IPUMS.[4] The NHIS, approved by the National Center for Health Statistics Research Ethics Review Board, is an ongoing cross-sectional household-based interview survey. It is deemed to be the "best single source for pain surveillance" among US adults, including for the study of pain trends.[9]

The choice of the 3 waves—2019, 2021, and 2023—is based on NHIS's sampling and variable collection practices: 2019 is the first year after a major study redesign[17]; 2023 is the most recent wave available at the time of the writing, and key variables were not collected in 2020 and 2022. In the 3 waves combined, the NHIS included 90,769 respondents aged 18 years and older.

2.2. Variables

Two widely used measures of pain were collected in 2019, 2021, and 2023. Chronic pain (CP) is defined as pain on most days or every day over the past 3 months, vs never or only on some days. High-impact chronic pain (HICP) is CP that also limits activities on most days or every day (versus no CP or CP that limits activities only on some days or never).

We also analyze all 6 available site-specific pain questions. Respondents who indicated they had pain on some days, most days, or every day were asked how much pain they experienced during the past 3 months in the following sites: back; arm, shoulder, or hand; hip, knee, or feet; headache or migraine; abdominal, pelvic, or genital; and jaw or tooth pain. Those who said they had "a lot of" pain at a given site (versus none, a little, or "somewhere between a little and a lot") were classified as having significant pain at that site.

The main predictor is the year of interview (2019 as reference, 2021, and 2023).

Covariates include demographics (age, sex, race/ethnicity, region, and rural/urban classification), socioeconomic status, health behaviors, physical health conditions, mental health, and health insurance type. The final covariate is long COVID (ever, vs never as reference). Supplemental analyses also use a more detailed categorization that includes current long COVID and current high-impact long COVID. The long COVID variables are only available in 2023; 2019 was before the pandemic and the variables were not collected in 2021. The categories for all covariates, their distributions in the population, and tests for changes in the distribution across 2019, 2021, and 2023 are summarized in Supplemental Table S1, http://links.lww.com/PAIN/C356.

2.3. Approach

First, we estimated the weighted crude prevalence of CP, HICP, and the 6 site-specific pain measures in each year and tested for differences across waves using design-based F-tests (**Table 1**). We then visualized the prevalence of CP and HICP in major population groups in each year. **Figure 1** shows the estimated prevalence for the total population, by sex, age groups, and education. Supplemental Figure S1, http://links.lww.com/PAIN/C356 shows the prevalence also by race/ethnicity and rural/urban status. We summarize the underlying point estimates and their 95% confidence intervals in Supplemental Table S2, http://links.lww.com/PAIN/C356. These estimates were adjusted for changes in age distribution across the 3 waves within each population subgroup by calculating average predicted prevalences from robust Poisson models that included age and year as covariates, estimated separately for each subgroup.

In addition to the graphical representation that visualized the 2019-to-2023 pain increases in major population subgroups, we formally tested whether the degree of change differed across population subgroups. This was performed by estimating regression models of pain with interaction terms between year and each population group, net of basic demographic controls (Supplemental Table S3, http://links.lww.com/PAIN/C356).

Second, we examined the covariates of pain change over time using regression-based approaches. Statistical significance was defined as $P < 0.05$ for all analyses, with P-values either reported exactly or using asterisks in select tables for parsimony ($^{*}P < 0.05$, $^{**}P < 0.01$, $^{***}P < 0.001$). We estimated a series of regression models of all pain outcomes as a function of year, net of the following covariate groups: Model 1 was bivariate, including only the survey year; Model 2 controlled for all covariates except long COVID; and Model 3 added long COVID (**Table 2**). We used modified Poisson models, which are appropriate for dichotomous outcomes and increasingly preferred over logistic models because their exponentiated coefficients are interpretable as prevalence ratios rather than the less intuitive odds ratios.[40] **Table 2** also summarizes the percent of pain change between 2019 and 2023 that was due to long COVID, estimated using the Karlson–Breen–Holm (KHB) method[5] for comparing coefficients across nonlinear models.

2.3.1. Sensitivity checks

We conducted extensive supplemental analyses to assess the robustness of our conclusions to different variable and model specifications. The regression models were reestimated with logit and probit links, and as linear probability models. The findings were comparable with those shown. We incorporated long COVID in regression models in 3 different ways because of its collinearity with 2019 and absence in 2021 (Supplemental Table S4, http://links.lww.com/PAIN/C356). Specifically, we used the composite year/COVID-19 set of dummies, added long COVID as a covariate (2021 dropped out of these models because long COVID was not ascertained that year), and estimated the models after excluding adults with long COVID. The goal was to ascertain that these 3 different approaches to incorporating long COVID yielded nearly identical results. We also estimated the KHB models with probit rather than logit link functions. Moreover, in addition to using the KHB decomposition to obtain an unbiased estimate of the proportion of the 2023 (vs 2019) difference due to long COVID, we also estimated the nested models with and without long COVID using linear probability models, as feasible for dichotomous outcomes,[16] where it is possible to directly calculate percent of effect (for the 2023 year) that was due to the inclusion of COVID-19. These checks also obtained estimates similar to those shown in the article.

We examined missingness on dependent and independent variables closely. Of the 90,769 respondents, 2300 (2.5%) were missing the lead chronic pain question; an additional 23 (0.02%)

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Table 1
Prevalence of pain in 2019, 2021, and 2023.

	2019		2021		2023		*P* from pairwise tests		
	N	Prevalence, (95% CI)	N	Prevalence, (95% CI)	N	Prevalence, (95% CI)	2021 vs 2019	2023 vs 2021	2023 vs 2019
Sample size	31,916		29,396		29,457				
Population represented	250,334,186		252,461,316		257,760,200				
Global pain									
Chronic pain	50,154,951	**20.5** (19.9-21.2)	51,490,798	20.9 (20.3-21.6)	60,713,114	**24.3** (23.7-25.0)	0.358	<0.001	<0.001
HICP	18,218,925	**7.5** (7.1-7.8)	17,076,145	6.9 (6.6-7.3)	21,114,932	**8.5** (8.1-8.9)	0.033	<0.001	<0.001
Site-specific pain									
Back/neck	27,369,896	11.2 (10.8-11.7)	26,555,370	10.8 (10.4-11.2)	30,992,275	12.4 (11.9-12.9)	0.132	<0.001	<0.001
Shoulder/arm	20,774,218	8.5 (8.1-9.0)	19,389,110	7.9 (7.5-8.3)	22,807,394	9.2 (8.7-9.6)	0.015	<0.001	0.029
Hip/knee/leg	29,652,413	12.2 (11.7-12.7)	28,200,773	11.5 (11.0-12.0)	32,575,447	13.1 (12.6-13.6)	0.026	<0.001	0.006
Head/migraine	11,623,361	4.8 (4.5-5.1)	10,478,580	4.3 (4.0-4.6)	13,832,320	5.6 (5.2-5.9)	0.010	<0.001	<0.001
Abdominal	6,162,424	2.5 (2.3-2.8)	5,887,226	2.4 (2.2-2.6)	7,730,317	3.1 (2.9-3.4)	0.343	<0.001	<0.001
Tooth/jaw	5,349,077	2.2 (2.0-2.4)	5,277,190	2.2 (1.9-2.4)	5,534,036	2.2 (2.0-2.4)	0.736	0.602	0.871

Prevalence estimates for 2023 vis-à-vis 2019 for CP and HICP are bolded for ease of observation.
All contents adjusted for complex sampling design. The last 3 columns show *P*-values from survey-adjusted Wald tests for differences across pairs of year. F-tests for equality across all 3 years, not shown for parsimony, yielded *P*-values $P < .001$ for all pain measures except tooth/jaw where $P = 0.873$.
Site-specific pain is defined as "a lot" of pain, vs none, a little, or "somewhere in between a little and a lot" in each site.
HICP, high-impact chronic pain.Source: National Health Interview Survey, Adults 18 years and older, n = 90,769.

were missing HICP; and site-specific pain was missing for an additional 98 to 144 (0.1% to 0.2%). There was no missingness on age, region, rurality, race/ethnicity, and income (imputed by NCHS), and only 10 respondents were missing sex. Other covariates had low to moderate missingness such that the fully adjusted complete-case models with all covariates lost only 5.8% of the analytic sample. Nonetheless, we compared complete-case and multiply imputed models (Supplemental Table S5, http://links.lww.com/PAIN/C356); findings were nearly identical between both approaches.

Finally, we closely examined the role of long COVID in influencing pain prevalence in 2023. We first estimated the association between long COVID and pain net of covariates; this set of models yielded estimates of the long COVID–pain association at the individual level (Supplemental Table S6, http://links.lww.com/PAIN/C356). Then, we analyzed the role of long COVID at the population level. We calculated the counterfactual (hypothetical) prevalence of pain under 2 scenarios: if no one had long COVID and if everyone in the population had long COVID. These were obtained by calculating the predicted probabilities of the outcome (pain) for each individual using their actual covariate values, but assigning the values of 0 or 1, respectively, for long COVID. We then averaged these probabilities over all observations. The comparison of the first scenario and actual observed prevalence was also used to calculate the population-attributable fraction[14] of CP and HICP due to long COVID (Supplemental Table S7, http://links.lww.com/PAIN/C356).

3. Results

Table 1 summarizes the weighted crude prevalence of pain in each year. The prevalence of CP was 20.5% (95% confidence interval [CI] 19.9%-21.2%) in 2019 and remained statistically comparable at 20.9% (95% CI 20.3%-21.6%) in 2021 but increased significantly to 24.3% (95% CI 23.7%-25.0%) in 2023. High-impact chronic pain prevalence was 7.5% (95% CI 7.1%-7.9%) in 2019. It declined to 6.9% (95% CI 6.6%-7.3%) in 2021 but increased significantly to 8.5% (95% CI 8.1%-8.9%) in 2023.

Table 1 also summarizes the prevalence of the 6 site-specific pain measures. Tooth/jaw pain remained stable across the 3 waves. All other sites remained stable or declined significantly in 2021 vs 2019 but then increased significantly by 2023, so that 5 of the 6 sites (back/neck, shoulder/arm, hip/knee/leg, headache/migraine, and abdominal/pelvic) had a higher prevalence in 2023 than in both 2021 and 2019. For example, the most prevalent pain site—hip/knee/leg pain—declined from 12.2% (95% CI 11.7%-12.7%) in 2019 to 11.5% (95% CI 11.0%-12.0%) in 2021, then increased to 13.1% (95% CI 12.6%-13.6%) in 2023.

Figure 1 visualizes the patterns in CP (Plot A) and HICP (Plot B) in the full sample in 2019, 2021, and 2023, and also shows prevalence by sex, age, and educational attainment. The results by race/ethnicity and rural/urban classification are in Supplemental Figure S1, http://links.lww.com/PAIN/C356. The figures show that the 2023 increase was universal across population groups: CP and HICP stayed relatively stable in 2021 compared with 2019 but increased sharply in 2023 for everyone. The underlying estimates are summarized in Supplemental Table S2, http://links.lww.com/PAIN/C356.

In addition, we also tested formally whether the 2023 increase relative to 2019 was comparable by sex, age, educational attainment, race/ethnicity, and rural/urban classification, using regression models with interaction terms. The findings are in Supplemental Table S3, http://links.lww.com/PAIN/C356. The HICP increases were statistically equivalent across all population groups. Chronic pain increases were also comparable for men and women, as well as for Black and Hispanic, as compared with White, adults. However, CP increased significantly more for younger people, Asian Americans, college graduates, and urban residents, as compared with older adults, Whites, those without a college degree, and rural residents, respectively. Thus, the increases in CP tended toward convergence because groups with lower baseline prevalence experienced significantly greater increases through 2023 than groups with higher baseline prevalence.

The second part of the analysis explored explanations for the changes in pain prevalence. Supplemental Table S1, http://links.lww.com/PAIN/C356 summarizes the distribution of population characteristics relevant to pain prevalence in each year.

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Table 2

Prevalence ratios from robust Poisson models for chronic pain, high-impact chronic pain, and site-specific pain in 2021 and 2023 relative to 2019 under different model specifications.

	Model 1		Model 2		Model 3		% of 2023 effect due to long COVID
Chronic pain							
2021	1.02	(0.98, 1.06)	1.07***	(1.04, 1.11)	1.07***	(1.04, 1.11)	
2023	**1.18*** **	**(1.14, 1.23)**	**1.22*** **	**(1.18, 1.26)**	**1.19*** **	**(1.15, 1.23)**	**12.9%**
2023 with long COVID					1.48***	(1.39, 1.57)	
High-impact chronic pain							
2021	0.93*	(0.87, 0.99)	1.03	(0.97, 1.10)	1.03	(0.97, 1.10)	
2023	**1.13*** **	**(1.06, 1.21)**	**1.19*** **	**(1.12, 1.27)**	**1.16*** **	**(1.09, 1.24)**	**12.4%**
2023 with long COVID					1.39***	(1.24, 1.57)	
Back/neck pain							
2021	0.96	(0.91, 1.01)	1.03	(0.99, 1.09)	1.03	(0.98, 1.09)	
2023	**1.11*** **	**(1.05, 1.17)**	**1.15*** **	**(1.09, 1.21)**	**1.11*** **	**(1.05, 1.17)**	**23.6%**
2023 with long COVID					1.44***	(1.31, 1.58)	
Arm/shoulder pain							
2021	0.92*	(0.87, 0.98)	1.01	(0.95, 1.07)	1.01	(0.95, 1.07)	
2023	**1.07***	**(1.01, 1.14)**	**1.13*** **	**(1.07, 1.20)**	**1.07***	**(1.00, 1.14)**	**40.1%**
2023 with long COVID					1.58***	(1.42, 1.75)	
Knee/hip/leg pain							
2021	0.94*	(0.89, 0.99)	1.01	(0.96, 1.06)	1.01	(0.96, 1.06)	
2023	**1.07** **	**(1.02, 1.13)**	**1.12*** **	**(1.07, 1.17)**	**1.08*** **	**(1.03, 1.14)**	**26.1%**
2023 with long COVID					1.35***	(1.23, 1.47)	
Head/migraine							
2021	0.89*	(0.82, 0.97)	0.97	(0.89, 1.06)	0.97	(0.89, 1.05)	
2023	**1.16*** **	**(1.07, 1.27)**	**1.18*** **	**(1.09, 1.29)**	**1.08**	**(0.99, 1.18)**	**41.5%**
2023 with long COVID					1.79***	(1.56, 2.06)	
Abdominal/pelvic pain							
2021	0.95	(0.84, 1.06)	1.03	(0.91, 1.16)	1.02	(0.91, 1.16)	
2023	**1.23*** **	**(1.10, 1.37)**	**1.25*** **	**(1.12, 1.40)**	**1.20** **	**(1.06, 1.35)**	**13.6%**
2023 with long COVID					1.58***	(1.29, 1.95)	
Tooth/jaw pain							
2021	0.98	(0.85, 1.12)	1.14	(1.00, 1.30)	1.14	(1.00, 1.30)	
2023	**1.01**	**(0.89, 1.15)**	**1.12**	**(0.98, 1.28)**	**1.06**	**(0.92, 1.22)**	**31.4%**
2023 with long COVID					1.51***	(1.19, 1.92)	

*$P < 0.05$, **$P < 0.01$, ***$P < 0.001$.

Table summarizes prevalence ratios from robust (modified) Poisson models of each pain outcome. Only coefficients for the year 2021 and 2023 relative to 2019 are shown for parsimony and the estimates for 2023 vs 2019 are bolded for ease of observation. Complete results for Model 3 for CP and HICP are summarized in Supplemental Table S4, http://links.lww.com/PAIN/C356.

Analyses take into account NHIS complex sampling design.

Model 1 has no covariates, only year (2019 as reference).

Model 2 controls for all covariates (age, sex, region, rurality, race, immigrant and marital status, education, food insecurity, difficulty paying medical bills, family income, BMI, smoking, 7 physical chronic conditions, high anxiety and depression symptoms, and health insurance type) except long COVID.

Model 3 adds long COVID. Because long COVID variable is not available in 2021 and it is zero for all respondents in 2019, it is included in the models by creating a composite variable that combines year and long COVID: 2019 (reference), 2021, 2023 for those without long COVID, and 2023 for those with long COVID. This composite variable is equivalent to controlling for long COVID but allows us to retain the 2021 survey wave. The coefficient for 2023 without long COVID is equivalent to the main effect of 2023 in models adjusting for long COVID, as shown in Supplemental Table S4, http://links.lww.com/PAIN/C356.

The last column shows the percent of the 2023 increase that was due to long COVID, estimated with the Karlson–Breen–Holm (KHB) method[5] for comparing coefficient effects across nonlinear models. Please note the approach is not available with full complex survey adjustment and for robust Poisson models; we therefore estimated it with sampling weights only and using the logit link. Probit KHB models yielded closely comparable findings.

HICP, high-impact chronic pain; NHIS, National Health Interview Survey.

Demographics (age, sex, region, race/ethnicity, and foreign-born) did not change significantly and neither did the prevalence of physical chronic conditions (angina, arthritis, cancer, congestive heart disease, diabetes, myocardial infarction, or hypertension). However, the distributions of socioeconomic factors, mental health, health behaviors, and health insurance changed significantly between 2019 and 2023: Education and family income increased, and a smaller proportion were uninsured or had difficulty paying medical bills. Smoking prevalence decreased but the prevalence of obesity increased significantly from 31.2% in 2019 to 33.3% in 2023. The prevalence of elevated depressive symptoms and anxiety increased significantly as well. The final covariate is long COVID. In 2023, 8.3% of the population reported having had long COVID. This includes those who had long COVID previously but recovered before the interview (4.8%), those with current long COVID (3.5%), and those with current high-impact long COVID (0.7%).

Table 2 summarizes these characteristics in regression models of CP, HICP, and the 6 site-specific pain measures. Model 1 is unadjusted, with only year as a predictor; Model 2 includes all covariates except long COVID; and Model 3 adds long COVID. Regarding CP, the unadjusted prevalence was unchanged in 2021 vs 2019 but increased 18% in 2023 (PR = 1.18, 95% CI 1.14, 1.23). Net of the covariates added in Model 2, the 2023 prevalence remained significantly higher (PR = 1.22, 95% CI 1.18, 1.26). In Model 3, we added a composite year/long COVID variable with 4 categories: 2019 (reference), 2021, 2023 *without* long COVID (yielding year effect estimates identical to those in models controlling for long COVID), and 2023 *with* long COVID. In this model, the 2023 prevalence of CP net of all

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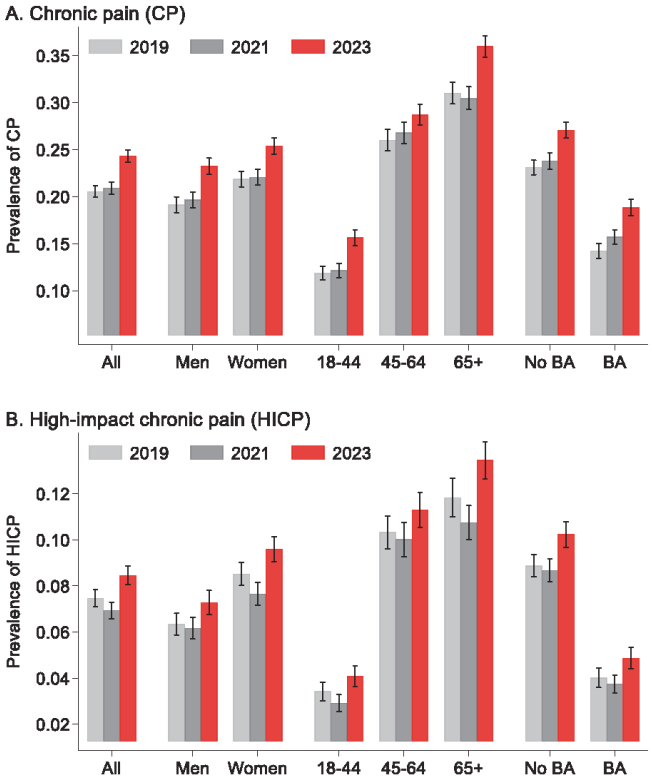

Figure 1. Chronic pain and high-impact chronic pain in 2019, 2021, and 2023, US adults 18 years and older, total and by sex, age, and education. Note: Weighted prevalence estimates and 95% confidence intervals adjusted for complex sampling design. Population in aggregate (all), by sex (men and women), by age (18-44, 45-64, and 65+), and by education (no college degree [no BA] and has college degree [BA]). See Supplemental Figure S1, http://links.lww.com/PAIN/C356 for results by race/ethnicity and rural/urban classification and Supplemental Table S2, http://links.lww.com/PAIN/C356 for the underlying estimates.

covariates including long COVID was 19% higher compared with 2019 (PR = 1.19, 95% CI 1.15, 1.23). The table also summarizes 2 perspectives on the role of long COVID in CP trends. First, we show the coefficient for 2023 with long COVID: Among adults who reported in 2023 that they ever had long COVID, pain was 48% higher than in the 2019 population (PR = 1.48, 95% CI 1.39, 1.57). Second, the proportion of the population-level increase in chronic pain attributable to long COVID, obtained through the KHB decomposition of estimates in Models 2 and 3, was 12.9%. That is, long COVID explained approximately 13% of the 2019 to 2023 increase in chronic pain.

Table 2 also summarizes the same series of models for HICP and site-specific pain. Except tooth/jaw pain, which showed no change over time, the data show (1) no significant increase in prevalence in 2021 compared with 2019, whether in unadjusted or adjusted models; (2) significant increases in 2023 compared with 2019 in the unadjusted Model 1 across all pain measures; (3) significant increases in 2023 compared with 2019 in the adjusted Model 2—in fact, the prevalence ratios (PRs) for 2023 are even larger than in Model 1, indicating that all the considered covariates jointly do not explain the pain increase postpandemic; and (4) long COVID explains a part of the increase between 2019 and 2023 as observed in Model 3 and the decomposition results in the last column. Specifically, the percent increase in pain prevalence due to long COVID ranges from approximately 13% for CP, HICP, and abdominal pain to approximately 40% for headache/migraine and arm/shoulder pain.

Table 2 only summarizes the coefficients for the key predictors (year 2021 and 2023) for parsimony; full results of Model 3 for CP and HICP are summarized in Supplemental Table S4, http://links.lww.com/PAIN/C356. This table also summarizes the equivalence of 3 ways of including long COVID in the models: using the composite variable as in **Table 2**; including long COVID as a covariate (2021 is dropped from that analysis because long COVID was not ascertained), and excluding adults with long COVID from analysis. These different specifications all show comparable results.

Finally, we offer 2 additional perspectives on the role of long COVID in pain prevalence by analyzing only 2023 data. Supplemental Table S6, http://links.lww.com/PAIN/C356 summarizes the results of regression models of CP and HICP as a function of long COVID, disaggregating this variable into long COVID in the past, current long COVID, and current high-impact long COVID. The results show a dose–response relationship between these

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COVID-19 variables and pain, confirming the strong association between long COVID and pain at the individual level.

Supplemental Table S7, http://links.lww.com/PAIN/C356 returns to the population level and calculates the population-attributable fraction of CP and HICP due to long COVID in 2023. Adjusting only for age and sex, approximately 5% to 7% of pain in the population is due to long COVID, a nontrivial but not decisive proportion. The proportion-attributable fraction is below 3% in fully adjusted models. Counterfactual simulations (hypothetical estimates) show that if nobody in the population had long COVID, CP and HICP in 2023 would have been 23.0% (95% CI 22.4, 23.6) and 7.8% (95% CI 7.5, 8.2)—still higher than in 2019 but slightly less than the observed prevalence levels.

4. Discussion

Pain surged dramatically among US adults after the COVID-19 pandemic. Between 2019 and 2023, prevalence of chronic pain and high-impact chronic pain increased by 18% and 13%, respectively. The widely cited 20% population prevalence of CP[8,34,46] seems outdated; our estimate from 2023 is 24.3%. This increase represents more than 10 million additional individuals experiencing chronic pain in 2023 compared with just 5 years prior, bringing the total to more than 60 million adults. Similarly, high-impact chronic pain, the most debilitating form of pain,[32] affected 8.5% of adults in 2023, up from 7.5% in 2019 (and only 6.9% during the pandemic in 2021). This new estimate represents more than 21 million Americans experiencing high-impact pain in 2023.

The increase is not restricted to specific demographics or pain sites: It is evident in most population subgroups and in all examined pain sites except tooth/jaw pain. We found similar relative increases in HICP for younger and older adults, men and women, college graduates and people without college diplomas, and across all race/ethnic groups and rural/urban classification. The increases in CP were often similar across groups as well, but groups with lower prevalences before the pandemic (younger adults, Asian Americans, college graduates, and people in large metropolitan areas) experienced significantly steeper increases than older adults, Whites, people without college diplomas, and rural residents, suggesting some convergence in age-related, racial/ethnic, educational, and geographic disparities in pain.

The increases in CP and HICP were not explained by changes in the population distribution of important sociodemographic and health covariates including age, education, economic well-being, smoking and obesity, physical conditions, or depressive and anxiety symptoms. In fact, if the population distribution of these characteristics had remained at 2019 levels, the increase in pain might have been even greater. However, this interpretation warrants caution given the cross-sectional and observational nature of our data.

One factor seeming to contribute to the observed trends is long COVID. At the individual level, long COVID is a powerful predictor of pain,[11,35] a relationship we confirmed in our analyses of 2023 data: adults with long COVID are significantly more likely to report both chronic and high-impact pain. However, at the population level, long COVID explains only a part of the 2019-to-2023 increase in pain prevalence. For chronic and high-impact chronic pain, long COVID explained approximately 13% of the increase. For site-specific pain, long COVID explained between 14% of the increase in abdominal/pelvic pain, up to 40% of the increase in headache/migraine and arm/shoulder pain.

That conventional demographic, health, and socioeconomic covariates—as well as long COVID—explain only a portion of the dramatic postpandemic pain escalation suggests that broader systemic factors are driving these trends. The counterintuitive temporal pattern—stable pain prevalence during the pandemic but substantial increases afterward—suggests complex biopsychosocial mechanisms operating across different phases.

Several factors may explain why pain did not increase during 2021 despite widespread social disruption. Pandemic-era policies provided temporary protective effects: enhanced unemployment benefits and eviction moratoriums reduced financial stress, a powerful pain correlate, for many American families. Remote work arrangements decreased commuting and workplace physical demands while allowing greater environmental control and schedule flexibility for self-care. Heightened social cohesion during the acute crisis phase may have strengthened support systems that buffer against pain, even when delivered virtually. In addition, dramatic reductions in respiratory infections due to masking and social distancing may have reduced inflammatory processes that exacerbate pain conditions.

Pandemic-linked disruptions in health care represent another potential mechanism of the observed fluctuations in pain. Healthcare visits for non–COVID-19 health issues declined dramatically in 2020 and 2021,[28] particularly at hospitals and emergency department,[3] which are often the first site of care for acute pain management.[7] Lack of adequate and timely management of acute pain during the pandemic might have led more individuals to transition to CP and HICP by 2023.[29]

Beyond healthcare disruption, the postpandemic environment may have created conditions that exacerbated pain prevalence. The termination of protective pandemic-era policies coincided with, or even caused, new forms of social and economic stress. The rapid transition back to prepandemic work demands and social obligations constituted significant readjustment stress for populations that had adapted to altered routines. The return-to-work mandates may have also contributed to increased pain through increased occupational injuries and accidents, a substantial source of pain.[15] In addition, the disruption of social connections, powerful correlates of chronic pain,[1,18,23] during the pandemic may have manifested with a temporal lag, contributing to the delayed pain surge rather than immediate increases during lockdowns. Meanwhile, cumulative allostatic load from prolonged pandemic stress may have manifested in delayed psychophysiological impacts that became apparent only by 2023. The expanding population with COVID-19 infections also created a larger pool susceptible to pain-inducing immune dysregulation, compounding these social and psychological stressors.

Finally, several changes in NHIS data collection modes and response characteristics may also partially account for changing pain prevalence estimates between 2019 and 2023. For instance, during this period, the NHIS response rate declined, the proportion of interviews conducted at least in part by phone (as opposed to fully in-person) increased, and the proportion of interviews that were incomplete increased as well (Supplemental Table S8, http://links.lww.com/PAIN/C356). Incomplete surveys typically occur when respondents or interviewers break off the interview (eg, because they need to go somewhere or because of time considerations). Although it is not obvious how these changes in survey characteristics might affect pain prevalence estimates, they may play a role in influencing the patterns observed in this study.

In addition to these data limitations, we also note that the analysis was based on cross-sectional data. Longitudinal data could allow more causal analyses that might better identify the reasons for the observed changes in pain prevalence. We also caution that NHIS only includes noninstitutionalized adults, so changes in institutionalization might contribute to observed

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patterns. Finally, all covariates were self-reported, increasing the chance of recall error. This is potentially problematic, especially regarding reports of long COVID. Given the complexity and recent emergence of this condition, over- and/or under-reporting are possible; this may lead to misestimation of its role in the rising prevalence of pain.

Despite its limitations, this analysis is the first comprehensive report on the escalation of chronic and high-impact pain after the pandemic in the US adult population. Our findings should be replicated with other nationally representative data sources, and a broader set of potential explanatory factors should be used to explain the postpandemic trends. We found that chronic pain, already a widespread health problem, reached an all-time high prevalence in the postpandemic era, necessitating urgent attention and interventions to address and alleviate this growing health crisis.

Conflict of interest statement

The authors have no conflicts of interest to declare.

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Supplemental digital content

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SPECIAL ARTICLES

Anesthesiology 2010; 112:1–1

Practice Guidelines for Chronic Pain Management

*An Updated Report by the American Society of Anesthesiologists Task Force on Chronic Pain Management and the American Society of Regional Anesthesia and Pain Medicine**

PRACTICE Guidelines are systematically developed recommendations that assist the practitioner and patient in making decisions about health care. These recommendations may be adopted, modified, or rejected according to clinical needs and constraints and are not intended to replace local institutional policies. In addition, Practice Guidelines developed by the American Society of Anesthesiologists (ASA) are not intended as standards or absolute requirements, and their use cannot guarantee any specific outcome. Practice Guidelines are subject to revision as warranted by the evolution of medical knowledge, technology, and practice. They provide basic recommendations that are supported by synthesis and analysis of the current literature, expert and practitioner opinion, open forum commentary, and clinical feasibility data.

This document updates the "Practice Guidelines for Chronic Pain Management," adopted by the ASA in 1996 and published in 1997.[1]

* Developed by the American Society of Anesthesiologists Task Force on Chronic Pain Management: Richard W. Rosenquist, M.D. (Chair), Iowa City, Iowa; Honorio T. Benzon, M.D., Chicago, Illinois; Richard T. Connis, Ph.D., Woodinville, Washington; Oscar A. De Leon-Casasola, M.D., Buffalo, New York; D. David Glass, M.D., Lebanon, New Hampshire; Wilhelmina C. Korevaar, M.D., Bala Cynwyd, Pennsylvania; Nagy A. Mekhail, M.D., Ph.D., Cleveland, Ohio; Douglas G. Merrill, M.D., Iowa City, Iowa; David G. Nickinovich, Ph.D., Bellevue, Washington; James P. Rathmell, M.D., Boston, Massachusetts; Christine Nai-Mei Sang, M.D., M.P.H., Boston, Massachusetts; and Dana L. Simon, M.D., Des Moines, Iowa. The Task Force thanks Timothy R. Deer, M.D. for his early contributions (September 2006–June 2008) to the development of these Practice Guidelines.

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Address correspondence to the American Society of Anesthesiologists: 520 North Northwest Highway, Park Ridge, Illinois 60068-2573. These Practice Guidelines, as well as all ASA Practice Parameters, may be obtained at no cost through the Journal Web site, www.anesthesiology.org.

Methodology

A. Definition of Chronic Pain

For these Guidelines, chronic pain is defined as pain of any etiology not directly related to neoplastic involvement, associated with a chronic medical condition or extending in duration beyond the expected temporal boundary of tissue injury and normal healing, and adversely affecting the function or well-being of the individual.

B. Purposes of the Guidelines

The purposes of these Guidelines are to (1) optimize pain control, recognizing that a pain-free state may not be attainable; (2) enhance functional abilities and physical and psychologic well-being; (3) enhance the quality of life of patients; and (4) minimize adverse outcomes.

C. Focus

These Guidelines focus on the knowledge base, skills, and range of interventions that are the essential elements of effective management of chronic pain and pain-related problems. The Guidelines recognize that the management of chronic pain occurs within the broader context of health care, including psychosocial function and quality of life. These Guidelines apply to patients with chronic noncancer neuropathic, somatic (*e.g.*, myofascial), or visceral pain syndromes. The Guidelines do not apply to patients with acute pain from an injury or postoperative recovery, cancer pain, degenerative major joint disease pain, headache syndromes (*e.g.*, migraine and cluster), temporomandibular joint syndrome, or trigeminal or other neuralgias of the head or face. In addition, the Guidelines do not apply to pediatric patients and do not address the administration of intravenous drugs or surgical interventions other than implanted intrathecal drug delivery systems and nerve stimulators.

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D. Application

These Guidelines are intended for use by anesthesiologists and other physicians serving as pain medicine specialists. The Guidelines recognize that all anesthesiologists or other physicians may not have access to the same knowledge base, skills, or range of modalities. However, aspects of the Guidelines may be helpful to anesthesiologists or other physicians who manage patients with chronic pain in a variety of practice settings. They may also serve as a resource for other physicians, nurses, and healthcare providers (*e.g.*, rehabilitation therapists, psychologists, and counselors) engaged in the care of patients with chronic pain. They are not intended to provide treatment algorithms for specific pain syndromes.

E. Task Force Members and Consultants

The ASA appointed a Task Force of 12 members, including anesthesiologists in both private and academic practice from various geographic areas of the United States and two consulting methodologists from the ASA Committee on Standards and Practice Parameters.

The Task Force developed the Guidelines by means of a seven-step process. First, they reached consensus on the criteria for evidence. Second, original published research studies from peer-reviewed journals relevant to chronic pain were reviewed and evaluated. Third, expert consultants were asked to (1) participate in opinion surveys on the effectiveness of various chronic pain management recommendations and (2) review and comment on a draft of the Guidelines. Fourth, opinions about the Guidelines recommendations were solicited from a sample of active members of the ASA and the American Society of Regional Anesthesia and Pain Medicine (ASRA). Fifth, the Task Force held open forums at two major national meetings† to solicit input on its draft recommendations. Sixth, the consultants were surveyed to assess their opinions on the feasibility of implementing the Guidelines. Seventh, all available information was used to build consensus within the Task Force to finalize the Guidelines (appendix).

F. Availability and Strength of Evidence

Preparation of these Guidelines followed a rigorous methodological process (appendix). Evidence was obtained from two principal sources: scientific evidence and opinion-based evidence.

Scientific Evidence

Study findings from published scientific literature were aggregated and are reported in summary form by evidence category, as described below. All literature (*e.g.*, randomized controlled trials, observational studies, and case reports) relevant to each topic was considered when evaluating the findings. However, for reporting purposes in this document, only the highest level of evidence (*i.e.*, levels 1, 2, or 3 identified below) within each category (*i.e.*, A, B, or C) is included in the summary.

Category A: Supportive Literature

Randomized controlled trials report statistically significant ($P < 0.01$) differences between clinical interventions for a specified clinical outcome.

Level 1: The literature contains multiple, randomized controlled trials, and the aggregated findings are supported by meta-analysis.‡

Level 2: The literature contains multiple, randomized controlled trials, but there is an insufficient number of studies to conduct a viable meta-analysis for the purpose of these Guidelines.

Level 3: The literature contains a single randomized controlled trial.

Category B: Suggestive Literature

Information from observational studies permits inference of beneficial or harmful relationships among clinical interventions and clinical outcomes.

Level 1: The literature contains observational comparisons (*e.g.*, cohort and case–control research designs) of clinical interventions or conditions and indicates statistically significant differences between clinical interventions for a specified clinical outcome.

Level 2: The literature contains noncomparative observational studies with associative (*e.g.*, relative risk and correlation) or descriptive statistics.

Level 3: The literature contains case reports.

Category C: Equivocal Literature

The literature cannot determine whether there are beneficial or harmful relationships among clinical interventions and clinical outcomes.

Level 1: Meta-analysis did not find significant differences among groups or conditions.

Level 2: There is an insufficient number of studies to conduct meta-analysis and (1) randomized controlled trials have not found significant differences among groups or conditions or (2) randomized controlled trials report inconsistent findings.

Level 3: Observational studies report inconsistent findings or do not permit inference of beneficial or harmful relationships.

Category D: Insufficient Evidence from Literature

The lack of scientific evidence in the literature is described by the following conditions.

(1) No identified studies address the specified relationships among interventions and outcomes.

(2) The available literature cannot be used to assess relationships among clinical interventions and clinical out-

† World Institute of Pain Fifth World Congress, New York, New York, March 14, 2009; and American Pain Society Annual Meeting, San Diego, California, May 7, 2009.

‡ All meta-analyses are conducted by the ASA methodology group. Meta-analyses from other sources are reviewed but not included as evidence in this document.

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comes. The literature either does not meet the criteria for content as defined in the "Focus" of the Guidelines or does not permit a clear interpretation of findings due to methodological concerns (*e.g.*, confounding in study design or implementation).

Opinion-based Evidence

All opinion-based evidence relevant to each topic (*e.g.*, survey data, open-forum testimony, Internet-based comments, letters, and editorials) is considered in the development of these Guidelines. However, only the findings obtained from formal surveys are reported.

Opinion surveys were developed by the Task Force to address each clinical intervention identified in the document. Identical surveys were distributed to three groups of respondents: expert consultants, ASA, and ASRA members.

Category A: Expert Opinion

Survey responses from Task Force–appointed expert consultants are reported in summary form in the text. A complete listing of consultant survey responses is reported in table 2 in appendix 2.

Category B: Membership Opinion

Survey responses from ASA and ASRA members with expertise in chronic pain management are reported in summary form in the text. A complete listing of ASA and ASRA members' survey responses are reported in tables 3 and 4 in appendix 2.

Expert consultant, ASA membership, and ASRA membership survey responses are recorded using a 5-point scale and summarized based on median values.§

Strongly agree: Median score of 5 (at least 50% of the responses are 5).
Agree: Median score of 4 (at least 50% of the responses are 4 or 4 and 5).
Equivocal: Median score of 3 (at least 50% of the responses are 3 or no other response category or combination of similar categories contain at least 50% of the responses).
Disagree: Median score of 2 (at least 50% of responses are 2 or 1 and 2).
Strongly disagree: Median score of 1 (at least 50% of responses are 1).

Category C: Informal Opinion

Open-forum testimony, Internet-based comments, letters, and editorials are informally evaluated and discussed during the development of Guidelines recommendations. When warranted, the Task Force may add educational information or cautionary notes based on this information.

§ When an equal number of categorically distinct responses are obtained, the median value is determined by calculating the arithmetic mean of the two middle values. Ties are calculated by a predetermined formula.

Guidelines

I. Patient Evaluation

History and physical examination: The Task Force recognizes that conducting a history and physical examination and reviewing diagnostic studies by a physician are well established as essential components of each patient's evaluation. Although no controlled trials were found that address the impact of conducting a history (*e.g.*, reviewing medical records and patient interviews), physical examination, or psychologic or behavioral evaluation, numerous studies address the identification of certain health disorders (*e.g.*, diabetes, multiple sclerosis, or posttraumatic injury) that are associated with specific pain conditions (*e.g.*, complex regional pain syndrome [CRPS] or neuropathic pain) (*Category B2 evidence*). Studies with observational findings suggest that a physical examination may aid in the diagnosis of some chronic pain disorders (*Category B2 evidence*), and an observational study suggests that a psychologic evaluation may be helpful in the prediction of treatment success (*Category B2 evidence*).

The consultants, ASA members, and ASRA members strongly agree that all patients presenting with chronic pain should have a documented history and physical examination and an assessment that ultimately supports a chosen treatment strategy. In addition, they strongly agree that findings from the patient history, physical examination, and diagnostic evaluation should be combined to provide the foundation for an individualized treatment plan, and that whenever possible, direct and ongoing contact should be made and maintained with the other physicians caring for the patient to ensure optimal care management.

Interventional diagnostic procedures: Although noninterventional diagnostic procedures (*e.g.*, diagnostic imaging and electrodiagnostic studies) may be a critical part of a patient's evaluation, these Guidelines focus specifically on interventional diagnostic procedures including, but not limited to, diagnostic joint block (*i.e.*, facet and sacroiliac), diagnostic nerve block (*e.g.*, peripheral or sympathetic, celiac plexus and hypogastric), provocative discography, or neuraxial opioid trials.

One study reporting observational findings for diagnostic cervical medial branch block indicates a sensitivity value of 54%, a specificity value of 88%, and a positive predictive value of 81% for the identification of cervical facet joint pain (*Category B2 evidence*). Additional observational findings from studies examining diagnostic facet joint blocks report positive predictive values ranging from 25 to 77% and false positive rates ranging from 38 to 49% for the identification of facet joint pain (*Category B2 evidence*). Studies with observational findings for diagnostic sacroiliac joint blocks report positive predictive values ranging from 18.5 to 72% for the identification of pain of sacroiliac origin (*Category B2 evidence*). Studies with observational findings and case reports indicate that diagnostic nerve blocks may be useful in determining the location or etiology of pain (*e.g.*, peripheral, central, or psychogenic) (*Category B2 evidence*). Finally, studies with observational findings for provocative discography re-

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port positive predictive values ranging from 42 to 60% for the identification of the disc as a source of pain (*Category B2 evidence*). Discitis, epidural abscess, and nucleus pulposus embolization are among the reported complications of provocative discography (*Category B3 evidence*).

Recommendations for patient evaluation. All patients presenting with chronic pain should have a documented history and physical examination and an assessment that ultimately supports a chosen treatment strategy.

History and physical examination: Pain history should include a general medical history with emphasis on the chronology and symptomatology of the presenting complaints. A history of current illness should include information about the onset, quality, intensity, distribution, duration, course, and sensory and affective components of the pain in addition to details about exacerbating and relieving factors. Additional symptoms (*e.g.*, motor, sensory, and autonomic changes) should be noted. Information regarding previous diagnostic tests, results of previous therapies, and current therapies should be reviewed by the physician.

In addition to a history of current illness, the history should include (1) a review of available records, (2) medical history, (3) surgical history, (4) social history, including substance use or misuse, (5) family history, (6) history of allergies, (7) current medications, including use or misuse, and (8) a review of systems. The causes and the effects of the pain (*e.g.*, physical deconditioning, change in occupational status, and psychosocial dysfunction) and the impacts of previous treatment(s) should be evaluated and documented.

The physical examination should include an appropriately directed neurologic and musculoskeletal evaluation, with attention to other systems as indicated.

The psychosocial evaluation should include information about the presence of psychologic symptoms (*e.g.*, anxiety, depression, or anger), psychiatric disorders, personality traits or states, and coping mechanisms. An assessment should be made of the impact of chronic pain on a patient's ability to perform activities of daily living. An evaluation of the influence of pain and treatment on mood, ability to sleep, addictive or aberrant behavior, and interpersonal relationships should be performed. Evidence of family, vocational, or legal issues and involvement of rehabilitation agencies should be noted. The expectations of the patient, significant others, employer, attorney, and other agencies may also be considered.

Interventional diagnostic procedures: Based on a patient's clinical presentation, appropriate diagnostic procedures may be conducted as part of a patient's evaluation. The choice of an interventional diagnostic procedure (*e.g.*, selective nerve root blocks, medial branch blocks, facet joint injections, sacroiliac joint injections, or provocative discography) should be based on the patient's specific history and physical examination and the anticipated course of treatment.

Interventional diagnostic procedures should be performed with appropriate image guidance. Diagnostic medial branch blocks or facet joint injections may be considered for patients with suspected facet-mediated pain to screen for subsequent therapeutic procedures. Diagnostic sacroiliac joint injections or lateral branch blocks may be considered for the evaluation of patients with suspected sacroiliac joint pain. Diagnostic selective nerve root blocks may be considered to further evaluate the anatomic level of radicular pain. The use of sympathetic blocks may be considered to support the diagnosis of sympathetically maintained pain. They should not be used to predict the outcome of surgical, chemical, or radiofrequency sympathectomy. Peripheral blocks may be considered to assist in the diagnosis of pain in a specific peripheral nerve distribution. Provocative discography may be considered for the evaluation of selected patients with suspected discogenic pain; it should not be used for routine evaluation of a patient with chronic nonspecific back pain.

Findings from patient history, physical examination, and diagnostic evaluation should be combined to provide the foundation for an individualized treatment plan focused on the optimization of the risk–benefit ratio with an appropriate progression of treatment from a lesser to a greater degree of invasiveness. Whenever possible, direct and ongoing contact should be made and maintained with the other physicians caring for the patient to ensure optimal care management.

II. Multimodal or Multidisciplinary Interventions

Multimodal interventions constitute the use of more than one type of therapy for the care of patients with chronic pain. Multidisciplinary interventions represent multimodality approaches in the context of a treatment program that includes more than one discipline. The literature indicates that the use of multidisciplinary treatment programs compared with conventional treatment programs is effective in reducing the intensity of pain reported by patients for periods of time ranging from 4 months to 1 yr (*Category A2 evidence*). The literature is insufficient to evaluate comparisons of multimodal therapies with single modality interventions (*Category D evidence*), possibly because of the prevailing multimodal nature of the management of patients with chronic pain.

Consultants, ASA members, and ASRA members strongly agree that multimodal interventions should be part of the treatment strategy for patients with chronic pain. They also strongly agree that a long-term approach that includes periodic follow-up evaluations should be developed and implemented as part of the overall treatment strategy, and that, whenever available, multidisciplinary programs should be used.

Recommendations for multimodal and multidisciplinary interventions. Multimodal interventions should be part of a treatment strategy for patients with chronic pain. The Task Force recognizes that a patient's pain and health status may change over time, necessitating reevaluations and changes in treatment. Therefore, a long-term approach that includes periodic follow-up evaluations should be developed and implemented as part of the overall treatment strategy. The goal of treatment should be to effectively reduce pain while improving function and re-

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ducing psychosocial suffering. When available, multidisciplinary programs may be used.

III. Single Modality Interventions

This section examines the evidence for the efficacy of individual modalities used in the treatment of chronic pain. The Task Force recognizes that the vast majority of the investigations of these individual treatments were performed in the context of multimodal or multidisciplinary care. Consequently, in all cases, recommendations in this section to use individual modalities are made with the expectation that they will be used as part of the multimodal or multidisciplinary management of patients with chronic pain.

Single modality interventions, as components of a multimodality approach to pain management, include, but are not limited to, the following: (1) ablative techniques, (2) acupuncture, (3) blocks (*i.e.*, joint and nerve or nerve root), (4) botulinum toxin injections, (5) electrical nerve stimulation, (6) epidural steroids with or without local anesthetics, (7) intrathecal drug therapies, (8) minimally invasive spinal procedures, (9) pharmacologic management, (10) physical or restorative therapy, (11) psychologic treatment, and (12) trigger point injections.

1. Ablative Techniques. Ablative techniques include chemical denervation, cryoneurolysis or cryoablation, thermal intradiscal procedures (*i.e.*, intervertebral disc annuloplasty [IDET], transdiscal biaculoplasty), and radiofrequency ablation.

Chemical denervation: An observational study indicates that chemical denervation using phenol is effective in providing pain relief for patients with neuropathic, facet, or musculoskeletal pain for a period of assessment ranging from 2 to 24 weeks (*Category B2 evidence*). A case report indicates similar efficacy for alcohol denervation, with a transient burning sensation as a reported side effect (*Category B3 evidence*).

Consultants, ASA members, and ASRA members disagree that chemical denervation (*e.g.*, alcohol, phenol, or high-concentration local anesthetics) should be used for routine care of patients with chronic noncancer pain.

Cryoneurolysis or cryoablation: Studies with observational findings for cryoablation report pain relief for assessment periods ranging from 1 to 12 months among patients with lumbar facet joint pain, postthoracotomy neuralgia, or peripheral nerve pain (*Category B2 evidence*).

ASA members agree and consultants and ASRA members are equivocal with regard to whether cryoneurolysis or cryoablation should be performed for postthoracotomy pain syndrome, neuralgia, and low back pain (medial branch). Consultants, ASA members, and ASRA members are equivocal as to whether cryoneurolysis or cryoablation should be performed for facial pain of nonherpetic origin.

Thermal intradiscal procedures: Two randomized controlled trials comparing IDET with sham IDET indicate no significant differences ($P > 0.01$) for either pain or functional outcomes (*Category C2 evidence*). However, studies with observational findings for IDET indicate that pain scores are improved over baseline scores for assessment periods of 6–12 months (*Category B2 evidence*). Cauda equina syndrome, vertebral osteonecrosis, and herniated disc are among the reported complications of IDET (*Category B3 evidence*). There is insufficient evidence to establish the efficacy of percutaneous thermal intradiscal procedures other than IDET (*Category D evidence*).

Consultants, ASA members, and ASRA member are equivocal as to whether IDET should be performed for young active patients with early single-level degenerative disc disease with well-maintained disc height.

Radiofrequency ablation: Meta-analytic findings from randomized controlled trials comparing conventional (*e.g.*, 80°C) or thermal (*e.g.*, 67°C) radiofrequency ablation of medial branches with sham controls report lower pain scores for assessment periods of 2–6 months after the procedure for patients with low back pain (*Category A1 evidence*). A randomized controlled trial of conventional radiofrequency ablation for patients with neck pain and no radiculopathy reports pain relief for up to 6 months after the procedure (*Category A3 evidence*). One randomized controlled trial comparing water-cooled radiofrequency with sham control for chronic sacroiliac joint pain reports lower pain scores in the radiofrequency ablation group for up to 3 months (*Category A3 evidence*). One randomized controlled trial reports no differences in lumbar radicular pain when thermal radiofrequency ablation of the dorsal root ganglion is compared with sham control (*Category C2 evidence*).

Consultants, ASA members, and ASRA members strongly agree that conventional (*e.g.*, 80°C) or thermal (*e.g.*, 67°C) radiofrequency ablation of the medial branch nerves to the facet joint should be performed for neck or low back (medial branch) pain. They are equivocal as to whether water-cooled radiofrequency ablation should be used for chronic sacroiliac joint pain. Consultants disagree and ASA members and ASRA members are equivocal with regard to whether conventional or thermal radiofrequency ablation of the dorsal root ganglion should be used for the treatment of lumbar radicular pain.

Recommendations for ablative techniques. The Task Force notes that other treatment modalities should be attempted before consideration of the use of ablative techniques.

Chemical denervation: Chemical denervation (*e.g.*, alcohol, phenol, or high-concentration local anesthetics) should *not* be used in the routine care of patients with chronic noncancer pain.

Cryoablation: Cryoablation may be used in the care of selected patients (*e.g.*, postthoracotomy pain syndrome, low back pain [medial branch], and peripheral nerve pain).

IDET: IDET may be considered for young active patients with early single-level degenerative disc disease with well-maintained disc height.

Radiofrequency ablation: Conventional (*e.g.*, 80°C) or thermal (*e.g.*, 67°C) radiofrequency ablation of the medial branch nerves to the facet joint should be performed for low back (me-

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dial branch) pain when previous diagnostic or therapeutic injections of the joint or medial branch nerve have provided temporary relief. Conventional radiofrequency ablation may be performed for neck pain, and water-cooled radiofrequency ablation may be used for chronic sacroiliac joint pain. Conventional or thermal radiofrequency ablation of the dorsal root ganglion should not be routinely used for the treatment of lumbar radicular pain.

2. Acupuncture. Acupuncture techniques include traditional acupuncture as well as electroacupuncture techniques. Meta-analytic findings from randomized controlled trials comparing traditional acupuncture techniques with sham acupuncture are equivocal regarding the efficacy of acupuncture techniques in providing pain relief for patients with low back pain (*Category C1 evidence*). One randomized controlled trial comparing traditional acupuncture with conventional therapy (*i.e.*, drugs, physical therapy, and exercise) is equivocal ($P > 0.01$) regarding the efficacy of acupuncture at a 6-month follow-up evaluation (*Category C2 evidence*). A randomized controlled trial comparing electroacupuncture with conventional acupuncture is equivocal ($P > 0.01$) regarding pain relief for patients with low back pain (*Category C2 evidence*). Studies with observational findings indicate that acupuncture can provide pain relief for assessment periods of 1 week to 6 months (*Category B2 evidence*).

ASA and ASRA members agree and consultants are equivocal with regard to whether acupuncture should be used for nonspecific, noninflammatory low back pain.

Recommendations for acupuncture. Acupuncture may be considered as an adjuvant to conventional therapy (*e.g.*, drugs, physical therapy, and exercise) in the treatment of nonspecific, noninflammatory low back pain.

3. Blocks. Blocks include joint blocks and nerve or nerve root blocks. Joint blocks include facet joint injections (*e.g.*, atlanto-axial and atlanto-occipital joint injections) and sacroiliac joint injections. Nerve and nerve root blocks include celiac plexus block, hypogastric plexus block, lumbar sympathetic block and paravertebral sympathectomy, medial branch block, peripheral nerve block, and stellate ganglion block and cervical paravertebral sympathectomy.

Joint blocks: Randomized controlled trials report equivocal findings regarding the efficacy of facet joint steroid injections compared with facet saline injections regarding pain relief for patients with low back pain (*Category C2 evidence*). However, studies with observational findings for facet joint injections indicate that pain scores are improved over baseline scores for assessment periods of 1–6 months (*Category B2 evidence*). The literature is insufficient to evaluate the efficacy of sacroiliac joint injections for pain relief (*Category D evidence*).

Consultants, ASA members, and ASRA members agree that intraarticular facet joint injections should be used for symptomatic relief of facet-mediated pain. Consultants and ASRA members agree and ASA members strongly agree that sacroiliac joint injections should be used for sacroiliac joint pain.

Nerve and nerve root blocks: Studies with observational findings report that celiac plexus blocks can provide pain relief for 25–50% of patients with pancreatitis for assessment periods ranging from 1 to 6 months (*Category B2 evidence*). No studies were found that examined the long-term efficacy of either lumbar sympathetic blocks or stellate ganglion blocks (*Category D evidence*). One randomized controlled trial comparing lumbar sympathetic block with saline placebo injection reports equivocal findings for low back pain at a 24-h follow-up (*Category C2 evidence*). However, one observational study indicates that lumbar sympathetic blocks can provide effective relief for CRPS pain for up to 1 week (*Category B2 evidence*). One case report indicates that stellate ganglion blocks can provide effective relief for neuropathic pain associated with CRPS for an assessment period of up to 4 weeks (*Category B3 evidence*). Randomized controlled trials comparing medial branch block with placebo controls were not found (*Category D evidence*). Studies with observational findings for medial branch blocks indicate improved pain outcomes for assessment periods ranging from 3 to 12 months (*Category B2 evidence*). Studies with observational findings for peripheral nerve blocks indicate effective pain relief for assessment periods ranging from 1 to 14 days (*Category B2 evidence*). There is insufficient evidence to evaluate peripheral nerve blocks for longer periods of time (*Category D evidence*).

ASA members and ASRA members agree and consultants are equivocal as to whether celiac plexus blocks using local anesthetics with or without steroids should be used for pain secondary to chronic pancreatitis. Consultants agree and ASA members and ASRA members strongly agree that lumbar sympathetic blocks or stellate ganglion blocks should be used for CRPS. Consultants, ASA members, and ASRA members are equivocal with regard to whether sympathetic nerve blocks should be used for long-term treatment of non-CRPS neuropathic pain; however, they strongly agree that medial branch blocks should be used for facet-mediated spine pain. Finally, consultants, ASA members, and ASRA members are equivocal with regard to whether peripheral somatic nerve blocks should be used for the long-term treatment of chronic pain.

Recommendations for blocks. *Joint blocks*: Intraarticular facet joint injections may be used for symptomatic relief of facet-mediated pain. Sacroiliac joint injections may be considered for symptomatic relief of sacroiliac joint pain.

Nerve and nerve root blocks: Celiac plexus blocks using local anesthetics with or without steroids may be used for the treatment of pain secondary to chronic pancreatitis. Lumbar sympathetic blocks or stellate ganglion blocks may be used as components of the multimodal treatment of CRPS if used in the presence of consistent improvement and increasing duration of pain relief. Sympathetic nerve blocks should *not* be used for long-term treatment of non-CRPS neuropathic pain. Medial branch blocks may be used for the treatment of

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facet-mediated spine pain. Peripheral somatic nerve blocks should *not* be used for long-term treatment of chronic pain.

4. Botulinum Toxin. Randomized controlled trials comparing injection of botulinum toxin type A with saline placebo report equivocal findings for myofascial pain (*Category C2 evidence*). Randomized controlled trials comparing botulinum toxin type A with saline indicate that botulinum toxin is an effective adjunct in the treatment of piriformis pain for assessment periods of 8–12 weeks (*Category A2 evidence*).

ASA members agree and consultants and ASRA members are equivocal with regard to whether botulinum toxin should be used for myofascial pain. ASRA members agree whereas consultants and ASA members are equivocal as to whether botulinum toxin should be used for piriformis syndrome.

Recommendations for botulinum toxin. Botulinum toxin should *not* be used in the routine care of patients with myofascial pain. Botulinum toxin may be used as an adjunct for the treatment of piriformis syndrome.

5. Electrical Nerve Stimulation. Electrical nerve stimulation techniques include neuromodulation with electrical stimulus (*i.e.*, subcutaneous peripheral nerve stimulation and spinal cord stimulation) and transcutaneous electrical nerve stimulation (TENS).

Neuromodulation with Electrical Stimulus

Subcutaneous peripheral nerve stimulation: Studies with observational findings indicate that subcutaneous peripheral nerve stimulation can provide pain relief for assessment periods ranging from 4 months to 2 yr (*Category B2 evidence*).

Consultants, ASA members, and ASRA members agree that subcutaneous peripheral nerve stimulation should be used for painful peripheral nerve injuries.

Spinal cord stimulation: One randomized controlled trial reports effective pain relief for CRPS patients at follow-up assessment periods of 6 months to 2 yr when spinal cord stimulation in combination with physical therapy is compared with physical therapy alone (*Category A3 evidence*). One randomized controlled trial reports effective pain relief for an assessment period of 6 months when failed lumbosacral spine surgery patients are treated with spinal cord stimulation compared with reoperation (*Category A3 evidence*). Studies with observational findings report that spinal cord stimulation also provides pain relief for other conditions (*e.g.*, peripheral neuropathic pain, peripheral vascular disease, or postherpetic neuralgia) (*Category B2 evidence*). Reported side effects include insertion-site pain and infections (*Category B2 evidence*).

ASA members agree and consultants and ASRA members strongly agree that spinal cord stimulation should be used for persistent radicular pain; they all agree that it should be used for other conditions (*e.g.*, postherpetic neuralgia, postamputation pain, peripheral neuropathic pain, spinal cord injury, CRPS, cauda equina syndrome, cervical root injury pain, peripheral vascular disease, and visceral pain). Consultants, ASA members, and ASRA members strongly agree that a spinal cord stimulation trial should be performed before considering permanent implantation of a stimulation device.

TENS: A meta-analysis of randomized controlled trials of TENS compared with sham TENS reports lower pain scores or greater pain relief from back pain for assessment periods ranging from 1 h to 1 month (*Category A1 evidence*). Observational findings indicate that TENS provides improved pain scores for a variety of pain conditions for assessment periods of 3–6 months (*Category B2 evidence*).

Consultants, ASA members, and ASRA members agree that TENS should be used for patients with chronic noncancer pain.

Recommendations for electrical nerve stimulation.

Neuromodulation with Electrical Stimulus. *Subcutaneous peripheral nerve stimulation*: Subcutaneous peripheral nerve stimulation may be used in the multimodal treatment of patients with painful peripheral nerve injuries who have not responded to other therapies.

Spinal cord stimulation: Spinal cord stimulation may be used in the multimodal treatment of persistent radicular pain in patients who have not responded to other therapies. It may also be considered for other selected patients (*e.g.*, those with CRPS, peripheral neuropathic pain, peripheral vascular disease, or postherpetic neuralgia). Shared decision making regarding spinal cord stimulation should include a specific discussion of potential complications associated with spinal cord stimulator placement. A spinal cord stimulation trial should be performed before considering permanent implantation of a stimulation device.

TENS: TENS should be used as part of a multimodal approach to pain management for patients with chronic back pain and may be used for other pain conditions (*e.g.*, neck and phantom limb pain).

6. Epidural Steroids with or without Local Anesthetics. Studies with observational findings on both interlaminar and transforaminal epidural steroid administration with or without local anesthetics report back pain relief for assessment periods ranging from 2 weeks to 3 months and neck pain relief for assessment periods ranging from 1 week to 12 months (*Category B2 evidence*). Reported complications include dural puncture, insertion-site infections, cauda equina syndrome, sensorimotor deficits, discitis, epidural granuloma, and retinal complications (*Category B3 evidence*). Randomized controlled trials comparing interlaminar epidural steroids with interlaminar epidural saline are equivocal regarding pain relief for patients with low back pain with radiculopathy for assessment periods ranging from 2 days to 3 months (*Category C2 evidence*). One randomized controlled trial reports lower pain scores at 6 months for leg pain (*Category A3 evidence*), but is equivocal for back pain (*Category C2 evidence*) when a transforaminal epidural steroid injection with local anesthetic is compared with a transforaminal epidural saline injection. A randomized controlled trial compar-

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ing the parasagittal interlaminar approach with the transforaminal approach, with fluoroscopic guidance used for both approaches, reports equivocal pain scores for low back pain between the two groups (*Category C2 evidence*). In addition, randomized controlled trials are equivocal regarding the efficacy of interlaminar or transforaminal epidural steroids with local anesthetics compared with epidural local anesthetics alone for back, leg, or neck pain for assessment periods ranging from 3 weeks to 3 months (*Category C2 evidence*). The literature is insufficient at this time to determine the clinical impact of using image guidance with epidural injections (*Category D evidence*).

Consultants, ASA members, and ASRA members strongly agree that epidural steroid injections with or without local anesthetics should be used for radicular pain or radiculopathy. They all strongly agree that image guidance (*e.g.*, fluoroscopy) should be used for both interlaminar and transforaminal epidural injections. The Task Force notes that image guidance for transforaminal epidural injections represents current practice.

Recommendations for epidural steroids. Epidural steroid injections with or without local anesthetics may be used as part of a multimodal treatment regimen to provide pain relief in selected patients with radicular pain or radiculopathy. Shared decision making regarding epidural steroid injections should include a specific discussion of potential complications, particularly with regard to the transforaminal approach. Transforaminal epidural injections should be performed with appropriate image guidance to confirm correct needle position and spread of contrast before injecting a therapeutic substance; image guidance may be considered for interlaminar epidural injections.

7. Intrathecal Drug Therapies. Intrathecal drug therapies include intrathecal neurolytic blocks, intrathecal nonopioid injections (*e.g.*, steroids, ziconotide, local anesthetics), and intrathecal opioid injections.

Neurolytic blocks: The literature is insufficient to evaluate the efficacy of intrathecal neurolytic blocks for pain relief in chronic non-cancer pain (*Category D evidence*).

ASA and ASRA members disagree and consultants strongly disagree that intrathecal neurolytic blocks should be performed for routine care.

Intrathecal nonopioid injections: Studies with observational findings indicate effective pain relief for intrathecal injections of steroid with or without local anesthetic for assessment periods ranging from 1 week to 2 yr for intractable postherpetic neuralgia patients (*Category B2 evidence*). One randomized trial was equivocal ($P > 0.01$) regarding the efficacy of ziconotide (*Category C2 evidence*). An observational study indicates that ziconotide can provide pain relief for an assessment period of up to 48 h for selected patients with refractory neuropathic pain (*Category B2 evidence*).

Consultants, ASA members, and ASRA members are equivocal with regard to whether intrathecal preservative-free steroid injections should be used for intractable postherpetic neuralgia. Similarly, they are equivocal as to whether ziconotide infusions should be used for refractory chronic pain.

Intrathecal opioid injections: Studies with observational findings indicate that intrathecal opioid injections can provide effective pain relief for assessment periods ranging from 1 to 12 months for patients with neuropathic pain (*Category B2 evidence*).

Consultants, ASA members, and ASRA members are equivocal with regard to whether intrathecal opioid injection or infusion should be used for neuropathic pain. However, they strongly agree that neuraxial opioid trials should be performed before considering permanent implantation of intrathecal drug delivery systems.

Recommendations for intrathecal drug therapies. *Neurolytic blocks*: Intrathecal neurolytic blocks should *not* be performed in the routine management of patients with noncancer pain.

Intrathecal nonopioid injections: Intrathecal preservative-free steroid injections may be used for the relief of intractable postherpetic neuralgia nonresponsive to previous therapies. Ziconotide infusion may be used in the treatment of a select subset of patients with refractory chronic pain.

Intrathecal opioid injections: Intrathecal opioid injection or infusion may be used for patients with neuropathic pain. Shared decision making regarding intrathecal opioid injection or infusion should include a specific discussion of potential complications. Neuraxial opioid trials should be performed before considering permanent implantation of intrathecal drug delivery systems.

8. Minimally Invasive Spinal Procedures. Minimally invasive spinal procedures include vertebroplasty, kyphoplasty, and percutaneous disc decompression (*e.g.*, nucleoplasty or coblation). Randomized sham-controlled trials of vertebroplasty are equivocal regarding pain relief for patients with osteoporotic vertebral compression fractures (*Category C2 evidence*). Studies with observational findings indicate that vertebroplasty and kyphoplasty provide effective relief for osteoporosis compression fracture pain for assessment periods ranging from 6 to 12 months (*Category B2 evidence*). In addition, studies with observational findings indicate that percutaneous disc decompression provides effective pain relief for back and radicular pain for assessment periods ranging from 2 weeks to 12 months (*Category B2 evidence*).

Consultants, ASA members, and ASRA members strongly agree that minimally invasive spinal procedures should be performed for pain related to vertebral compression fractures.

Recommendations for minimally invasive spinal procedures. Minimally invasive spinal procedures may be used for the treatment of pain related to vertebral compression fractures.

9. Pharmacologic Management. Pharmacologic management for chronic pain includes (1) anticonvulsants, (2) anti-

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depressants,‖ (3) benzodiazepines, (4) *N*-methyl-D-aspartate (NMDA) receptor antagonists, (5) nonsteroidal antiinflammatory drugs (NSAIDs), (6) opioid therapy (*e.g.*, oral, transdermal, transmucosal, internasal, and sublingual), (7) skeletal muscle relaxants, and (8) topical agents (*e.g.*, lidocaine, capsaicin, and ketamine).

Anticonvulsants: Meta-analyses of randomized controlled trials report that α-2-delta calcium-channel antagonists provide effective neuropathic pain relief for assessment periods ranging from 5 to 12 weeks (*Category A1 evidence*). Dizziness, somnolence or sedation, and peripheral edema are reported side effects of pregabalin (*Category A1 evidence*). In addition, a meta-analysis found that sodium-channel antagonists or membrane-stabilizing anticonvulsants provide effective pain relief for assessment periods ranging from 2 to 18 weeks (*Category A1 evidence*).

Consultants, ASA members, and ASRA members strongly agree that anticonvulsants (*e.g.*, α-2-delta calcium-channel antagonists, sodium-channel blockers, and membrane-stabilizing drugs) should be used for patients with neuropathic pain.

Antidepressants: Meta-analyses of randomized controlled trials indicate that tricyclic antidepressants provide effective pain relief for a variety of chronic pain etiologies for assessment periods ranging from 2 to 8 weeks, with dry mouth and somnolence or sedation as reported side effects (*Category A1 evidence*). In addition, meta-analyses of randomized controlled trials indicate that selective serotonin–norepinephrine reuptake inhibitors provide effective pain relief for a variety of chronic pain etiologies for assessment periods ranging from 3 to 6 months (*Category A1 evidence*). A meta-analysis of randomized placebo-controlled trials is equivocal regarding the efficacy of selective serotonin reuptake inhibitors in providing effective pain relief for diabetic neuropathy (*Category C1 evidence*).

Consultants, ASA members, and ASRA members strongly agree that tricyclic antidepressants should be used. ASA members and ASRA members agree and consultants strongly agree that serotonin-norepinephrine reuptake inhibitors should be used. Finally, ASA members and ASRA members agree and consultants are equivocal with regard to whether selective serotonin reuptake inhibitors should be used for diabetic neuropathy.

Benzodiazepines: One case report indicates that benzodiazepines can provide pain relief for up to 2 months for neuralgic pain syndrome (*Category B3 evidence*).

Consultants and ASRA members disagree and ASA members are equivocal with regard to whether benzodiazepines should be used for chronic pain.

NMDA receptor antagonists: Randomized, placebo-controlled controlled trials of NMDA receptor antagonists (*e.g.*, dextromethorphan and memantine) are equivocal regarding pain relief for patients with diabetic neuropathy, postherpetic neuralgia, or other neuropathic pain conditions (*e.g.*, phantom limb pain, peripheral nerve injury, and CRPS) (*Category C2 evidence*). Observational data from these studies indicate that NMDA receptor antagonists provide pain relief for neuropathic pain for assessment periods ranging from 2 to 16 weeks (*Category B2 evidence*).

Consultants, ASA members, and ASRA members agree that NMDA receptor antagonists should be used for neuropathic pain.

NSAIDs: Randomized controlled trials indicate that NSAIDs compared with placebo provide effective pain relief for patients with back pain for assessment periods ranging from 2 to 12 weeks (*Category A2 evidence*).

Consultants, ASA members, and ASRA members agree that NSAIDs should be used for patients with back pain.

Opioid therapy: A meta-analysis of randomized controlled trials indicates that controlled or extended release opioid therapy (*e.g.*, morphine, codeine, and oxycodone) provides effective pain relief for patients with low back pain or neuropathic pain for assessment periods ranging from 1 to 9 weeks, with nausea or vomiting and constipation as side effects (*Category A1 evidence*). Randomized controlled trials indicate that tramadol provides effective pain relief for assessment periods ranging from 4 to 6 weeks (*Category A2 evidence*). Studies with observational findings report that immediate release opioids, transdermal opioids, and sublingual opioids provide relief for back, neck, leg, and neuropathic pain for assessment periods ranging from 2 weeks to 3 months (*Category B2 evidence*). Dizziness, somnolence, and pruritus are among reported side effects associated with opioid therapy (*Category B2 evidence*).

ASA and ASRA members agree and consultants are equivocal as to whether opioids should be used for patients with neuropathic or back pain.

Skeletal muscle relaxants: The literature is insufficient to evaluate the efficacy of skeletal muscle relaxants in providing pain relief for patients with chronic pain (*Category D evidence*).

ASA members and ASRA members agree and consultants are equivocal with regard to whether skeletal muscle relaxants should be used for patients with chronic pain.

Topical agents: Randomized, placebo-controlled controlled trials of topical agents (*e.g.*, capsaicin, lidocaine, and ketamine) are equivocal regarding relief of peripheral pain for patients with neuropathic pain (*e.g.*, diabetic neuropathy and postherpetic neuralgia) (*Category C2 evidence*). Studies with observational findings indicate that topical agents (*e.g.*, capsaicin, lidocaine, and ketamine) provide relief for peripheral neuropathic pain for assessment periods ranging from 3 to 6 weeks (*Category B2 evidence*).

Consultants, ASA members, and ASRA members agree that topical agents should be used for patients with peripheral neuropathic pain.

‖ Tricyclic antidepressants (TCAs): amitriptyline, nortriptyline, desipramine, imipramine; selective serotonin reuptake inhibitors (SSRIs): paroxetine, fluoxetine, citalopram; selective norepinephrine reuptake inhibitors (SNRIs): duloxetine, venlafaxine, desvenlafaxine, milnacipran.

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Recommendations for pharmacologic management. *Anticonvulsants*: Anticonvulsants (*e.g.*, α-2-delta calcium-channel antagonists, sodium-channel antagonists, and membrane-stabilizing drugs) should be used as part of a multimodal strategy for patients with neuropathic pain.

Antidepressants: Tricyclic antidepressants and serotonin–norepinephrine reuptake inhibitors should be used as part of a multimodal strategy for a variety of patients with chronic pain. Selective serotonin reuptake inhibitors may be considered specifically for patients with diabetic neuropathy.

Other drugs: As part of a multimodal pain management strategy, extended-release oral opioids should be used for neuropathic or back pain patients, and transdermal, sublingual, and immediate-release oral opioids may be used. For selected patients, NMDA (ionotropic) receptor antagonists (*e.g.*, neuropathic pain), NSAIDs (*e.g.*, back pain), and topical agents (*e.g.*, peripheral neuropathic pain) may be used, and benzodiazepines and skeletal muscle relaxants may be considered.

A strategy for monitoring and managing side effects, adverse effects, and compliance should be in place before prescribing any long-term pharmacologic therapy.

10. Physical or Restorative Therapy. Randomized controlled trials combining a variety of physical or restorative therapies (*e.g.*, physiotherapy, fitness classes, and exercise therapy) indicate effective low back pain relief for a period of assessment ranging from 2 to 18 months (*Category A2 evidence*).

Consultants, ASA members, and ASRA members strongly agree that physical or restorative therapy should be used for patients with low back pain. Similarly, they strongly agree that physical or restorative therapy should be used for other (nonlow back pain) chronic pain conditions.

Recommendations for physical or restorative therapy. Physical or restorative therapy may be used as part of a multimodal strategy for patients with low back pain and may be considered for other chronic pain conditions.

11. Psychological Treatment. Psychological treatment includes (1) cognitive behavioral therapy, biofeedback, and relaxation training; and (2) supportive psychotherapy, group therapy, or counseling.

Randomized controlled trials evaluating a cognitive behavioral therapy, biofeedback, and relaxation training indicate that these therapies provide relief of back pain for assessment periods ranging from 4 weeks to 2 yr (*Category A2 evidence*). Case reports suggest that supportive psychotherapy, group therapy, and counseling may be useful for chronic pain management (*Category B3 evidence*).

Consultants, ASA members, and ASRA members agree that cognitive behavioral therapy, biofeedback, or relaxation training should be performed for low back pain and other chronic pain conditions. Consultants, ASA members, and ASRA members also agree that supportive psychotherapy, group therapy, or counseling should be performed for patients with chronic pain.

Recommendations for psychological treatment. *Cognitive behavioral therapy, biofeedback, or relaxation training*: These interventions may be used as part of a multimodal strategy for low back pain and for other chronic pain conditions.

Supportive psychotherapy, group therapy, or counseling: These interventions may be considered as part of a multimodal strategy for chronic pain management.

12. Trigger Point Injections. The literature is insufficient to evaluate the efficacy of trigger point injections (*i.e.*, compared with sham trigger point injection) as a technique for providing pain relief for patients with chronic pain (*Category D evidence*). Studies with observational findings suggest that trigger point injections may provide relief for patients with myofascial pain for assessment periods ranging from 1 to 4 months (*Category B2 evidence*).

Consultants, ASA members, and ASRA members agree that trigger point injections should be used for patients with myofascial pain.

Recommendations for trigger point injections. Trigger point injections may be considered for treatment of patients with myofascial pain as part of a multimodal approach to pain management.

Reference

1. American Society of Anesthesiologists: Practice guidelines for chronic pain management. ANESTHESIOLOGY 1997; 86: 995–1004

Appendix 1: Summary of Recommendations

I. Patient Evaluation

- All patients presenting with chronic pain should have a documented history and physical examination and an assessment that ultimately supports a chosen treatment strategy.
  - *History*:
    - A pain history should include a general medical history with emphasis on the chronology and symptomatology of the presenting complaints.
    - A history of current illness should include information about the onset, quality, intensity, distribution, duration, course, and sensory and affective components of the pain and details about exacerbating and relieving factors.
    - Additional symptoms (*e.g.*, motor, sensory, and autonomic changes) should be noted.
    - Information regarding previous diagnostic tests, results of previous therapies, and current therapies should be reviewed by the physician.
    - In addition to a history of current illness, the history should include (1) a review of available records, (2) medical history, (3) surgical history, (4) social history including substance use or misuse, (5) family history, (6) history of allergies, (7) current medications including use or misuse, and (8) review of systems.
    - The causes as well as the effects of pain (*e.g.*, physical deconditioning, change in occupational status, and psychosocial dysfunction) and the impacts of previous treatment(s) should be evaluated and documented.

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- *Physical examination:* The physical examination should include an appropriately directed neurologic and musculoskeletal evaluation, with attention to other systems as indicated.
- *Psychosocial evaluation:* The psychosocial evaluation should include information about the presence of psychologic symptoms (*e.g.*, anxiety, depression, or anger), psychiatric disorders, personality traits or states, and coping mechanisms.
  - An assessment should be made of the impact of chronic pain on a patient's ability to perform activities of daily living.
  - An evaluation of the influence of pain and treatment on mood, ability to sleep, addictive or aberrant behavior, and interpersonal relationships should be performed.
  - Evidence of family, vocational, or legal issues and involvement of rehabilitation agencies should be noted.
    - The expectations of the patient, significant others, employer, attorney, and other agencies may also be considered.
- *Interventional diagnostic procedures:* Appropriate diagnostic procedures may be conducted as part of a patient's evaluation, based on a patient's clinical presentation.
  - The choice of an interventional diagnostic procedure (*e.g.*, selective nerve root blocks, medial branch blocks, facet joint injections, sacroiliac joint injections, and provocative discography) should be based on the patient's specific history and physical examination and anticipated course of treatment.
  - Interventional diagnostic procedures should be performed with appropriate image guidance.
  - Diagnostic medial branch blocks or facet joint injections may be considered for patients with suspected facet-mediated pain to screen for subsequent therapeutic procedures.
  - Diagnostic sacroiliac joint injections or lateral branch blocks may be considered for the evaluation of patients with suspected sacroiliac joint pain.
  - Diagnostic selective nerve root blocks may be considered to further evaluate the anatomic level of radicular pain.
  - The use of sympathetic blocks may be considered to support the diagnosis of sympathetically maintained pain.
    - They should not be used to predict the outcome of surgical, chemical, or radiofrequency sympathectomy.
  - Peripheral blocks may be considered to assist in the diagnosis of pain in a specific peripheral nerve distribution.
  - Provocative discography may be considered for the evaluation of selected patients with suspected discogenic pain.
    - Provocative discography should not be used for the routine evaluation of the patient with chronic nonspecific back pain.

- Findings from the patient history, physical examination, and diagnostic evaluation should be combined to provide the foundation for an individualized treatment plan focused on the optimization of the risk–benefit ratio with an appropriate progression of treatment from a lesser to greater degree of invasiveness.
- Whenever possible, direct and ongoing contact should be made and maintained with the other physicians caring for the patient to ensure optimal care management.

II. Multimodal or Multidisciplinary Interventions

- Multimodal interventions should be part of a treatment strategy for patients with chronic pain.
- A long-term approach that includes periodic follow-up evaluations should be developed and implemented as part of the overall treatment strategy.
- When available, multidisciplinary programs may be used.

III. Single Modality Interventions

- *Ablative techniques* (other treatment modalities should be attempted before consideration of the use of ablative techniques):
  - Chemical denervation (*e.g.*, alcohol, phenol, or high concentration local anesthetics) should not be used in the routine care of patients with chronic noncancer pain.
  - Cryoablation may be used in the care of selected patients (*e.g.*, postthoracotomy pain syndrome, low back pain [medial branch], and peripheral nerve pain).
  - Thermal intradiscal procedures: IDET may be considered for young, active patients with early single-level degenerative disc disease with well-maintained disc height.
  - Radiofrequency ablation:
    - Conventional (*e.g.*, 80°C) or thermal (*e.g.*, 67°C) radiofrequency ablation of the medial branch nerves to the facet joint should be performed for low back (medial branch) pain when previous diagnostic or therapeutic injections of the joint or medial branch nerve have provided temporary relief.
    - Conventional radiofrequency ablation may be performed for neck pain.
    - Water-cooled radiofrequency ablation may be used for chronic sacroiliac joint pain.
    - Conventional or other thermal radiofrequency ablation of the dorsal root ganglion should not be routinely used for the treatment of lumbar radicular pain.
- *Acupuncture:* Acupuncture may be considered as an adjuvant to conventional therapy (*e.g.*, drugs, physical therapy, and exercise) in the treatment of nonspecific, noninflammatory low back pain.
- Blocks:
  - *Joint blocks*:
    - Intraarticular facet joint injections may be used for the symptomatic relief of facet-mediated pain.
    - Sacroiliac joint injections may be considered for the symptomatic relief of sacroiliac joint pain.
  - Nerve and nerve root blocks:
    - Celiac plexus blocks using local anesthetics with or without steroids may be used for the treatment of pain secondary to chronic pancreatitis.
    - Lumbar sympathetic blocks or stellate ganglion blocks may be used as components of the multimodal treatment of CRPS if used in the presence of consistent improvement and increasing duration of pain relief.
    - Sympathetic nerve blocks should not be used for the long-term treatment of non-CRPS neuropathic pain.
    - Medial branch blocks may be used for the treatment of facet-mediated spine pain.
    - Peripheral somatic nerve blocks should not be used for long-term treatment of chronic pain.
- *Botulinum toxin*:
  - Botulinum toxin should not be used in the routine care of patients with myofascial pain.

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- Botulinum toxin may be used as an adjunct for the treatment of piriformis syndrome.

- *Electrical nerve stimulation*:
  - *Neuromodulation with electrical stimulus*:
    - *Subcutaneous peripheral nerve stimulation*: Subcutaneous peripheral nerve stimulation may be used in the multimodal treatment of patients with painful peripheral nerve injuries who have not responded to other therapies.
    - *Spinal cord stimulation:* Spinal cord stimulation may be used in the multimodal treatment of persistent radicular pain in patients who have not responded to other therapies.
      - Spinal cord stimulation may also be considered for other selected patients (*e.g.*, CRPS, peripheral neuropathic pain, peripheral vascular disease, and postherpetic neuralgia).
      - Shared decision making regarding spinal cord stimulation should include a specific discussion of potential complications associated with spinal cord stimulator placement.
      - A spinal cord stimulation trial should be performed before considering permanent implantation of a stimulation device.
  - *TENS*:
    - TENS should be used as part of a multimodal approach to pain management for patients with chronic back pain and may be used for other pain conditions (*e.g.*, neck and phantom limb pain).

- *Epidural steroids with or without local anesthetics*:
  - Epidural steroid injections with or without local anesthetics may be used as part of a multimodal treatment regimen to provide pain relief in selected patients with radicular pain or radiculopathy.
    - Shared decision making regarding epidural steroid injections should include a specific discussion of potential complications, particularly with regard to the transforaminal approach.
    - Transforaminal epidural injections should be performed with appropriate image guidance to confirm correct needle position and spread of contrast before injecting a therapeutic substance
    - Image guidance may be considered for interlaminar epidural injections to confirm correct needle position and spread of contrast before injecting a therapeutic substance

- *Intrathecal drug therapies*:
  - *Neurolytic blocks*: Intrathecal neurolytic blocks should not be performed in the routine management of patients with noncancer pain.
  - *Intrathecal nonopioid injections*:
    - Intrathecal preservative-free steroid injections may be used for the relief of intractable postherpetic neuralgia nonresponsive to previous therapies.
    - Ziconotide infusion may be used in the treatment of a select subset of patients with refractory chronic pain.
  - *Intrathecal opioid injections*: Intrathecal opioid injection or infusion may be used for neuropathic pain patients.
    - Shared decision-making regarding intrathecal opioid injection or infusion should include a specific discussion of potential complications.
    - Neuraxial opioid trials should be performed before considering permanent implantation of intrathecal drug delivery systems.

- *Minimally invasive spinal procedures:* Minimally invasive spinal procedures (*e.g.*, vertebroplasty) may be used for the treatment of pain related to vertebral compression fractures.

- *Pharmacologic management*:
  - *Anticonvulsants*: Anticonvulsants (*e.g.*, α-2-delta calcium-channel antagonists, sodium-channel antagonists, and membrane-stabilizing drugs) should be used as part of a multimodal strategy for patients with neuropathic pain.
  - *Antidepressants*:
    - Tricyclic antidepressants should be used as part of a multimodal strategy for patients with chronic pain.
    - Serotonin–norepinephrine reuptake inhibitors should be used as part of a multimodal strategy for a variety of chronic pain patients.
    - Selective serotonin reuptake inhibitors may be considered specifically for patients with diabetic neuropathy.
  - *Other drugs*:
    - As part of a multimodal pain management strategy, extended-release oral opioids should be used for neuropathic or back pain patients, and transdermal, sublingual, and immediate-release oral opioids may be used.
    - For selected patients, ionotropic NMDA receptor antagonists (*e.g.*, neuropathic pain), NSAIDs (*e.g.*, back pain), and topical agents (*e.g.*, peripheral neuropathic pain) may be used, benzodiazepines and skeletal muscle relaxants may be considered.
  - A strategy for monitoring and managing side effects, adverse effects, and compliance should be considered for all patients undergoing any long-term pharmacologic therapy.

- *Physical or restorative therapy*:
  - Physical or restorative therapy may be used as part of a multimodal strategy for patients with low back pain.
  - Physical or restorative therapy may be considered for other chronic pain conditions.

- *Psychological treatment*:
  - *Cognitive behavioral therapy, biofeedback, or relaxation training:* These interventions may be used as part of a multimodal strategy for patients with low back pain, as well as for other chronic pain conditions.
  - *Supportive psychotherapy, group therapy, or counseling:* These interventions may be considered as part of a multimodal strategy for chronic pain management.

- *Trigger point injections:* These injections may be considered for treatment of myofascial pain as part of a multimodal approach to pain management.

Appendix 2: Methods and Analyses

A. State of the Literature

For these Guidelines, a literature review was used in combination with opinions obtained from expert consultants and other sources (*e.g.*, ASA members, ASRA members, open forums, and Internet postings). Both the literature review and opinion data were based on evidence linkages or statements regarding potential relationships between clinical interventions and outcomes. The interventions

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listed below were examined to assess their impact on a variety of outcomes related to chronic noncancer pain.#

I. Patient evaluation:
   1. Medical records review or patient condition
   2. Physical examination
   3. Psychological and behavioral evaluation
   4. Interventional diagnostic procedures
      Diagnostic facet joint block
      Diagnostic sacroiliac joint block
      Diagnostic nerve block (*e.g.*, peripheral or sympathetic, medial branch, celiac plexus, and hypogastric).
      Provocative discography

II. Multimodal or multidisciplinary pain management programs (*e.g.*, pain centers *vs.* single discipline care)

III. Single Modality Interventions
   Ablative techniques:
   Chemical denervation
   Cryoneurolysis or cryoablation
   Thermal intradiscal procedures (intervertebral disc annuloplasty [IDET], transdiscal biaculoplasty)
   Conventional or thermal radiofrequency ablation (facet joint, sacroiliac joint, dorsal root ganglion)
   2. Acupuncture
   3. Blocks:
      Joint blocks
      Facet joint injections
      Sacroiliac joint injections
      Nerve or nerve root blocks
      Celiac plexus blocks
      Lumbar sympathetic blocks or lumbar paravertebral sympathectomy
      Medial branch blocks
      Peripheral nerve blocks
      Stellate ganglion blocks or cervical paravertebral sympathectomy
   4. Botox
   5. Electrical nerve stimulation:
      Peripheral nerve stimulation
      Spinal cord or dorsal column stimulation
      TENS
   6. Epidural steroids:
      Interlaminar steroids *versus* placebo
      Interlaminar steroids with local anesthetics *versus* without local anesthetics
      Transforaminal steroids *versus* placebo
      Transforaminal steroids with local anesthetics *versus* without local anesthetics
   7. Intrathecal drug therapies
      Intrathecal neurolytic blocks
      Intrathecal nonopioid injection (*e.g.*, ziconotide, clonidine, or local anesthetics)
      Intrathecal opioid injection
   8. Minimally invasive spinal procedures
      Kyphoplasty (percutaneous, glue, and balloon)
      Vertebroplasty
      Percutaneous disc decompression
   9. Pharmacologic interventions
      Anticonvulsants
      Alpha-2-delta calcium channel antagonists
      Sodium channel blockers
      Membrane-stabilizing drugs
      Antidepressants
      Tricyclic antidepressants
      Selective serotonin–norepinephrine reuptake inhibitors
      Selective serotonin reuptake inhibitors
      Benzodiazepines
      NMDA receptor antagonists
      NSAIDs
      Opioid therapy
      Sustained or controlled-release opioids
      Tramadol
      Skeletal muscle relaxants
      Topical agents
      Capsaicin
      Lidocaine
      Ketamine
   10. Physical or restorative therapy
   11. Psychologic treatment or counseling
      Cognitive behavioral therapy, biofeedback, or relaxation training
      Supportive psychotherapy or group therapy
   12. Trigger point injections

For the literature review, potentially relevant clinical studies were identified through electronic and manual searches of the literature. The electronic and manual searches covered a 56-yr period from 1944 to 2009. More than 5,000 citations were initially identified, yielding a total of 2,246 nonoverlapping articles that addressed topics related to the evidence linkages. After a review of the articles, 1550 studies did not provide direct evidence and were subsequently eliminated. A total of 696 articles contained direct linkage-related evidence. A complete bibliography used to develop these Guidelines, organized by section, is available as Supplemental Digital Content 2, http://links.lww.com/ALN/A566.

Initially, each pertinent outcome reported in a study was classified as supporting an evidence linkage, refuting a linkage, or equivocal. The results were then summarized to obtain a directional assessment for each evidence linkage before conducting a formal meta-analysis. Literature pertaining to eight evidence linkages contained enough studies with well-defined experimental designs and statistical information sufficient for meta-analyses. These linkages were (1) ablative techniques: radiofrequency ablation *versus* placebo; (2) acupuncture *versus* sham acupuncture; (3) botulinum toxin A *versus* placebo; (4) electrical nerve stimulation: TENS *versus* sham TENS; (5) anticonvulsants: calcium-channel antagonists *versus* placebo, and sodium-channel blockers or membrane-stabilizing drugs *versus* placebo; (6) antidepressants: tricyclic antidepressants, selective serotonin–norepinephrine reuptake inhibitors, and selective serotonin reuptake inhibitors *versus* placebo; (7) NMDA receptor antagonists *versus* placebo; and (8) extended or controlled-release opioids *versus* placebo.

General variance-based effect-size estimates or combined probability tests were obtained for continuous outcome measures, and Mantel-Haenszel odds-ratios were obtained for dichotomous outcome measures. Two combined probability tests were used as follows: (1) the Fisher combined test, producing chi-square values based on logarithmic transformations of the reported *P* values from the independent studies, and (2) the Stouffer combined test, providing weighted representation of the studies by weighting each of

Unless otherwise specified, outcomes for the listed interventions refer to pain scores or relief, health, and functional outcomes.

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the standard normal deviates by the size of the sample. An odds-ratio procedure based on the Mantel-Haenszel method for combining study results using 2 × 2 tables was used with outcome frequency information. An acceptable significance level was set at $P < 0.01$ (one tailed). Tests for heterogeneity of the independent studies were conducted to ensure consistency among the study results. DerSimonian-Laird random-effects odds ratios were obtained when significant heterogeneity was found ($P < 0.01$). To control for potential publishing bias, a "fail-safe n" value was calculated. No search for unpublished studies was conducted, and no reliability tests for locating research results were done.

Meta-analyses were limited to single modality interventions (*e.g.*, extended-release oral opioids *vs.* placebo) because multimodal interventions (*e.g.*, multidisciplinary pain programs) typically combine a variety of different treatment or comparison groups. These groupings of interventions (or controls) were not consistent across the aggregated studies, leading to high levels of heterogeneity in meta-analytic findings. Findings from such meta-analyses may be unclear and could risk undue bias in interpretation.

Meta-analytic results from single modality interventions are reported in table 1. To be accepted as significant findings, Mantel-Haenszel odds ratios must agree with combined test results whenever both types of data are assessed. In the absence of Mantel-Haenszel odds ratios, findings from both the Fisher and weighted Stouffer combined tests must agree with each other to be acceptable as significant.

Interobserver agreement among Task Force members and two methodologists was established by interrater reliability testing. Agreement levels using a kappa (κ) statistic for two-rater agreement pairs were as follows: (1) type of study design, $\kappa = 0.63–0.88$; (2) type of analysis, $\kappa = 0.87$; (3) evidence linkage assignment, $\kappa = 0.82–1.00$; and (4) literature inclusion for database, $\kappa = 0.83–1.00$. Three-rater chance-corrected agreement values were (1) study design, Sav = 0.72, Var (Sav) = 0.008; (2) type of analysis, Sav = 0.87, Var (Sav) = 0.005; (3) linkage assignment, Sav = 0.88, Var (Sav) = 0.003; (4) literature database inclusion, Sav = 0.88, Var (Sav) = 0.018. These values represent moderate to high levels of agreement.

B. Consensus-based Evidence

Consensus was obtained from multiple sources, including (1) survey opinion from consultants who were selected based on their knowledge or expertise in chronic pain management, (2) survey opinions solicited from active members of the ASA and ASRA membership, (3) testimony from attendees of publicly held open forums at two national anesthesia meetings, (4) Internet commentary, and (5) Task Force opinion and interpretation. The survey rate of return was 78 of 182 (42.9%) for the consultants, 304 surveys were received from active ASA members, and 171 surveys were received from active ASRA members. Results of the surveys are reported in tables 2–4 and in the text of the Guidelines.

The consultants were asked to indicate which, if any, of the evidence linkages would change their clinical practices if the Guidelines were instituted. The rate of return was 16% (n = 29 of 182). The percent of responding consultants expecting no change associated with each linkage were as follows: (1) history, physical, and psychologic examination = 91%; (2) interventional diagnostic procedures = 92.5%; (3) multidisciplinary programs = 88%; (4) thermal intradiscal procedures = 91%; (5) radiofrequency ablation = 97%; (6) acupuncture = 91%; (7) joint blocks = 94%; (8) nerve or nerve root blocks = 97%; (9) botulinum toxin injections = 88%; (10) neuromodulation with electrical stimulus = 97%; (11) TENS = 98.5%; (12) epidural steroids = 92.5%; (13) intrathecal drug therapies = 95.5%; (14) anticonvulsants = 98.5%; (15) antidepressants = 98.5%; (16) NMDA receptor antagonists = 97%; (17) opioid therapy = 100%; (18) topical agents = 100%; (19) physical therapy = 100%; (20) psychologic treatment or counseling = 94%; and (21) trigger point injections = 98.5%. Seventy-two percent of the respondents indicated that the Guidelines would have no effect on the amount of time spent on a typical case, and 27.6% indicated that there would be an increase in the amount of time spent on a typical case with the implementation of these Guidelines. Seventy-three percent indicated that new equipment, supplies, or training would not be needed to implement the Guidelines, and 64% indicated that implementation of the Guidelines would not require changes in practice that would affect costs.

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Table 1. Meta-analysis Summary

Evidence Linkages	N	Fisher χ^2	*P* Values	Weighted Stouffer Zc	*P* Values	Effect Size	Odds Ratio	Confidence Interval	Heterogeneity: Significance	Heterogeneity: Effect Size
Ablative techniques: RF ablation *vs.* sham controls										
Pain scores at 2–6 mo follow-up	5	39.82	0.001	−4.02	0.001	−0.30			NS	NS
Acupuncture *vs.* sham controls										
Pain scores/relief at 1–2 mo	6	33.19	0.001	−2.24	0.013	−0.10			NS	NS
Pain scores/relief at 3–6 mo	6	41.82	0.001	−2.28	0.011	−0.11			NS	0.008
Botulinum toxin A *vs.* placebo										
Pain scores at 1-mo follow-up	5	17.53	0.040	−1.00	0.159	−0.30			NS	0.001
Electrical nerve stimulation: TENS *vs.* sham controls										
Pain scores/relief 1 h–1 mo	10	80.67	0.001	−4.30	0.001	−0.28			NS	NS
Anticonvulsants: calcium channel antagonists *vs.* placebo										
Gabapentin *vs.* placebo										
Pain scores at 6–8 wk	7	64.01	0.001	−6.69	0.001	−0.22			NS	NS
Dizziness*	6						2.32	0.41–8.91		0.001
Somnolence/sedation*	7						2.16	0.52–5.34		0.001
Pregabalin *vs.* placebo										
Pain scores/relief at 5–12 wk	7	98.22	0.001	−8.50	0.001	−0.31			NS	NS
Dizziness	7						4.10	2.77–6.05		NS
Somnolence/sedation	7						4.46	2.79–7.13		NS
Peripheral edema	7						4.32	2.43–7.67		NS
Sleep scores/relief at 8–12 wk	5	69.21	0.001	−7.56	0.001	−0.30			NS	NS
Sodium channel blockers/ membrane stabilizing drugs *vs.* placebo										
Pain scores/relief at 2–18 wk	10	91.01	0.001	−5.83	0.001	−0.47			0.001	0.001
Antidepressants										
TCAs *vs.* placebo										
Pain scores/relief at 2–8 wk	11	114.22	0.001	−6.10	0.001	−0.32			NS	NS
Dry mouth	9						2.82	1.70–4.70		NS
Somnolence/sedation	6						2.62	1.39–4.92		NS
SNRIs *vs.* placebo										
Duloxetine 60 mg/d: pain scores at 3 mo	6	75.31	0.001	−7.64	0.001	−0.21			NS	NS
Duloxetine 120 mg/d: pain scores at 3 mo	5	75.52	0.001	−8.00	0.001	−0.23			NS	NS
SSRIs *vs.* placebo										
Pain scores/relief at 3–8 wk	5	20.95	0.030	−0.10	0.460	−0.08			NS	NS
Extended release opioids *vs.* placebo										
Pain scores/relief at 1–9 wk	7	96.71	0.001	−11.11	0.001	−0.47			0.001	0.001
Nausea/vomiting	7						3.79	2.19–6.56		NS
Constipation	6						3.48	2.12–5.73		NS

* Random-effects odds ratio.

RF = radiofrequency; SNRIs = Selective norepinephrine reuptake inhibitors; TCAs = Tricyclic antidepressants; TENS = transcutaneous electrical nerve stimulation.

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Table 2. Consultant Survey Responses

	Percent Responding to Each Item					
	N	Strongly Agree	Agree	Equivocal	Disagree	Strongly Disagree
I. Patient evaluation						
1. All patients presenting with chronic pain should have a documented history and physical examination, and an assessment that ultimately supports a chosen treatment strategy	78	91.0*	9.0	0.0	0.0	0.0
2. Findings from the patient history, physical examination, and diagnostic evaluation should be combined to provide the foundation for an individualized treatment plan	78	92.3*	7.7	0.0	0.0	0.0
3. Whenever possible, direct and ongoing contact should be made and maintained with the other physicians caring for the patient to ensure optimal care management	77	80.5*	15.6	2.6	1.3	0.0
II. Multimodal or multidisciplinary interventions						
4. Multimodal interventions should be part of a treatment strategy for patients with chronic pain	78	68.0*	28.2	2.5	1.3	0.0
5. A long-term approach that includes periodic follow-up evaluations should be developed and implemented as part of the overall treatment strategy	77	71.4*	24.7	3.9	0.0	0.0
6. When available, multidisciplinary programs should be used	77	50.7*	33.7	13.0	1.3	1.3
III. Single modality interventions						
Ablative techniques						
7. Chemical denervation for routine care	75	4.0	6.7	17.3	33.3*	38.7
8. Cryoneurolysis or cryoablation for postthoracotomy pain syndrome, neuralgia, or low back pain (medial branch)	78	6.4	29.5	42.3*	14.1	7.7
9. Cryoneurolysis or cryoablation for facial pain of nonherpetic origin strategy	78	5.1	12.8	53.9*	19.2	9.0
10. Thermal intradiscal procedures for young active patients with early single-level degenerative disc disease with well-maintained disc height	76	15.8	23.7	29.0*	19.7	11.8
11. Conventional (*e.g.*, 80°C) or other thermal (*e.g.*, 67°C) radiofrequency ablation of the medial branch nerves to the facet joint for neck or low back (medial branch) pain	77	54.5*	29.9	11.7	2.6	1.3
12. Water-cooled radiofrequency ablation for chronic sacroiliac joint pain	78	6.4	29.5	52.5*	9.0	2.6
13. Conventional or other thermal radiofrequency ablation of the dorsal root ganglion for lumbar radicular pain	78	3.8	12.8	33.3	35.9*	14.1
Acupuncture						
14. Acupuncture for nonspecific, noninflammatory low back pain	77	6.5	42.9	37.6*	11.7	1.3
Blocks						
Joint injections						
15. Intra-articular facet joint injections for facet mediated pain	78	25.6	35.9*	19.2	12.8	6.4
16. Sacroiliac joint injections for sacroiliac joint pain	78	47.4	42.3*	7.7	1.3	1.3
Nerve and nerve root blocks						
17. Celiac plexus blocks using local anesthetics with or without steroids for pain secondary to chronic pancreatitis	77	13.0	32.5	28.6*	20.8	5.2
18. Lumbar sympathetic blocks or stellate ganglion blocks for CRPS	77	44.2	42.8*	7.8	3.9	1.3

(*continued*)

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Table 2. Continued

	N	Percent Responding to Each Item: Strongly Agree	Agree	Equivocal	Disagree	Strongly Disagree
19. Sympathetic nerve blocks for the long-term treatment of non-CRPS neuropathic pain	76	3.9	22.4	39.5*	27.6	6.6
20. Medial branch blocks for facet-mediated spine pain	77	54.5*	31.2	9.1	3.9	1.3
21. Peripheral somatic nerve blocks for long-term treatment	77	10.4	29.9	32.4*	23.4	3.9
Botulinum toxin						
22. Botulinum toxin for myofascial pain	77	6.5	32.5	41.5*	18.2	1.3
23. Botulinum toxin for piriformis syndrome	78	8.9	28.2	44.9*	15.4	2.6
Electrical nerve stimulation						
Neuromodulation with electrical stimulus						
24. Subcutaneous peripheral nerve stimulation for painful peripheral nerve injuries	77	15.5	44.2*	29.9	6.5	3.9
25. Spinal cord stimulation for persistent radicular pain	78	52.6*	33.3	10.3	3.8	0.0
26. Spinal cord stimulation for other conditions (*e.g.*, postherpetic neuralgia, postamputation pain, peripheral neuropathic pain, spinal cord injury, CRPS, cauda equina syndrome, cervical root injury pain, peripheral vascular disease, and visceral pain)	76	38.2	38.2*	18.4	5.2	0.0
27. Spinal cord stimulation trial before considering permanent implantation of a stimulation device	78	91.0*	9.0	0.0	0.0	0.0
Transcutaneous electrical nerve stimulation						
28. TENS for chronic non-cancer pain	78	19.2	62.8*	11.5	6.4	0.0
Epidural steroids with or without local anesthetics						
29. Epidural steroid injections with or without local anesthetics for radicular pain or radiculopathy	78	65.4*	33.3	1.3	0.0	0.0
30. Image guidance (*e.g.*, fluoroscopy) for transforaminal epidural injections	78	89.7*	6.4	2.6	0.0	1.3
31. Image guidance (*e.g.*, fluoroscopy) for interlaminar epidural injections	78	50.0*	28.2	15.4	5.1	1.3
Intrathecal drug therapies						
Neurolytic blocks						
32. Intrathecal neurolytic blocks for routine care	76	1.3	0.0	9.2	32.9	56.6*
Intrathecal nonopioid injections						
33. Intrathecal preservative-free steroid injections for intractable postherpetic neuralgia	77	2.6	22.1	36.3*	29.9	9.1
34. Ziconotide infusion for refractory chronic pain	78	11.5	32.1	46.2*	6.4	3.8
Intrathecal opioid injections						
35. Intrathecal opioid injection or infusion for neuropathic pain	78	9.0	38.5	28.2*	21.8	2.5
36. Neuraxial opioid trials should be performed before considering permanent implantation of intrathecal drug delivery systems	77	70.1*	22.1	3.9	2.6	1.3
Minimally invasive spinal procedures						
37. Minimally invasive spinal procedures (*e.g.*, vertebroplasty) for pain related to vertebral compression fractures	78	53.9*	33.3	11.5	0.0	1.3
Pharmacologic management						
38. Anticonvulsants (*e.g.*, alpha-2-delta calcium channel antagonists, sodium channel blockers, membrane stabilizing drugs) for neuropathic pain	77	83.1*	15.6	1.3	0.0	0.0
39. Tricyclic antidepressants	77	63.6*	31.2	3.9	1.3	0.0
40. Serotonin-norepinephrine reuptake inhibitors	76	51.3*	36.8	6.6	4.0	1.3

(*continued*)

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Purpose of the Project

Table 2. Continued

	Percent Responding to Each Item					
	N	Strongly Agree	Agree	Equivocal	Disagree	Strongly Disagree
41. Selective serotonin reuptake inhibitors for diabetic neuropathy	78	18.0	25.6	19.2*	26.9	10.3
42. NMDA receptor antagonists for neuropathic pain	78	19.2	44.9*	33.3	1.3	1.3
43. Opioids for neuropathic or back pain	77	7.8	32.5	41.6*	11.7	6.5
44. Benzodiazepines	75	1.3	8.0	22.7	42.7*	25.3
45. NSAIDs for back pain	77	35.1	45.4*	14.3	3.9	1.3
46. Topical agents for peripheral neuropathic pain	78	33.3	50.0*	14.1	2.6	0.0
47. Skeletal muscle relaxants	76	13.2	35.5	32.9*	14.5	3.9
Physical or restorative therapy						
48. Physical or restorative therapy for low back pain	78	70.5*	24.4	5.1	0.0	0.0
49. Physical or restorative therapy for other chronic pain conditions	77	55.8*	35.1	9.1	0.0	0.0
Psychological treatment						
50. Cognitive behavioral therapy, biofeedback, or relaxation training for low back pain	78	38.5	50.0*	11.5	0.0	0.0
51. Cognitive behavioral therapy, biofeedback, or relaxation training for other chronic pain conditions	77	42.9	48.0*	9.1	0.0	0.0
52. Supportive psychotherapy, group therapy, or counseling	77	40.3	42.5*	18.2	0.0	0.0
Trigger point injections						
53. Trigger point injections for myofascial pain	78	29.5	47.4*	19.2	2.6	1.3

* Median.

CRPS = complex regional pain syndrome; N = number of consultants who responded to each item; NMDA = *N*-methyl-D-aspartate; NSAID = nonsteroidal antiinflammatory drug; TENS = transcutaneous electrical nerve stimulation.

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Table 3. ASA Member Survey Responses

	Percent Responding to Each Item					
	N	Strongly Agree	Agree	Equivocal	Disagree	Strongly Disagree
I. Patient evaluation						
1. All patients presenting with chronic pain should have a documented history and physical examination, and an assessment that ultimately supports a chosen treatment strategy	304	82.2*	15.2	2.0	0.3	0.3
2. Findings from the patient history, physical examination, and diagnostic evaluation should be combined to provide the foundation for an individualized treatment plan	305	84.3*	14.4	1.3	0.0	0.0
3. Whenever possible, direct and ongoing contact should be made and maintained with the other physicians caring for the patient to ensure optimal care management	305	64.3*	29.8	5.6	0.0	0.3
II. Multimodal or multidisciplinary interventions						
4. Multimodal interventions should be part of a treatment strategy for patients with chronic pain	305	65.9*	27.9	4.9	1.0	0.3
5. A long-term approach that includes periodic follow-up evaluations should be developed and implemented as part of the overall treatment strategy	304	63.2*	30.3	4.9	1.3	0.3
6. When available, multidisciplinary programs should be used	303	56.1*	31.0	8.9	2.7	1.3
III. Single modality interventions						
Ablative techniques						
7. Chemical denervation for routine care	298	4.4	8.4	24.8	41.3*	21.1
8. Cryoneurolysis or cryoablation for postthoracotomy pain syndrome, neuralgia, or low back pain (medial branch)	295	15.9	34.6*	33.6	13.9	2.0
9. Cryoneurolysis or cryoablation for facial pain of nonherpetic origin strategy	294	5.4	28.2	44.6*	19.4	2.4
10. Thermal intradiscal procedures for young active patients with early single-level degenerative disc disease with well-maintained disc height	294	13.6	32.3	30.6*	17.7	5.8
11. Conventional (*e.g.*, 80°C) or other thermal (*e.g.*, 67°C) radiofrequency ablation of the medial branch nerves to the facet joint for neck or low back (medial branch) pain	298	51.0*	30.9	12.1	5.3	0.7
12. Water-cooled radiofrequency ablation for chronic sacroiliac joint pain	295	13.2	27.8	47.5*	9.8	1.7
13. Conventional or other thermal radiofrequency ablation of the dorsal root ganglion for lumbar radicular pain	299	10.4	27.1	39.1*	19.1	4.3
Acupuncture						
14. Acupuncture for nonspecific, noninflammatory low back pain	300	15.0	40.7*	34.3	6.7	3.3
Blocks						
Joint injections						
15. Intra-articular facet joint injections for facet-mediated pain	303	31.0	46.9*	12.2	6.9	3.0
16. Sacroiliac joint injections for sacroiliac joint pain	303	51.1*	41.9	5.6	0.7	0.7
Nerve and nerve root blocks						
17. Celiac plexus blocks using local anesthetics with or without steroids for pain secondary to chronic pancreatitis	298	26.9	48.0*	18.1	5.0	2.0
18. Lumbar sympathetic blocks or stellate ganglion blocks for CRPS	299	62.2*	31.1	5.7	1.0	0.0

(*continued*)

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Table 3. Continued

	Percent Responding to Each Item					
	N	Strongly Agree	Agree	Equivocal	Disagree	Strongly Disagree
19. Sympathetic nerve blocks for the long-term treatment of non-CRPS neuropathic pain	299	17.7	28.1	32.5*	17.7	4.0
20. Medial branch blocks for facet-mediated spine pain	299	51.9*	33.5	13.0	1.3	0.3
21. Peripheral somatic nerve blocks for long-term treatment	298	17.4	28.2	34.6*	17.1	2.7
Botulinum toxin						
22. Botulinum toxin for myofascial pain	294	12.2	41.5*	34.4	8.5	3.4
23. Botulinum toxin for piriformis syndrome	290	12.4	36.2	41.4*	5.9	4.1
Electrical nerve stimulation						
Neuromodulation with electrical stimulus						
24. Subcutaneous peripheral nerve stimulation for painful peripheral nerve injuries	296	22.3	46.3*	27.7	2.0	1.7
25. Spinal cord stimulation for persistent radicular pain	294	48.0	37.0*	10.9	3.1	1.0
26. Spinal cord stimulation for other conditions (*e.g.*, postherpetic neuralgia, postamputation pain, peripheral neuropathic pain, spinal cord injury, CRPS, cauda equina syndrome, cervical root injury pain, peripheral vascular disease, and visceral pain)	296	44.9	38.2*	12.2	3.7	1.0
27. Spinal cord stimulation trial before considering permanent implantation of a stimulation device	297	84.5*	12.8	2.7	0.0	0.0
Transcutaneous electrical nerve stimulation						
28. TENS for chronic non-cancer pain	302	31.8	48.6*	16.9	2.0	0.7
Epidural steroids with or without local anesthetics						
29. Epidural steroid injections with or without local anesthetics for radicular pain or radiculopathy	302	72.9*	23.8	3.3	0.0	0.0
30. Image guidance (*e.g.*, fluoroscopy) for transforaminal epidural injections	301	83.1*	12.0	4.6	0.0	0.3
31. Image guidance (*e.g.*, fluoroscopy) for interlaminar epidural injections	302	56.0*	26.2	12.9	3.3	1.6
Intrathecal drug therapies						
Neurolytic blocks						
32. Intrathecal neurolytic blocks for routine care	295	1.0	3.4	13.6	41.7*	40.3
Intrathecal nonopioid injections						
33. Intrathecal preservative-free steroid injections for intractable postherpetic neuralgia	293	7.2	22.2	39.2*	25.3	6.1
34. Ziconotide infusion for refractory chronic pain	286	10.8	29.7	50.0*	6.7	2.8
Intrathecal opioid injections						
35. Intrathecal opioid injection or infusion for neuropathic pain	296	11.5	34.1	35.5*	15.5	3.4
36. Neuraxial opioid trials should be performed before considering permanent implantation of intrathecal drug delivery systems	297	73.0*	19.9	6.4	0.7	0.0
Minimally invasive spinal procedures						
37. Minimally invasive spinal procedures (*e.g.*, vertebroplasty) for pain related to vertebral compression fractures	296	51.7*	37.2	9.8	1.3	0.0
Pharmacologic management						
38. Anticonvulsants (*e.g.*, alpha-2-delta calcium channel antagonists, sodium channel blockers, membrane stabilizing drugs) for neuropathic pain	300	67.3*	29.3	2.7	0.3	0.3
39. Tricyclic antidepressants	298	56.4*	37.6	5.4	0.3	0.3
40. Serotonin-norepinephrine reuptake inhibitors	299	43.1	42.8*	12.7	1.3	0.0

(*continued*)

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Table 3. Continued

	N	Percent Responding to Each Item: Strongly Agree	Agree	Equivocal	Disagree	Strongly Disagree
41. Selective serotonin reuptake inhibitors for diabetic neuropathy	298	28.8	35.9*	23.5	10.1	1.7
42. NMDA receptor antagonists for neuropathic pain	293	35.1	48.5*	15.4	0.7	0.3
43. Opioids for neuropathic or back pain	295	15.6	42.4*	29.1	9.8	3.1
44. Benzodiazepines	299	4.0	16.4	33.1*	32.1	14.4
45. NSAIDs for back pain	299	43.1	46.2*	9.0	1.7	0.0
46. Topical agents for peripheral neuropathic pain	300	33.0	48.7*	16.7	1.7	0.0
47. Skeletal muscle relaxants	297	19.0	37.5*	29.2	8.9	5.4
Physical or restorative therapy						
48. Physical or restorative therapy for low back pain	297	74.4*	22.2	3.4	0.0	0.0
49. Physical or restorative therapy for other chronic pain conditions	299	64.5*	29.8	5.7	0.0	0.0
Psychological treatment						
50. Cognitive behavioral therapy, biofeedback, or relaxation training for low back pain	300	45.3	41.7*	12.3	0.0	0.7
51. Cognitive behavioral therapy, biofeedback, or relaxation training for other chronic pain conditions	301	47.2	41.5*	10.3	0.7	0.3
52. Supportive psychotherapy, group therapy, or counseling	299	41.5	45.5*	10.4	2.3	0.3
Trigger point injections						
53. Trigger point injections for myofascial pain	302	43.7	42.4*	12.2	1.7	0.0

* Median.

CRPS = complex regional pain syndrome; N = number of American Society of Anesthesiologists (ASA) members who responded to each item; NMDA = *N*-methyl-D-aspartate; NSAID = nonsteroidal antiinflammatory drug; TENS = transcutaneous electrical nerve stimulation.

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Table 4. ASRA Member Survey Responses

	Percent Responding to Each Item					
	N	Strongly Agree	Agree	Equivocal	Disagree	Strongly Disagree
I. Patient evaluation						
1. All patients presenting with chronic pain should have a documented history and physical examination, and an assessment that ultimately supports a chosen treatment strategy	171	88.3*	8.2	2.3	0.0	1.2
2. Findings from the patient history, physical examination, and diagnostic evaluation should be combined to provide the foundation for an individualized treatment plan	170	85.3*	11.7	1.8	0.0	1.2
3. Whenever possible, direct and ongoing contact should be made and maintained with the other physicians caring for the patient to ensure optimal care management	171	67.2*	25.2	7.6	0.0	0.0
II. Multimodal or multidisciplinary interventions						
4. Multimodal interventions should be part of a treatment strategy for patients with chronic pain	171	67.2*	25.7	5.3	1.2	0.6
5. A long-term approach that includes periodic follow-up evaluations should be developed and implemented as part of the overall treatment strategy	170	65.3*	25.3	6.5	2.9	0.0
6. When available, multidisciplinary programs should be used	171	55.0*	29.2	11.1	3.5	1.2
III. Single modality interventions						
Ablative techniques						
7. Chemical denervation for routine care	167	4.2	12.0	17.4	41.9*	24.5
8. Cryoneurolysis or cryoablation for postthoracotomy pain syndrome, neuralgia, or low back pain (medial branch)	170	13.5	33.5	30.0*	16.5	6.5
9. Cryoneurolysis or cryoablation for facial pain of nonherpetic origin strategy	171	4.1	22.2	43.9*	22.8	7.0
10. Thermal intradiscal procedures for young active patients with early single-level degenerative disc disease with well-maintained disc height	170	14.7	20.0	31.2*	21.7	12.4
11. Conventional (*e.g.*, 80°C) or other thermal (*e.g.*, 67°C) radiofrequency ablation of the medial branch nerves to the facet joint for neck or low back (medial branch) pain	169	54.4*	26.0	14.2	3.6	1.8
12. Water-cooled radiofrequency ablation for chronic sacroiliac joint pain	170	12.3	31.8	45.9*	7.6	2.4
13. Conventional or other thermal radiofrequency ablation of the dorsal root ganglion for lumbar radicular pain	170	11.2	24.1	36.5*	20.6	7.6
Acupuncture						
14. Acupuncture for nonspecific, noninflammatory low back pain	170	13.5	39.4*	38.8	7.7	0.6
Blocks						
Joint injections						
15. Intra-articular facet joint injections for facet mediated pain	169	30.2	39.0*	15.4	13.0	2.4
16. Sacroiliac joint injections for sacroiliac joint pain	170	48.8	45.9*	4.1	1.2	0.0
Nerve and nerve root blocks						
17. Celiac plexus blocks using local anesthetics with or without steroids for pain secondary to chronic pancreatitis	171	18.1	37.4*	21.1	19.3	4.1
18. Lumbar sympathetic blocks or stellate ganglion blocks for CRPS	170	64.7*	25.9	7.0	1.2	1.2

(*continued*)

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Table 4. Continued

	N	Percent Responding to Each Item: Strongly Agree	Agree	Equivocal	Disagree	Strongly Disagree
19. Sympathetic nerve blocks for the long-term treatment of non-CRPS neuropathic pain	170	13.5	28.8	34.7*	20.0	2.9
20. Medial branch blocks for facet-mediated spine pain	169	58.6*	29.6	7.1	3.5	1.2
21. Peripheral somatic nerve blocks for long-term treatment	170	15.3	30.6	34.7*	15.3	4.1
Botulinum toxin						
22. Botulinum toxin for myofascial pain	170	12.3	36.5	35.9*	10.0	5.3
23. Botulinum toxin for piriformis syndrome	169	11.2	42.6*	31.4	11.8	3.0
Electrical nerve stimulation						
Neuromodulation with electrical stimulus						
24. Subcutaneous peripheral nerve stimulation for painful peripheral nerve injuries	171	18.1	46.2*	27.5	7.0	1.2
25. Spinal cord stimulation for persistent radicular pain	167	53.9*	35.3	6.0	3.6	1.2
26. Spinal cord stimulation for other conditions (*e.g.*, postherpetic neuralgia, postamputation pain, peripheral neuropathic pain, spinal cord injury, CRPS, cauda equina syndrome, cervical root injury pain, peripheral vascular disease, and visceral pain)	171	41.5	40.4*	14.0	2.3	1.8
27. Spinal cord stimulation trial before considering permanent implantation of a stimulation device	171	90.6*	7.0	1.2	0.6	0.6
Transcutaneous electrical nerve stimulation						
28. TENS for chronic non-cancer pain	170	42.9	40.6*	14.1	2.4	0.0
Epidural steroids with or without local anesthetics						
29. Epidural steroid injections with or without local anesthetics for radicular pain or radiculopathy	170	71.2*	22.9	4.1	1.2	0.6
30. Image guidance (*e.g.*, fluoroscopy) for transforaminal epidural injections	168	86.9*	10.7	1.2	1.2	0.0
31. Image guidance (*e.g.*, fluoroscopy) for interlaminar epidural injections	170	62.9*	24.7	7.1	3.5	1.8
Intrathecal drug therapies						
Neurolytic blocks						
32. Intrathecal neurolytic blocks for routine care	167	3.0	6.0	9.6	34.1*	47.3
Intrathecal nonopioid injections						
33. Intrathecal preservative-free steroid injections for intractable postherpetic neuralgia	169	4.7	24.9	37.9*	27.2	5.3
34. Ziconotide infusion for refractory chronic pain	167	8.4	31.1	45.5*	9.0	6.0
Intrathecal opioid injections						
35. Intrathecal opioid injection or infusion for neuropathic pain	170	10.6	27.6	40.0*	17.7	4.1
36. Neuraxial opioid trials should be performed before considering permanent implantation of intrathecal drug delivery systems	168	73.8*	22.0	3.6	0.0	0.6
Minimally invasive spinal procedures						
37. Minimally invasive spinal procedures (*e.g.*, vertebroplasty) for pain related to vertebral compression fractures	169	52.1*	40.2	6.5	1.2	0.0
Pharmacologic management						
38. Anticonvulsants (*e.g.*, alpha-2-delta calcium channel antagonists, sodium channel blockers, membrane stabilizing drugs) for neuropathic pain	171	76.0*	23.4	0.6	0.0	0.0
39. Tricyclic antidepressants	171	54.4*	39.8	5.8	0.0	0.0
40. Serotonin-norepinephrine reuptake inhibitors	170	43.5	44.1*	10.0	2.4	0.0

(*continued*)

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Table 4. Continued

	Percent Responding to Each Item					
	N	Strongly Agree	Agree	Equivocal	Disagree	Strongly Disagree
41. Selective serotonin reuptake inhibitors for diabetic neuropathy	171	34.5	30.4*	19.3	11.1	4.7
42. NMDA receptor antagonists for neuropathic pain	169	36.7	47.3*	15.4	0.6	0.0
43. Opioids for neuropathic or back pain	170	19.4	37.1*	31.2	8.2	4.1
44. Benzodiazepines	169	3.6	7.7	30.2	39.6*	18.9
45. NSAIDs for back pain	169	43.8	43.8*	10.0	1.8	0.6
46. Topical agents for peripheral neuropathic pain	169	37.9	52.6*	8.9	0.6	0.0
47. Skeletal muscle relaxants	168	19.0	37.5*	29.2	8.9	5.4
Physical or restorative therapy						
48. Physical or restorative therapy for low back pain	169	75.7*	22.5	1.8	0.0	0.0
49. Physical or restorative therapy for other chronic pain conditions	168	62.5*	32.7	4.8	0.0	0.0
Psychological treatment						
50. Cognitive behavioral therapy, biofeedback, or relaxation training for low back pain	170	47.6	38.8*	11.8	1.8	0.0
51. Cognitive behavioral therapy, biofeedback, or relaxation training for other chronic pain conditions	171	48.5	42.7*	8.8	0.0	0.0
52. Supportive psychotherapy, group therapy, or counseling	170	48.2	38.2*	12.4	1.2	0.0
Trigger point injections						
53. Trigger point injections for myofascial pain	170	42.4	41.2*	13.5	2.9	0.0

* Median.

CRPS = complex regional pain syndrome; N = number of American Society of Regional Anesthesia and Pain Medicine (ASRA) members who responded to each item; NMDA = *N*-methyl-D-aspartate; NSAID = nonsteroidal antiinflammatory drug; TENS = transcutaneous electrical nerve stimulation.

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Morbidity and Mortality Weekly Report (*MMWR*)

Chronic Pain Among Adults — United States, 2019–2021

Weekly / April 14, 2023 / 72(15);379–385

Summary

What is already known about this topic?

An estimated 50 million adults in the United States experienced chronic pain (i.e., pain lasting ≥3 months) in 2016, resulting in substantial health care costs and lost productivity.

What is added by this report?

During 2021, an estimated 20.9% of U.S. adults (51.6 million persons) experienced chronic pain, and 6.9% (17.1 million persons) experienced high-impact chronic pain (i.e., chronic pain that results in substantial restriction to daily activities) with a higher prevalence among non-Hispanic American Indian or Alaska Native adults, adults identifying as bisexual, and adults who were divorced or separated.

What are the implications for public health practice?

Clinicians, practices, health systems, and payers should vigilantly attend to health inequities and ensure access to appropriate, affordable, diversified, coordinated, and effective pain management care for all persons.

Related Materials

Article PDF

Full Issue PDF

S. Michaela Rikard, PhD[1]; Andrea E. Strahan, PhD[1]; Kristine M. Schmit, MD[1]; Gery P. Guy Jr., PhD[1] (VIEW AUTHOR AFFILIATIONS)

View suggested citation

Chronic pain (i.e., pain lasting ≥3 months) is a debilitating condition that affects daily work and life activities for many adults in the United States and has been linked with depression (*1*), Alzheimer disease and related dementias (*2*), higher suicide risk (*3*), and substance use and misuse (*4*). During 2016, an estimated 50 million adults in the United States experienced chronic pain, resulting in substantial health care costs and lost productivity (*5*,*6*). Addressing chronic pain and improving the lives of persons living with pain is a public health imperative. Population research objectives in the National Pain Strategy, which was released in 2016 by the Interagency Pain Research Coordinating Committee, call for more precise estimates of the prevalence of chronic pain and high-impact chronic pain (i.e., chronic pain that results in substantial restriction to daily activities) in the general population and within various population groups to guide efforts to reduce the impact of chronic pain (*3*). Further, a 2022 review of U.S. chronic pain surveillance systems identified the National Health Interview Survey (NHIS) as the best source for pain surveillance data (*7*). CDC analyzed data from the 2019–2021 NHIS to provide updated estimates of the prevalence of chronic pain and high-impact chronic pain among adults in the United States and within population groups defined by demographic, geographic, socioeconomic, and health status characteristics. During 2021, an estimated 20.9% of U.S. adults (51.6 million persons) experienced chronic pain, and 6.9% (17.1 million persons)

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experienced high-impact chronic pain. New findings from this analysis include that non-Hispanic American Indian or Alaska Native (AI/AN) adults, adults identifying as bisexual, and adults who are divorced or separated are among the populations experiencing a higher prevalence of chronic pain and high-impact chronic pain. Clinicians, practices, health systems, and payers should vigilantly attend to health inequities and ensure access to appropriate, affordable, diversified, coordinated, and effective pain management care for all persons (*8*).

NHIS is a cross-sectional, household survey of the civilian, noninstitutionalized population conducted annually by the National Center for Health Statistics (NCHS).* Data were analyzed using the 2019–2021 Sample Adult Interviews.† Survey questions used to estimate the prevalence of pain included, "In the past three months, how often did you have pain? Would you say never, some days, most days, or every day?" and "Over the past three months, how often did your pain limit your life or work activities? Would you say never, some days, most days, or every day?" If the participant was physically or mentally unable to respond to survey questions, then a knowledgeable proxy was permitted to answer on their behalf. Consistent with previous work, chronic pain was defined as pain on most days or every day during the previous 3 months, and high-impact chronic pain was defined as chronic pain that also limited daily life or work activities on most days or every day during the previous 3 months (*5*).

Using data from the 2019–2021 NHIS, the prevalence of chronic pain and high-impact chronic pain (including estimated number, crude rates, and age-adjusted rates with Korn-Graubard 95% CIs) were estimated for the adult U.S. population overall and within population groups defined by demographic, geographic, socioeconomic, and health status characteristics. Age-adjusted rates were calculated because the prevalence of pain is reported to vary by age (*5*). Estimates not meeting the NCHS reliability standards§ were not reported. Demographic characteristics included sex, age, race and ethnicity, sexual orientation, marital status, veteran status, and nativity (U.S.-born or non–U.S.-born). Geographic characteristics included region¶ and urban-rural classification. Socioeconomic characteristics included family income relative to the federal poverty level, education level, employment status, and health insurance coverage (reported separately by NHIS for adults aged <65 years and ≥65 years). Health status characteristics included general health status, disability status, and history of chronic medical conditions. Analysis was conducted using SAS (version 9.4; SAS Institute) and used weight and variance estimation variables** that account for the complex survey design of NHIS. All reported differences between subgroups in crude rates and in age-adjusted rates were significantly different on the basis of two-tailed Z-tests ($p<0.05$). This activity was reviewed by CDC and was conducted consistent with applicable federal law and CDC policy.††

Between 2019 and 2021, the prevalence of chronic pain among U.S. adults ranged from 20.5% to 21.8%, and the prevalence of high-impact chronic pain ranged from 6.9% to 7.8% (Figure). During 2021, an estimated 51.6 million U.S. adults (20.9%) experienced chronic pain, and 17.1 million (6.9%) experienced high-impact chronic pain (Table). The age-adjusted prevalence of both chronic pain and high-impact chronic pain was notably higher among certain demographic population groups including AI/AN adults, adults identifying as bisexual, and adults who were divorced or separated. The age-adjusted prevalence of high-impact chronic pain among AI/AN adults (12.8%) was six times as high as among non-Hispanic Asian adults (2.1%) and nearly twice as high as among non-Hispanic White adults (6.5%). The age-adjusted prevalence of chronic pain among adults identifying as bisexual was 32.9%, compared with 19.3% among adults identifying as straight and 20.7% among those identifying as gay or lesbian. The age-adjusted prevalence of chronic pain and high-impact chronic pain among adults who were divorced or separated (29.6% and 10.1%, respectively) was nearly twice as high as among those who were married (18.2% and 5.2%, respectively). The age-adjusted prevalence of chronic pain and high-impact chronic pain among those born in the United States (21.6% and 7.0%, respectively) was nearly twice as high as among those born outside the United States (11.9% and 4.1%, respectively).

Within population groups defined by geographic and socioeconomic characteristics, the age-adjusted prevalence of high-impact chronic pain among adults residing in nonmetropolitan areas (9.2%) and adults with a family income <100% of the federal poverty level (FPL) (14.4%) was approximately two and four times as high, respectively, as among those residing in large central metro areas (5.5%) and those with family income ≥400% FPL (3.5%). Adults reporting poor general health and adults with a disability experienced an exceptionally high prevalence of chronic pain (67.6% and 52.4%, respectively) and high-impact chronic pain (48.7% and 32.0%, respectively). Among all chronic medical conditions reported, the age-adjusted prevalence of chronic pain and high-impact chronic pain was highest among adults with a history of myalgic encephalomyelitis/chronic fatigue syndrome (70.0% and 43.8%, respectively) and dementia (54.9% and 34.2%, respectively).

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Discussion

Chronic pain is a debilitating condition that affects the lives of millions of adults in the United States. During 2021, an estimated 20.9% of U.S. adults experienced chronic pain, similar to the reported estimate of 20.4% in 2016 (*5*). The estimated prevalence of high-impact chronic pain in 2021 (6.9%) was, however, lower than in 2016 (8.0%) (*5*). Further, the age-adjusted prevalence of high-impact chronic pain in 2021 was 6.4%, which is the goal set by the Healthy People 2030 objective to reduce the prevalence of high-impact chronic pain (*9*).

Findings in this report highlight important disparities in the prevalence of chronic pain among certain population groups. Consistent with previous studies, the prevalences of chronic pain and high-impact chronic pain were higher among older adults, females, adults currently unemployed but who worked previously, veterans, adults living in poverty, those residing in nonmetropolitan areas, and those with public health insurance (*5*). This report contributes additional findings that the prevalences of chronic pain and high-impact chronic pain were also higher among AI/AN adults, adults identifying as bisexual, those who are divorced or separated, U.S.-born adults compared with non–U.S.-born adults, adults with a disability, adults in poor health, and adults with a history of certain chronic medical conditions.

Previous studies have identified disparities in the treatment of chronic pain and access to affordable and effective pain management care, yet further work is needed to understand why these disparities exist and to identify opportunities for appropriate and effective interventions (*10*). CDC's 2022 Clinical Practice Guideline for Prescribing Opioids for Pain provides recommendations to promote a multimodal and multidisciplinary approach to pain management and implementation strategies to reduce disparities in pain management care (*8*). In addition, policies and programs that address primary injury prevention, improved access to affordable, culturally responsive health care, and more effective pain management therapies can mitigate the burden of chronic pain (*3*).

The findings in this report are subject to at least three limitations. First, the results are generalizable only to the noninstitutionalized, civilian adult population; military personnel and persons in nursing homes and other institutions were excluded. Second, survey responses are self-reported and subject to recall bias. Finally, the COVID-19 pandemic affected the collection of survey responses[55] and had impacts on health care access and utilization that might affect these results in unknown ways.

Consistent with the population research objectives of the National Pain Strategy to provide more precise estimates of pain among various population groups, this study provides updated estimates of the prevalence of chronic pain and high-impact chronic pain and highlights disparities in the prevalence of pain among certain populations. These findings can guide policymakers, clinicians, and researchers in future research examining the underlying reasons for disparities and in the development of tailored interventions and strategies addressing chronic pain in the United States.

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Corresponding author: S. Michaela Rikard, ruv4@cdc.gov.

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[1]Division of Overdose Prevention, National Center for Injury Prevention and Control, CDC.

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* https://www.cdc.gov/nchs/nhis/index.htm

† Sample size and response rates for each year of the NHIS were as follows: 2019 (n = 31,997; response rate = 61.1%), 2020 (n = 31,568; response rate = 48.9%), and 2021 (n = 29,482; response rate = 50.9%). More information is available in the NHIS 2019–2021 survey description documents. https://www.cdc.gov/nchs/nhis/data-questionnaires-documentation.htm

§ https://www.cdc.gov/nchs/data/series/sr_02/sr02_175.pdf

¶ States are grouped into four regions used by the U.S. Census Bureau. https://www2.census.gov/geo/pdfs/maps-data/maps/reference/us_regdiv.pdf

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** During 2020, the survey question used to define high-impact chronic pain was only included in quarters 3 and 4. Therefore, weights were doubled to produce annual estimates for high-impact chronic pain for the year 2020.

†† 5 C.F.R. part 46, 21 C.F.R. part 56; 42 U.S.C. Sect. 241(d); 5 U.S.C. Sect. 552a; 44 U.S.C. Sect. 3501 et seq.

§§ Typical data collection procedures were disrupted, attributable to the COVID-19 pandemic. Additional documentation regarding changes to data collection procedures is available at the NHIS website.
https://www.cdc.gov/nchs/nhis/2020nhisdata.htm
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FIGURE. Prevalence of chronic pain* and high-impact chronic pain† among adults — United States, 2019–2021§,¶

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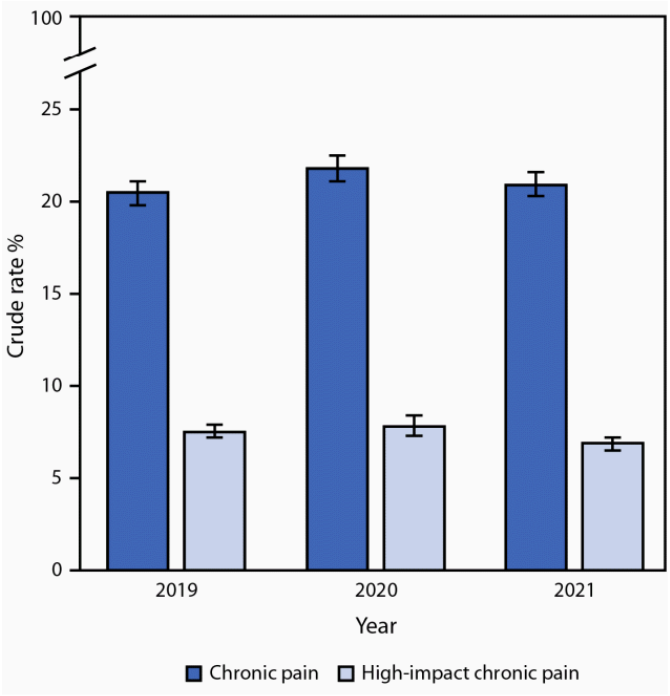

* Pain reported on most days or every day during the previous 3 months.

† Chronic pain that limited life or work activities on most days or every day during the previous 3 months.

§ Sample sizes for chronic pain and high-impact chronic pain were as follows: 2019 (n = 31,304; n = 31,281), 2020 (n = 31,126; n = 17,409), 2021 (n = 28,759; n = 28,740). Survey responses coded as "refused," "don't know," "not ascertained," or missing responses were excluded from the analysis. In 2020, the survey question used to define high-impact chronic pain was only included in quarters 3 and 4. Therefore, the sample size was smaller, and survey weights were doubled to produce annual estimates for high-impact chronic pain for 2020.

¶ With 95% CIs indicated with error bars.

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TABLE. Prevalence of chronic pain* and high-impact chronic pain† among adults, by demographic, geographic, socioeconomic, and health status characteristics — United States, 2021

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Characteristic	Chronic pain			High-impact chronic pain		
	Estimated no.§	Crude rate % (95% CI)	Age-adjusted rate¶ % (95% CI)	Estimated no.§	Crude rate % (95% CI)	Age-adjusted rate¶ % (95% CI)
Overall	51,561,000	20.9 (20.2–21.5)	19.7 (19.1–20.3)	17,100,000	6.9 (6.6–7.3)	6.4 (6.1–6.7)
Sex						

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Characteristic	Chronic pain			High-impact chronic pain		
	Estimated no.[§]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)	Estimated no.[§]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)
Female	28,074,000	22.0 (21.2–22.9)	20.5 (19.7–21.3)	9,739,000	7.6 (7.2–8.2)	7.0 (6.5–7.5)
Male	23,484,000	19.7 (18.8–20.5)	18.8 (18.0–19.6)	7,360,000	6.2 (5.7–6.7)	5.8 (5.3–6.2)
Age group, yrs						
18–24	2,135,000	7.5 (6.3–9.0)	NA	357,000	1.3 (0.7–2.0)	NA
25–44	11,532,000	13.7 (12.8–14.6)	NA	2,928,000	3.5 (3.0–4.0)	NA
45–64	21,236,000	26.8 (25.7–27.9)	NA	7,938,000	10.0 (9.3–10.8)	NA
65–84	14,694,000	30.0 (28.8–31.3)	NA	5,067,000	10.4 (9.6–11.2)	NA
≥85	1,894,000	34.3 (30.6–38.2)	NA	786,000	14.3 (11.8–17.2)	NA
Race and ethnicity**						
AI/AN, non-Hispanic	991,000	29.8 (22.4–38.0)	28.0 (21.5–34.6)	451,000	13.6 (9.2–19.1)	12.8 (8.6–17.0)
Asian, non-Hispanic	1,136,000	7.8 (6.4–9.3)	7.7 (6.3–9.0)	305,000	2.1 (1.4–3.0)	2.1 (1.4–2.9)
Black or African American, non-Hispanic	5,352,000	18.8 (17.3–20.4)	18.2 (16.7–19.7)	2,247,000	7.9 (6.8–9.1)	7.6 (6.5–8.7)
White, non-Hispanic	37,105,000	23.8 (23.0–24.6)	21.8 (21.0–22.5)	11,631,000	7.5 (7.0–7.9)	6.5 (6.1–6.9)

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Characteristic	Chronic pain			High-impact chronic pain		
	Estimated no.[5]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)	Estimated no.[5]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)
Hispanic or Latino	6,379,000	15.4 (14.0–16.9)	16.5 (15.0–18.0)	2,191,000	5.3 (4.5–6.1)	5.7 (4.9–6.6)
Other single and multiple race	599,000	18.5 (14.0–23.7)	20.9 (15.8–26.1)	274,000	8.5 (5.2–12.8)	10.5 (6.5–14.5)
Sexual orientation						
Straight	47,580,000	20.8 (20.2–21.5)	19.3 (18.7–20.0)	15,772,000	6.9 (6.5–7.3)	6.3 (5.9–6.6)
Gay or lesbian	960,000	19.2 (15.9–22.9)	20.7 (17.3–24.1)	332,000	6.7 (4.6–9.2)	7.0 (4.8–9.2)
Bisexual	1,384,000	24.3 (20.2–28.7)	32.9 (27.7–38.1)	357,000	6.3 (4.4–8.7)	9.9 (6.6–13.1)
Marital status						
Married	26,750,000	21.1 (20.3–22.0)	18.2 (17.3–19.2)	8,079,000	6.4 (5.9–6.9)	5.2 (4.7–5.6)
Widowed	4,673,000	32.9 (30.7–35.1)	25.9 (19.9–31.9)	1,836,000	12.9 (11.5–14.5)	8.1 (5.8–10.3)
Divorced or separated	7,820,000	32.1 (30.5–33.8)	29.6 (24.5–34.6)	3,214,000	13.2 (12.0–14.5)	10.1 (8.9–11.3)
Never married	7,596,000	13.0 (12.0–14.1)	19.2 (17.8–20.5)	2,339,000	4.0 (3.5–4.6)	6.8 (5.9–7.7)
Living with a partner	4,197,000	20.2 (18.1–22.4)	22.9 (20.6–25.1)	1,443,000	6.9 (5.7–8.3)	8.5 (7.0–10.1)
Veteran status						

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Characteristic	Chronic pain			High-impact chronic pain		
	Estimated no.[§]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)	Estimated no.[§]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)
Veteran	5,915,000	32.0 (29.9–34.1)	27.5 (24.9–30.1)	2,132,000	11.6 (10.2–13.0)	9.1 (7.6–10.5)
Not veteran	45,170,000	20.0 (19.3–20.6)	19.2 (18.6–19.8)	14,788,000	6.5 (6.2–6.9)	6.2 (5.9–6.6)
Nativity						
U.S.-born	45,340,000	22.7 (22.0–23.4)	21.6 (20.9–22.2)	14,897,000	7.5 (7.1–7.9)	7.0 (6.6–7.4)
Non–U.S.-born	5,759,000	12.8 (11.6–14.1)	11.9 (10.8–13.1)	2,028,000	4.5 (3.9–5.3)	4.1 (3.5–4.8)
U.S. Census Bureau region						
Northeast	7,796,000	18.2 (16.7–19.7)	16.8 (15.5–18.3)	2,309,000	5.4 (4.6–6.3)	4.9 (4.1–5.8)
Midwest	11,526,000	22.3 (20.9–23.7)	20.9 (19.7–22.2)	3,514,000	6.8 (6.1–7.5)	6.2 (5.5–6.8)
South	20,337,000	21.8 (20.7–22.8)	20.4 (19.4–21.4)	7,352,000	7.9 (7.3–8.5)	7.2 (6.6–7.8)
West	11,903,000	20.2 (18.9–21.6)	19.6 (18.4–20.8)	3,926,000	6.7 (5.9–7.5)	6.4 (5.7–7.1)
Urban-rural classification[††]						
Large central metro	13,387,000	17.1 (16.1–18.2)	16.8 (15.8–17.8)	4,433,000	5.7 (5.1–6.4)	5.5 (4.9–6.2)
Large fringe metro	11,073,000	18.7 (17.6–19.9)	17.4 (16.3–18.5)	3,385,000	5.7 (5.1–6.4)	5.2 (4.6–5.8)

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Characteristic	Chronic pain			High-impact chronic pain		
	Estimated no.[§]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)	Estimated no.[§]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)
Medium and small metro	17,868,000	23.4 (22.1–24.7)	21.9 (20.8–23.1)	5,780,000	7.6 (6.9–8.3)	6.9 (6.3–7.6)
Nonmetropolitan	9,233,000	27.8 (25.7–30.0)	25.4 (23.5–27.4)	3,502,000	10.6 (9.4–11.8)	9.2 (8.2–10.3)
Family income[§§]						
<100% FPL	6,921,000	28.5 (26.3–30.9)	28.8 (26.6–31.0)	3,444,000	14.2 (12.7–15.9)	14.4 (12.8–16.0)
100% to <200% FPL	10,803,000	25.1 (23.6–26.6)	24.1 (22.6–25.6)	4,220,000	9.8 (8.9–10.8)	9.5 (8.6–10.5)
200% to <400% FPL	15,983,000	22.0 (20.9–23.1)	20.9 (19.9–22.0)	5,248,000	7.2 (6.6–7.9)	6.7 (6.1–7.3)
≥400% FPL	17,855,000	16.7 (16.0–17.5)	15.3 (14.6–16.1)	4,187,000	3.9 (3.5–4.3)	3.5 (3.1–3.9)
Education						
No high school diploma or GED	5,898,000	25.7 (23.6–27.9)	22.6 (20.5–24.8)	2,464,000	10.8 (9.5–12.1)	8.9 (7.6–10.1)
High school diploma or GED	15,615,000	22.5 (21.3–23.7)	21.7 (20.6–22.9)	5,756,000	8.3 (7.6–9.1)	7.9 (7.2–8.6)
Some college	15,979,000	24.5 (23.3–25.7)	24.2 (23.0–25.3)	5,441,000	8.3 (7.6–9.1)	8.1 (7.4–8.9)
Bachelor's degree or higher	13,804,000	15.7 (15.0–16.5)	14.8 (14.0–15.6)	3,291,000	3.8 (3.4–4.2)	3.4 (3.0–3.7)
Employment status						

ATTACHMENT 12
Purpose of the Project

Characteristic	Chronic pain			High-impact chronic pain		
	Estimated no.[§]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)	Estimated no.[§]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)
Employed[††]	24,045,000	15.8 (15.1–16.6)	16.5 (15.7–17.3)	5,088,000	3.4 (3.0–3.7)	3.7 (3.2–4.1)
Not employed, worked previously	26,093,000	30.5 (29.4–31.6)	26.7 (25.5–28.0)	11,461,000	13.4 (12.6–14.2)	12.7 (11.8–13.7)
Not employed, never worked	822,000	13.1 (10.2–16.3)	15.6 (12.3–19.0)	334,000	5.3 (3.5–7.6)	6.8 (4.3–9.3)
Health insurance coverage* **						
Aged <65 yrs						
Private	21,401,000	16.1 (15.4–16.9)	15.3 (14.6–16.0)	5,348,000	4.0 (3.6–4.5)	3.7 (3.3–4.1)
Medicaid and other public coverage	6,899,000	25.7 (23.7–27.8)	26.9 (25.0–28.8)	3,295,000	12.3 (10.9–13.8)	13.1 (11.7–14.4)
Other coverage	2,999,000	38.6 (35.1–42.2)	32.5 (28.9–36.0)	1,589,000	20.5 (17.6–23.6)	16.9 (13.8–20.0)
Uninsured	3,532,000	14.7 (12.9–16.5)	14.9 (13.1–16.7)	972,000	4.0 (3.2–5.1)	4.2 (3.2–5.1)
Aged ≥65 yrs						
Private	5,938,000	28.8 (27.0–30.7)	29.1 (27.3–30.9)	1,734,000	8.4 (7.4–9.5)	8.6 (7.6–9.6)
Medicare and Medicaid	1,595,000	43.1 (37.7–48.5)	43.1 (37.8–48.4)	800,000	21.8 (17.8–26.3)	21.8 (17.7–25.9)
Medicare Advantage	5,574,000	29.8 (27.8–31.8)	29.9 (27.9–31.8)	2,005,000	10.7 (9.5–12.1)	10.7 (9.4–12.0)

ATTACHMENT 12
Purpose of the Project

Characteristic	Chronic pain			High-impact chronic pain		
	Estimated no.[§]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)	Estimated no.[§]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)
Medicare only, excluding Medicare Advantage	1,810,000	27.1 (23.9–30.6)	27.2 (23.9–30.5)	646,000	9.7 (7.7–12.0)	9.8 (7.7–11.9)
Other coverage	1,624,000	35.8 (31.7–40.1)	35.5 (31.4–39.6)	669,000	14.7 (11.9–18.0)	14.8 (11.8–17.8)
Uninsured	53,000	—[†††]	—[†††]	9,000	—[†††]	—[†††]
General health status						
Excellent	4,221,000	7.0 (6.2–7.7)	7.4 (6.7–8.2)	666,000	1.1 (0.8–1.5)	1.2 (0.9–1.5)
Very good	12,421,000	14.7 (13.9–15.6)	14.3 (13.5–15.1)	2,063,000	2.4 (2.1–2.8)	2.3 (2.0–2.7)
Good	17,659,000	25.8 (24.6–27.0)	23.5 (22.3–24.6)	5,095,000	7.4 (6.8–8.1)	6.5 (5.9–7.1)
Fair	12,016,000	47.0 (44.8–49.4)	42.5 (39.6–45.4)	5,684,000	22.3 (20.6–24.1)	19.5 (17.5–21.4)
Poor	5,212,000	69.2 (65.4–72.9)	67.6 (60.5–74.7)	3,578,000	48.3 (44.4–52.2)	48.7 (41.8–55.7)
Disability status[§§§]						
With disability	12,489,000	58.0 (55.7–60.3)	52.4 (49.3–55.5)	7,391,000	34.5 (32.5–36.5)	32.0 (29.3–34.8)
Without disability	39,072,000	17.3 (16.7–17.9)	16.8 (16.2–17.4)	9,709,000	4.3 (4.0–4.6)	4.1 (3.8–4.4)
Chronic medical conditions[¶¶¶]						
Cardiovascular						
Hypertension	25,625,000	33.0 (31.9–34.2)	27.3 (25.7–28.9)	10,268,000	13.2 (12.5–14.1)	10.6 (9.7–11.5)

ATTACHMENT 12
Purpose of the Project

Characteristic	Chronic pain			High-impact chronic pain		
	Estimated no.[§]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)	Estimated no.[§]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)
High cholesterol	21,012,000	31.6 (30.3–32.9)	25.2 (23.6–26.8)	7,905,000	11.9 (11.1–12.8)	9.0 (8.1–9.9)
Coronary heart disease	4,977,000	40.7 (37.9–43.6)	33.8 (25.4–42.2)	2,382,000	19.5 (17.3–21.9)	16.6 (11.2–22.0)
Angina	1,906,000	50.9 (45.6–56.3)	44.0 (34.6–53.3)	1,122,000	30.0 (25.2–35.1)	27.7 (19.3–36.2)
Myocardial infarction	3,319,000	44.0 (40.2–47.8)	40.3 (31.1–49.5)	1,615,000	21.5 (18.6–24.5)	17.1 (11.8–22.4)
Stroke	3,176,000	46.0 (42.2–49.9)	43.4 (34.8–52.0)	1,692,000	24.8 (21.6–28.3)	23.8 (17.9–29.7)
Respiratory						
COPD, emphysema, or chronic bronchitis	6,210,000	54.5 (51.6–57.4)	50.0 (44.4–55.5)	3,130,000	27.5 (24.9–30.2)	23.9 (19.8–28.0)
Asthma	6,926,000	35.0 (32.7–37.3)	33.6 (31.4–35.7)	2,964,000	15.0 (13.4–16.7)	14.2 (12.7–15.8)
Psychiatric						
Anxiety disorder	15,163,000	37.4 (35.7–39.1)	37.5 (35.9–39.0)	6,596,000	16.3 (15.0–17.6)	16.3 (15.1–17.5)
Depression	16,776,000	39.0 (37.4–40.7)	38.0 (36.4–39.5)	7,535,000	17.6 (16.4–18.8)	16.8 (15.7–17.9)
Digestive						
Hepatitis	1,534,000	38.9 (33.7–44.2)	28.2 (23.3–33.2)	740,000	18.8 (14.9–23.1)	12.9 (9.6–16.2)

ATTACHMENT 12
Purpose of the Project

Characteristic	Chronic pain			High-impact chronic pain		
	Estimated no.[§]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)	Estimated no.[§]	Crude rate % (95% CI)	Age-adjusted rate[¶] % (95% CI)
Cirrhosis or liver condition	1,120,000	50.8 (43.7–57.8)	40.9 (34.4–47.4)	643,000	29.1 (23.4–35.4)	22.3 (17.3–27.3)
Musculoskeletal						
Arthritis	26,796,000	51.0 (49.5–52.5)	51.3 (48.3–54.4)	10,700,000	20.4 (19.2–21.6)	20.0 (17.6–22.4)
Endocrine						
Diabetes	8,954,000	37.7 (35.5–39.9)	29.1 (26.2–32.0)	3,916,000	16.5 (15.1–18.1)	12.9 (10.9–14.8)
Neurologic						
Dementia	1,151,000	44.8 (39.0–50.7)	54.9 (38.4–71.3)	648,000	25.3 (20.2–30.9)	34.2 (19.9–48.5)
Epilepsy	1,868,000	42.4 (37.0–47.9)	40.0 (34.8–45.1)	912,000	20.7 (16.7–25.1)	19.6 (15.7–23.5)
Genitourinary						
Chronic kidney disease	3,760,000	53.8 (50.1–57.4)	48.4 (42.0–54.7)	1,954,000	28.0 (24.7–31.5)	25.4 (19.8–31.1)
Multiple systems						
Cancer	8,536,000	35.1 (33.3–37.0)	30.6 (26.2–35.0)	3,258,000	13.4 (12.2–14.7)	11.9 (9.9–13.8)
ME/CFS	1,914,000	74.5 (68.5–79.8)	70.0 (63.1–76.9)	1,242,000	48.3 (42.2–54.4)	43.8 (37.0–50.7)

Abbreviations: AI/AN = American Indian or Alaska Native, non-Hispanic; COPD = chronic obstructive pulmonary disease; FPL = federal poverty level; GED = general educational development certificate; ME/CFS = myalgic encephalomyelitis/chronic fatigue syndrome; NA = not applicable; NHIS = National Health Interview Survey.

* Pain reported on most days or every day during the previous 3 months.

† Chronic pain that limits life or work activities on most days or every day during the previous 3 months.

§ Weighted estimates are rounded to the nearest 1,000. Responses coded as "refused," "don't know," "not ascertained," or

ATTACHMENT 12
Purpose of the Project

missing responses were excluded from the analysis.
¶ Estimates are age-adjusted using the projected 2000 U.S. Census Bureau population as the standard population and five age groups (18–24, 25–44, 45–64, 65–84, and ≥85 years) except for health insurance coverage. For health insurance coverage for those aged <65 years, three age groups were used (18–24, 25–44, and 45–64), and for health insurance coverage for those aged ≥65 years, two age groups were used (65–84 and ≥85).
** Persons who reported AI/AN only or AI/AN and another race are included in the AI/AN category. Persons who reported a single race other than Black or African American, Asian, AI/AN, or White, or who reported more than one race not including AI/AN were combined into the "other single and multiple race" category.
†† Based on the 2013 National Center for Health Statistics Urban-Rural Classification Scheme for Counties (https://www.cdc.gov/nchs/data/series/sr_02/sr02_166.pdf). Nonmetropolitan includes counties in micropolitan statistical areas and noncore counties.
§§ Missing data on family income and earnings in the NHIS are imputed using a multiple imputation methodology. Family income is reported as a percentage of the FPL using the weighted average thresholds published annually by the U.S. Census Bureau. https://www.census.gov/data/tables/time-series/demo/income-poverty/historical-poverty-thresholds.html
¶¶ Persons who performed seasonal or contract work and worked during the previous 12 months, or those who were working at a job or business, but not for pay, were considered employed.
*** https://ftp.cdc.gov/pub/Health_Statistics/NCHS/Dataset_Documentation/NHIS/2021/srvydesc-508.pdf
††† Estimates considered unreliable according to the National Center for Health Statistics' standards of reliability. https://www.cdc.gov/nchs/data/series/sr_02/sr02_175.pdf
§§§ Based on the Washington Group Adult Composite Disability Indicator.
¶¶¶ Based on the survey question, "Have you ever been told by a doctor or other health professional that you had..." except for asthma and ME/CFS, which are a combination of the previous question and "Do you still have asthma?," or "Do you still have CFS or ME?"

Top

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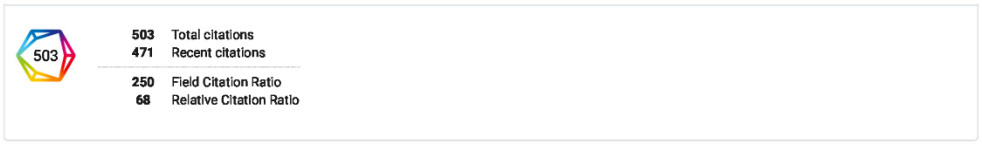
ATTACHMENT 12
Purpose of the Project



Last Reviewed: April 13, 2023

Was this page helpful?

Yes Partly No

ATTACHMENT 13
Alternatives

The Applicant explored several options before submitting this application to the Board requesting these categories of service for River Oaks Surgery Center ("River Oaks").

Among other options, the Applicant considered maintaining the status quo, seeking out other ASTC's or Hospitals, or the Project as Proposed. For the reasons stated below, Applicant opted to seek the Project as Proposed.

Alternative #1: Maintain the Status Quo (No additional Cost)

The Applicant considered continuing to perform procedures at multiple existing ambulatory surgery centers throughout the Chicagoland area. As documented, Dr. Shoeb Mohiuddin has historically provided services across numerous facilities, including 13 different ASTCs between April 2024 and April 2025. However, this approach was determined to be suboptimal for several reasons. They include: the fragmentation of care: in that providing services across multiple facilities limits continuity of care, creates inefficiencies in scheduling, and reduces the ability to implement standardized clinical protocols Traveling between multiple sites reduces physician productivity and limits the ability to expand service availability in a coordinated manner. Patients must navigate varying locations, staff, and care processes, which can negatively impact satisfaction and outcomes.

Accordingly, maintaining the status quo would not adequately address the identified need for accessible, coordinated outpatient orthopedic and pain management services within the service area.

Alternative #2: Utilize Hospital-Based Surgical Facilities

The Applicant also considered performing procedures exclusively within hospital-based operating rooms. This alternative was rejected due to the following reasons: Hospital-based procedures are significantly more expensive than those performed in an ambulatory surgical setting, resulting in increased costs to both patients and payors. Hospital operating rooms are often prioritized for higher-acuity cases, leading to delays in scheduling elective orthopedic and pain procedures. Hospital environments typically involve longer wait times, more complex administrative processes, and greater exposure to hospital-acquired conditions. The minimally invasive orthopedic and pain management procedures proposed are well-suited for an outpatient setting and do not require the resources of a hospital inpatient environment. Further, these procedures are considered low acuity and priority for overburden hospital surgical suites.

Alternative #3- Expand an Existing ASTC

The Applicant evaluated the feasibility of expanding an existing ASTC or entering into a joint venture or partnership arrangement. This alternative was pursued and ultimately not successful leading to the filing of this application for the following reasons: Existing ASTCs would limit the Applicant's ability to implement a fully integrated, patient-centered model focused on minimally invasive orthopedic and pain management services.

Many existing ASTCs do not offer the comprehensive combination of orthopedic and interventional pain services proposed, or are structured around different specialties. Existing facilities may have competing priorities, governance structures, or referral relationships that do not align with the Applicant's practice model and patient population.

As a result, this alternative would not achieve the level of integration, access, or efficiency necessary to meet community needs.

ATTACHMENT 13
Alternatives

Alternative #4: Project as Proposed

The Applicant was thorough and data-driven in concluding to pursue this Certificate of Need. Dr. Mohiuddin and his fellow practitioners, and others will continue the exceptional care its patients have grown accustomed to. The costs will be mitigated once the additional service lines are incorporated into an existing building and leveraging interdisciplinary teams of staff. Simply put, this option is both the most cost effective, and guaranteed quality option available to River Oaks.

ATTACHMEN 14
Size of the Project

The square footage identified in this application for the proposed project, includes two operating room and recovery stations 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?**
ASTC (2 Operating Rooms)	**5,181**	**2750-GSF Per Operating Room**	**-319**	**YES**

ATTACHMENT 15
Project Service Utilization

The Applicant projects that the proposed River Oaks Surgery Center LLC ("ASTC") will achieve utilization that meets the State's target utilization standards for a two operating room ambulatory surgical treatment center. The proposed facility will include two operating rooms and is expected to perform 1,872 procedures in its first year of operation, generating approximately 1,560 operating hours. In the second year, it is expected that there will be a conversative 3% increase in volume that will result in utilization of up to 1,928 procedures and approximately 1,607 operating hours. These projections exceed the State standard of 1,500 hours per operating room and demonstrate that the facility will operate at an efficient and sustainable level from the outset.

UTILIZATION					
	DEPARTMENT / SERVICE	**HISTORICAL UTILIZATION (PATIENT DAYS) (TREATMENTS) ETC.**	**PROJECTED UTILIZATION**	**STATE STANDARD**	**MEET STANDARD?**
YEAR 1	**ASTC**	**1,872 Patients**	**1,560 Hours**	**>1500**	**YES**
YEAR 2	**ASTC**	**1,928 Patients**	**1,607 Hours**	**>1500**	**YES**

The projected utilization is based on historical data related to the established clinical practice of Dr. Shoeb Mohiuddin, and his practice Regenerative Pain Solutions. Dr. Mohiuddin maintains a high-volume interventional pain management practice and has historically performed procedures across multiple ambulatory surgical treatment centers throughout the Chicagoland area. Between April 2024 and April 2025, he performed approximately 2,198 procedures at 13 different ASTCs and other office-based locations.

Facility Name	Count of Patient's Zip Code
ACCREDITED AMBULATORY CARE	151
ADVANCED SPINE AND REHAB	3
CHICAGO PAIN AND ORTHO	4
ELMWOOD PARK SURGERY CENTER	422
FULLERTON SURGERY CENTER	239
GRAND AVENUE SURGICAL CENTER	44
ILLINOIS BACK AND NECK INSTITUTE	365
INNOVIA SURGERY CENTER	21
LAKESHORE SURGICAL CENTER	1
METRO NORTH SURGICAL CENTER	169
REGENERATIVE PAIN AND SPINE	299
ROGERS PARK SURGERY CENTER	453
SOUTH CHIACAGO SURGICAL SOLUTIONS	27
Grand Total	**2198**

ATTACHMENT 15
Project Service Utilization

This historical volume reflects a stable and recurring patient base and provides a reliable foundation for the proposed utilization. Rather than relying on speculative growth, the Applicant's projections are based primarily on the consolidation of existing procedural volume into a single, centralized facility.

The utilization projections are based on a conservative average procedure time of 50 minutes, which includes patient preparation, procedure time, and room turnover. Applying this assumption to the projected Year 1 volume results in approximately 93,600 procedure minutes, or 1,560 operating hours, which aligns directly with the Applicant's projections. This results in approximately 1,875 available hours per operating room annually, yielding utilization rates of approximately 83 percent in Year 1 and 86 percent in Year 2. These levels are consistent with efficient ASTC operations and provide sufficient capacity to accommodate modest growth without exceeding optimal operating thresholds.

State Standard for One Operating Room (in hours)	1500
Proposed Facility Utilization (in minutes)	93600
Proposed Facility Utilization Year 1 (in hours)	1560
Total Projected Referrals in Year 1	1872
Total Projected Referrals in Year 2	1928
Average Procedure Time (Including Room Prep, Procedure, and Clean-up)	50
Operational Days	250
Average Hours of Operation	7.5
Total Available Procedure Hours (Per Operating Room)	1875
Number of Operating Rooms	1
First Year Proposed Hours	1560
First Year Utilization (Operating Room 1)	83%
Second Year Proposed Procedures	1607
Second Year Utilization (Operating Room 1)	86%

In summary, the Applicant has demonstrated that the proposed ASTC will achieve appropriate and sustainable utilization levels based on established historical procedure volumes, conservative operational assumptions, and a care delivery model aligned with current clinical and industry trends. The project meets the State's utilization standards and represents an efficient and appropriate use of healthcare resources within the geographic service area.

ATTACHMENT 16
Unfinished or Shell Space

NOT APPLICABLE – the proposed project does not include plans for shell space.

ATTACHMENT 17
Assurances

NOT APPLICABLE – the proposed project does not include plans for shell space.

ATTACHMENT 24
Non-Hospital Based Ambulatory Services to GSA Residents - 1110.235(C)(2)(B)

The proposed project is necessary to meet the needs of the residents of the planning area as noted in this application. The project involves establishing a new ASTC in Cook County. This limited multi-specialty ASTC will have ample capacity to meet the needs of patients in the area.

The primary purpose of this project is to provide necessary health care to residents of the geographic service area ("GSA") in which the ASTC will be located. Listed in the following pages, in accordance with 77 Ill. Admin. Code §1110.235(c)(2)(B), is the GSA consisting of all zip codes that are located with a 10-mile radius of the proposed site of the ASTC. We have also included a map of the multidirectional travel radii of the proposed ASTC site. The proposed site at 7941 S. Western Avenue, Chicago, Illinois, is centrally positioned within a densely populated area of Cook County that demonstrates significant demand for outpatient surgical services, particularly among patients with chronic pain and musculoskeletal conditions.

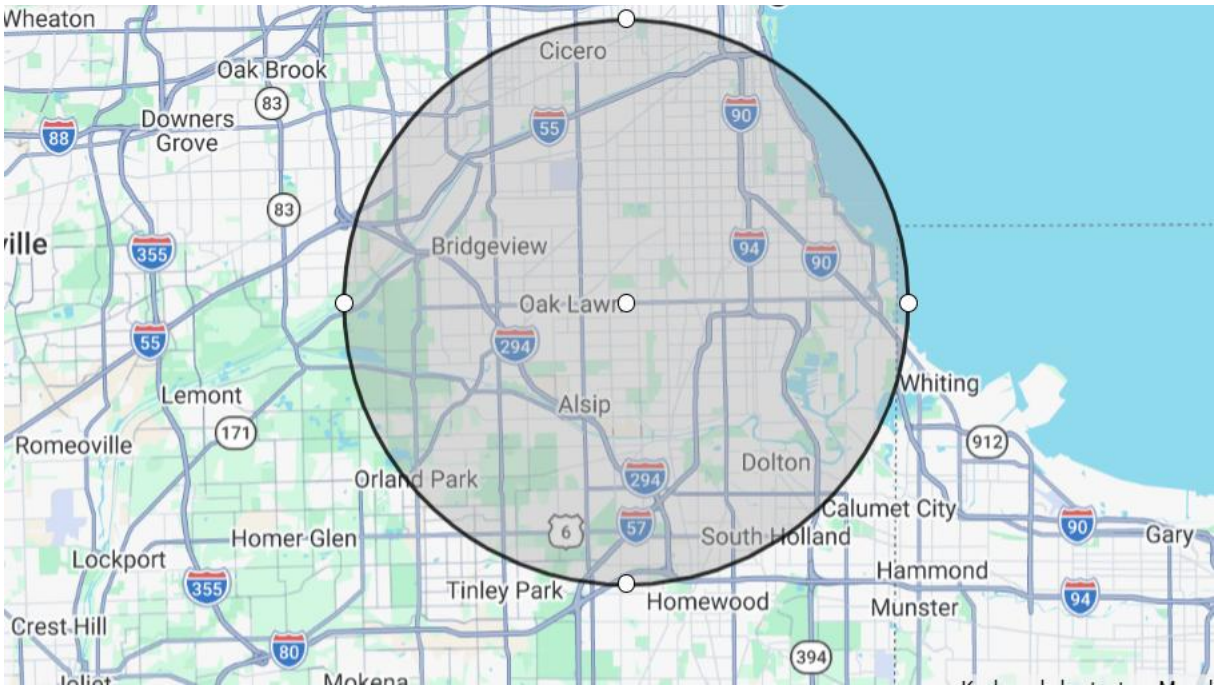
Consistent with 77 Ill. Adm. Code 1100.510(d), the GSA for the proposed ASTC is defined as all zip codes located, in whole or in part, within a 10-mile radius of the project site. The GSA includes numerous Chicago and surrounding suburban zip codes, and these zip codes represent a substantial and diverse population base within Cook County and surrounding areas, many of which include communities with historically limited access to specialized outpatient surgical services. The proposed location is accessible via major roadways and public transportation routes, further supporting its ability to effectively serve residents within the defined GSA.

A significant proportion of these patients reside within zip codes located in close proximity to the proposed facility, including 60620, 60628, 60629, 60619, 60617, 60621, 60623, 60624, 60644, 60649, 60651, and 60827. These zip codes represent some of the highest-volume sources of patient origin and are all located within the defined 10-mile geographic service area.

Based on the Applicant's patient origin analysis, well over 50 percent of patients reside within the geographic service area, thereby satisfying the requirements of this criteria. The concentration of patients within these zip codes demonstrates that the proposed ASTC is appropriately located to serve its existing patient population and will improve access by reducing travel distances and enhancing continuity of care.

ATTACHMENT 24
Non-Hospital Based Ambulatory Services to GSA Residents - 1110.235(C)(2)(B)

10-Mile Radius from 3523 W. 95th St., Evergreen Park, IL 60805



ATTACHMENT 24
Non-Hospital Based Ambulatory Services to GSA Residents - 1110.235(C)(2)(B)

Zip Code	City	Population (2020 Census)
60805	Evergreen Park	19,945
60456	Hometown	4,343
60655	Chicago	27,837
60652	Chicago	40,898
60620	Chicago	66,514
60643	Chicago	47,831
60453	Oak Lawn	58,362
60629	Chicago	114,453
60803	Alsip	22,189
60459	Burbank	29,451
60415	Chicago Ridge	14,433
60636	Chicago	34,800
60406	Blue Island	24,011
60621	Chicago	29,570
60628	Chicago	62,832
60619	Chicago	63,303
60482	Worth	11,216
60418	Crestwood	10,813
60455	Bridgeview	17,098
60472	Robbins	4,671
60638	Chicago	56,928
60827	Riverdale	24,936
60632	Chicago	92,237
60463	Palos Heights	14,048
60469	Posen	5,469
60457	Hickory Hills	14,420
60465	Palos Hills	18,530
60445	Midlothian	14,692
60609	Chicago	65,770
60637	Chicago	53,555
60458	Justice	14,504
60617	Chicago	77,270
60501	Summit Argo	11,746
60615	Chicago	43,502
60649	Chicago	48,171
60426	Harvey	24,114
60428	Markham	11,351
60419	Dolton	21,409
60633	Chicago	13,359
60452	Oak Forest	27,363
60653	Chicago	33,146

ATTACHMENT 24
Non-Hospital Based Ambulatory Services to GSA Residents - 1110.235(C)(2)(B)

Zip Code	City	Population (2020 Census)
60402	Berwyn	64,706
60804	Cicero	85,673
60623	Chicago	87,649
60525	La Grange	32,613
60534	Lyons	10,749
60608	Chicago	75,770
60464	Palos Park	9,982
60480	Willow Springs	5,272
60616	Chicago	54,013
60473	South Holland	21,661

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery Service Demand - Establishment of an ASTC - 1110.235(C)(3)

The Applicant has demonstrated that the proposed River Oaks Surgery Center LLC ("ASTC") is necessary to accommodate existing and ongoing service demand based on established referral patterns and historical procedural volume. The proposed project is not speculative in nature, but rather reflects the consolidation of an existing, active caseload currently distributed across multiple IDPH-licensed ambulatory surgical treatment centers and hospital-based outpatient departments within the geographic service area ("GSA").

The Applicant's service demand is supported by the historical clinical activity of Dr. Mohiuddin, who maintains an active interventional pain management practice and regularly performs procedures requiring an ambulatory surgical setting. During the most recent 12-month period, Dr. Mohiuddin performed approximately 2,198 procedures across 13 different ambulatory surgical treatment centers located throughout the Chicagoland area. Included with this attachment is a referral letter from Dr. Mohiuddin attesting to the number of procedures referred to existing ASTCs and hospital outpatient departments during the relevant 12-month period and identify the referring physician, specialty, patient origin by zip code, and the recipient facilities. These letters confirm that the Applicant has an established referral base sufficient to support the proposed project.

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery Service Demand - Establishment of an ASTC - 1110.235(C)(3)

REGENERATIVE
PAIN & SPINE

2335 W. Fullerton Ave
Suite B
Chicago, IL 60647

March 16, 2026

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

Re: Referral Letter - River Oaks Surgery Center LLC

Dear Mr. Kniery:

My name is Shoeb Mohiuddin, M.D. and I am an anesthesiologist affiliated with Regenerative Pain Medicine. This letter contains the referral documentation required per 77 Ill. Admin. Code Section 1110.235(c)(3)(A)-(B). During the 12 month period prior to submission of this letter, our facility was referred a total of 2,199 patients from the following healthcare facilities:

Historical Caseload by Licensed setting:

Name of Healthcare Facility	Number of cases in past 12 months	River Oaks Surgery Center LLC
Accredited Ambulatory Care	151	151
Advanced Spine and Rehab	3	3
Chicago Pain and Orthopedic	4	4
Elmwood Park Surgery Center	422	422
Fullerton Surgery Center	239	239
Grand Avenue Surgical Center	44	44
Illinois Back and Neck Institute	365	365
Innovia Surgery Center	21	21
Lakeshore Surgical Center	1	1
Metro North Surgical Center	169	169
Regenerative Pain and Spine	299	0
Rogers Park Surgery Center	453	453
South Chicago Surgical Solutions	27	0
Total	**2,198**	**1,872**

Based on my historical referrals, our facility anticipates 1,900 referred patients each year to River Oaks Surgery Center LLC. Enclosed with this letter is a list of patient origin by zip code of residence. I certify that the patients I propose to refer reside within the applicant's proposed geographic service area.

I further certify that the aforementioned referrals have not been used to support another pending or approved certificate of need permit application. The information provided in this letter is true and accurate to the best of my knowledge.

Sincerely,

Shoeb Mohiuddin, M.D.
Managing Member
River Oaks Surgery Center LLC

SHOEB@RPSPINE.COM 312-300-3418 WWW.RPSPINE.COM

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery Service Demand - Establishment of an ASTC - 1110.235(C)(3)

REGENERATIVE PAIN & SPINE

2335 W. Fullerton Ave
Suite B
Chicago, IL 60647

I further certify that the aforementioned referrals have not been used to support another pending or approved certificate of need permit application. The information provided in this letter is true and accurate to the best of my knowledge.

Thank you,

Shoeb Mohiuddin, M.D.

March 16, 2026
Date

Physician's Signature

Signature of Notary:

Subscribed and sworn to before me

this 16 day of March, 2026

Official Seal
ERICA L BRODERICK
Notary Public, State of Illinois
Commission No. 906011
My Commission Expires December 18, 2027

SHOEB@RPSPINE.COM 312-300-3418 WWW.RPSPINE.COM

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery Service Demand - Establishment of an ASTC - 1110.235(C)(3)

Patient Zip Code	Count of Patient's Zip Code
60644	2
32828	1
34638	2
46303	2
46311	2
46312	7
46319	2
46320	2
46322	2
46323	9
46324	14
46327	4
46341	1
46342	1
46368	1
46375	2
46383	1
46402	1
46403	2
46404	6
46406	1
46407	2
46408	6
46409	3
46410	2
46628	1
47904	2
53132	1
53154	1
53221	1

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery Service Demand - Establishment of an ASTC - 1110.235(C)(3)

Patient Zip Code	Count of Patient's Zip Code
55128	2
60005	5
60008	1
60010	1
60016	10
60018	1
60031	9
60047	1
60048	4
60053	1
60056	6
60060	8
60064	7
60067	1
60068	5
60070	1
60073	3
60074	1
60076	6
60077	2
60083	1
60085	39
60087	11
60089	1
60090	9
60099	11
60101	3
60104	8
60106	7
60107	6

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery Service Demand - Establishment of an ASTC - 1110.235(C)(3)

Patient Zip Code	Count of Patient's Zip Code
60110	3
60115	2
60120	11
60123	8
60130	4
60131	1
60139	1
60140	1
60148	2
60153	14
60154	1
60155	3
60156	1
60160	4
60162	6
60163	4
60169	5
60171	7
60174	1
60176	2
60177	1
60181	6
60187	5
60188	1
60190	3
60194	1
60201	1
60202	2
60302	5
60303	3

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery Service Demand - Establishment of an ASTC - 1110.235(C)(3)

Patient Zip Code	Count of Patient's Zip Code
60304	6
60401	1
60402	21
60405	1
60406	14
60409	48
60411	28
60415	10
60417	2
60418	1
60419	25
60422	2
60423	3
60424	5
60425	1
60426	19
60428	10
60429	6
60430	7
60431	1
60432	2
60433	3
60435	8
60436	1
60438	11
60440	11
60442	2
60443	1
60445	5

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery Service Demand - Establishment of an ASTC - 1110.235(C)(3)

Patient Zip Code	Count of Patient's Zip Code
60446	6
60447	2
60448	3
60449	2
60452	4
60453	29
60455	14
60456	3
60457	3
60458	10
60459	16
60461	1
60462	14
60464	3
60465	5
60466	2
60468	1
60469	1
60471	5
60472	1
60473	10
60475	5
60476	2
60477	8
60478	9
60480	1
60481	1
60482	7
60487	9

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery Service Demand - Establishment of an ASTC - 1110.235(C)(3)

Patient Zip Code	Count of Patient's Zip Code
60490	1
60491	1
60501	9
60502	5
60503	5
60504	11
60505	18
60506	17
60513	3
60517	6
60521	1
60525	1
60527	4
60532	1
60534	1
60538	1
60540	1
60542	2
60543	1
60546	1
60559	1
60564	2
60586	4
60601	4
60605	5
60607	4
60608	29
60609	18
60610	1

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery Service Demand - Establishment of an ASTC - 1110.235(C)(3)

Patient Zip Code	Count of Patient's Zip Code
60612	14
60613	10
60614	7
60615	15
60616	9
60617	53
60618	20
60619	47
60620	58
60621	15
60622	15
60623	48
60624	42
60625	25
60626	14
60628	56
60629	48
60630	14
60631	4
60632	22
60633	3
60634	34
60636	29
60637	32
60638	18
60639	62
60640	14
60641	29
60642	3

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery Service Demand - Establishment of an ASTC - 1110.235(C)(3)

Patient Zip Code	Count of Patient's Zip Code
60643	32
60644	54
60645	9
60647	30
60649	49
60651	56
60652	20
60653	9
60654	10
60655	5
60656	8
60657	7
60659	10
60660	12
60661	2
60706	4
60707	28
60712	1
60714	2
60803	15
60804	35
60805	11
60827	20
60901	3
60915	1
61008	1
61065	2
61102	1
61103	9

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery Service Demand - Establishment of an ASTC - 1110.235(C)(3)

Patient Zip Code	Count of Patient's Zip Code
61104	5
61107	3
61108	3
61109	6
61282	1
61354	1
61364	1
61375	2
61448	1
61482	2
61554	2
61603	3
61701	1
61820	2
62656	1
75074	1
660651	1
60093	1
60647	1
Grand Total	2198

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery - Treatment Room Assessment 1110.235(C)(4)

The Applicant projects that the proposed River Oaks Surgery Center LLC ("ASTC") will achieve utilization that meets the State's target utilization standards for a two operating room ambulatory surgical treatment center. The proposed facility will include two operating rooms and is expected to perform 1,872 procedures in its first year of operation, generating approximately 1,560 operating hours. In the second year, it is expected that there will be a conversative 3% increase in volume that will result in utilization of up to 1,928 procedures and approximately 1,607 operating hours. These projections exceed the State standard of 1,500 hours per operating room and demonstrate that the facility will operate at an efficient and sustainable level from the outset.

UTILIZATION					
	DEPT./ SERVICE	HISTORICAL UTILIZATION (PATIENT DAYS) (TREATMENTS) ETC.	PROJECTED UTILIZATION	STATE STANDARD	MEET STANDARD?
YEAR 1	ASTC	1,872 Patients	1,560 Hours	>1500	YES
YEAR 2	ASTC	1,928 Patients	1,607 Hours	>1500	YES

The projected utilization is based on historical data related to the established clinical practice of Dr. Shoeb Mohiuddin, and his practice Regenerative Pain Solutions. Dr. Mohiuddin maintains a high-volume interventional pain management practice and has historically performed procedures across multiple ambulatory surgical treatment centers throughout the Chicagoland area. Between April 2024 and April 2025, he performed approximately 2,198 procedures at 13 different ASTCs and other office-based locations.

Facility Name	Count of Patient's Zip Code
ACCREDITED AMBULATORY CARE	151
ADVANCED SPINE AND REHAB	3
CHICAGO PAIN AND ORTHO	4
ELMWOOD PARK SURGERY CENTER	422
FULLERTON SURGERY CENTER	239
GRAND AVENUE SURGICAL CENTER	44
ILLINOIS BACK AND NECK INSTITUTE	365
INNOVIA SURGERY CENTER	21
LAKESHORE SURGICAL CENTER	1
METRO NORTH SURGICAL CENTER	169
REGENERATIVE PAIN AND SPINE	299
ROGERS PARK SURGERY CENTER	453
SOUTH CHIACAGO SURGICAL SOLUTIONS	27
Grand Total	**2198**

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery - Treatment Room Assessment 1110.235(C)(4)

This historical volume reflects a stable and recurring patient base and provides a reliable foundation for the proposed utilization. Rather than relying on speculative growth, the Applicant's projections are based primarily on the consolidation of existing procedural volume into a single, centralized facility.

The utilization projections are based on a conservative average procedure time of 50 minutes, which includes patient preparation, procedure time, and room turnover. Applying this assumption to the projected Year 1 volume results in approximately 93,600 procedure minutes, or 1,560 operating hours, which aligns directly with the Applicant's projections. This results in approximately 1,875 available hours per operating room annually, yielding utilization rates of approximately 83 percent in Year 1 and 86 percent in Year 2. These levels are consistent with efficient ASTC operations and provide sufficient capacity to accommodate modest growth without exceeding optimal operating thresholds.

State Standard for One Operating Room (in hours)	1500
Proposed Facility Utilization (in minutes)	93600
Proposed Facility Utilization Year 1 (in hours)	1560
Total Projected Referrals in Year 1	1872
Total Projected Referrals in Year 2	1928
Average Procedure Time (Including Room Prep, Procedure, and Clean-up)	50
Operational Days	250
Average Hours of Operation	7.5
Total Available Procedure Hours (Per Operating Room)	1875
Number of Operating Rooms	1
First Year Proposed Hours	1560
First Year Utilization (Operating Room 1)	83%
Second Year Proposed Procedures	1607
Second Year Utilization (Operating Room 1)	86%

In summary, the Applicant has demonstrated that the proposed ASTC will achieve appropriate and sustainable utilization levels based on established historical procedure volumes, conservative operational assumptions, and a care delivery model aligned with current clinical and industry trends. The project meets the State's utilization standards and represents an efficient and appropriate use of healthcare resources within the geographic service area.

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery - Service Accessibility 1110.235(C)(6)

The proposed River Oaks Surgery Center LLC ("ASTC") is necessary to improve access to outpatient orthopedic and interventional pain management services for residents within the geographic service area ("GSA"). While there are existing IDPH-licensed ambulatory surgical treatment centers within a 10-mile radius of the proposed site, the project satisfies subsection (C) of this criterion, as the specific services proposed are not sufficiently accessible to the population served due to service specialization, geographic distribution, and operational limitations.

First, certain facilities are highly specialized and do not offer orthopedic or interventional pain management services. For example, Vascular Access Centers of Illinois and Premier Cardiac Surgery Center focus on vascular and cardiac procedures, respectively, and are not substitutes for the services proposed in this application.

Second, while some facilities offer orthopedic and pain management services, including Palos Surgicenter and Palos Hills Surgery Center, these facilities are located in the southwestern portion of the GSA and are not optimally accessible to the Applicant's primary patient population. The Applicant's patient origin data demonstrates that a significant portion of patients reside in central and southeastern Chicago zip codes, including 60620, 60628, 60629, 60619, and 60617. Patients from these areas must frequently travel outside their immediate communities to access care, often to facilities located several miles away and outside their natural care patterns.

Third, the Applicant's historical experience in performing procedures across 13 different facilities throughout the region demonstrates that access to operating room time is fragmented and not consistently available in a manner that supports continuity of care. This fragmentation results in inefficiencies, delays in scheduling, and increased burden on patients.

The population within the GSA exceeds 1.4 million residents, including numerous high-density Chicago zip codes such as 60629 (114,453), 60620 (66,514), 60628 (62,832), 60619 (63,303), and 60617 (77,270). Despite this substantial population base, there is no centrally located ASTC within the core of these communities that provides a coordinated, patient-centered model for orthopedic and interventional pain management services.

In summary, while facilities exist within the geographic service area, the specific services proposed by the Applicant are not sufficiently accessible to the population served due to service specialization, geographic distribution, and operational limitations. The proposed ASTC will meaningfully improve access by providing conveniently located, specialized, and efficient outpatient orthopedic and pain management services within the core of the GSA.

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery - Unnecessary Duplication/Maldistribution, Impact on Area Providers - 1110.235(C)(7)(A)-(C)

Facilities within 10 miles of 7941 South Western Avenue, Chicago, IL 60620.

Facility	Distance from ASTC	Services
Vascular Access Centers of Illinois at Morgan Park 1701 W. Monterey Avenue Chicago, IL 60643	4.2 miles	-Angiogram AV Fistula -Angioplasty AV Fistula -Permcath procedures -Thrombectomy AV Fistula
Premier Cardiac Surgery Center, PLLC 11560 S. Kedzie Avenue, Suite 102 Merrionette Park, IL 60803	3.1 miles	-Electrophysiology -Peripheral Vascular
Southwestern Medical Center, LLC, d/b/a Magna Surgi 7456 S. State Road, Suite 300 Bedford Park, IL 60638	4.2 miles	-Gastroenterology -Ophthalmology -Otolaryngology -Pain Management -Podiatry
Palos Surgicenter, LLC 7340 W. College Drive Palos Heights, IL 60463	7.0 miles	-Laser Eye Surgery -OB/Gynecology -Ophthalmology -Orthopedic -Otolaryngology -Pain Management -Plastic Surgery -Podiatry
Palos Hills Surgery Center 10330 S. Roberts Road, Suite 300 Palos Hills, IL 60465	6.6 miles	-Orthopedic -Pain Management -Podiatry

The Applicant has determined that the proposed River Oaks Surgery Center LLC ("ASTC") will not result in an unnecessary duplication of services or a maldistribution of healthcare resources within the geographic service area ("GSA"). Rather, the project represents an appropriate and necessary addition of capacity that is aligned with demonstrated patient demand and the distribution of existing services.

While the above facilities provide certain outpatient surgical services, they do not constitute unnecessary duplication relative to the proposed project. Several facilities are highly specialized and do not offer the same scope of orthopedic and interventional pain management services proposed by the Applicant. For example, Vascular Access Centers of Illinois and Premier Cardiac Surgery Center are focused on vascular and cardiac procedures, respectively, and do not serve as substitutes for the Applicant's services.

Other facilities within the GSA offer broader services but are either geographically concentrated outside the core patient population or structured around different specialties. While Palos Surgicenter and Palos Hills Surgery Center provide orthopedic and pain management services, these facilities are located in the southwestern portion of the GSA and are not optimally accessible to patients residing in central and southeastern Chicago neighborhoods. According to the Board's 2022 annual questionnaire data, Palos Surgicenter accepted zero Medicaid patients and Palos Hills Surgery Center's Medicaid payor mix was .01% of their total patients.

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery - Unnecessary Duplication/Maldistribution, Impact on Area Providers - 1110.235(C)(7)(A)-(C)

The Applicant's historical data demonstrates that patients frequently travel across the region to access care, with procedures currently being performed at numerous facilities throughout the Chicagoland area. The proposed project will consolidate this existing volume into a centrally located facility within the core of the Applicant's patient base, rather than duplicating services in an already saturated submarket.

The proposed project will not result in a maldistribution of services within the GSA. To the contrary, the current distribution of facilities reflects a geographic imbalance, with many existing ASTCs located outside the neighborhoods that generate a significant portion of the Applicant's patient volume.

The population within the GSA includes large and densely populated Chicago zip codes such as:

- 60629 (114,453)
- 60620 (66,514)
- 60628 (62,832)
- 60619 (63,303)
- 60617 (77,270)
- 60623 (87,649)
- 60632 (92,237)

These communities collectively represent hundreds of thousands of residents with demonstrated demand for orthopedic and pain management services. Despite this population density, access to conveniently located, specialized outpatient surgical services within these neighborhoods remains limited. The Applicant is not aware of any evidence that the ratio of surgical/treatment rooms to population within the GSA exceeds one and one-half times the State average. Moreover, there is no indication that existing facilities are consistently operating below the State utilization standard of 1,500 hours per operating room.

The proposed project will not lower the utilization of existing providers below the State standard, nor will it further reduce utilization at facilities currently operating below that standard. The Applicant's projected volume is derived primarily from procedures that are currently being performed across multiple facilities throughout the region. Because this volume is dispersed among numerous providers, the establishment of the proposed ASTC will not result in a material reduction in utilization at any single facility.

Instead, the project will improve system efficiency by consolidating an existing caseload into a single, purpose-built facility that is better aligned with patient origin patterns. The redistribution of cases will occur incrementally across a broad group of providers, mitigating any potential impact on individual facilities.

Within 24 months of project completion, existing facilities are expected to continue operating consistently with current utilization levels. The proposed ASTC will complement the existing delivery system by addressing a geographic and service-specific access gap, rather than competing directly with any single provider.

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery - Staffing - 1110.235(C)(8)

The Applicant has carefully evaluated the clinical and professional staffing requirements necessary to support the proposed River Oaks Surgery Center LLC (“ASTC”) and has determined that sufficient staffing resources are available to ensure safe, efficient, and compliant operations. The proposed staffing model has been developed in accordance with applicable licensure requirements of the Illinois Department of Public Health (“IDPH”) and the standards of nationally recognized accrediting organizations, including The Joint Commission.

The ASTC will be staffed by a multidisciplinary team of qualified healthcare professionals, including registered nurses, surgical technologists, anesthesia providers, and administrative personnel. Clinical staffing will be structured to support two operating rooms and will include circulating nurses, scrub personnel, and recovery room staff with experience in ambulatory surgical settings. Anesthesia services will be provided by qualified anesthesiologists, physician assistants and/or certified registered nurse anesthetists (CRNAs), consistent with the types of procedures to be performed at the facility.

The proposed facility is located within the City of Chicago, a large metropolitan area with a well-established healthcare workforce. The availability of experienced clinical personnel in the region supports the Applicant’s ability to recruit and retain qualified staff. The Applicant anticipates that a portion of the clinical team will be recruited from existing professional relationships developed through Dr. Mohiuddin’s current practice locations and prior affiliations with ambulatory surgery centers in the area.

In addition, the Applicant will implement standard recruitment strategies, including targeted outreach to experienced ambulatory surgical personnel, engagement with local healthcare training programs, and utilization of professional staffing networks.

The Applicant will ensure that all staff meet applicable licensure, certification, and credentialing requirements, and will implement policies and procedures consistent with IDPH regulations and accrediting body standards. Ongoing training and competency assessments will be conducted to maintain high standards of patient care and safety.

Shoeb Mohiuddin, M.D., will serve as the Medical Director of the proposed ASTC. Dr. Mohiuddin is board-certified in pain management and anesthesiology and has extensive experience in performing minimally invasive interventional pain procedures and related surgical services.

Dr. Mohiuddin’s background includes over a decade of experience in anesthesiology and interventional pain management, as well as leadership roles in clinical practice settings. His familiarity with ambulatory surgical environments and commitment to evidence-based, patient-centered care position him to effectively guide the clinical direction of the facility.

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery - Charge Commitment - 1110.235(C)(9)

REGENERATIVE
PAIN & SPINE

2335 W. Fullerton Ave
Suite B
Chicago, IL 60647

March 16, 2026

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

Re: River Oaks Surgery Center LLC - Charge Commitment

Dear Mr. Kniery:

As a representative of River Oaks Surgery Center LLC, I, Shoeb Mohiuddin, M.D., hereby attest that a peer review program exists or will be implemented that evaluates whether patient outcomes are consistent with quality standards established by professional organizations for ASTC services, and if outcomes do not meet or exceed those standards, that a quality improvement plan will be initiated.

Furthermore, I hereby attest that in order to meet the objects of the Illinois Health Facilities Planning Act, which are to improve the financial ability of the public to obtain necessary health services; and to establish an orderly and comprehensive health care delivery system that will guarantee the availability of quality health care to the general public; and cost containment and support for safety net services that we have enclosed a list of CPT codes and a proposed fee schedule. We hereby commit that the charges will not increase, at a minimum, for the first 2 years of operation unless a permit is first obtained pursuant to 77 Ill. Admin. Code §1130.310(a).

Sincerely,

Shoeb Mohiuddin, M.D.
Managing Member
River Oaks Surgery Center LLC

SHOEB@RPSPINE.COM 312-300-3418 WWW.RPSPINE.COM

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery - Charge Commitment - 1110.235(C)(9)

Description of CPT	CPT with Description
Removal of sutures or staples w/o anesth	15853: Removal of sutures or staples w/o anesth
Inj: single tendon origin/insertion	20551: Inj: single tendon origin/insertion
Inj: Trigger Point; 1 or 2 muscle(s)	20552: Inj: Trigger Point; 1 or 2 muscle(s)
Inj: Trigger Point; 3 or more muscles	20553: Inj: Trigger Point; 3 or more muscles
Injection/Aspiration Intermediate Joint	20605: Injection/Aspiration Intermediate Joint
Draining or injecting a joint or bursa	20606: Draining or injecting a joint or bursa
Injection/Aspiration Large Joint	20610: Injection/Aspiration Large Joint
Injection/Aspiration Large Jnt w ultraso	20611: Injection/Aspiration Large Jnt w ultraso
Kyphoplasty; thoracic, unilateral/bilate	22513: Kyphoplasty; thoracic, unilateral/bilate
Kyphoplasty; lumbar, unilateral/bilate	22514: Kyphoplasty; lumbar, unilateral/bilate
Kyphoplasty; lumbar/thoracic, each addit	22515: Kyphoplasty; lumbar/thoracic, each addit
Sacroiliac joint injection†	27096: Sacroiliac joint injection†
Discography, each level; L/S	62290: Discography, each level; L/S
Inj: C/T Epidural Steroid with Imaging	62321: Inj: C/T Epidural Steroid with Imaging
Inj: L/S Epidural Steroid with Imaging	62323: Inj: L/S Epidural Steroid with Imaging
Spinal Stim Trial - Percutaneous Lead†	63650: Spinal Stim Trial - Percutaneous Lead†
Removal of SCS electrode percutaneous ar	63661: Removal of SCS electrode percutaneous ar
Inj: Greater Occipital Nerve	64405: Inj: Greater Occipital Nerve
Inj: Intercostal Nerve, single level	64420: Inj: Intercostal Nerve, single level
Inj: Intercostal Nerve, each additional	64421: Inj: Intercostal Nerve, each additional
Inj: Other Peripheral Nerve or Branch	64450: Inj: Other Peripheral Nerve or Branch
Inj: C/T Transforaminal Epidural, 1st le	64479: Inj: C/T Transforaminal Epidural, 1st le
Inj: C/T Transforaminal Epidural, addtnl	64480: Inj: C/T Transforaminal Epidural, addtnl
Inj: L/S Transforaminal Epidural, 1st le	64483: Inj: L/S Transforaminal Epidural, 1st le
Inj: L/S Transforaminal Epidural, addtnl	64484: Inj: L/S Transforaminal Epidural, addtnl
Inj: C/T MBB/Facet Joint, 1st level	64490: Inj: C/T MBB/Facet Joint, 1st level
Inj: C/T MBB/Facet Joint, 2nd level	64491: Inj: C/T MBB/Facet Joint, 2nd level
Inj: C/T MBB/Facet Joint, 2nd level	64491: Inj: C/T MBB/Facet Joint, 2nd level
Inj: C/T MBB/Facet Joint, 3rd level	64492: Inj: C/T MBB/Facet Joint, 3rd level
Inj: L/S MBB/Facet Joint, 1st level	64493: Inj: L/S MBB/Facet Joint, 1st level
Inj: L/S MBB/Facet Joint, 2nd level	64494: Inj: L/S MBB/Facet Joint, 2nd level
Inj: L/S MBB/Facet Joint, 3rd level	64495: Inj: L/S MBB/Facet Joint, 3rd level
Inj: L/T Paravertebral Sympathetic	64520: Inj: L/T Paravertebral Sympathetic
Implantation of neurostimulator electrod	64555: Implantation of neurostimulator electrod
Insertion or replacement of a peripheral	64590: Insertion or replacement of a peripheral
Destruction; RFA C/T, 1st level	64633: Destruction; RFA C/T, 1st level
Destruction; RFA C/T, additional level	64634: Destruction; RFA C/T, additional level
Destruction; RFA L/S, 1st level	64635: Destruction; RFA L/S, 1st level
Destruction; RFA L/S, additional level	64636: Destruction; RFA L/S, additional level
Discography, lumbar, radiological superv	72295: Discography, lumbar, radiological superv
Ultrasonic guidance for needle placement	76942: Ultrasonic guidance for needle placement
Flouroscopic Guidance for needle placeme	77002: Flouroscopic Guidance for needle placeme
Psychological testing eval; first hour	96130: Psychological testing eval; first hour
Review of Creyos Cognitive Test	96132: Review of Creyos Cognitive Test
Creyos test with technician, 30 mins	96138: Creyos test with technician, 30 mins

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery - Charge Commitment - 1110.235(C)(9)

Description of CPT	CPT with Description
Education and Training for Patient Sm	98960: Education and Training for Patient Sm
Educational Supplies	99071: Educational Supplies
Special reports or forms	99080: Special reports or forms
New Patient Eval; Low MDM	99203: New Patient Eval; Low MDM
New Patient Eval; Moderate MDM	99204: New Patient Eval; Moderate MDM
New Patient Eval; High MDM	99205: New Patient Eval; High MDM
Established Patient Visit; straightforwa	99212: Established Patient Visit; straightforwa
Established Patient Visit; low MDM	99213: Established Patient Visit; low MDM
Established Patient Visit; moderate MDM	99214: Established Patient Visit; moderate MDM
New Patient Consultation; Moderate MDM	99244: New Patient Consultation; Moderate MDM
New Patient Consultation; High MDM	99245: New Patient Consultation; High MDM
Behav chng smoking 3-10min	99406: Behav chng smoking 3-10min
Work related or medical disability exam	99455: Work related or medical disability exam
Platelet Rich Plasma Injection	0232T: Platelet Rich Plasma Injection
Visit complexity inherent to E/M for ong	G2211: Visit complexity inherent to E/M for ong
Nutritional counseling, dietitian visit	S9470: Nutritional counseling, dietitian visit
Interpretive services, per 15 minutes	T1013: Interpretive services, per 15 minutes

ATTACHMENT 24
Non-Hospital Based Ambulatory Surgery - Assurances - 1110.235(C)(10)

REGENERATIVE
PAIN & SPINE

2335 W. Fullerton Ave
Suite B
Chicago, IL 60647

March 16, 2026

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

Re: River Oaks Surgery Center LLC - Assurances

Dear Mr. Kniery:

As a representative of River Oaks Surgery Center LLC, I, Shoeb Mohiuddin, M.D., hereby attest that the Applicant's full anticipation that, by the end of the second year following the proposed ambulatory surgical treatment center's opening, the proposed facility will operate at or in excess of the utilization standards identified in 77 Ill. Admin. Code §1110, Appendix B.

Sincerely,

Shoeb Mohiuddin, M.D. Managing Member
River Oaks Surgery Center LLC

SHOEB@RPSPINE.COM 312-300-3418 WWW.RPSPINE.COM

ATTACHMENT 33
Availability of Funds

The total estimated project cost is $5,495,857 of that amount $4,362,857 is attributable to construction and equipment purchases. The balance of the project cost is related to the leasing costs for the new facility. Dr. Mohiuddin will fund the project costs with cash and a loan from PNC Bank. Dr. Mohiuddin has sufficient internal resources to fund the cash portion of the project and a letter of commitment from PNC Bank is enclosed to evidence his/her ability to obtain financing for the remainder of the project costs.

ATTACHMENT 35
Financial Viability

PNC BANK

John P. Kniery, Administrator
Illinois Health Facilities
and Services Review Board
525 W Jefferson St. 2nd FL
Springfield, IL 62761

March 24, 2026

Dear Mr. Kniery

It is my understanding that Regenerative Pain & Spine PLLC, of which Dr. Shoeb Mohiuddin is the President, is submitting a Certificate of Need application to establish surgical treatment center at 7941 S. Western Ave, Chicago, IL 60620. Regenerative Pain & Spine PLLC will require financing in the amount of approximately $4,212,857.

Should the Illinois Health Facilities & Services Review Board approve their application and based upon a preliminary review of the financial information submitted by Dr. Mohiuddin, PNC Bank would likely be prepared to extend Regenerative Pain & Spine PLLC up to $4,212,857. This letter is not a commitment or an offer to lend and does not create any obligation on the part of the Bank.

I trust that this letter is sufficient for your needs. PNC Bank has a solid relationship with Dr. Mohiuddin and looks forward to working with him in the future. Should you or the Illinois Health Facilities & Services Review Board have any questions or comments, please contact me directly at 740-317-0843.

Sincerely,

Anthony Sheposh
Vice President
Healthcare Banking

PNC Bank
7151 West 159th Street (D1-Y792-01-1)
Tinley Park, IL 60477
(c) 740-317-0843
anthony.sheposh@pnc.com

ATTACHMENT 36
ECONOMIC FEASIBILITY
PROJECT OPERATING COSTS AND TOTAL EFFECT OF THE PROJECT ON CAPITAL COSTS

REGENERATIVE
PAIN & SPINE

2335 W. Fullerton Ave
Suite B
Chicago, IL 60647

March 16, 2026

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

Re: River Oaks Surgery Center LLC
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 representative of River Oaks Surgery Center LLC, I, Shoeb Mohiuddin, M.D., hereby attest that the project costs will be $4,212,857. Dr. Mohiuddin will fund the entirety of the construction of the project and the necessary working capital and operating deficits through the first full fiscal year. Dr. Mohiuddin will fund these costs with cash and existing securities and a loan from PNC Bank. Dr. Mohiuddin has sufficient and readily accessible internal resources to fund the obligation required by the project.

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,

Shoeb Mohiuddin, M.D.
Managing Member
River Oaks Surgery Center LLC

SHOEB@RPSPINE.COM 312-300-3418 WWW.RPSPINE.COM

ATTACHMENT 36
Economic Feasibility
Cost and GSF By Service

Pursuant to Illinois Administrative Code Section 1120 Appendix A (a)(3), a project's cost must be at or below the RS Means for the new construction of an ASTC. At the time of this application, the RS Means for the new construction of an ASTC in this area of the state is $510.27 per GSF. This project is slated to be completed in the third quarter of 2027 and the applicable RS Means standard is $510.27 per GSF. The proposed cost per GSF for this project is $25.80, and thus this project meets the Board's criteria.

ATTACHMENT 37
Safety Net Impact Statement

River Oaks Surgery Center LLC is a new entity and has no applicable historical data for this section of the application. However, it is anticipated that the proposed facility will have a positive material impact on essential safety net services in the community.

Dr. Mohiuddin and his practice have long maintained a commitment to serving diverse communities in Chicago and the Chicagoland area. That diversity has included both racial and economic diversity. This is evidenced by the location of their current physician practice sites, and the proposed business plan for the facility which intends to service Medicaid patients and patients without regard to their ability to pay for procedures.

This project involves operating a new facility and should not have any impact on the ability of another provider to cross-subsidize safety net services.

ATTACHMENT 38
Charity Care

River Oaks Surgery Center LLC ("River Oaks") is a new entity and has no applicable historical data for this section of the application. The projected patient mix by payer source is based on the existing patient base seen Dr. Mohiuddin over the last 12 months. Dr. Mohiuddin intends for the facility to enroll multiple managed care organizations where is patients are members.

Projected Patient Base Payor Mix

Payor Name	% of Patients Treated at Facility
Private Insurance	47-52%
Worker's Compensation	27-30%
Medicare	15-18%
Medicaid/ Medicaid MCO	4-7%

ATTACHMENT 39
Flood Plain Information

REGENERATIVE
PAIN & SPINE

2335 W. Fullerton Ave
Suite B
Chicago, IL 60647

March 16, 2026

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

Re: River Oaks Surgery Center LLC - Flood Plain Requirements

Dear Mr. Kniery:

As representative of River Oaks Surgery Center LLC, I, Shoeb Mohiuddin, MD, affirm that our facility complies with Illinois Executive Order #2005-5. The facility location at 7941 S. Western Avenue, Chicago, IL 60620 is not located in a flood plain, as evidence, please find enclosed a map from the Federal Emergency Management Agency ("FEMA").

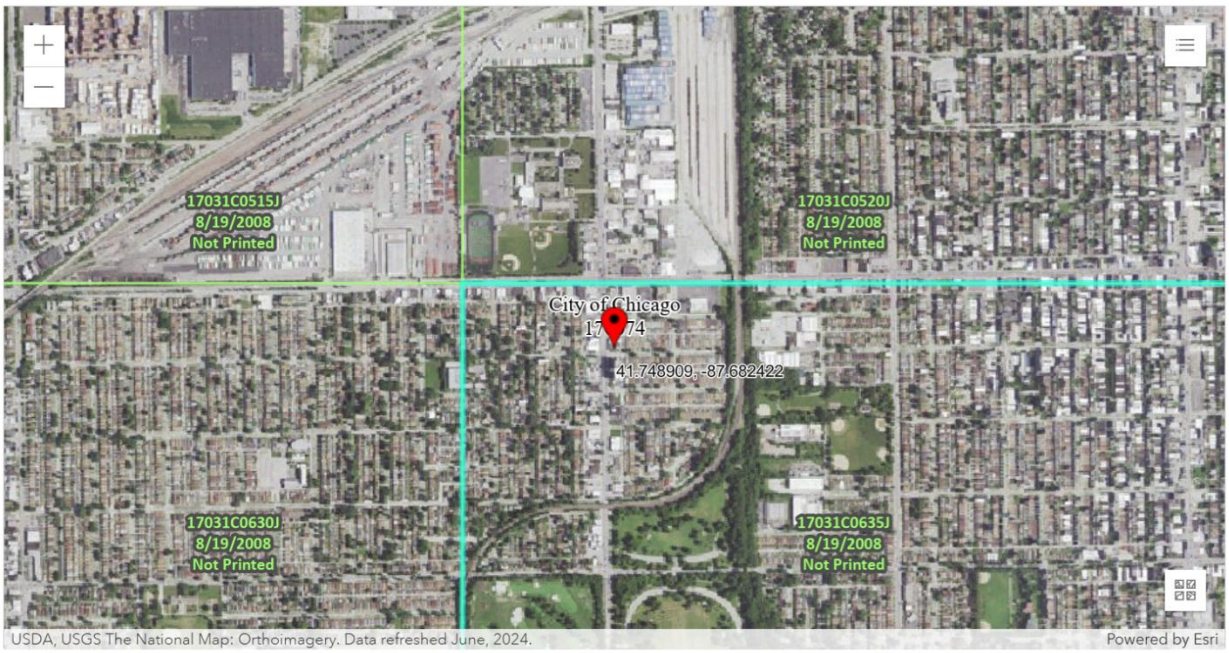
I hereby certify this is true and is based upon my personal knowledge under penalty of perjury and in accordance with 735 ILCS 5/1-109.

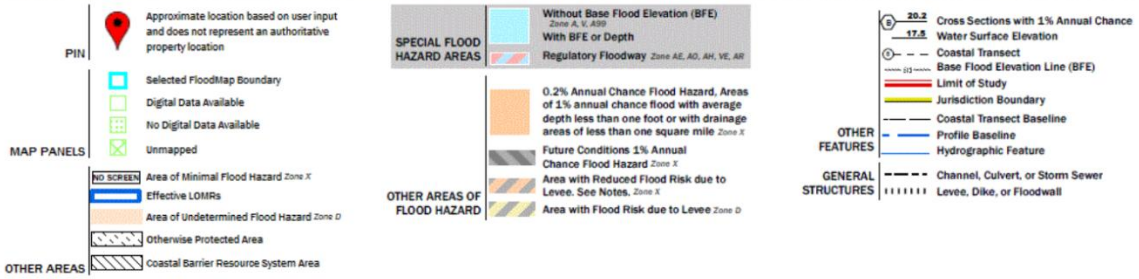
Sincerely,

Shoeb Mohiuddin, MD
Managing Member
River Oaks Surgery Center LLC

SHOEB@RPSPINE.COM 312-300-3418 WWW.RPSPINE.COM

ATTACHMENT 39
Flood Plain Information





INDEX OF ATTACHMENTS