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# **Chronic Pain Procedures in Minnesota, 2010-2012**

Minnesota Department of Health  
*Report to the Minnesota  
Legislature - 2014*

**January 2015**

# **Chronic Pain Procedures in Minnesota, 2010-2012**

**January 2015**

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*Protecting, maintaining and improving the health of all Minnesotans*

January 15, 2015

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Finance Committee  
Minnesota Senate  
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75 Rev. Dr. Martin Luther King Jr. Blvd.  
Saint Paul, MN 55155-1606

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Saint Paul, MN 55155

To the Honorable Chairs:

The 2014 Minnesota Legislature directed the Minnesota Department of Health in Session Laws, Chapter 312—HF3172, Article 23, Sec. 11 to conduct a study of chronic pain management services delivered in Minnesota. For this report we relied on published research on chronic pain conditions and interventional pain procedures, obtained input from experts and practitioners in Minnesota through discussions and interviews, and conducted quantitative analysis using Minnesota's All Payer Claims Database, a comprehensive administrative billing dataset of health care services delivered to Minnesota residents.

The major findings from our study on chronic pain management include:

- For the period of 2010 to 2012 approximately 220,000 chronic pain procedures were delivered per year to Minnesota patients, totaling 660,728.
- Approximately 83,000 Minnesotans per year received chronic pain procedures during that period, with most (44.4 percent) receiving one procedure and about one-third (30.9 percent) having 3 or more procedures.
- On average, female Minnesotans accounted for 62 percent of patients and people older than 60 years for about 44 percent.
- The volume of chronic pain procedures increased 13.2 percent from 2010 to 2012.

- Almost 63 percent of these procedures were delivered by providers in the seven-county Metro area of the Twin Cities
- Travel distance to providers delivering chronic pain procedures varies, with patients seeing rural providers traveling on average 53 miles and patients seeing providers in urban centers traveling on average of 28 miles for treatment.
- The majority of chronic pain procedures (58.9 percent) were provided within a physician office or clinic setting.
- According to provider identification reported on billing data, pain specialists and physicians with pain-related specialties provided 86.1 percent of all chronic pain procedures, while Certified Nurse Anesthetists (CRNAs) provided 1.6 percent

The report identifies potential limitation associated with accurately detecting chronic pain management services through claims data research and includes options for addressing these limitations through further research.

If you have questions or concerns regarding this study, please contact Stefan Gildemeister, the State Health Economist, at 651-201-3554 or [stefan.gildemeister@state.mn.us](mailto:stefan.gildemeister@state.mn.us).

Sincerely,



Edward P. Ehlinger, M.D., M.S.P.H  
Commissioner of Health  
P.O. Box 64975  
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Enclosure

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# Executive Summary

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The 2014 Minnesota Legislature directed the Minnesota Department of Health (MDH) to conduct a study<sup>1</sup> describing the delivery of chronic pain procedures by focusing on:

- Where in Minnesota chronic procedures are delivered;
- In what types of facilities they are provided to patients; and
- What provider specialties, focusing on Medical Doctors, Doctors of Osteopathy, and Certified Nurse Anesthetists, deliver these services.

The authorizing legislation permits MDH to use the Minnesota All Payer Claims Data (MN APCD), which are collected under Minnesota Statutes, section 62U.04, subdivision 4. The MN APCD includes health insurance claims for Minnesotans with Medicare, Medicaid and commercial insurance coverage and represents the most comprehensive health care services data for the state of Minnesota.

To fulfill the legislative requirements, MDH conducted quantitative analysis using the MN APCD, reviewed published studies on provision of chronic pain therapy, consulted experts in the insurance industry on matters of customary practice in provider billing, and sought advice from the provider associations representing Minnesota physicians and nurse anesthetists on the subject of defining chronic pain management through claims records.

Major findings of our analysis include:

- For the period of 2010 to 2012 approximately 220,000 chronic pain procedures were delivered per year to Minnesota patients, totaling 660,728.
- Approximately 83,000 Minnesotans per year received chronic pain procedures during that period, with most (44.4 percent) receiving one procedure and about one-third (30.9 percent) having three or more procedures.
- On average, female Minnesotans accounted for 62 percent of patients and people older than 60 years for about 44 percent.
- The volume of chronic pain procedures increased 13.2 percent from 2010 to 2012.
- Almost 63 percent of these procedures were delivered by providers in the Seven-County Metro area of the Twin Cities.
- Travel distance to providers delivering chronic pain procedures varies, with patients seeing rural providers traveling on average 53 miles and patients seeing providers in urban centers traveling on average of 28 miles for treatment.
- The majority of chronic pain procedures (58.9 percent) were provided within a physician office or clinic setting.
- According to provider identification reported on billing data, more than 98 percent of all chronic pain management services were delivered by physicians. Pain specialists and physicians with pain-related specialties provided 86.1 percent of all chronic pain procedures, primary care physicians delivered 8.2 percent, and Certified Registered Nurse Anesthetists (CRNAs) provided 1.6 percent.

Challenges conducting this analysis included an absence of consistent definitions of chronic pain in the existing literature, a lack of clearly specified interventional pain procedures used to treat these conditions, and potential inconsistency in provider billing practices that may mask a portion of the rendering provider by reporting the supervising or billing provider.

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<sup>1</sup> 2014, Regular Session, Minnesota Laws Chapter 312—HF3172, Article 23, Sec. 11, see appendix A

# Introduction

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In 2014, the Minnesota legislature directed the Minnesota Department of Health (MDH) to conduct a study about the delivery of procedures used to treat chronic pain over a period of 36 months.<sup>2</sup> The focus of study is to describe:

1. The frequency of chronic pain procedures,
2. The geographic location where chronic pain services are provided,
3. The types of facilities where chronic pain is treated, and
4. The types of providers who provide these services, with a focus on physicians, doctors of osteopathy, and certified registered nurse anesthetists (CRNAs).

To conduct the study, MDH took advantage of existing knowledge by examining published studies on provision of chronic pain therapy, consulting experts in the insurance industry on matters of billing and coding practices, and obtaining feedback from the professional organizations representing Minnesota physicians and nurse anesthetists. In addition, MDH conducted empirical research using the Minnesota All Payer Claims Database (MN APCD) to analyze the volume, distribution and types of chronic pain management procedures performed between January 1, 2010 and December 31, 2012.

The quantitative analyses included developing an algorithm to (1) identify chronic pain procedures within the data, (2) examine the geographic distribution and variation in the provision of pain management services by using Economic Development Regions (EDR) and groupings of Minnesota's urban-rural continuum, (3) identify the place of service or the types of facilities where chronic pain services are provided, and (4) examine what types of health care professionals, in terms of their specializations and professional license, perform chronic pain treatment procedures.

## Chronic Pain and Procedures Used in Treatment

Chronic pain is a substantial public health concern affecting both the quality of life of individuals and their families, and imposing an economic burden on the economy through lost productivity and public and private health care expenditures. The Institute of Medicine estimates about 100 million Americans are affected by chronic pain, more than those affected by heart disease, diabetes and cancer combined, and pain-associated economic costs reach approximately \$600 billion per year.<sup>3</sup>

National research indicates that treatment of chronic pain is most often associated with musculoskeletal disorders, inflammation, or neurological conditions including back disorders, fibromyalgia, rheumatoid arthritis, and other joint disorders.<sup>4</sup> Most broadly, procedures commonly used to treat chronic pain include temporary pain relief from a few days to several months from nerve root blocks, epidural injections, and joint injections to more long term and invasive therapies, such as neurolytic nerve

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<sup>2</sup> See Appendix A.

<sup>3</sup> Institute of Medicine. 2011. Relieving Pain in America: A Blueprint for Transforming Prevention, Care, Education, and Research. Washington, DC: National Academies Press.

<sup>4</sup> Interagency Pain Research Coordinating Committee. 2011. Federal Pain Research Portfolio Analysis Report. Baltimore, MD: National Institute of Health.

destructions, radiofrequency ablation, and ambulatory surgical procedures on the spinal column or disc.<sup>5</sup> These procedures are often necessary as available surgical treatment for these conditions may be ineffective or fail to completely eliminate the symptoms of pain. Interventional pain procedures are often part of more comprehensive treatment program when pain becomes chronic and may include broad-based services such as physical therapy, acupuncture, or biofeedback.<sup>6</sup>

## Background Research

Work by federal agencies and others has helped to identify priorities in research on pain management and those who provide such services, including by forming the National Institutes of Health (NIH) Pain Consortium.<sup>7</sup> Examples of research in this area have demonstrated that:

- There has been a substantial increase in interventional pain procedures: those procedures nearly doubled over a ten-year period, increasing by 177 percent per 100,000 Medicare beneficiaries between 2000 and 2011.<sup>8</sup>
- The majority of these services are provided by physicians (medical doctors, MDs, and doctors of osteopathy, DOs); Certified Nurse Anesthetists, or CRNAs, account for less than 0.5 percent of services delivered to the Medicare fee-for-services population.<sup>9</sup>
- There is little research on the clinical effectiveness of intervention pain procedures that differentiates between types of providers.<sup>10</sup>
- Finally, work by the U.S. Government Accountability Office (GAO) has shown that administrative billing practices on insurance claims can mask the identity of provider actually performing the pain procedure if they work, like many CRNAs, in a supervised setting.<sup>11</sup>

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<sup>5</sup> Institute for Clinical Systems Improvement (ICSI). 2013. Assessment and Management of Chronic Pain. Bloomington, MN: ICSI.

<sup>6</sup> ICSI 2013. Analyses of these broader treatments were outside the scope of this study.

<sup>7</sup> Interagency Pain Research Coordinating Committee (IPRCC). 2011. Federal Pain Research Portfolio Analysis Report. Baltimore, MD: National Institute of Health.

<sup>8</sup> Manchikanti L, Falco FJE, Singh V, et al. 2012. "Utilization of Interventional Techniques in Managing Chronic Pain in the Medicare Population: Analysis of Growth Patterns from 2000 to 2011." Pain Physician 15:E969-E982.

<sup>9</sup> General Accounting Office (GAO). 2014. Medicare: Nurse Anesthetists Billed for Few Chronic Pain Procedures; Implementation of CMS Payment Policy Inconsistent. Washington, DC: GAO-14-153.

<sup>10</sup> Cost effectiveness studies have demonstrated the financial savings of using CRNAs for anesthesia services but there have been no comparable cost studies of pain intervention. See Hogan PF, et al. 2010. "Cost Effectiveness Analysis of Anesthesia Providers." Nursing Economics 28(3):159-69.

<sup>11</sup> GAO 2014.

# Study Design

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MDH conducted primary analysis using Minnesota data because the Minnesota Legislature was interested in better understanding the provision of chronic pain management services specific to Minnesota.

## Data Used in the Study

The quantitative analysis of the study was conducted using insurance claims and enrollment information for services provided from 2010 through 2012 as submitted to the MN ACPD, a large data repository that contains Minnesota health insurance information, including diagnosis, treatment, and provider detail, from medical and pharmacy claims. The data are collected from private and public insurance payers as required by the Minnesota Legislature. While the study is using a subset of the data from 2010 through 2012, the MN ACPD is updated continuously and currently includes historical enrollment, claims, and price data starting in 2009 through present submissions for 2013 and 2014. It represents medical care transactions for approximately 4.6 million insured Minnesotans or about 85 percent of the state's population and is as such, the most comprehensive dataset about health care transactions in Minnesota.<sup>12</sup>

One of the main features of the MN ACPD is that it is focused on health care use by Minnesota residents. Therefore, although much of the analysis in this study focuses on Minnesota providers, it excludes patients seen from outside the state. By design, the MN ACPD also excludes claims for non-Minnesota residents or claims paid for by certain federal agencies, including the Indian Health Service, Veterans Affairs, Tricare, and the Civilian Health and Medical Program of the Uniformed Services (CHAMPUS).<sup>13</sup> To minimize the reporting burden on smaller insurers serving Minnesota patients, health plan companies with less than \$3 million in annual claims and pharmacy insurers with less than \$300,000 in annual claims are not required to submit data to the MN ACPD. Also not part of the data are claims for care covered by the Workers' Compensation program and care paid for directly by people who do not have insurance coverage. To the extent that patients receiving chronic pain services are in those coverage arrangements (or lack insurance coverage), estimates presented in this report about the *number* of procedures will be marginally undercounted – these patients make up a small share of the overall Minnesota population. The findings about distribution of services across the state, provider types and facility types will likely not be meaningfully affected.

## Identifying the Scope of Chronic Pain Procedures

In reviewing the literature on the delivery of chronic pain procedures, we noticed an absence of consistent definitions of chronic pain and a lack of clearly specified interventional pain procedures used to treat these conditions. To ensure that the scope of chronic pain procedures identified for this study were carefully selected and clinically meaningful, we sought input from professional associations of physicians

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<sup>12</sup> Additional information about the history, content and use of the MN ACPD is available online: <http://www.health.state.mn.us/healthreform/allpayer/>

<sup>13</sup> State law requiring the collection of this data cannot extend to federal agencies. Although, Minnesota is continuously pursuing strategies to further expand the list of submitters to the MN ACPD, including through discussions with federal agencies.

and certified registered nurse anesthetists on the selection methodology and drew on the literature, including published clinical guidelines.<sup>14</sup>

Broadly speaking, our selection approach started with a broad selection of pain procedures which we then refined to exclude procedures limited to treatment of acute pain. Consistent with the legislative direction, our focus was on services that are exclusively provided by medical doctors (MDs), doctors of osteopathy (DOs), and certified registered nurse anesthetists (CRNAs).<sup>15</sup> Our approach generally took the following steps, but more detailed information, including the specific procedure codes selected for this analysis, is available in Appendix B.

- We identified a broad set of pain procedures by studying clinical guidelines specific to MDs, DOs, and CRNAs;
- We complemented this information by adding procedures identified by national chronic pain associations and other federal agency research initiatives that focused on investigating chronic pain;
- We excluded the following procedures from our list, because they are either not primarily used to treat chronic pain or are exclusively used as diagnostic procedures: discography, fluoroscopic guidance, arthrography, epidurography, myelography, catheter placement, diagnostic spinal puncture, arthrocentesis, acupuncture;
- In order to appropriately differentiate chronic pain procedures from treatment for acute pain conditions, we excluded professional claims with place of service settings in inpatient hospitals, emergency departments, urgent care centers, and birthing centers; and we also excluded any professional claim with peri-operative modifier codes or with a code for that the Medicare Outpatient Prospective Payment System indicated as inpatient hospital provision;
- A final exclusion category was any professional claim with a diagnosis for ICD-9 v338.18 for acute pain following surgery or v338.1 for acute pain.

The final group of pain intervention procedures includes those commonly used to treat the majority of chronic pain patients, especially those with musculoskeletal and neurologic causes of pain. Table 1 provides a detailed description of the pain procedures used in the analysis.

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<sup>14</sup> GAO 2014; ICSI 2013; MedPAC 2001.

<sup>15</sup> American Association of Nurse Anesthetists (AANA). 2014. Chronic Pain Management Guidelines. Park Ridge, IL: AANA; American Osteopathic Association (AOA). 2013. Basic Standard for Fellowship Training in Acute and Chronic Pain Management in Anesthesiology. AOA and American Osteopathic College of Anesthesiologists; American Society of Interventional Pain Physicians (ASIPP). 2013a. “An Update of Comprehensive Evidence-Based Guideline for Interventional Techniques in Chronic Spinal Pain. Part I: Introduction and General Considerations.” Pain Physician 16:S1-S48; ASIPP. 2013b. “An Update of Comprehensive Evidence-Based Guideline for Interventional Techniques in Chronic Spinal Pain. Part II: Guidance and Recommendations.” Pain Physician 16:S49-S283.

**Table 1: Chronic Pain Procedure Description**

Chronic Pain Procedure	Description
<i>Non-Surgical Pain Procedures</i>	
Interlaminar Epidural injections	Injections of local anesthetic, anti-inflammatory (e.g., steroid), or other medication (e.g., saline) agents into the epidural space of the spine to treat or diagnose pain from irritation of spinal nerves. The injection flushes out inflammatory proteins from around the spinal nerve and may temporarily inhibit the production of additional inflammation allowing the nerve root time to heal.
Transforaminal Epidural injections	Injection of local anesthetic, anti-inflammatory, or other medication agents into the foramen epidural space of the spine to treat or diagnose pain from irritation of spinal nerves. The specific nerve roots that are the source of the pain are isolated allowing more precise treatment than the conventional interlaminar epidural injection.
Epidural Lysis and other spinal column lesions	Injection of medication through an inserted catheter to dissolve spinal column adhesions that are placing pressure on spinal nerve roots and causing chronic back pain. Spinal column lesions or scar formations may inhibit effectiveness of epidural injections by blocking the circulation of the injected therapeutic medication, and eradication of them improves treatment effectiveness.
Autonomic nerve blocks	Injection of local anesthetic agents to treat or diagnose pain in the autonomic nerve system that controls involuntary body functions, such as pulmonary systems.
Somatic nerve blocks	Injection of local anesthetic agents to treat or diagnose pain in the somatic nerve system, nerves that radiate into the arms or legs.
Facet neurolytic destruction/ radiofrequency ablation	Injection of chemical neurolytic agent or use of radiofrequency ablation of electrical current for destruction of paravertebral facet joint nerve endings to treat back pain.
Paravertebral facet joint injections	Injection of local anesthetic or anti-inflammatory agents into spinal joints to treat or diagnose back pain.
Sacroiliac joint injections	Injection of local anesthetic or anti-inflammatory agents into sacroiliac joint to treat or diagnose low back, buttock, or leg pain.
Somatic nerve destruction	Injection of chemical neurolytic agent or use of radiofrequency ablation of electrical current for destruction of somatic nerve ending to treat pain radiating through arms or legs.
Other Peripheral nerve destruction	Injection of chemical neurolytic agent or use of radiofrequency ablation of electrical current for destruction of peripheral nerve ending to treat pain.
Trigger point injections	Injection of local anesthetic or anti-inflammatory agents in muscle tissue to treat one or more pain points.
Tendon injections	Injection of local anesthetic or anti-inflammatory agents in tendon sheath or ligament to treat one or more pain points.

Chronic Pain Procedure	Description
<i>Ambulatory Surgical Pain Procedures</i>	
Spinal Decompression/Discectomy	Removal of damaged spinal disc fragment pressing on nerve ending and producing irritation and inflammation or a bulging disc.
Laminectomy/Laminotomy	Dissection of the lamina surrounding the spinal column to allow space surrounding the spinal nerve and to reduce the constriction from irritation or inflammation.
Vertebroplasty	Injection of bone cement into crushed vertebral space to stabilize the site by limiting movement within it to reduce pain from nerve ending irritation or compression.
Kyphoplasty	Insertion of inflatable balloon devices to expand the vertebral space to correct deformity impinging on spinal nerve. Following the balloon correction, bone cement is injected within the space to permanently stabilize the site.
Neurostimulation	Application of electrical current, regulated by a programmable generator, from leads implanted underneath the skin to the spinal cord areas involved with chronic pain. The electrical impulses intersect the pain signals between the nerve root and brain providing relief without any of the side effects that may be experienced from other medications or injections.
Intrathecal Drug Pump	Surgical implantation of medication pump underneath abdominal skin with a catheter implanted in precise area associated with spinal pain. The drug delivery device allows a lower dose of medication to be used for better pain relief by pumping medication directly into the spinal fluid at the source of the nerve pain. Spinal pumps are a chronic pain treatment option when other standards of care have been ineffective or produced intolerable side effects.

Sources: MDH summary of information from GAO 2014; ICSI 2013; MedPAC 2001; IPRCC 2011; AANA 2014; APCA 2014; AOA 2013; and ASIPP 2013A, 2013B.

## Other Methodological Decisions

The determination of the geographic location where treatment was provided relied on provider zip codes in the MN APCD, aggregated to Economic Development Regions and a Rural-Urban Continuum to ensure sufficient sample size in each area of the state. Detailed information on the geographic identifiers is provided in Appendix C.

Facility type was established by using commonly identified place of service codes also submitted as part of the standard insurance claim. A complete listing a place of service codes for professional claims is in Appendix D.

Providers were identified in the MN APCD with the help of provider registries, licensure data, and information contained in the National Provider Identification (NPI) database. To distinguish CRNAs as service providers from MDs, DOs and other pain management service providers, we used the taxonomy code for the NPI on the professional claim. Detailed information about provider identification is in Appendix E.

# Findings

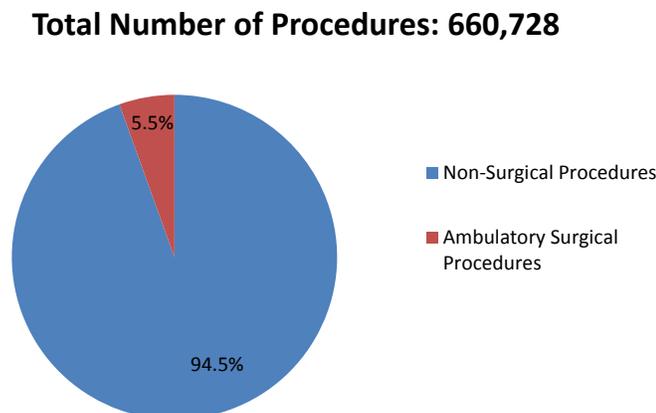
The findings presented in this section are drawn from health care services delivered to insured Minnesota residents between 2010 and 2012. We first present findings on broad volume of procedures, followed by geographical distribution of where the procedures are performed and the type of setting in which they are provided, and ending with a detailed discussion of the type of providers rendering these services.

## Volume and Types of Chronic Pain Interventions Delivered in Minnesota

Between 2010 and 2012, health care providers delivered an estimated 660,728 interventional chronic pain procedures to Minnesota patients. Per year, approximately 83,000 patients received chronic pain procedures, with most (44.4 percent) receiving one procedure and about one-third (30.9 percent) having three or more procedures.<sup>16</sup> On average, female Minnesotans accounted for 62 percent of patients and people older than 60 years for about 44 percent.

As shown in Figure 1, most of these chronic pain procedures (94.5 percent) were non-surgical procedures, such as epidural injections or nerve blocks; only 5.5 percent were ambulatory surgical procedures.

**Figure 1: Volume of Chronic Pain Procedures Received by Minnesota Patients (2010 to 2012)**



Source: MDH/Health Economics Program analysis of data from the MN APCD for services in 2010 to 2012 (2014)

<sup>16</sup> The estimate of the number of patients (within the MN APCD data limitations noted earlier) is likely high, while the estimate of the number of procedures per patient is likely low. This is an outcome of how the database is designed: it is constructed from de-identified data, i.e., it lacks patient identifiers such as social security numbers. As a result, when patients change coverage or how they identify themselves to health insurance carriers, they might look overtime as “new” or different patients, limiting how successful health care use is aggregated per record. For more information, see: <http://www.health.state.mn.us/healthreform/allpayer/faq.html>

Table 2 presents the numerical volume for each procedure and its distribution from 2010 through 2012. The table also lists the rate of change in the standardized number of procedures performed from 2010 to 2012. The rate is standardized to 10,000 covered Minnesotans per year included in the MN APCD data to adjust for potential differences how data is submitted by health insurance carriers to the MN APCD each year.<sup>17</sup>

As shown, the four most common procedures (paravertebral facet joint injections, 18.2 percent; transforaminal epidural injections, 16.4 percent; interlaminar epidural injections, 16.1 percent; and tendon injections, 10.8 percent) accounted for 60.8 percent of all delivered chronic pain procedures. Intrathecal drug pumps (2.8 percent) and neurostimulation (1.5 percent) were the most common ambulatory surgical pain procedures provided from 2010 to 2012 within the state.

The overall volume of chronic pain services has increased from 2010 to 2012 by 13.2 percent. In 2012, 518 chronic pain procedures were performed for every 10,000 covered Minnesotans within the state, or roughly one procedure for every 19 persons. Over the same period, injection based treatments increased more than twice as much as other more complicated and invasive procedures, 13.7 percent versus 6.0 percent.

**Table 2: Volume and Distribution of Chronic Pain Procedures Delivered in Minnesota (2010 to 2012)**

Chronic Pain Procedure	Procedures, 2010 to 2012		Rate of Procedures per 10,000 Covered Minnesotans		
	Number	Percent	2010	2012	% Change
<i><u>Non-Surgical Pain Procedures</u></i>					
Interlaminar Epidural injections	106,207	16.1%	73.7	82.7	12.2%
Transforaminal Epidural injections	108,673	16.4%	77.0	81.6	6.0%
Epidural Lysis and other spinal column lesions	2,468	0.4%	1.7	2.0	18.7%
Autonomic nerve blocks	5,592	0.8%	4.1	4.2	2.7%
Somatic nerve blocks	48,727	7.4%	37.6	37.1	-1.5%
Facet neurolytic destruction/radiofrequency ablation	38,715	5.9%	25.6	30.1	17.4%
Paravertebral facet joint injections	120,464	18.2%	80.5	96.6	20.1%
Sacroiliac joint injections	25,314	3.8%	17.4	19.7	12.9%
Somatic nerve destruction	34,916	5.3%	19.8	32.8	65.6%
Other Peripheral nerve destruction	3,903	0.6%	3.4	2.4	-30.1%
Trigger point injections	57,640	8.7%	38.8	46.5	20.0%
Tendon injections	71,476	10.8%	51.6	54.5	5.5%
<i><u>Ambulatory Surgical Pain Procedures</u></i>					
Spinal Decompression/Discectomy	279	0.0%	0.3	0.2	-16.2%

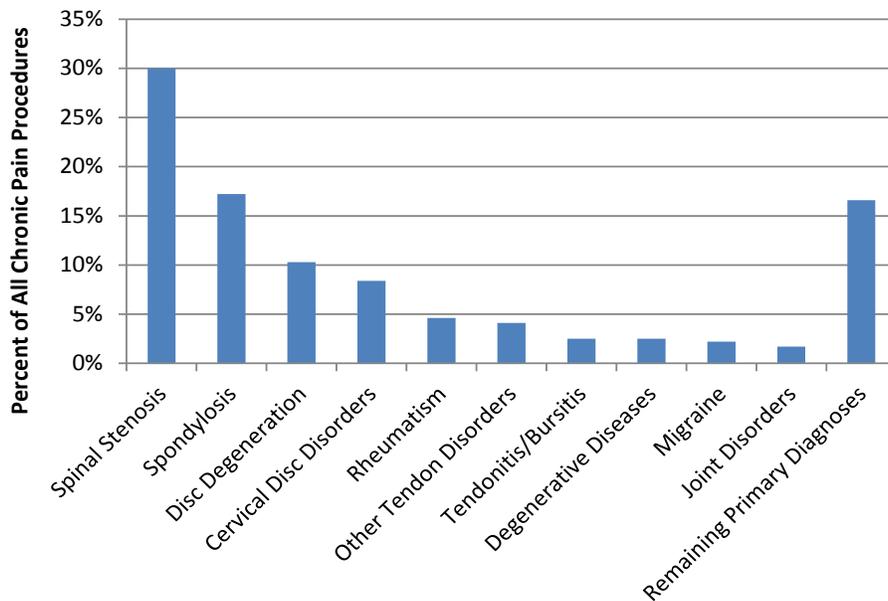
<sup>17</sup> The covered count is based on the count of unique individuals in the MN APCD per calendar year weighted by the number of member months enrolled during the year. For example, a person with a full year of enrollment and claims data would have a weighted value of 1 (12 enrolled months/12 months in the calendar year), whereas a partial year enrollee would have a fractional weighted value based on the number of enrolled months, such as 0.75 (9 enrolled months/12 months in the calendar year).

Chronic Pain Procedure	Procedures, 2010 to 2012		Rate of Procedures per 10,000 Covered Minnesotans		
	Number	Percent	2010	2012	% Change
Laminectomy/Laminotomy	5,010	0.8%	2.4	5.3	117.9%
Vertebroplasty	2,084	0.3%	1.9	1.2	-38.5%
Kyphoplasty	736	0.1%	0.4	0.8	119.1%
Neurostimulation	9,939	1.5%	7.5	7.6	2.4%
Intrathecal Drug Pump	<u>18,585</u>	<u>2.8%</u>	<u>13.9</u>	<u>12.8</u>	<u>-8.2%</u>
<b>Total Number of Procedures</b>	<b>660,728</b>	<b>100%</b>	<b>457.6</b>	<b>518.0</b>	<b>13.2%</b>

Source: MDH/Health Economics Program analysis of data from the MN APCD for services in 2010 to 2012 (2014).

As shown in Figure 2, ten conditions accounted for 83.4 percent of all chronic pain procedures performed from 2010 to 2012. Clinical diagnoses for back disorders, identified through the first three digits of the classification system for health conditions,<sup>18</sup> had the highest volume of chronic pain procedures. They included: spinal stenosis 30.0 percent, disc degeneration 10.3 percent, and cervical disc disorders (neck pain) 8.4 percent. Spondylosis, a form of osteoarthritis, was the second more common primary diagnosis, 17.2 percent.

**Figure 2: Distribution of Chronic Pain Procedures by Primary Diagnosis (2010 to 2012)**



Source: MDH/Health Economics Program analysis of data from the MN APCD for services in 2010 to 2012 (2014)

<sup>18</sup> International Statistical Classification of Diseases, Clinical Modification, version 9, or ICD-9-CM.

## Geography of Pain Intervention Procedures Delivered in Minnesota

By far, most chronic pain procedures between 2010 and 2012 were delivered by providers practicing in metropolitan areas of the state, or regions characterized as large or medium size urban centers (96.1 percent).<sup>19,20</sup> Their patients traveled on average 28.5 or 30 miles to receive care (for metropolitan and micropolitan areas, respectively).<sup>21</sup> Patients receiving pain treatments by providers who practice in rural settings traveled an average of 53 miles for treatment.

**Table 3: Volume, Distribution, and Travel Distance for Chronic Pain Procedures Delivered in Minnesota, by Provider Geography (2010 to 2012)**

Rural-Urban Continuum of Provider	Procedures, 2010 to 2012		Average Distance in Miles Traveled to Provider
	Number	Percent	
Metropolitan (more than 50,000 persons)	559,599	84.7%	28.5
Micropolitan (10,000 – 49,999 persons)	75,592	11.4%	30.0
Small Town (2,500 – 9,999 persons)	17,062	2.6%	27.9
Rural (less than 2,500 persons)	<u>8,475</u>	<u>1.3%</u>	53.0
<b>Total</b>	<b>660,728</b>	<b>100.0%</b>	<b>29.0</b>

Source: MDH/Health Economics Program analysis of data from the MN APCD for services in 2010 to 2012 (2014).  
Note: Distance is calculated between zip code centroids for provider zip code and patient zip code.

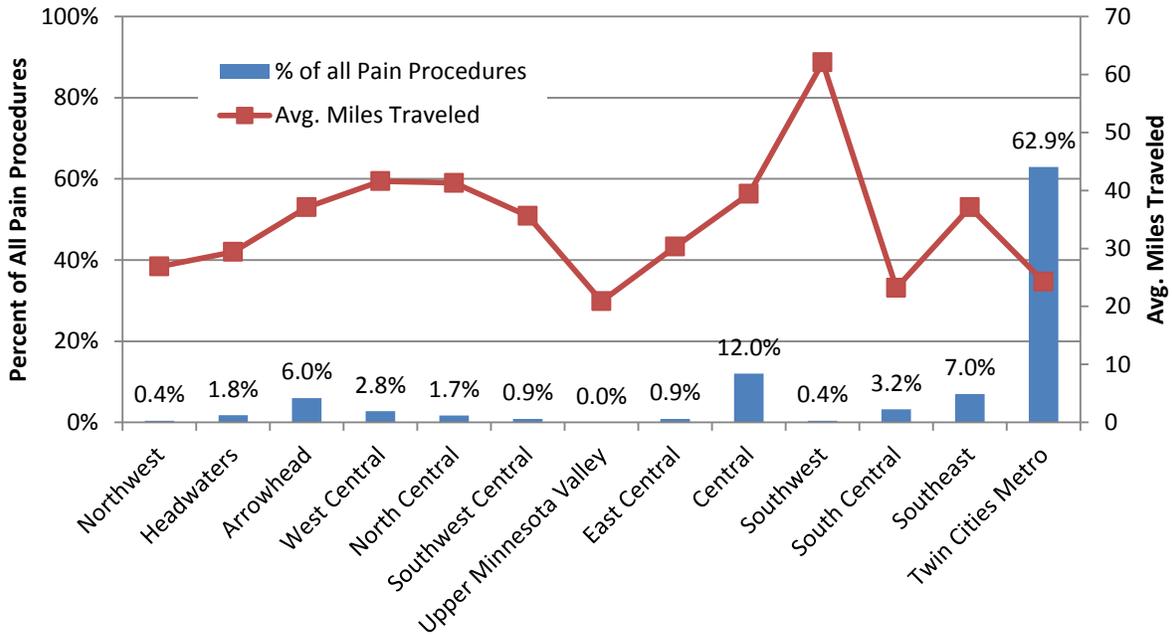
An analysis of finer geographic detail, using Economic Development Regions, shows that most chronic pain procedures (88 percent) were provided in 4 regions: Twin Cities, 62.9 percent; Central, 12.0 percent; Southeast, 7.0 percent; and Arrowhead, 6.1 percent. Average distance travels for patients to providers in those regions varied between 23 miles (South Central Minnesota) and 62 miles (Southwest Minnesota).

<sup>19</sup> Additional information about geographic identifiers used in this study can be found in Appendix G. Also available in the Appendix are maps that show the reference geographical areas.

<sup>20</sup> Distance geography is presented from the perspective of the provider location. From the patient perspective, metropolitan residents travel 18.6 miles to their chronic pain provider; micropolitan residents 44.6 miles; small town residents 56.1 miles; and rural residents 64.2 miles, on average.

<sup>21</sup> Average travel distance is an imperfect way to measure the degree to which patients travel to obtain certain care. It has the potential to mask a large distribution in the burden of travel faced by patients. For instance, while average travel distance for patients receiving care from rural providers is calculated at 53 miles (distance between patient to provider zip code centroids), some patients between 2010 and 2012 traveled as far as 118 miles. Average travel distance is provided in this study to provide general context.

**Figure 3: Volume, Distribution, and Distance Traveled for Chronic Pain Procedures Delivered in Minnesota, by Provider Economic Development Region (2010 to 2012)**

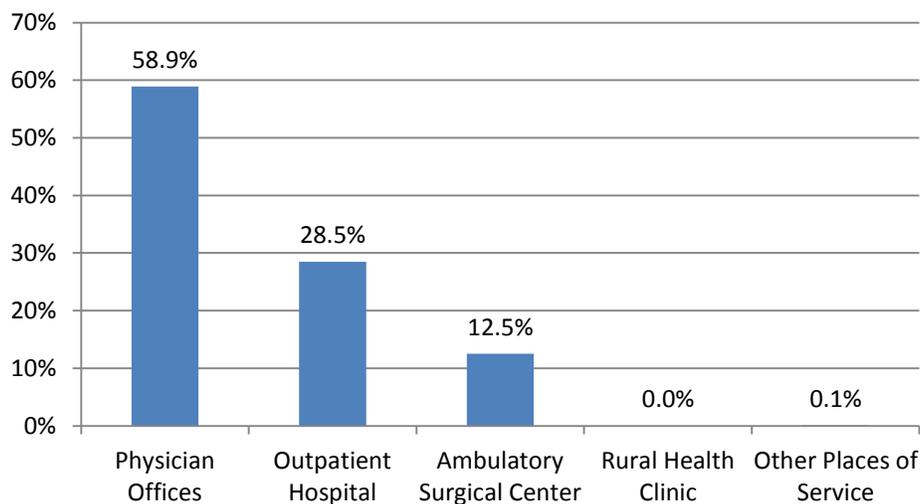


Source: MDH/Health Economics Program analysis of data from the MN APCD for services in 2010 to 2012 (2014). Note: Twin Cities Metro includes the following seven counties: Anoka, Washington, Ramsey, Hennepin, Dakota, Scott, and Carver. Distance is calculated between provider and patient zip code centroids.

## Types of Facilities Where Chronic Pain Procedures Were Provided in Minnesota

According to our analysis of data from the MN APCD from 2010 through 2012, the majority of chronic pain procedures (58.9 percent) were provided in physician office settings (Figure 4). Treatments in rural health clinics were rare (there were just 91 cases across the three years). Outpatient hospital settings accounted for 28.5 percent of chronic pain procedures, more than twice the volume performed in Ambulatory Surgical Centers (12.5 percent).

**Figure 4: Distribution of Chronic Pain Procedures Delivered in Minnesota, by Place of Service (2010 to 2012)**



Source: MDH/Health Economics Program analysis of data from the MN APCD for services in 2010 to 2012 (2014).  
 Note: The other place of service codes include other place of service, missing data category, and locations with fewer than 11 chronic procedure codes.

## Professionals Performing Pain Intervention Procedures in Minnesota

The legislature asked the department to provide information about the distribution of Minnesota providers who perform chronic pain procedures. Of particular interest to the legislature was the extent to which medical doctors, doctors of osteopathy, and certified registered nurse anesthetists provided such services.<sup>22</sup>

Our analysis of administrative billing data for 2010 to 2012 shows the delivery of pain procedures is significantly restricted to physician specialties. In aggregate, physicians (MDs and DOs combined<sup>23</sup>), delivered approximately 98.4 percent of all chronic pain management services in Minnesota. As shown in Figure 4, pain specialists and physicians in a pain-related specialties delivered most of chronic pain procedures (40.9 percent and 45.2 percent, respectively).<sup>24</sup> Primary care physicians delivered about 8.2

<sup>22</sup> A comparison of other clinical specialties providing chronic pain procedures within the state is provided in Appendix F.

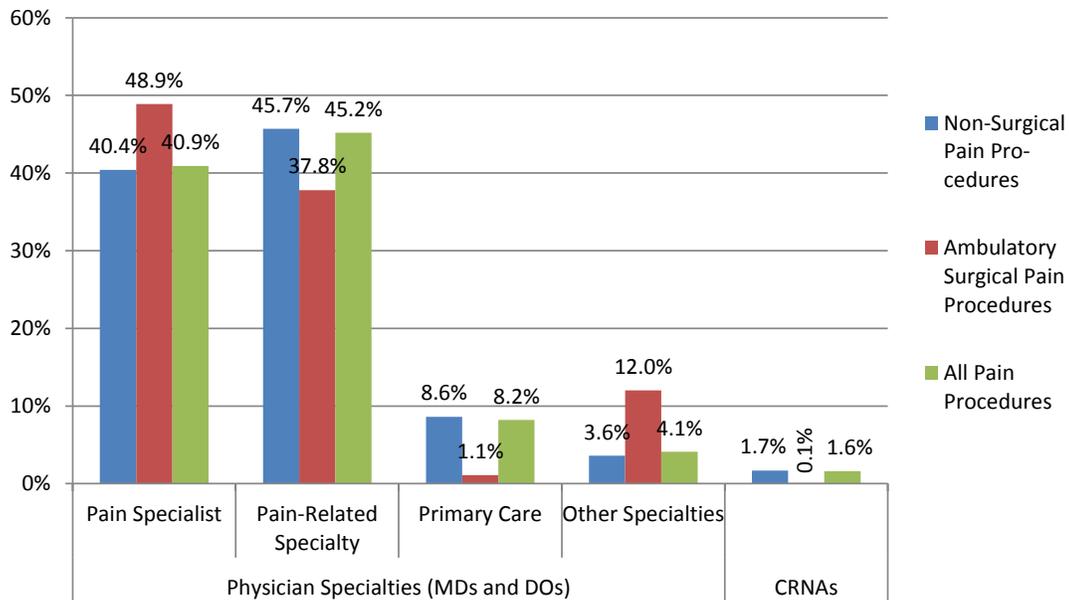
<sup>23</sup> Doctors of Medicine (MDs) and Doctors of Osteopathy (DOs) rendering chronic pain procedures are compared in Appendix G.

<sup>24</sup> Pain specialists have additional training and certification in pain medicine. Physicians without this additional certification but practice within fields primarily treating patients with acute and chronic pain are classified as pain-related specialties for this analysis and these specialties include: anesthesia, neurology, physical medicine, orthopedic and neurological surgery, and radiology. Additional detail on physician specialties is provided in Appendix E.

percent of all chronic pain procedures. As appears to be the case nationally as well,<sup>25</sup> CRNAs delivered a small fraction of all chronic pain intervention services (1.6 percent).

In distinguishing between non-surgical and ambulatory surgical pain procedures, pain specialists accounted for a greater share of the latter procedures (48.9 percent), while physicians in pain related specialties delivered a greater portion of the former (45.7 percent).

**Figure 5: Distribution of Pain Management Services Delivered in Minnesota, by Provider Type (2010 to 2012)**



Source: MDH/Health Economics Program analysis of data from the MN APCD for services in 2010 to 2012 (2014).

Our data shows that MDs who are pain specialists delivered primarily paravertebral facet joint injections and epidurals. Primary care physicians mainly performed tendon injections, trigger point injections, and somatic nerve blocks. Chronic pain services provided by CRNAs were composed of 45.7 percent interlaminar epidural injections, 15.7 percent somatic nerve blocks, and 18.1 percent trigger point injections.<sup>26</sup>

As noted earlier, the volume of chronic pain procedures between 2010 and 2012 rose by about 13.2 percent. Not all providers delivering these procedures experienced growth in services they provided. Primary Care physicians saw the highest growth in the volume of services provided over this period (22.2 percent). Physicians who are pain specialists or practice in a pain related specialty saw in aggregate double-digit growth in chronic pain management services they provided (15.8 percent and 11.3 percent respectively).

<sup>25</sup> GAO 2014.

<sup>26</sup> Additional detail on the distribution of procedures by specialty is in Appendix H.

In contrast, the volume of these procedures delivered by CRNAs declined 5 percent from 2010 to 2012. There are a variety of possible reasons for this decline, including retirement of certain CRNAs that provided high volumes of services or refocus on delivering other procedures. However, one likely contributing factor could be variations in billing or coding practices, involving how the rendering provider is identified (or whether claims only note the supervising or billing provider) and how precisely chronic pain procedures are identified. For instance, in our analysis of 2012 data we noticed a greater share of procedures that are identified as treatments of post-operative acute pain (diagnosis code v338.18) that are excluded from the definition of chronic pain procedures in this analysis than in the 2010 data.

The role of provider types in the delivery of care varies across regions. For instance, as shown in Table 4, pain specialists accounted for most care delivered in Central Minnesota (62.2 percent). MDs and DOs were dominant in West Central Minnesota (75.0 percent) and South Central Minnesota (63.7 percent). Primary Care physicians delivered most of the chronic pain management services (69.4 percent) in Northwest Minnesota. Consistent with the earlier findings, CRNAs accounted for a minor share of pain management services across areas of Minnesota, with the exception of Headwaters and East Central Minnesota (32.1 percent and 39.1 percent, respectively).<sup>27</sup>

**Table 4: Distribution of Pain Management Services Delivered in Minnesota, by Provider Type by Economic Development Region (2010 to 2012)**

Provider Economic Development Region	Physician Specialties (MDs and DOs)				Certified Registered Nurse Anesthetist (CRNA)
	Pain Specialist	Pain-Related Specialty	Primary Care	Other Specialties	
Northwest	1.0%	16.1%	69.4%	4.6%	8.9%
Headwaters	6.7%	41.5%	18.0%	1.6%	32.1%
Arrowhead	34.4%	48.2%	14.8%	2.2%	0.4%
West Central	11.7%	75.0%	8.8%	2.7%	1.9%
North Central	34.4%	46.3%	14.3%	2.3%	2.7%
Southwest Central	14.0%	63.7%	15.8%	3.0%	3.5%
Upper Minnesota Valley	0.0%	36.1%	51.4%	11.9%	0.0%
East Central	19.6%	17.3%	22.7%	1.2%	39.1%
Central	62.2%	26.9%	9.7%	1.1%	0.2%
Southwest	30.4%	32.2%	23.4%	1.4%	12.5%
South Central	14.5%	54.9%	10.8%	15.9%	3.9%
Southeast	28.3%	55.7%	9.2%	5.4%	1.3%
7 County Twin Cities	43.6%	46.0%	5.8%	4.3%	0.4%
<b>Percent of All Pain Procedures</b>	<b>40.9%</b>	<b>45.2%</b>	<b>8.2%</b>	<b>4.1%</b>	<b>1.6%</b>

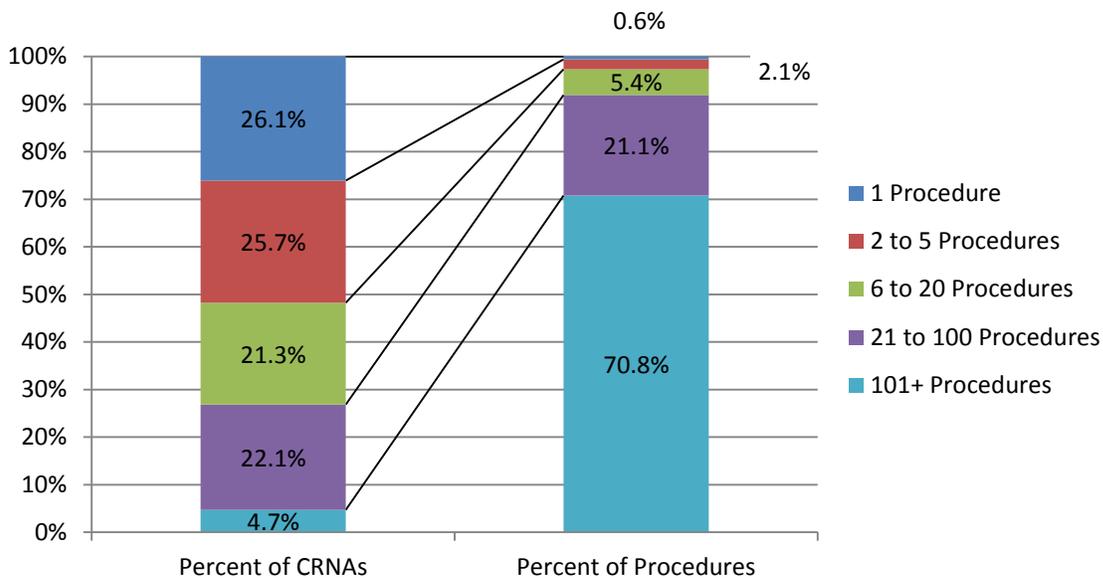
Source: MDH/Health Economics Program analysis of data from the MN APCD for services in 2010 to 2012 (2014).

<sup>27</sup> Additional detail on the geographic distribution of chronic pain management services is available in Appendix I.

Other findings on the intersection of provider type and service delivery of chronic pain procedures include:

- On average, patients of CRNAs had the shortest travel distance (21.8 miles compared with 31.1 miles, 29.4 miles, and 20.3 miles, respectively for physicians who are pain specialists, in pain related specialties, or primary care providers).
- With the exception of CRNAs, providers of chronic pain management services deliver care predominantly in physician office settings; in contrast 97.4 percent of pain management services delivered by CRNAs are provided in outpatient hospital settings.
- Finally, as shown in Figure 6, delivery of chronic pain management services by CRNAs is highly concentrated among a few individuals. Among a total of 253 CRNAs identified in the MN APCD as delivering chronic pain procedures between 2010 and 2012, 12 CRNAs account for most of these procedures (70.8 percent).

**Figure 6: Distribution of the Number of CRNAs and the Volume of Chronic Pain Procedures Provided per CRNAs (2010 to 2012)**



Source: MDH/Health Economics Program analysis of data from the MN APCD for services in 2010 to 2012 (2014).

## Conclusions

This study occurs at a time when national and local changes are taking place in the composition of the provider work force, bringing with them changes in scope of practice provisions. Broadly, the role of CRNAs in the provision of interventional pain procedures are defined by guidance from the national association scope of practice guidelines. Survey and licensure data document a steady increase in the number of CRNAs in Minnesota. According to the MN Board of Nursing, the number of CRNAs

applying for registered nurse re-licensure increased by about eight percent over the two years ending in February, 2013.<sup>28</sup>

The most sizeable increase in the number of resident CRNAs was in the Northwest planning region (from 68 to 82, a 21 percent increase). Still, most CRNAs are located in the seven-county Twin Cities metropolitan area, 48 percent (773) in February, 2013. Still, with 1,627 members, CRNAs remain a numerically small provider specialty in the state. Consistently with this CRNAs continued to play a minor role in providing chronic pain management services in Minnesota, accounting according to our analysis for only for 1.6 percent of all such services delivered between 2010 and 2012.

Pain specialists and physicians who practice in pain related specialties (MDs/DOs) delivered by far the most chronic pain management services, accounting for approximately 86 percent of services. Primary care physicians delivered about 8.2 percent of chronic pain management services.

## Limitations on the Analysis

To some extent, research on the treatment of chronic pain and the circumstances in which services are provided is still an evolving field. To date, a consistent definition of chronic pain is lacking, as is a complete enumeration of interventional pain procedures used to treat these conditions. Contributing to this challenge is the degree to which differences in billing practices might affect:

- How treatment of chronic pain management services is recorded in procedure codes, and
- How rendering providers are recorded in administrative billing data, in cases where providers are operating under a supervision arrangement.

While MDH used a number of strategies to minimize the occurrence of acute conditions in the analysis, including by obtaining feedback from professional organizations representing MDs and CRNAs, there is still the potential that procedures are very slightly overstated. On the other hand, there is the potential that chronic pain procedures delivered by CRNAs are somewhat undercounted if their role as “rendering provider” is not adequately recorded in billing data

## Potential Next Steps

Should the legislature wish to address these potential limitations, there are two potential options: (1) The analysis of administrative billing data could be extended by an analysis of electronic records data; and (2) conducting a survey of service providers identified in licensing data and administrative billing records may lend itself to estimating the volume of potentially undercounted CRNA service providers and the volume of services delivered by them.

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<sup>28</sup> Full details of this workforce survey are provided in Appendix J.

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# Appendices

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## Appendix A: 2014, Regular Session, Minnesota Laws Chapter 312—HF3172, Article 23, Sec. 11

Sec. 11. **DATA ON CHRONIC PAIN THERAPIES.** (a) The commissioner of health shall gather the following data on the provision of chronic pain treatment procedures by physicians, doctors of osteopathy, and certified registered nurse anesthetists who perform these procedures:

(1) the types and number of chronic pain management procedures performed within the last 36 months;

(2) the types of health professionals who perform chronic pain treatment procedures and the professional licenses they hold; and

(3) the location and type of facility in which the chronic pain treatment procedures are performed.

(b) The commissioner shall submit a report with the compiled data to the chairs and ranking minority members of the house and senate committees with jurisdiction over health and human services finance and policy by January 15, 2015.

(c) The commissioner of health may use the data submitted under Minnesota Statutes, section 62U.04, subdivision 4, paragraph (a), to carry out the requirements of this section.

## Appendix B: Method Used to Identify Chronic Pain Intervention Procedures

For the specific analysis on chronic pain procedures provided in 2010-2012, we identified 660,728 insurance claims for the treatment of interventional pain procedures. Pain procedures were identified using clinical guidelines for chronic pain treatment for certified nurse anesthetists, doctors of medicine, and doctors of osteopathy.<sup>29</sup> We also selected procedures consistent with limited previous research established by national chronic pain associations and other federal agency research investigating chronic pain.<sup>30</sup> The final group of pain intervention procedures includes those commonly used to treat the majority of chronic pain patients, especially those with musculoskeletal and neurologic causes of pain.

Excluded procedures include such treatments as discography, fluoroscopic guidance, arthrography, epidurography, myelography, catheter placement, diagnostic spinal puncture, arthrocentesis, acupuncture, or diagnostic procedures often used to identify but not necessarily treat chronic pain.

In order to differentiate the set of pain intervention procedure codes as treatment for chronic pain rather than acute pain conditions, professional claims with place of service settings in inpatient hospitals, emergency departments, urgent care centers, and birthing centers were excluded. In addition, any professional claim with peri-operative modifier codes or with a code for that the Medicare Outpatient Prospective Payment System indicated as inpatient hospital provision only were excluded from the analysis. A final exclusion category was any professional claim with a diagnosis for ICD-9 v338.18 for acute pain following surgery or v338.1 for acute pain.

Appendix Table B-1 provides the complete list of procedure codes used in the analysis.

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<sup>29</sup> American Association of Nurse Anesthetists (AANA). 2014. Chronic Pain Management Guidelines. Park Ridge, IL: AANA; American Osteopathic Association (AOA). 2013. Basic Standard for Fellowship Training in Acute and Chronic Pain Management in Anesthesiology. AOA and American Osteopathic College of Anesthesiologists; American Society of Interventional Pain Physicians (ASIPP). 2013a. "An Update of Comprehensive Evidence-Based Guideline for Interventional Techniques in Chronic Spinal Pain. Part I: Introduction and General Considerations." Pain Physician 16:S1-S48; ASIPP. 2013b. "An Update of Comprehensive Evidence-Based Guideline for Interventional Techniques in Chronic Spinal Pain. Part II: Guidance and Recommendations." Pain Physician 16:S49-S283.

<sup>30</sup> American Chronic Pain Association (ACPA). 2014. ACPA Resource Guide to Chronic Pain Medication & Treatment. Rocklin, CA: ACPA; General Accounting Office (GAO). 2014. Medicare: Nurse Anesthetists Billed for Few Chronic Pain Procedures; Implementation of CMS Payment Policy Inconsistent. Washington, DC: GAO-14-153; Medicare Payment Advisory Commission (MedPAC). 2001. Paying for Interventional Pain Service in Ambulatory Settings. Washington, DC: MedPAC; Office of Inspector General (OIG). 2008. Medicare Payments for Facet Joint Injection Services. Washington, DC: Health and Human Services, OEI-05-07-00200.

**Appendix Table B-1: Chronic Pain Procedure Billing Codes**

Chronic Pain Procedure	Current Procedural Terminology (CPT) Codes								
<i>Non-Surgical Pain Procedures</i>									
Interlaminar Epidural injections	62310	62311	62318	62319					
Transforaminal Epidural injections	64479	64480	64483	64484	0230T				
Epidural Lysis and other spinal column lesions	61790	62263	62264	62268	62272	62273	62280	62282	
Autonomic nerve blocks	64505	64508	64510	64517	64520	64530			
Somatic nerve blocks	64400	64402	64405	64408	64412	64413	64415	64416	
	64417	64418	64420	64421	64425	64430	64435	64445	
	64446	64447	64448	64449	64450	64455			
Facet neurolytic destruction/ radiofrequency ablation	64622	64623	64626	64627	64633	64634	64635	64636	
Paravertebral facet joint injections	64470	64472	64475	64476	64490	64491	64492	64493	
	64494	64495	0213T	0214T	0215T	0216T	0217T	0218T	
Sacroiliac joint injections	27096	G0260							
Somatic nerve destruction	64600	64605	64610	64612	64613	64620			
Other Peripheral nerve destruction	64630	64632	64640	64680	64681				
Trigger point injections	20552	20553							
Tendon injections	20526	20550	20551	M0076					
<i>Ambulatory Surgical Pain Procedures</i>									
Spinal Decompression/Discectomy	63055	63056	63057	22526	22527	62287	62292	63075	
	63076								
Laminectomy/Laminotomy	63001	63003	63005	63011	63012	63015	63016	63017	
	63045	63046	63047	63048	63020	63030	63035	63042	
	0275T								
Vertebroplasty	22520	22521	22522						
Kyphoplasty	22523	22524	22525						
Neurostimulation	63650	63655	63661	63662	63663	63664	63685	63688	
	64550	64553	64555	64560	64561	64575	64580	64581	
	64585	64590	64595						
Intrathecal Drug Pump	62360	62361	62362	62365	62367	62368	62369	62370	

## Appendix C: Geographic Identifiers

Geographic identifiers used in the study are based on the provider zip codes submitted on the professional claim for the chronic pain procedure. This zip code data is grouped into Department of Employment and Economic Development (DEED) “economic development regions” (EDRs) and sorted by population and commuting patterns into a rural-urban continuum for the zip code. The figures and tables below provide information about the geographic units analyzed in the report.

### Rural-Urban Continuum Classification

Provider zip codes are classified using the rural-urban continuum created by the Economic Research Service at the United State Department of Agriculture.<sup>31</sup> Using work commuting patterns and population estimates from the Census Bureau American Community Survey, zip codes are classified by the population size based on commuting patterns. Appendix Table C-1 provides category definitions.

**Appendix Table C-1: Rural-Urban Continuum Definitions**

<b>Rural-Urban Continuum Zip Code</b>	<b>Definition</b>
<b>Metropolitan</b>	Zip code population size larger than 50,000 persons or primary commuting patterns to adjacent zip code with corresponding population size
<b>Micropolitan</b>	Zip code population size between 10,000 – 49,999 persons or primary commuting patterns to adjacent zip code with corresponding population size
<b>Small Town</b>	Zip code population size between 2,500 – 9,999 persons or primary commuting patterns to adjacent zip code with corresponding population size
<b>Rural</b>	Zip code population size fewer than 2,500 persons

Source: Economic Research Service 2013.

<sup>31</sup> See also: <http://www.ers.usda.gov/data-products/rural-urban-continuum-codes.aspx>

## Economic Development Regions

The Minnesota DEED EDRs classify Minnesota’s 87 counties into 13 contiguous regions within the state. The regions follow county borders, and Appendix Table C-2 lists the counties contained within each region.

**Appendix Table C-2: Economic Development Region by County**

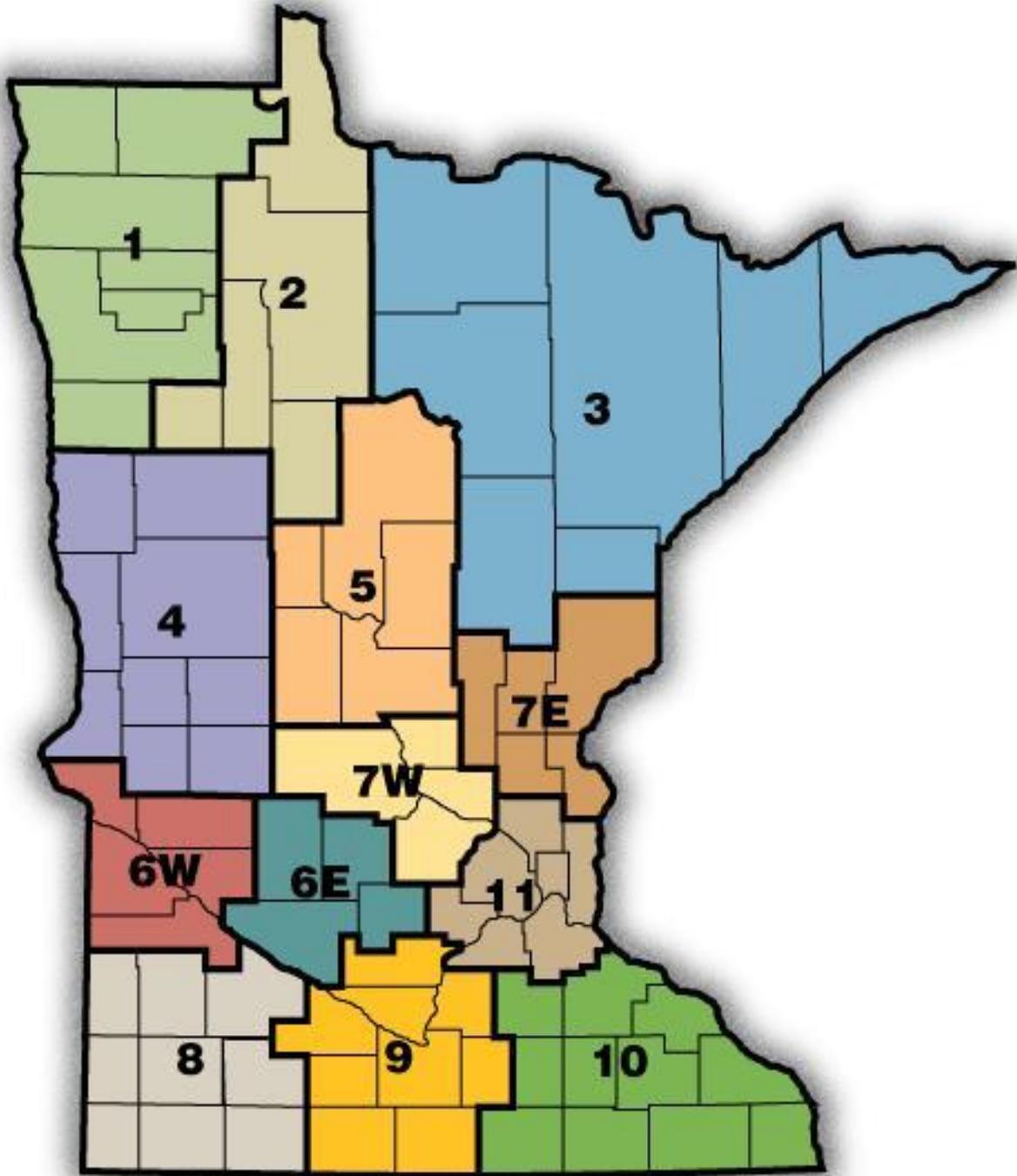
Economic Development Region (EDR)	County
Northwest (1)	Kittson, Marshall, Norman, Pennington, Polk, Red Lake, Roseau
Headwaters (2)	Beltrami, Clearwater, Hubbard, Lake of the Woods, Mahnommen
Arrowhead (3)	Aitkin, Carlton, Cook, Itasca, Koochiching, Lake, St. Louis
West Central (4)	Becker, Clay, Douglas, Grant, Otter Tail, Pope, Stevens, Traverse, Wilkin
North Central (5)	Cass, Crow Wing, Morrison, Todd, Wadena
Southwest Central (6E)	Kandiyohi, McLeod, Meeker, Renville
Upper Minnesota Valley (6W)	Big Stone, Chippewa, Lac qui Parle, Swift, Yellow Medicine
East Central (7E)	Chisago, Isanti, Kanabec, Mille Lacs, Pine
Central (7W)	Benton, Sherburne, Stearns, Wright
Southwest (8)	Cottonwood, Jackson, Lincoln, Lyon, Murray, Nobles, Pipestone, Redwood, Rock
South Central (9)	Blue Earth, Brown, Faribault, Le Sueur, Martin, Nicollet, Sibley, Waseca, Watonwan
Southeast (10)	Dodge, Fillmore, Freeborn, Goodhue, Houston, Mower, Olmsted, Rice, Steele, Wabasha, Winona
Seven County Twin Cities (11)	Anoka, Carver, Dakota, Hennepin, Ramsey, Scott, Washington

Source: Minnesota Department of Employment and Economic Development.

Appendix Figure C-1 provides a map of EDRs with the corresponding EDR reference number listed on the map.

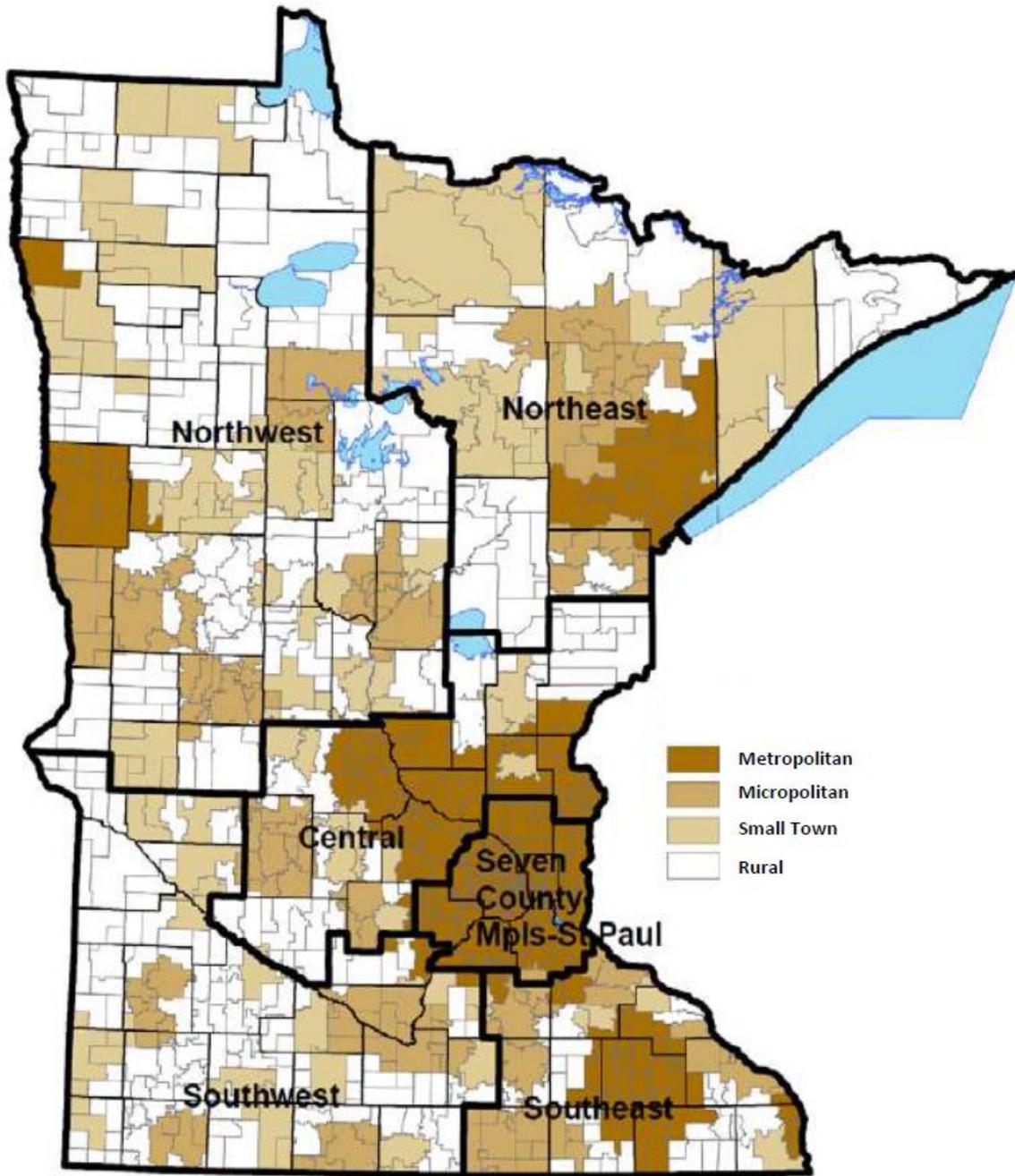
Appendix Figure C-2 shows a map of Minnesota zip codes by the four rural-urban continuum categories. For spatial reference, the county boundaries are overlaid on the map, and the DEED Planning Regions are labelled and have thick black boundaries on the map. Note that DEED Planning Regions encapsulate the EDRs providing a clearer reference boundary over the zip code areas because they are a larger size. In addition, Appendix H uses the Planning Regions from the CRNA workforce survey so they are provided here as a convenient reference. EDRs 3, 11, and 10 are the same as the Planning Regions Northeast, 7-County Metro, and Southeast. The Central Planning Region is comprised of EDRs 6E, 7W, and 7E. The Northwest Planning Region is EDRs 1, 2, 4, and 5. The Southwest Planning Region is EDRs 6W, 8, and 9.

Appendix Figure C-1: Minnesota County Map of Economic Development Regions



Source: Minnesota Department of Employment and Economic Development.

Appendix Figure C-2: Minnesota Zip Code Map of Rural-Urban Continuum Classification



Sources: Rural-Urban Continuum, ERS 2013; Planning Regions, Minnesota Department of Employment and Economic Development.

## Appendix D: Identifying Types of Facilities using Administrative Claims Data

Facility types are coded from the place of service code on the professional claim in the administrative data. The following table provides the complete set of codes and the description of the facility types that may be billed on the professional claim.

**Appendix Table D-1. Place of Service Categories to Identify Facility Types**

<b>Place of Service Code</b>	<b>Place of Service Name</b>	<b>Place of Service Description</b>
<b>01</b>	Pharmacy	A facility or location where drugs and other medically related items and services are sold, dispensed, or otherwise provided directly to patients.
<b>03</b>	School	A facility whose primary purpose is education.
<b>04</b>	Homeless Shelter	A facility or location whose primary purpose is to provide temporary housing to homeless individuals (e.g., emergency shelters, individual or family shelters).
<b>05</b>	Indian Health Service Free-standing Facility	A facility or location, owned and operated by the Indian Health Service, which provides diagnostic, therapeutic (surgical and non-surgical), and rehabilitation services to American Indians and Alaska Natives who do not require hospitalization.
<b>06</b>	Indian Health Service Provider-based Facility	A facility or location, owned and operated by the Indian Health Service, which provides diagnostic, therapeutic (surgical and non-surgical), and rehabilitation services rendered by, or under the supervision of, physicians to American Indians and Alaska Natives admitted as inpatients or outpatients.
<b>07</b>	Tribal 638 Free-standing Facility	A facility or location owned and operated by a federally recognized American Indian or Alaska Native tribe or tribal organization under a 638 agreement, which provides diagnostic, therapeutic (surgical and non-surgical), and rehabilitation services to tribal members who do not require hospitalization.

Place of Service Code	Place of Service Name	Place of Service Description
08	Tribal 638 Provider-based Facility	A facility or location owned and operated by a federally recognized American Indian or Alaska Native tribe or tribal organization under a 638 agreement, which provides diagnostic, therapeutic (surgical and non-surgical), and rehabilitation services to tribal members admitted as inpatients or outpatients.
09	Prison/ Correctional Facility	A prison, jail, reformatory, work farm, detention center, or any other similar facility maintained by either Federal, State or local authorities for the purpose of confinement or rehabilitation of adult or juvenile criminal offenders.
11	Office	Location, other than a hospital, skilled nursing facility (SNF), military treatment facility, community health center, State or local public health clinic, or intermediate care facility (ICF), where the health professional routinely provides health examinations, diagnosis, and treatment of illness or injury on an ambulatory basis.
12	Home	Location, other than a hospital or other facility, where the patient receives care in a private residence.
13	Assisted Living Facility	Congregate residential facility with self-contained living units providing assessment of each resident's needs and on-site support 24 hours a day, 7 days a week, with the capacity to deliver or arrange for services including some health care and other services.
14	Group Home	A residence, with shared living areas, where clients receive supervision and other services such as social and/or behavioral services, custodial service, and minimal services (e.g., medication administration).
15	Mobile Unit	A facility/unit that moves from place-to-place equipped to provide preventive, screening, diagnostic, and/or treatment services.
16	Temporary Lodging	A short term accommodation such as a hotel, camp ground, hostel, cruise ship or resort where the patient receives care, and which is not identified by any other POS code.
17	Walk-in Retail Health Clinic	A walk-in health clinic, other than an office, urgent care facility, pharmacy or independent clinic and not described by any other Place of Service code, that is located within a retail operation and provides, on an ambulatory basis, preventive and primary care services.

Place of Service Code	Place of Service Name	Place of Service Description
18	Place of Employment-Worksite	A location, not described by any other POS code, owned or operated by a public or private entity where the patient is employed, and where a health professional provides on-going or episodic occupational medical, therapeutic or rehabilitative services to the individual.
20	Urgent Care Facility	Location, distinct from a hospital emergency room, an office, or a clinic, whose purpose is to diagnose and treat illness or injury for unscheduled, ambulatory patients seeking immediate medical attention.
21	Inpatient Hospital	A facility, other than psychiatric, which primarily provides diagnostic, therapeutic (both surgical and nonsurgical), and rehabilitation services by, or under, the supervision of physicians to patients admitted for a variety of medical conditions.
22	Outpatient Hospital	A portion of a hospital which provides diagnostic, therapeutic (both surgical and nonsurgical), and rehabilitation services to sick or injured persons who do not require hospitalization or institutionalization.
23	Emergency Room – Hospital	A portion of a hospital where emergency diagnosis and treatment of illness or injury is provided.
24	Ambulatory Surgical Center	A freestanding facility, other than a physician's office, where surgical and diagnostic services are provided on an ambulatory basis.
25	Birthing Center	A facility, other than a hospital's maternity facilities or a physician's office, which provides a setting for labor, delivery, and immediate post-partum care as well as immediate care of new born infants.
26	Military Treatment Facility	A medical facility operated by one or more of the Uniformed Services. Military Treatment Facility (MTF) also refers to certain former U.S. Public Health Service (USPHS) facilities now designated as Uniformed Service Treatment Facilities (USTF).
31	Skilled Nursing Facility	A facility which primarily provides inpatient skilled nursing care and related services to patients who require medical, nursing, or rehabilitative services but does not provide the level of care or treatment available in a hospital.

Place of Service Code	Place of Service Name	Place of Service Description
32	Nursing Facility	A facility which primarily provides to residents skilled nursing care and related services for the rehabilitation of injured, disabled, or sick persons, or, on a regular basis, health-related care services above the level of custodial care to other than mentally retarded individuals.
33	Custodial Care Facility	A facility which provides room, board and other personal assistance services, generally on a long-term basis, and which does not include a medical component.
34	Hospice	A facility, other than a patient's home, in which palliative and supportive care for terminally ill patients and their families are provided.
41	Ambulance - Land	A land vehicle specifically designed, equipped and staffed for lifesaving and transporting the sick or injured.
42	Ambulance – Air or Water	An air or water vehicle specifically designed, equipped and staffed for lifesaving and transporting the sick or injured.
49	Independent Clinic	A location, not part of a hospital and not described by any other Place of Service code, that is organized and operated to provide preventive, diagnostic, therapeutic, rehabilitative, or palliative services to outpatients only.
50	Federally Qualified Health Center	A facility located in a medically underserved area that provides Medicare beneficiaries preventive primary medical care under the general direction of a physician.
51	Inpatient Psychiatric Facility	A facility that provides inpatient psychiatric services for the diagnosis and treatment of mental illness on a 24-hour basis, by or under the supervision of a physician.
52	Psychiatric Facility-Partial Hospitalization	A facility for the diagnosis and treatment of mental illness that provides a planned therapeutic program for patients who do not require full time hospitalization, but who need broader programs than are possible from outpatient visits to a hospital-based or hospital-affiliated facility.

Place of Service Code	Place of Service Name	Place of Service Description
53	Community Mental Health Center	A facility that provides the following services: outpatient services, including specialized outpatient services for children, the elderly, individuals who are chronically ill, and residents of the CMHC's mental health services area who have been discharged from inpatient treatment at a mental health facility; 24 hour a day emergency care services; day treatment, other partial hospitalization services, or psychosocial rehabilitation services; screening for patients being considered for admission to State mental health facilities to determine the appropriateness of such admission; and consultation and education services.
54	Intermediate Care Facility/Mentally Retarded	A facility which primarily provides health-related care and services above the level of custodial care to mentally retarded individuals but does not provide the level of care or treatment available in a hospital or SNF.
55	Residential Substance Abuse Treatment Facility	A facility which provides treatment for substance (alcohol and drug) abuse to live-in residents who do not require acute medical care. Services include individual and group therapy and counseling, family counseling, laboratory tests, drugs and supplies, psychological testing, and room and board.
56	Psychiatric Residential Treatment Center	A facility or distinct part of a facility for psychiatric care which provides a total 24-hour therapeutically planned and professionally staffed group living and learning environment.
57	Non-residential Substance Abuse Treatment Facility	A location which provides treatment for substance (alcohol and drug) abuse on an ambulatory basis. Services include individual and group therapy and counseling, family counseling, laboratory tests, drugs and supplies, and psychological testing.
60	Mass Immunization Center	A location where providers administer pneumococcal pneumonia and influenza virus vaccinations and submit these services as electronic media claims, paper claims, or using the roster billing method. This generally takes place in a mass immunization setting, such as, a public health center, pharmacy, or mall but may include a physician office setting.
61	Comprehensive Inpatient Rehabilitation Facility	A facility that provides comprehensive rehabilitation services under the supervision of a physician to inpatients with physical disabilities. Services include physical therapy, occupational therapy, speech pathology, social or psychological services, and orthotics and prosthetics services.

Place of Service Code	Place of Service Name	Place of Service Description
62	Comprehensive Outpatient Rehabilitation Facility	A facility that provides comprehensive rehabilitation services under the supervision of a physician to outpatients with physical disabilities. Services include physical therapy, occupational therapy, and speech pathology services.
65	End-Stage Renal Disease Treatment Facility	A facility other than a hospital, which provides dialysis treatment, maintenance, and/or training to patients or caregivers on an ambulatory or home-care basis.
71	Public Health Clinic	A facility maintained by either State or local health departments that provides ambulatory primary medical care under the general direction of a physician.
72	Rural Health Clinic	A certified facility which is located in a rural medically underserved area that provides ambulatory primary medical care under the general direction of a physician.
81	Independent Laboratory	A laboratory certified to perform diagnostic and/or clinical tests independent of an institution or a physician's office.
99	Other Place of Service	Other place of service not identified above.

Source: Centers for Medicare and Medicaid Services 2012.

## Appendix E: Identification of Rendering Provider within Administrative Claims Data

The rendering provider specialty was determined by linking the taxonomy code from the National Plan and Provider Enumeration System (NPPES) database with the provider National Provider Identifier (NPI) from the professional claim. The table below provides additional information on the taxonomy codes as they are grouped into broader specialty categories for the report analysis and lists all provider types included in the study.

All physician specialties with additional pain specialization are grouped within one category as pain specialists. Pain-related specialties include anesthesia, physical medicine, and neurology classifications that do not have additional pain specialization, and the physician fields of radiology, orthopedic surgeons, and neurological surgeons.<sup>32</sup> Primary Care specialists are physicians with general medicine, family practice, or internal medicine classifications. All other remaining physician specialties are grouped together, and certified registered nurse anesthetists are a single grouping.

**Appendix Table E-1: Provider Classification from National Provider Identifier (NPI) Registry**

Code	Taxonomy	Type	Classification	Specialization	Definition
CRNA	367500000X	Physician Assistants & Advanced Practice Nursing Providers	Nurse Anesthetist, Certified Registered		(1) A licensed registered nurse with advanced specialty education in anesthesia who, in collaboration with appropriate health care professionals, provides preoperative, intraoperative, and postoperative care to patients and assists in management and resuscitation of critical patients in intensive care, coronary care, and emergency situations. Nurse anesthetists are certified following successful completion of credentials and state licensure review and a national examination directed by the Council on Certification of Nurse Anesthetists. (2) A registered nurse who is qualified by special training to administer anesthesia in collaboration with a physician or dentist and who can assist in the care of patients who are in critical condition.
Pain Specialist	207LP2900X	Allopathic & Osteopathic Physicians	Anesthesiology	Pain Medicine	An anesthesiologist who provides a high level of care, either as a primary physician or consultant, for patients experiencing problems with acute, chronic and/or cancer pain in both hospital and ambulatory settings. Patient care needs are also coordinated with other specialists.

<sup>32</sup> Grouping of physician specialties was based on the previous research by Manchikanti, et al. (2012) and GAO (2014).

Code	Taxonomy	Type	Classification	Specialization	Definition
Pain Specialist	208VP0000X	Allopathic & Osteopathic Physicians	Pain Medicine	Pain Medicine	Pain Medicine is a primary medical specialty based on a distinct body of knowledge and a well-defined scope of clinical practice that is founded on science, research and education. It is concerned with the study of pain, the prevention of pain, and the evaluation, treatment, and rehabilitation of persons in pain. A comprehensive evaluation incorporates the physical, psychological, cognitive and socio-cultural contributions to pain. The treatment protocol may include pharmacological, invasive, behavioral, cognitive, rehabilitative and complementary strategies provided in a concurrent focused and patient specific manner. The pain medicine physician often serves the patient as a frontline physician regarding their pain, but also may serve as a consultant to other physicians, direct an interdisciplinary/multidisciplinary treatment team, conduct research, or advocate for the patient's pain care with public and private agencies. The Pain Medicine physician may work in variety of settings including office, clinic, hospital, university, or governmental/public agencies.
Pain Specialist	208VP0014X	Allopathic & Osteopathic Physicians	Pain Medicine	Interventional Pain Medicine	Interventional Pain Medicine is the discipline of medicine devoted to the diagnosis and treatment of pain and related disorders principally with the application of interventional techniques in managing subacute, chronic, persistent, and intractable pain, independently or in conjunction with other modalities of treatment.
Pain Specialist	2081P2900X	Allopathic & Osteopathic Physicians	Physical Medicine & Rehabilitation	Pain Medicine	A physician who provides a high level of care, either as a primary physician or consultant, for patients experiencing problems with acute, chronic or cancer pain in both hospital and ambulatory settings. Patient care needs may also be coordinated with other specialists.
Pain Specialist	2084P2900X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Pain Medicine	A neurologist, child neurologists or psychiatrist who provides a high level of care, either as a primary physician or consultant, for patients experiencing problems with acute, chronic or cancer pain in both hospital and ambulatory settings. Patient care needs may also be coordinated with other specialists.

Code	Taxonomy	Type	Classification	Specialization	Definition
Pain-Related Specialty	207L00000X	Allopathic & Osteopathic Physicians	Anesthesiology		An anesthesiologist is trained to provide pain relief and maintenance, or restoration, of a stable condition during and immediately following an operation or an obstetric or diagnostic procedure. The anesthesiologist assesses the risk of the patient undergoing surgery and optimizes the patient's condition prior to, during and after surgery. In addition to these management responsibilities, the anesthesiologist provides medical management and consultation in pain management and critical care medicine. Anesthesiologists diagnose and treat acute, long-standing and cancer pain problems; diagnose and treat patients with critical illnesses or severe injuries; direct resuscitation in the care of patients with cardiac or respiratory emergencies, including the need for artificial ventilation; and supervise post-anesthesia recovery.
Pain-Related Specialty	207LA0401X	Allopathic & Osteopathic Physicians	Anesthesiology	Addiction Medicine	An anesthesiologist who specializes in the diagnosis and treatment of addictions.
Pain-Related Specialty	207LC0200X	Allopathic & Osteopathic Physicians	Anesthesiology	Critical Care Medicine	An anesthesiologist, who specializes in critical care medicine diagnoses, treats and supports patients with multiple organ dysfunction. This specialist may have administrative responsibilities for intensive care units and may also facilitate and coordinate patient care among the primary physician, the critical care staff and other specialists.
Pain-Related Specialty	207LH0002X	Allopathic & Osteopathic Physicians	Anesthesiology	Hospice and Palliative Medicine	An anesthesiologist with special knowledge and skills to prevent and relieve the suffering experienced by patients with life-limiting illnesses. This specialist works with an interdisciplinary hospice or palliative care team to maximize quality of life while addressing physical, psychological, social and spiritual needs of both patient and family throughout the course of the disease, through the dying process, and beyond for the family. This specialist has expertise in the assessment of patients with advanced disease; the relief of distressing symptoms; the coordination of interdisciplinary patient and family-centered care in diverse venues; the use of specialized care systems including hospice; the management of the imminently dying patient; and legal and ethical decision making in end-of-life care.
Pain-Related Specialty	207LP3000X	Allopathic & Osteopathic Physicians	Anesthesiology	Pediatric Anesthesiology	An anesthesiologist who has had additional skill and experience in and is primarily concerned with the anesthesia, sedation, and pain management needs of infants and children. A pediatric anesthesiologist generally provides services including the evaluation of complex medical problems in infants and children when surgery is necessary, planning and care for children before and after surgery, pain control, anesthesia and sedation for any procedures out of the operating room such as MRI, CT scan, and radiation therapy.

Code	Taxonomy	Type	Classification	Specialization	Definition
Pain-Related Specialty	207T00000X	Allopathic & Osteopathic Physicians	Neurological Surgery		A neurological surgeon provides the operative and non-operative management (i.e., prevention, diagnosis, evaluation, treatment, critical care, and rehabilitation) of disorders of the central, peripheral, and autonomic nervous systems, including their supporting structures and vascular supply; the evaluation and treatment of pathological processes which modify function or activity of the nervous system; and the operative and non-operative management of pain. A neurological surgeon treats patients with disorders of the nervous system; disorders of the brain, meninges, skull, and their blood supply, including the extracranial carotid and vertebral arteries; disorders of the pituitary gland; disorders of the spinal cord, meninges, and vertebral column, including those which may require treatment by spinal fusion or instrumentation; and disorders of the cranial and spinal nerves throughout their distribution.
Pain-Related Specialty	207X00000X	Allopathic & Osteopathic Physicians	Orthopaedic Surgery		An orthopaedic surgeon is trained in the preservation, investigation and restoration of the form and function of the extremities, spine and associated structures by medical, surgical and physical means. An orthopaedic surgeon is involved with the care of patients whose musculoskeletal problems include congenital deformities, trauma, infections, tumors, metabolic disturbances of the musculoskeletal system, deformities, injuries and degenerative diseases of the spine, hands, feet, knee, hip, shoulder and elbow in children and adults. An orthopaedic surgeon is also concerned with primary and secondary muscular problems and the effects of central or peripheral nervous system lesions of the musculoskeletal system.
Pain-Related Specialty	207XP3100X	Allopathic & Osteopathic Physicians	Orthopaedic Surgery	Pediatric Orthopaedic Surgery	An orthopedic surgeon who has additional training and experience in diagnosing, treating and managing musculoskeletal problems in infants, children and adolescents. These may include limb and spine deformities (such as club foot, scoliosis); gait abnormalities (limping); bone and joint infections; broken bones.
Pain-Related Specialty	207XS0106X	Allopathic & Osteopathic Physicians	Orthopaedic Surgery	Hand Surgery	An orthopaedic surgeon trained in the investigation, preservation and restoration by medical, surgical and rehabilitative means of all structures of the upper extremity directly affecting the form and function of the hand and wrist.
Pain-Related Specialty	207XS0114X	Allopathic & Osteopathic Physicians	Orthopaedic Surgery	Adult Reconstructive Orthopaedic Surgery	Recognized by several state medical boards as a fellowship subspecialty program of orthopaedic surgery, adult reconstructive orthopaedic surgeons deal with reconstructive procedures such as joint arthroplasty (i.e., hip and knee), osteotomy, arthroscopy, soft-tissue reconstruction, and a variety of other adult reconstructive surgical procedures.

Code	Taxonomy	Type	Classification	Specialization	Definition
Pain-Related Specialty	207XS0117X	Allopathic & Osteopathic Physicians	Orthopaedic Surgery	Orthopaedic Surgery of the Spine	Recognized by several state medical boards as a fellowship subspecialty program of orthopaedic surgery, orthopaedic surgeons of the spine deal with the evaluation and nonoperative and operative treatment of the full spectrum of primary spinal disorders including trauma, degenerative, deformity, tumor, and reconstructive.
Pain-Related Specialty	207XX0004X	Allopathic & Osteopathic Physicians	Orthopaedic Surgery	Foot and Ankle Surgery	Recognized by several state medical boards as a fellowship subspecialty program of orthopaedic surgery, foot and ankle surgeons deal with adult reconstructive foot and ankle surgery, adult foot and ankle trauma, sports medicine foot and ankle, and children's foot and ankle reconstructive surgery.
Pain-Related Specialty	207XX0005X	Allopathic & Osteopathic Physicians	Orthopaedic Surgery	Sports Medicine	An orthopaedic surgeon trained in sports medicine provides appropriate care for all structures of the musculoskeletal system directly affected by participation in sporting activity. This specialist is proficient in areas including conditioning, training and fitness, athletic performance and the impact of dietary supplements, pharmaceuticals, and nutrition on performance and health, coordination of care within the team setting utilizing other health care professionals, field evaluation and management, soft tissue biomechanics and injury healing and repair. Knowledge and understanding of the principles and techniques of rehabilitation, athletic equipment and orthotic devices enables the specialist to prevent and manage athletic injuries.
Pain-Related Specialty	207XX0801X	Allopathic & Osteopathic Physicians	Orthopaedic Surgery	Orthopaedic Trauma	Recognized by several state medical boards as a fellowship subspecialty program of orthopaedic surgery, orthopaedic trauma surgeons deal with the evaluation and management of acute orthopaedic injuries, evaluation and treatment of post-traumatic deformities and nonunions, acute and delayed reconstruction of pelvic and acetabular fractures, as well as osteotomy in the adult hip for treatment of hip arthritis.

Code	Taxonomy	Type	Classification	Specialization	Definition
Pain-Related Specialty	208100000X	Allopathic & Osteopathic Physicians	Physical Medicine & Rehabilitation		Physical medicine and rehabilitation, also referred to as rehabilitation medicine, is the medical specialty concerned with diagnosing, evaluating, and treating patients with physical disabilities. These disabilities may arise from conditions affecting the musculoskeletal system such as neck and back pain, sports injuries, or other painful conditions affecting the limbs, such as carpal tunnel syndrome. Alternatively, the disabilities may result from neurological trauma or disease such as spinal cord injury, head injury or stroke. A physician certified in physical medicine and rehabilitation is often called a physiatrist. The primary goal of the physiatrist is to achieve maximal restoration of physical, psychological, social and vocational function through comprehensive rehabilitation. Pain management is often an important part of the role of the physiatrist. For diagnosis and evaluation, a physiatrist may include the techniques of electromyography to supplement the standard history, physical, x-ray and laboratory examinations. The physiatrist has expertise in the appropriate use of therapeutic exercise, prosthetics (artificial limbs), orthotics and mechanical and electrical devices.
Pain-Related Specialty	2081H0002X	Allopathic & Osteopathic Physicians	Physical Medicine & Rehabilitation	Hospice and Palliative Medicine	A physical medicine and rehabilitation physician with special knowledge and skills to prevent and relieve the suffering experienced by patients with life-limiting illnesses. This specialist works with an interdisciplinary hospice or palliative care team to maximize quality of life while addressing physical, psychological, social and spiritual needs of both patient and family throughout the course of the disease, through the dying process, and beyond for the family. This specialist has expertise in the assessment of patients with advanced disease; the relief of distressing symptoms; the coordination of interdisciplinary patient and family-centered care in diverse venues; the use of specialized care systems including hospice; the management of the imminently dying patient; and legal and ethical decision making in end-of-life care.
Pain-Related Specialty	2081N0008X	Allopathic & Osteopathic Physicians	Physical Medicine & Rehabilitation	Neuromuscular Medicine	A physician who specializes in neuromuscular medicine possesses specialized knowledge in the science, clinical evaluation and management of these disorders. This encompasses the knowledge of the pathology, diagnosis and treatment of these disorders at a level that is significantly beyond the training and knowledge expected of a general neurologist, child neurologist or physiatrist.
Pain-Related Specialty	2081P0004X	Allopathic & Osteopathic Physicians	Physical Medicine & Rehabilitation	Spinal Cord Injury Medicine	A physician who addresses the prevention, diagnosis, treatment and management of traumatic spinal cord injury and non-traumatic etiologies of spinal cord dysfunction by working in an interdisciplinary manner. Care is provided to patients of all ages on a lifelong basis and covers related medical, physical, psychological and vocational disabilities and complications.

Code	Taxonomy	Type	Classification	Specialization	Definition
Pain-Related Specialty	2081P0010X	Allopathic & Osteopathic Physicians	Physical Medicine & Rehabilitation	Pediatric Rehabilitation Medicine	A physiatrist who utilizes an interdisciplinary approach and addresses the prevention, diagnosis, treatment and management of congenital and childhood-onset physical impairments including related or secondary medical, physical, functional, psychosocial and vocational limitations or conditions, with an understanding of the life course of disability. This physician is trained in the identification of functional capabilities and selection of the best of rehabilitation intervention strategies, with an understanding of the continuum of care.
Pain-Related Specialty	2081S0010X	Allopathic & Osteopathic Physicians	Physical Medicine & Rehabilitation	Sports Medicine	A physician who specializes in Sports Medicine is responsible for continuous care related to the enhancement of health and fitness as well as the prevention of injury and illness. The specialist possesses knowledge and experience in the promotion of wellness and the prevention of injury from many areas of medicine such as exercise physiology, biomechanics, nutrition, psychology, physical rehabilitation, epidemiology, physical evaluation and injuries. It is the goal of a Sports Medicine specialist to improve the healthcare of the individual engaged in physical exercise.
Pain-Related Specialty	2084D0003X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Diagnostic Neuroimaging	A licensed physician, who has completed a residency program in Neurology, and who has additional training, experience, and competence in the standards of performance and interpretation of Magnetic Resonance Imaging (MRI / MRA) of the head, spine, and peripheral nerves, and Computed Tomography (CT) of the head and spine. Physicians are trained in the administration of contrast media and the recognition and treatment of adverse reactions to contrast media. Neuroimaging training encompasses thorough knowledge of clinical neurology, neurophysiology, neuroanatomy, neurochemistry, neuropharmacology, and dynamics of cerebrospinal fluid circulation. Physicians possess special expertise in the technical aspects and clinical applications of each of the modalities and techniques of neuroimaging.
Pain-Related Specialty	2084N0008X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Neuromuscular Medicine	A neurologist or child neurologist who specializes in the diagnosis and management of disorders of nerve, muscle or neuromuscular junction, including amyotrophic lateral sclerosis, peripheral neuropathies (e.g., diabetic and immune mediated neuropathies), various muscular dystrophies, congenital and acquired myopathies, inflammatory myopathies (e.g., polymyositis, inclusion body myositis) and neuromuscular transmission disorders (e.g., myasthenia gravis, Lambert-Eaton myasthenic syndrome).
Pain-Related Specialty	2084N0400X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Neurology	A Neurologist specializes in the diagnosis and treatment of diseases or impaired function of the brain, spinal cord, peripheral nerves, muscles, autonomic nervous system, and blood vessels that relate to these structures.

Code	Taxonomy	Type	Classification	Specialization	Definition
Pain-Related Specialty	2084N0402X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Neurology with Special Qualifications in Child Neurology	A Child Neurologist specializes in neurology with special skills in diagnosis and treatment of neurologic disorders of the neonatal period, infancy, early childhood, and adolescence.
Pain-Related Specialty	2084N0600X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Clinical Neurophysiology	Clinical Neurophysiology is a subspecialty with psychiatric or neurologic expertise in the diagnosis and management of central, peripheral, and autonomic nervous system disorders using combined clinical evaluation and electrophysiologic testing such as electroencephalography (EEG), electromyography (EMG), and nerve conduction studies (NCS).
Pain-Related Specialty	2084P0005X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Neurodevelopmental Disabilities	A pediatrician or neurologist who specializes in the diagnosis and management of chronic conditions that affect the developing and mature nervous system such as cerebral palsy, mental retardation and chronic behavioral syndromes, or neurologic conditions.
Pain-Related Specialty	2084S0010X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Sports Medicine	A psychiatrist or neurologist who specializes in the diagnosis and treatment of sports related conditions and injuries.
Pain-Related Specialty	2084V0102X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Vascular Neurology	Vascular Neurology is a subspecialty in the evaluation, prevention, treatment and recovery from vascular diseases of the nervous system. This subspecialty includes the diagnosis and treatment of vascular events of arterial or venous origin from a large number of causes that affect the brain or spinal cord such as ischemic stroke, intracranial hemorrhage, spinal cord ischemia and spinal cord hemorrhage.
Pain-Related Specialty	2085B0100X	Allopathic & Osteopathic Physicians	Radiology	Body Imaging	A Radiology doctor of Osteopathy that specializes in Body Imaging.
Pain-Related Specialty	2085D0003X	Allopathic & Osteopathic Physicians	Radiology	Diagnostic Neuroimaging	A licensed physician, who has completed a residency program in Neurology, and who has additional training, experience, and competence in the standards of performance and interpretation of Magnetic Resonance Imaging (MRI / MRA) of the head, spine, and peripheral nerves, and Computed Tomography (CT) of the head and spine. Physicians are trained in the administration of contrast media and the recognition and treatment of adverse reactions to contrast media. Neuroimaging training encompasses thorough knowledge of clinical neurology, neurophysiology, neuroanatomy, neurochemistry, neuropharmacology, and dynamics of cerebrospinal fluid circulation. Physicians possess special expertise in the technical aspects and clinical applications of each of the modalities and techniques of neuroimaging.

Code	Taxonomy	Type	Classification	Specialization	Definition
Pain-Related Specialty	2085H0002X	Allopathic & Osteopathic Physicians	Radiology	Hospice and Palliative Medicine	A radiologist with special knowledge and skills to prevent and relieve the suffering experienced by patients with life-limiting illnesses. This specialist works with an interdisciplinary hospice or palliative care team to maximize quality of life while addressing physical, psychological, social and spiritual needs of both patient and family throughout the course of the disease, through the dying process, and beyond for the family. This specialist has expertise in the assessment of patients with advanced disease; the relief of distressing symptoms; the coordination of interdisciplinary patient and family-centered care in diverse venues; the use of specialized care systems including hospice; the management of the imminently dying patient; and legal and ethical decision making in end-of-life care.
Pain-Related Specialty	2085N0700X	Allopathic & Osteopathic Physicians	Radiology	Neuroradiology	A radiologist who diagnoses and treats diseases utilizing imaging procedures as they relate to the brain, spine and spinal cord, head, neck and organs of special sense in adults and children.
Pain-Related Specialty	2085N0904X	Allopathic & Osteopathic Physicians	Radiology	Nuclear Radiology	A radiologist who is involved in the analysis and imaging of radionuclides and radiolabeled substances in vitro and in vivo for diagnosis and the administration of radionuclides and radiolabeled substances for the treatment of disease.
Pain-Related Specialty	2085P0229X	Allopathic & Osteopathic Physicians	Radiology	Pediatric Radiology	A radiologist who is proficient in all forms of diagnostic imaging as it pertains to the treatment of diseases in the newborn, infant, child and adolescent. This specialist has knowledge of both imaging and interventional procedures related to the care and management of diseases of children. A pediatric radiologist must be highly knowledgeable of all organ systems as they relate to growth and development, congenital malformations, diseases peculiar to infants and children and diseases that begin in childhood but cause substantial residual impairment in adulthood.
Pain-Related Specialty	2085R0001X	Allopathic & Osteopathic Physicians	Radiology	Radiation Oncology	A radiologist who deals with the therapeutic applications of radiant energy and its modifiers and the study and management of disease, especially malignant tumors.
Pain-Related Specialty	2085R0202X	Allopathic & Osteopathic Physicians	Radiology	Diagnostic Radiology	A radiologist who utilizes x-ray, radionuclides, ultrasound and electromagnetic radiation to diagnose and treat disease.
Pain-Related Specialty	2085R0204X	Allopathic & Osteopathic Physicians	Radiology	Vascular & Interventional Radiology	A radiologist who diagnoses and treats diseases by various radiologic imaging modalities. These include fluoroscopy, digital radiography, computed tomography, sonography and magnetic resonance imaging.
Pain-Related Specialty	2085R0205X	Allopathic & Osteopathic Physicians	Radiology	Radiological Physics	A radiological physicist deals with the diagnostic and therapeutic applications of roentgen rays, gamma rays from sealed sources, ultrasonic radiation and radio-frequency radiation, as well as the equipment associated with their production and use, including radiation safety.

Code	Taxonomy	Type	Classification	Specialization	Definition
Pain-Related Specialty	2085U0001X	Allopathic & Osteopathic Physicians	Radiology	Diagnostic Ultrasound	A Radiology doctor of Osteopathy that specializes in Diagnostic Ultrasound.
Primary Care	207Q00000X	Allopathic & Osteopathic Physicians	Family Medicine		Family Medicine is the medical specialty which is concerned with the total health care of the individual and the family. It is the specialty in breadth which integrates the biological, clinical, and behavioral sciences. The scope of family medicine is not limited by age, sex, organ system, or disease entity.
Primary Care	207QA0000X	Allopathic & Osteopathic Physicians	Family Medicine	Adolescent Medicine	A family medicine physician with multidisciplinary training in the unique physical, psychological and social characteristics of adolescents and their health care problems and needs.
Primary Care	207QA0401X	Allopathic & Osteopathic Physicians	Family Medicine	Addiction Medicine	A family medicine physician who specializes in the diagnosis and treatment of addictions.
Primary Care	207QB0002X	Allopathic & Osteopathic Physicians	Family Medicine	Bariatric Medicine	Bariatric medicine is the medical treatment of obesity and its associated conditions. Bariatric medicine addresses the obese individual with a comprehensive program of diet, exercise and behavior modification, and when indicated, the prescription of appropriate medications as determined by the Bariatric physician. Bariatric physicians are licensed physicians who offer specialized programs in the medical treatment of obesity and its associated conditions.
Primary Care	207QG0300X	Allopathic & Osteopathic Physicians	Family Medicine	Geriatric Medicine	A family medicine physician with special knowledge of the aging process and special skills in the diagnostic, therapeutic, preventive and rehabilitative aspects of illness in the elderly. This specialist cares for geriatric patients in the patient's home, the office, long-term care settings such as nursing homes, and the hospital.
Primary Care	207QH0002X	Allopathic & Osteopathic Physicians	Family Medicine	Hospice and Palliative Medicine	A family medicine physician with special knowledge and skills to prevent and relieve the suffering experienced by patients with life-limiting illnesses. This specialist works with an interdisciplinary hospice or palliative care team to maximize quality of life while addressing physical, psychological, social and spiritual needs of both patient and family throughout the course of the disease, through the dying process, and beyond for the family. This specialist has expertise in the assessment of patients with advanced disease; the relief of distressing symptoms; the coordination of interdisciplinary patient and family-centered care in diverse venues; the use of specialized care systems including hospice; the management of the imminently dying patient; and legal and ethical decision making in end-of-life care.

Code	Taxonomy	Type	Classification	Specialization	Definition
Primary Care	207QS0010X	Allopathic & Osteopathic Physicians	Family Medicine	Sports Medicine	A family medicine physician that is trained to be responsible for continuous care in the field of sports medicine, not only for the enhancement of health and fitness, but also for the prevention of injury and illness. A sports medicine physician must have knowledge and experience in the promotion of wellness and the prevention of injury. Knowledge about special areas of medicine such as exercise physiology, biomechanics, nutrition, psychology, physical rehabilitation, epidemiology, physical evaluation, injuries (treatment and prevention and referral practice) and the role of exercise in promoting a healthy lifestyle are essential to the practice of sports medicine. The sports medicine physician requires special education to provide the knowledge to improve the health care of the individual engaged in physical exercise (sports) whether as an individual or in team participation.
Primary Care	207QS1201X	Allopathic & Osteopathic Physicians	Family Medicine	Sleep Medicine	A Family Medicine Physician who practices Sleep Medicine is certified in the subspecialty of sleep medicine and specializes in the clinical assessment, physiologic testing, diagnosis, management and prevention of sleep and circadian rhythm disorders. Sleep specialists treat patients of any age and use multidisciplinary approaches. Disorders managed by sleep specialists include, but are not limited to, sleep related breathing disorders, insomnia, hypersomnias, circadian rhythm sleep disorders, parasomnias and sleep related movement disorders.
Primary Care	208D00000X	Allopathic & Osteopathic Physicians	General Practice		
Primary Care	207R00000X	Allopathic & Osteopathic Physicians	Internal Medicine		A physician who provides long-term, comprehensive care in the office and the hospital, managing both common and complex illness of adolescents, adults and the elderly. Internists are trained in the diagnosis and treatment of cancer, infections and diseases affecting the heart, blood, kidneys, joints and digestive, respiratory and vascular systems. They are also trained in the essentials of primary care internal medicine, which incorporates an understanding of disease prevention, wellness, substance abuse, mental health and effective treatment of common problems of the eyes, ears, skin, nervous system and reproductive organs.
Primary Care	207RA0000X	Allopathic & Osteopathic Physicians	Internal Medicine	Adolescent Medicine	An internist who specializes in adolescent medicine is a multi-disciplinary healthcare specialist trained in the unique physical, psychological and social characteristics of adolescents, their healthcare problems and needs.
Primary Care	207RA0201X	Allopathic & Osteopathic Physicians	Internal Medicine	Allergy & Immunology	An internist doctor of osteopathy that specializes in the treatment of allergy and immunologic disorders. A doctor of osteopathy that is board eligible/certified by the American Osteopathic Board of Internal Medicine can obtain a Certificate of Special Qualifications in the field of

Code	Taxonomy	Type	Classification	Specialization	Definition
					Allergy & Immunology.
Primary Care	207RA0401X	Allopathic & Osteopathic Physicians	Internal Medicine	Addiction Medicine	An internist doctor of osteopathy that specializes in the treatment of addiction disorders. A doctor of osteopathy that is board eligible/certified by the American Osteopathic Board of Internal Medicine can obtain a Certificate of Added Qualifications in the field of Addiction Medicine.
Primary Care	207RB0002X	Allopathic & Osteopathic Physicians	Internal Medicine	Bariatric Medicine	Bariatric medicine is the medical treatment of obesity and its associated conditions. Bariatric medicine addresses the obese individual with a comprehensive program of diet, exercise and behavior modification, and when indicated, the prescription of appropriate medications as determined by the Bariatric physician. Bariatric physicians are licensed physicians who offer specialized programs in the medical treatment of obesity and its associated conditions.
Primary Care	207RC0000X	Allopathic & Osteopathic Physicians	Internal Medicine	Cardiovascular Disease	An internist who specializes in diseases of the heart and blood vessels and manages complex cardiac conditions such as heart attacks and life-threatening, abnormal heartbeat rhythms.
Primary Care	207RC0001X	Allopathic & Osteopathic Physicians	Internal Medicine	Clinical Cardiac Electrophysiology	A field of special interest within the subspecialty of cardiovascular disease, specialty of Internal Medicine, which involves intricate technical procedures to evaluate heart rhythms and determine appropriate treatment for them.
Primary Care	207RC0200X	Allopathic & Osteopathic Physicians	Internal Medicine	Critical Care Medicine	An internist who diagnoses, treats and supports patients with multiple organ dysfunction. This specialist may have administrative responsibilities for intensive care units and may also facilitate and coordinate patient care among the primary physician, the critical care staff and other specialists.
Primary Care	207RE0101X	Allopathic & Osteopathic Physicians	Internal Medicine	Endocrinology, Diabetes & Metabolism	An internist who concentrates on disorders of the internal (endocrine) glands such as the thyroid and adrenal glands. This specialist also deals with disorders such as diabetes, metabolic and nutritional disorders, obesity, pituitary diseases and menstrual and sexual problems.
Primary Care	207RG0100X	Allopathic & Osteopathic Physicians	Internal Medicine	Gastroenterology	An internist who specializes in diagnosis and treatment of diseases of the digestive organs including the stomach, bowels, liver and gallbladder. This specialist treats conditions such as abdominal pain, ulcers, diarrhea, cancer and jaundice and performs complex diagnostic and therapeutic procedures using endoscopes to visualize internal organs.
Primary Care	207RG0300X	Allopathic & Osteopathic Physicians	Internal Medicine	Geriatric Medicine	An internist who has special knowledge of the aging process and special skills in the diagnostic, therapeutic, preventive and rehabilitative aspects of illness in the elderly. This specialist cares for geriatric patients in the patient's home, the office, long-term care settings such as nursing homes and the hospital.

Code	Taxonomy	Type	Classification	Specialization	Definition
Primary Care	207RH0000X	Allopathic & Osteopathic Physicians	Internal Medicine	Hematology	An internist with additional training who specializes in diseases of the blood, spleen and lymph. This specialist treats conditions such as anemia, clotting disorders, sickle cell disease, hemophilia, leukemia and lymphoma.
Primary Care	207RH0002X	Allopathic & Osteopathic Physicians	Internal Medicine	Hospice and Palliative Medicine	An internal medicine physician with special knowledge and skills to prevent and relieve the suffering experienced by patients with life-limiting illnesses. This specialist works with an interdisciplinary hospice or palliative care team to maximize quality of life while addressing physical, psychological, social and spiritual needs of both patient and family throughout the course of the disease, through the dying process, and beyond for the family. This specialist has expertise in the assessment of patients with advanced disease; the relief of distressing symptoms; the coordination of interdisciplinary patient and family-centered care in diverse venues; the use of specialized care systems including hospice; the management of the imminently dying patient; and legal and ethical decision making in end-of-life care.
Primary Care	207RH0003X	Allopathic & Osteopathic Physicians	Internal Medicine	Hematology & Oncology	An internist doctor of osteopathy that specializes in the treatment of the combination of hematology and oncology disorders. A doctor of osteopathy that is board eligible/certified by the American Osteopathic Board of Internal Medicine WAS able to obtain a Certificate of Special Qualifications in the field of Hematology and Oncology. The Certificate is NO longer offered.
Primary Care	207RH0005X	Allopathic & Osteopathic Physicians	Internal Medicine	Hypertension Specialist	A Hypertension Specialist is a physician who concentrates on all aspects of the diagnosis and treatment of hypertension.
Primary Care	207RI0001X	Allopathic & Osteopathic Physicians	Internal Medicine	Clinical & Laboratory Immunology	An internal medicine physician who specializes in clinical and laboratory immunology disease management.
Primary Care	207RI0008X	Allopathic & Osteopathic Physicians	Internal Medicine	Hepatology	The discipline of Hepatology encompasses the structure, function, and diseases of the liver and biliary tract. The American Board of Internal Medicine considers Hepatology part of the subspecialty of gastroenterology. Physicians who identify themselves as Hepatologists usually, but not always, have been trained in gastrointestinal programs.
Primary Care	207RI0011X	Allopathic & Osteopathic Physicians	Internal Medicine	Interventional Cardiology	An area of medicine within the subspecialty of cardiology, which uses specialized imaging and other diagnostic techniques to evaluate blood flow and pressure in the coronary arteries and chambers of the heart and uses technical procedures and medications to treat abnormalities that impair the function of the cardiovascular system.

Code	Taxonomy	Type	Classification	Specialization	Definition
Primary Care	207RI0200X	Allopathic & Osteopathic Physicians	Internal Medicine	Infectious Disease	An internist who deals with infectious diseases of all types and in all organ systems. Conditions requiring selective use of antibiotics call for this special skill. This physician often diagnoses and treats AIDS patients and patients with fevers which have not been explained. Infectious disease specialists may also have expertise in preventive medicine and travel medicine.
Primary Care	207RN0300X	Allopathic & Osteopathic Physicians	Internal Medicine	Nephrology	An internist who treats disorders of the kidney, high blood pressure, fluid and mineral balance and dialysis of body wastes when the kidneys do not function. This specialist consults with surgeons about kidney transplantation.
Primary Care	207RP1001X	Allopathic & Osteopathic Physicians	Internal Medicine	Pulmonary Disease	An internist who treats diseases of the lungs and airways. The pulmonologist diagnoses and treats cancer, pneumonia, pleurisy, asthma, occupational and environmental diseases, bronchitis, sleep disorders, emphysema and other complex disorders of the lungs.
Primary Care	207RR0500X	Allopathic & Osteopathic Physicians	Internal Medicine	Rheumatology	An internist who treats diseases of joints, muscle, bones and tendons. This specialist diagnoses and treats arthritis, back pain, muscle strains, common athletic injuries and "collagen" diseases.
Primary Care	207RS0010X	Allopathic & Osteopathic Physicians	Internal Medicine	Sports Medicine	An internist trained to be responsible for continuous care in the field of sports medicine, not only for the enhancement of health and fitness, but also for the prevention of injury and illness. A sports medicine physician must have knowledge and experience in the promotion of wellness and the prevention of injury. Knowledge about special areas of medicine such as exercise physiology, biomechanics, nutrition, psychology, physical rehabilitation, epidemiology, physical evaluation, injuries (treatment and prevention and referral practice) and the role of exercise in promoting a healthy lifestyle are essential to the practice of sports medicine. The sports medicine physician requires special education to provide the knowledge to improve the healthcare of the individual.
Primary Care	207RS0012X	Allopathic & Osteopathic Physicians	Internal Medicine	Sleep Medicine	An Internist who practices Sleep Medicine is certified in the subspecialty of sleep medicine and specializes in the clinical assessment, physiologic testing, diagnosis, management and prevention of sleep and circadian rhythm disorders. Sleep specialists treat patients of any age and use multidisciplinary approaches. Disorders managed by sleep specialists include, but are not limited to, sleep related breathing disorders, insomnia, hypersomnias, circadian rhythm sleep disorders, parasomnias and sleep related movement disorders.
Primary Care	207RT0003X	Allopathic & Osteopathic Physicians	Internal Medicine	Transplant Hepatology	An internist with special knowledge and the skill required of a gastroenterologist to care for patients prior to and following hepatic transplantation that spans all phases of liver transplantation. Selection of appropriate recipients requires assessment by a team having experience in evaluating the severity and prognosis of patients with liver disease.

Code	Taxonomy	Type	Classification	Specialization	Definition
Primary Care	207RX0202X	Allopathic & Osteopathic Physicians	Internal Medicine	Medical Oncology	An internist who specializes in the diagnosis and treatment of all types of cancer and other benign and malignant tumors. This specialist decides on and administers therapy for these malignancies as well as consults with surgeons and radiotherapists on other treatments for cancer.
Other Specialty	207K00000X	Allopathic & Osteopathic Physicians	Allergy & Immunology		An allergist-immunologist is trained in evaluation, physical and laboratory diagnosis, and management of disorders involving the immune system. Selected examples of such conditions include asthma, anaphylaxis, rhinitis, eczema, and adverse reactions to drugs, foods, and insect stings as well as immune deficiency diseases (both acquired and congenital), defects in host defense, and problems related to autoimmune disease, organ transplantation, or malignancies of the immune system.
Other Specialty	207KA0200X	Allopathic & Osteopathic Physicians	Allergy & Immunology	Allergy	An allergist-immunologist is trained in evaluation, physical and laboratory diagnosis, and management of disorders involving the immune system. Selected examples of such conditions include asthma, anaphylaxis, rhinitis, eczema, and adverse reactions to drugs, foods, and insect stings as well as immune deficiency diseases (both acquired and congenital), defects in host defense, and problems related to autoimmune disease, organ transplantation, or malignancies of the immune system.
Other Specialty	208U00000X	Allopathic & Osteopathic Physicians	Clinical Pharmacology		Clinical pharmacology encompasses the spectrum of activities related to the discovery, development, regulation, and utilization of safe and effective drugs.
Other Specialty	208C00000X	Allopathic & Osteopathic Physicians	Colon & Rectal Surgery		A colon and rectal surgeon is trained to diagnose and treat various diseases of the intestinal tract, colon, rectum, anal canal and perianal area by medical and surgical means. This specialist also deals with other organs and tissues (such as the liver, urinary and female reproductive system) involved with primary intestinal disease.
Other Specialty	207N00000X	Allopathic & Osteopathic Physicians	Dermatology		A dermatologist is trained to diagnose and treat pediatric and adult patients with benign and malignant disorders of the skin, mouth, external genitalia, hair and nails, as well as a number of sexually transmitted diseases. The dermatologist has had additional training and experience in the diagnosis and treatment of skin cancers, melanomas, moles and other tumors of the skin, the management of contact dermatitis and other allergic and nonallergic skin disorders, and in the recognition of the skin manifestations of systemic (including internal malignancy) and infectious diseases. Dermatologists have special training in dermatopathology and in the surgical techniques used in dermatology. They also have expertise in the management of cosmetic disorders of the skin such as hair loss and scars and the skin changes associated with aging.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	207ND0101X	Allopathic & Osteopathic Physicians	Dermatology	MOHS-Micrographic Surgery	The highly-trained surgeons that perform Mohs Micrographic Surgery are specialists both in dermatology and pathology. With their extensive knowledge of the skin and unique pathological skills, they are able to remove only diseased tissue, preserving healthy tissue and minimizing the cosmetic impact of the surgery. Mohs surgeons who belong to the American College of Mohs Surgery (ACMS) have completed a minimum of one year of fellowship training at one of the ACMS-approved training centers in the U.S.
Other Specialty	207ND0900X	Allopathic & Osteopathic Physicians	Dermatology	Dermatopathology	A dermatopathologist has the expertise to diagnose and monitor diseases of the skin including infectious, immunologic, degenerative and neoplastic diseases. This entails the examination and interpretation of specially prepared tissue sections, cellular scrapings and smears of skin lesions by means of routine and special (electron and fluorescent) microscopes.
Other Specialty	207NI0002X	Allopathic & Osteopathic Physicians	Dermatology	Clinical & Laboratory Dermatological Immunology	A dermatologist who utilizes various specialized laboratory procedures to diagnose disorders characterized by defective responses of the body's immune system. Immunodermatologists also may provide consultation in the management of these disorders and administer specialized forms of therapy for these diseases.
Other Specialty	207NP0225X	Allopathic & Osteopathic Physicians	Dermatology	Pediatric Dermatology	A pediatric dermatologist has, through additional special training, developed expertise in the treatment of specific skin disease categories with emphasis on those diseases which predominate in infants, children and adolescents.
Other Specialty	207NS0135X	Allopathic & Osteopathic Physicians	Dermatology	Procedural Dermatology	Procedural Dermatology, a subspecialty of Dermatology, encompassing a wide variety of surgical procedures and methods to remove or modify skin tissue for health or cosmetic benefit. These methods include scalpel surgery, laser surgery, chemical surgery, cryosurgery (liquid nitrogen), electrosurgery, aspiration surgery, liposuction, injection of filler substances, and Mohs micrographic controlled surgery (a special technique for the removal of growths, especially skin cancers).
Other Specialty	204R00000X	Allopathic & Osteopathic Physicians	Electrodiagnostic Medicine		Electrodiagnostic medicine is the medical subspecialty that applies neurophysiologic techniques to diagnose, evaluate, and treat patients with impairments of the neurologic, neuromuscular, and/or muscular systems. Qualified physicians are trained in performing electrophysiological testing and interpretation of the test data. They require knowledge in anatomy, physiology, kinesiology, histology, and pathology of the brain, spinal cord, autonomic nerves, cranial nerves, peripheral nerves, neuromuscular junction, and muscles. They must know clinical features and treatment of diseases of the central, peripheral, and autonomic nervous systems, as well as those of neuromuscular junction and muscle. Physicians also require special knowledge about electric signal processing, including waveform analysis, electronics and instrumentation, stimulation and recording equipment, and statistics.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	207P00000X	Allopathic & Osteopathic Physicians	Emergency Medicine		An emergency physician focuses on the immediate decision making and action necessary to prevent death or any further disability both in the pre-hospital setting by directing emergency medical technicians and in the emergency department. The emergency physician provides immediate recognition, evaluation, care, stabilization and disposition of a generally diversified population of adult and pediatric patients in response to acute illness and injury.
Other Specialty	207PE0004X	Allopathic & Osteopathic Physicians	Emergency Medicine	Emergency Medical Services	An emergency medicine physician who specializes in non-hospital based emergency medical services (e.g., disaster site, accident scene, transport vehicle, etc.) to provide pre-hospital assessment, treatment, and transport patients.
Other Specialty	207PE0005X	Allopathic & Osteopathic Physicians	Emergency Medicine	Undersea and Hyperbaric Medicine	A specialist who treats decompression illness and diving accident cases and uses hyperbaric oxygen therapy to treat such conditions as carbon monoxide poisoning, gas gangrene, non-healing wounds, tissue damage from radiation and burns, and bone infections. This specialist also serves as a consultant to other physicians in all aspects of hyperbaric chamber operations, and assesses risks and applies appropriate standards to prevent disease and disability in divers and other persons working in altered atmospheric conditions.
Other Specialty	207PH0002X	Allopathic & Osteopathic Physicians	Emergency Medicine	Hospice and Palliative Medicine	An emergency medicine physician with special knowledge and skills to prevent and relieve the suffering experienced by patients with life-limiting illnesses. This specialist works with an interdisciplinary hospice or palliative care team to maximize quality of life while addressing physical, psychological, social and spiritual needs of both patient and family throughout the course of the disease, through the dying process, and beyond for the family. This specialist has expertise in the assessment of patients with advanced disease; the relief of distressing symptoms; the coordination of interdisciplinary patient and family-centered care in diverse venues; the use of specialized care systems including hospice; the management of the imminently dying patient; and legal and ethical decision making in end-of-life care.
Other Specialty	207PP0204X	Allopathic & Osteopathic Physicians	Emergency Medicine	Pediatric Emergency Medicine	Pediatric Emergency Medicine is a clinical subspecialty that focuses on the care of the acutely ill or injured child in the setting of an emergency department.
Other Specialty	207PS0010X	Allopathic & Osteopathic Physicians	Emergency Medicine	Sports Medicine	An emergency physician with special knowledge in sports medicine is responsible for continuous care in the field of sports medicine, not only for the enhancement of health and fitness, but also for the prevention and management of injury and illness. A sports medicine physician has knowledge and experience in the promotion of wellness and the role of exercise in promoting a healthy lifestyle. Knowledge of exercise physiology, biomechanics, nutrition, psychology, physical rehabilitation and epidemiology is essential to the practice of sports medicine.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	207PT0002X	Allopathic & Osteopathic Physicians	Emergency Medicine	Medical Toxicology	Medical toxicologists are physicians who specialize in the prevention, evaluation, treatment and monitoring of injury and illness from exposures to drugs and chemicals, as well as biological and radiological agents. Medical toxicologists care for people in clinical, academic, governmental and public health settings, and provide poison control center leadership. Important areas of medical toxicology include acute drug poisoning, adverse drug events, drug abuse, addiction and withdrawal, chemicals and hazardous materials, terrorism preparedness, venomous bites and stings and environmental and workplace exposures.
Other Specialty	208M00000X	Allopathic & Osteopathic Physicians	Hospitalist		Hospitalists are physicians whose primary professional focus is the general medical care of hospitalized patients. Their activities include patient care, teaching, research, and leadership related to Hospital Medicine. The term 'hospitalist' refers to physicians whose practice emphasizes providing care for hospitalized patients.
Other Specialty	202C00000X	Allopathic & Osteopathic Physicians	Independent Medical Examiner		A special evaluator not involved with the medical care of the individual examinee that impartially evaluates the care being provided by other practitioners to clarify clinical, disability, liability or other case issues.
Other Specialty	209800000X	Allopathic & Osteopathic Physicians	Legal Medicine		Legal Medicine is a special field of medicine that focuses on various aspects of medicine and law. Historically, the practice of legal medicine made contributions to medicine as a scientific instrument to solve criminal perplexities. Since World War II, the domain of legal medicine has broadened to include not only aspects of medical science to solve legal and criminal problems but aspects of law as it applies to medicine. Legal Medicine continues to grow as medicolegal issues like medical malpractice and liability, government regulation of health care, issues of tort reform, and moral and ethical complexities presented by technological advances become increasingly prominent. Many medical schools have implemented courses which supply medicolegal instruction for medical students, and many law schools now offer medicolegal courses. Also, dual degree programs in law and medicine have been created to assist physicians to bridge the gap between medicine and the law.
Other Specialty	207SC0300X	Allopathic & Osteopathic Physicians	Medical Genetics	Clinical Cytogenetic	A clinical cytogeneticist demonstrates competence in providing laboratory diagnostic and clinical interpretive services dealing with cellular components, particularly chromosomes, associated with heredity.
Other Specialty	207SG0201X	Allopathic & Osteopathic Physicians	Medical Genetics	Clinical Genetics (M.D.)	A clinical geneticist demonstrates competence in providing comprehensive diagnostic, management and counseling services for genetic disorders.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	207SG0202X	Allopathic & Osteopathic Physicians	Medical Genetics	Clinical Biochemical Genetics	A clinical biochemical geneticist demonstrates competence in performing and interpreting biochemical analyses relevant to the diagnosis and management of human genetic diseases and is a consultant regarding laboratory diagnosis of a broad range of inherited disorders.
Other Specialty	207SG0203X	Allopathic & Osteopathic Physicians	Medical Genetics	Clinical Molecular Genetics	A clinical molecular geneticist demonstrates competence in performing and interpreting molecular analyses relevant to the diagnosis and management of human genetic diseases and is a consultant regarding laboratory diagnosis of a broad range of inherited disorders.
Other Specialty	207SG0205X	Allopathic & Osteopathic Physicians	Medical Genetics	Ph.D. Medical Genetics	A medical geneticist works in association with a medical specialist, is affiliated with a clinical genetics program and serves as a consultant to medical and dental specialists.
Other Specialty	207SM0001X	Allopathic & Osteopathic Physicians	Medical Genetics	Molecular Genetic Pathology	A board certified subspecialty, the molecular genetic pathologist is expert in the principles, theory and technologies of molecular biology and molecular genetics. This expertise is used to make or confirm diagnoses of Mendelian genetic disorders, of human development, infectious diseases and malignancies and to assess the natural history of those disorders. A molecular genetic pathologist provides information about gene structure, function and alteration, and applies laboratory techniques for diagnosis, treatment and prognosis for individuals with related disorders.
Other Specialty	207U00000X	Allopathic & Osteopathic Physicians	Nuclear Medicine		A nuclear medicine specialist employs the properties of radioactive atoms and molecules in the diagnosis and treatment of disease and in research. Radiation detection and imaging instrument systems are used to detect disease as it changes the function and metabolism of normal cells, tissues and organs. A wide variety of diseases can be found in this way, usually before the structure of the organ involved by the disease can be seen to be abnormal by any other techniques. Early detection of coronary artery disease (including acute heart attack), early cancer detection and evaluation of the effect of tumor treatment, diagnosis of infection and inflammation anywhere in the body and early detection of blood clot in the lungs are all possible with these techniques. Unique forms of radioactive molecules can attack and kill cancer cells (e.g., lymphoma, thyroid cancer) or can relieve the severe pain of cancer that has spread to bone
Other Specialty	207UN0901X	Allopathic & Osteopathic Physicians	Nuclear Medicine	Nuclear Cardiology	A nuclear medicine physician who specializes in nuclear cardiology.
Other Specialty	207UN0902X	Allopathic & Osteopathic Physicians	Nuclear Medicine	Nuclear Imaging & Therapy	A nuclear medicine physician who specializes in nuclear imaging and therapy.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	207UN0903X	Allopathic & Osteopathic Physicians	Nuclear Medicine	In Vivo & In Vitro Nuclear Medicine	A nuclear medicine physician who specializes in in vivo and in vitro nuclear medicine.
Other Specialty	207V00000X	Allopathic & Osteopathic Physicians	Obstetrics & Gynecology		An obstetrician/gynecologist possesses special knowledge, skills and professional capability in the medical and surgical care of the female reproductive system and associated disorders. This physician serves as a consultant to other physicians and as a primary physician for women.
Other Specialty	207VB0002X	Allopathic & Osteopathic Physicians	Obstetrics & Gynecology	Bariatric Medicine	Bariatric medicine is the medical treatment of obesity and its associated conditions. Bariatric medicine addresses the obese individual with a comprehensive program of diet, exercise and behavior modification, and when indicated, the prescription of appropriate medications as determined by the Bariatric physician. Bariatric physicians are licensed physicians who offer specialized programs in the medical treatment of obesity and its associated conditions.
Other Specialty	207VC0200X	Allopathic & Osteopathic Physicians	Obstetrics & Gynecology	Critical Care Medicine	An obstetrician/gynecologist, who specializes in critical care medicine diagnoses, treats and supports female patients with multiple organ dysfunction. This specialist may have administrative responsibilities for intensive care units and may also facilitate and coordinate patient care among the primary physician, the critical care staff and other specialists.
Other Specialty	207VE0102X	Allopathic & Osteopathic Physicians	Obstetrics & Gynecology	Reproductive Endocrinology	An obstetrician/gynecologist who is capable of managing complex problems relating to reproductive endocrinology and infertility.
Other Specialty	207VF0040X	Allopathic & Osteopathic Physicians	Obstetrics & Gynecology	Female Pelvic Medicine and Reconstructive Surgery	A subspecialist in Female Pelvic Medicine and Reconstructive Surgery is a physician in Urology or Obstetrics and Gynecology who, by virtue of education and training, is prepared to provide consultation and comprehensive management of women with complex benign pelvic conditions, lower urinary tract disorders, and pelvic floor dysfunction. Comprehensive management includes those diagnostic and therapeutic procedures necessary for the total care of the patient with these conditions and complications resulting from them.
Other Specialty	207VG0400X	Allopathic & Osteopathic Physicians	Obstetrics & Gynecology	Gynecology	An obstetrician/gynecologist possesses special knowledge, skills and professional capability in the medical and surgical care of the female reproductive system and associated disorders. This physician serves as a consultant to other physicians and as a primary physician for women.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	207VH0002X	Allopathic & Osteopathic Physicians	Obstetrics & Gynecology	Hospice and Palliative Medicine	An obstetrician/gynecologist with special knowledge and skills to prevent and relieve the suffering experienced by patients with life-limiting illnesses. This specialist works with an interdisciplinary hospice or palliative care team to maximize quality of life while addressing physical, psychological, social and spiritual needs of both patient and family throughout the course of the disease, through the dying process, and beyond for the family. This specialist has expertise in the assessment of patients with advanced disease; the relief of distressing symptoms; the coordination of interdisciplinary patient and family-centered care in diverse venues; the use of specialized care systems including hospice; the management of the imminently dying patient; and legal and ethical decision making in end-of-life care.
Other Specialty	207VM0101X	Allopathic & Osteopathic Physicians	Obstetrics & Gynecology	Maternal & Fetal Medicine	An obstetrician/gynecologist who cares for, or provides consultation on, patients with complications of pregnancy. This specialist has advanced knowledge of the obstetrical, medical and surgical complications of pregnancy and their effect on both the mother and the fetus. The specialist also possesses expertise in the most current diagnostic and treatment modalities used in the care of patients with complicated pregnancies.
Other Specialty	207VX0000X	Allopathic & Osteopathic Physicians	Obstetrics & Gynecology	Obstetrics	An obstetrician/gynecologist possesses special knowledge, skills and professional capability in the medical and surgical care of the female reproductive system and associated disorders. This physician serves as a consultant to other physicians and as a primary physician for women.
Other Specialty	207VX0201X	Allopathic & Osteopathic Physicians	Obstetrics & Gynecology	Gynecologic Oncology	An obstetrician/gynecologist who provides consultation and comprehensive management of patients with gynecologic cancer, including those diagnostic and therapeutic procedures necessary for the total care of the patient with gynecologic cancer and resulting complications.
Other Specialty	207W00000X	Allopathic & Osteopathic Physicians	Ophthalmology		An ophthalmologist has the knowledge and professional skills needed to provide comprehensive eye and vision care. Ophthalmologists are medically trained to diagnose, monitor and medically or surgically treat all ocular and visual disorders. This includes problems affecting the eye and its component structures, the eyelids, the orbit and the visual pathways. In so doing, an ophthalmologist prescribes vision services, including glasses and contact lenses.
Other Specialty	204E00000X	Allopathic & Osteopathic Physicians	Oral & Maxillofacial Surgery		Oral and maxillofacial surgeons are trained to recognize and treat a wide spectrum of diseases, injuries and defects in the head, neck, face, jaws and the hard and soft tissues of the oral and maxillofacial region. They are also trained to administer anesthesia, and provide care in an office setting. They are trained to treat problems such as the extraction of wisdom teeth, misaligned jaws, tumors and cysts of the jaw and mouth, and to perform dental implant surgery.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	207Y00000X	Allopathic & Osteopathic Physicians	Otolaryngology		An otolaryngologist-head and neck surgeon provides comprehensive medical and surgical care for patients with diseases and disorders that affect the ears, nose, throat, the respiratory and upper alimentary systems and related structures of the head and neck. An otolaryngologist diagnoses and provides medical and/or surgical therapy or prevention of diseases, allergies, neoplasms, deformities, disorders and/or injuries of the ears, nose, sinuses, throat, respiratory and upper alimentary systems, face, jaws and the other head and neck systems. Head and neck oncology, facial plastic and reconstructive surgery and the treatment of disorders of hearing and voice are fundamental areas of expertise.
Other Specialty	207YP0228X	Allopathic & Osteopathic Physicians	Otolaryngology	Pediatric Otolaryngology	A pediatric otolaryngologist has special expertise in the management of infants and children with disorders that include congenital and acquired conditions involving the aerodigestive tract, nose and paranasal sinuses, the ear and other areas of the head and neck. The pediatric otolaryngologist has special skills in the diagnosis, treatment, and management of childhood disorders of voice, speech, language and hearing.
Other Specialty	207YS0012X	Allopathic & Osteopathic Physicians	Otolaryngology	Sleep Medicine	An Otolaryngologist who practices Sleep Medicine is certified in the subspecialty of sleep medicine and specializes in the clinical assessment, physiologic testing, diagnosis, management and prevention of sleep and circadian rhythm disorders. Sleep specialists treat patients of any age and use multidisciplinary approaches. Disorders managed by sleep specialists include, but are not limited to, sleep related breathing disorders, insomnia, hypersomnias, circadian rhythm sleep disorders, parasomnias and sleep related movement disorders.
Other Specialty	207YS0123X	Allopathic & Osteopathic Physicians	Otolaryngology	Facial Plastic Surgery	An otolaryngologist who specializes in facial plastic surgery.
Other Specialty	207YX0007X	Allopathic & Osteopathic Physicians	Otolaryngology	Plastic Surgery within the Head & Neck	An otolaryngologist with additional training in plastic and reconstructive procedures within the head, face, neck and associated structures, including cutaneous head and neck oncology and reconstruction, management of maxillofacial trauma, soft tissue repair and neural surgery. The field is diverse and involves a wide age range of patients, from the newborn to the aged. While both cosmetic and reconstructive surgeries are practiced, there are many additional procedures which interface with them.
Other Specialty	207YX0602X	Allopathic & Osteopathic Physicians	Otolaryngology	Otolaryngic Allergy	An otolaryngologist who specializes in the diagnosis and treatment of otolaryngic allergies and other allergic diseases.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	207YX0901X	Allopathic & Osteopathic Physicians	Otolaryngology	Otology & Neurotology	An otolaryngologist who treats diseases of the ear and temporal bone, including disorders of hearing and balance. The additional training in otology and neurotology emphasizes the study of embryology, anatomy, physiology, epidemiology, pathophysiology, pathology, genetics, immunology, microbiology and the etiology of diseases of the ear and temporal bone.
Other Specialty	207YX0905X	Allopathic & Osteopathic Physicians	Otolaryngology	Otolaryngology/Facial Plastic Surgery	An otolaryngologist who specializes in the diagnosis and surgical treatment of head and neck conditions.
Other Specialty	207ZB0001X	Allopathic & Osteopathic Physicians	Pathology	Blood Banking & Transfusion Medicine	A physician who specializes in blood banking/transfusion medicine is responsible for the maintenance of an adequate blood supply, blood donor and patient-recipient safety and appropriate blood utilization. Pre-transfusion compatibility testing and antibody testing assure that blood transfusions, when indicated, are as safe as possible. This physician directs the preparation and safe use of specially prepared blood components, including red blood cells, white blood cells, platelets and plasma constituents, and marrow or stem cells for transplantation.
Other Specialty	207ZC0006X	Allopathic & Osteopathic Physicians	Pathology	Clinical Pathology	A pathologist deals with the causes and nature of disease and contributes to diagnosis, prognosis and treatment through knowledge gained by the laboratory application of the biologic, chemical and physical sciences. A pathologist uses information gathered from the microscopic examination of tissue specimens, cells and body fluids, and from clinical laboratory tests on body fluids and secretions for the diagnosis, exclusion and monitoring of disease.
Other Specialty	207ZC0008X	Allopathic & Osteopathic Physicians	Pathology	Clinical Informatics	Physicians who practice Clinical Informatics collaborate with other health care and information technology professionals to analyze, design, implement and evaluate information and communication systems that enhance individual and population health outcomes, improve patient care, and strengthen the clinician-patient relationship. Clinical Informaticians use their knowledge of patient care combined with their understanding of informatics concepts, methods, and tools to: assess information and knowledge needs of health care professionals and patients; characterize, evaluate, and refine clinical processes; develop, implement, and refine clinical decision support systems; and lead or participate in the procurement, customization, development, implementation, management, evaluation, and continuous improvement of clinical information systems.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	207ZC0500X	Allopathic & Osteopathic Physicians	Pathology	Cytopathology	A cytopathologist is an anatomic pathologist trained in the diagnosis of human disease by means of the study of cells obtained from body secretions and fluids, by scraping, washing, or sponging the surface of a lesion, or by the aspiration of a tumor mass or body organ with a fine needle. A major aspect of a cytopathologist's practice is the interpretation of Papanicolaou-stained smears of cells from the female reproductive systems, the "Pap" test. However, the cytopathologist's expertise is applied to the diagnosis of cells from all systems and areas of the body. He/she is a consultant to all medical specialists.
Other Specialty	207ZD0900X	Allopathic & Osteopathic Physicians	Pathology	Dermatopathology	A dermatopathologist is an expert in diagnosing and monitoring diseases of the skin including infectious, immunologic, degenerative, and neoplastic diseases. This entails the examination and interpretation of specially prepared tissue sections, cellular scrapings, and smears of skin lesions by means of light microscopy, electron microscopy, and fluorescence microscopy.
Other Specialty	207ZF0201X	Allopathic & Osteopathic Physicians	Pathology	Forensic Pathology	A forensic pathologist is expert in investigating and evaluating cases of sudden, unexpected, suspicious and violent death as well as other specific classes of death defined by law. The forensic pathologist serves the public as coroner or medical examiner, or by performing medicolegal autopsies for such officials.
Other Specialty	207ZH0000X	Allopathic & Osteopathic Physicians	Pathology	Hematology	A hematopathologist is expert in diseases that affect blood cells, blood clotting mechanisms, bone marrow and lymph nodes. This physician has the knowledge and technical skills essential for the laboratory diagnosis of anemias, leukemias, lymphomas, bleeding disorders and blood clotting disorders.
Other Specialty	207ZI0100X	Allopathic & Osteopathic Physicians	Pathology	Immunopathology	A pathologist who specializes in the diagnosis of immunologic diseases.
Other Specialty	207ZM0300X	Allopathic & Osteopathic Physicians	Pathology	Medical Microbiology	A medical microbiologist is expert in the isolation and identification of microbial agents that cause infectious disease. Viruses, bacteria and fungi, as well as parasites, are identified and, where possible, tested for susceptibility to appropriate antimicrobial agents.
Other Specialty	207ZN0500X	Allopathic & Osteopathic Physicians	Pathology	Neuropathology	A neuropathologist is expert in the diagnosis of diseases of the nervous system and skeletal muscles and functions as a consultant primarily to neurologists and neurosurgeons. The neuropathologist is knowledgeable in the infirmities of humans as they affect the nervous and neuromuscular systems, be they degenerative, infectious, metabolic, immunologic, neoplastic, vascular or physical in nature.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	207ZP0007X	Allopathic & Osteopathic Physicians	Pathology	Molecular Genetic Pathology	A molecular genetic pathologist is expert in the principles, theory and technologies of molecular biology and molecular genetics. This expertise is used to make or confirm diagnoses of Mendelian genetic disorders, disorders of human development, infectious diseases and malignancies, and to assess the natural history of those disorders. A molecular genetic pathologist provides information about gene structure, function and alteration and applies laboratory techniques for diagnosis, treatment and prognosis for individuals with related disorders.
Other Specialty	207ZP0101X	Allopathic & Osteopathic Physicians	Pathology	Anatomic Pathology	A pathologist deals with the causes and nature of disease and contributes to diagnosis, prognosis and treatment through knowledge gained by the laboratory application of the biologic, chemical and physical sciences. A pathologist uses information gathered from the microscopic examination of tissue specimens, cells and body fluids, and from clinical laboratory tests on body fluids and secretions for the diagnosis, exclusion and monitoring of disease.
Other Specialty	207ZP0102X	Allopathic & Osteopathic Physicians	Pathology	Anatomic Pathology & Clinical Pathology	A pathologist deals with the causes and nature of disease and contributes to diagnosis, prognosis and treatment through knowledge gained by the laboratory application of the biologic, chemical and physical sciences. A pathologist uses information gathered from the microscopic examination of tissue specimens, cells and body fluids, and from clinical laboratory tests on body fluids and secretions for the diagnosis, exclusion and monitoring of disease.
Other Specialty	207ZP0104X	Allopathic & Osteopathic Physicians	Pathology	Chemical Pathology	A chemical pathologist has expertise in the biochemistry of the human body as it applies to the understanding of the cause and progress of disease. This physician functions as a clinical consultant in the diagnosis and treatment of human disease. Chemical pathology entails the application of biochemical data to the detection, confirmation or monitoring of disease.
Other Specialty	207ZP0105X	Allopathic & Osteopathic Physicians	Pathology	Clinical Pathology/Laboratory Medicine	A pathologist deals with the causes and nature of disease and contributes to diagnosis, prognosis and treatment through knowledge gained by the laboratory application of the biologic, chemical and physical sciences. A pathologist uses information gathered from the microscopic examination of tissue specimens, cells and body fluids, and from clinical laboratory tests on body fluids and secretions for the diagnosis, exclusion and monitoring of disease.
Other Specialty	207ZP0213X	Allopathic & Osteopathic Physicians	Pathology	Pediatric Pathology	A pediatric pathologist is expert in the laboratory diagnosis of diseases that occur during fetal growth, infancy and child development. The practice requires a strong foundation in general pathology and substantial understanding of normal growth and development, along with extensive knowledge of pediatric medicine.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	208000000X	Allopathic & Osteopathic Physicians	Pediatrics		A pediatrician is concerned with the physical, emotional and social health of children from birth to young adulthood. Care encompasses a broad spectrum of health services ranging from preventive healthcare to the diagnosis and treatment of acute and chronic diseases. A pediatrician deals with biological, social and environmental influences on the developing child, and with the impact of disease and dysfunction on development.
Other Specialty	2080A0000X	Allopathic & Osteopathic Physicians	Pediatrics	Adolescent Medicine	A pediatrician who specializes in adolescent medicine is a multi-disciplinary healthcare specialist trained in the unique physical, psychological and social characteristics of adolescents, their healthcare problems and needs.
Other Specialty	2080C0008X	Allopathic & Osteopathic Physicians	Pediatrics	Child Abuse Pediatrics	A Child Abuse Pediatrician serves as a resource to children, families and communities by accurately diagnosing abuse; consulting with community agencies on child safety; providing expertise in courts of law; treating consequences of abuse and neglect; directing child abuse and neglect prevention programs and participating on multidisciplinary teams investigating; and managing child abuse cases.
Other Specialty	2080H0002X	Allopathic & Osteopathic Physicians	Pediatrics	Hospice and Palliative Medicine	A pediatrician with special knowledge and skills to prevent and relieve the suffering experienced by patients with life-limiting illnesses. This specialist works with an interdisciplinary hospice or palliative care team to maximize quality of life while addressing physical, psychological, social and spiritual needs of both patient and family throughout the course of the disease, through the dying process, and beyond for the family. This specialist has expertise in the assessment of patients with advanced disease; the relief of distressing symptoms; the coordination of interdisciplinary patient and family-centered care in diverse venues; the use of specialized care systems including hospice; the management of the imminently dying patient; and legal and ethical decision making in end-of-life care.
Other Specialty	2080I0007X	Allopathic & Osteopathic Physicians	Pediatrics	Clinical & Laboratory Immunology	A pediatrician who specializes in clinical and laboratory immunology disease management.
Other Specialty	2080N0001X	Allopathic & Osteopathic Physicians	Pediatrics	Neonatal-Perinatal Medicine	A pediatrician who is the principal care provider for sick newborn infants. Clinical expertise is used for direct patient care and for consulting with obstetrical colleagues to plan for the care of mothers who have high-risk pregnancies.
Other Specialty	2080P0006X	Allopathic & Osteopathic Physicians	Pediatrics	Developmental – Behavioral Pediatrics	A developmental-behavioral specialist is a pediatrician with special training and experience who aims to foster understanding and promotion of optimal development of children and families through research, education, clinical care and advocacy efforts. This physician assists in the prevention, diagnosis, and management of developmental difficulties and problematic behaviors in children and in the family dysfunctions that compromise children's development.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	2080P0008X	Allopathic & Osteopathic Physicians	Pediatrics	Neurodevelopmental Disabilities	A pediatrician who treats children having developmental delays or learning disorders including those associated with visual and hearing impairment, mental retardation, cerebral palsy, spina bifida, autism and other chronic neurologic conditions. This specialist provides medical consultation and education and assumes leadership in the interdisciplinary management of children with neurodevelopmental disorders. They may also focus on the early identification and diagnosis of neurodevelopmental disabilities in infants and young children as well as on changes that occur as the child with developmental disabilities grows.
Other Specialty	2080P0201X	Allopathic & Osteopathic Physicians	Pediatrics	Pediatric Allergy/Immunology	A pediatrician who specializes in the diagnosis and treatment of allergies, allergic reactions, and immunologic diseases in children.
Other Specialty	2080P0202X	Allopathic & Osteopathic Physicians	Pediatrics	Pediatric Cardiology	A pediatric cardiologist provides comprehensive care to patients with cardiovascular problems. This specialist is skilled in selecting, performing and evaluating the structural and functional assessment of the heart and blood vessels, and the clinical evaluation of cardiovascular disease.
Other Specialty	2080P0203X	Allopathic & Osteopathic Physicians	Pediatrics	Pediatric Critical Care Medicine	A pediatrician expert in advanced life support for children from the term or near-term neonate to the adolescent. This competence extends to the critical care management of life-threatening organ system failure from any cause in both medical and surgical patients and to the support of vital physiological functions. This specialist may have administrative responsibilities for intensive care units and also facilitates patient care among other specialists.
Other Specialty	2080P0204X	Allopathic & Osteopathic Physicians	Pediatrics	Pediatric Emergency Medicine	A pediatrician who has special qualifications to manage emergencies in infants and children.
Other Specialty	2080P0205X	Allopathic & Osteopathic Physicians	Pediatrics	Pediatric Endocrinology	A pediatrician who provides expert care to infants, children and adolescents who have diseases that result from an abnormality in the endocrine glands (glands which secrete hormones). These diseases include diabetes mellitus, growth failure, unusual size for age, early or late pubertal development, birth defects, the genital region and disorders of the thyroid, the adrenal and pituitary glands.
Other Specialty	2080P0206X	Allopathic & Osteopathic Physicians	Pediatrics	Pediatric Gastroenterology	A pediatrician who specializes in the diagnosis and treatment of diseases of the digestive systems of infants, children and adolescents. This specialist treats conditions such as abdominal pain, ulcers, diarrhea, cancer and jaundice and performs complex diagnostic and therapeutic procedures using lighted scopes to see internal organs.
Other Specialty	2080P0207X	Allopathic & Osteopathic Physicians	Pediatrics	Pediatric Hematology-Oncology	A pediatrician trained in the combination of pediatrics, hematology and oncology to recognize and manage pediatric blood disorders and cancerous diseases.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	2080P0208X	Allopathic & Osteopathic Physicians	Pediatrics	Pediatric Infectious Diseases	A pediatrician trained to care for children in the diagnosis, treatment and prevention of infectious diseases. This specialist can apply specific knowledge to affect a better outcome for pediatric infections with complicated courses, underlying diseases that predispose to unusual or severe infections, unclear diagnoses, uncommon diseases and complex or investigational treatments.
Other Specialty	2080P0210X	Allopathic & Osteopathic Physicians	Pediatrics	Pediatric Nephrology	A pediatrician who deals with the normal and abnormal development and maturation of the kidney and urinary tract, the mechanisms by which the kidney can be damaged, the evaluation and treatment of renal diseases, fluid and electrolyte abnormalities, hypertension and renal replacement therapy.
Other Specialty	2080P0214X	Allopathic & Osteopathic Physicians	Pediatrics	Pediatric Pulmonology	A pediatrician dedicated to the prevention and treatment of all respiratory diseases affecting infants, children and young adults. This specialist is knowledgeable about the growth and development of the lung, assessment of respiratory function in infants and children, and experienced in a variety of invasive and noninvasive diagnostic techniques.
Other Specialty	2080P0216X	Allopathic & Osteopathic Physicians	Pediatrics	Pediatric Rheumatology	A pediatrician who treats diseases of joints, muscle, bones and tendons. A pediatric rheumatologist diagnoses and treats arthritis, back pain, muscle strains, common athletic injuries and "collagen" diseases.
Other Specialty	2080S0010X	Allopathic & Osteopathic Physicians	Pediatrics	Sports Medicine	A pediatrician who is responsible for continuous care in the field of sports medicine, not only for the enhancement of health and fitness, but also for the prevention of injury and illness. A sports medicine physician must have knowledge and experience in the promotion of wellness and the prevention of injury. Knowledge about special areas of medicine such as exercise physiology, biomechanics, nutrition, psychology, physical rehabilitation, epidemiology, physical evaluation, injuries (treatment and prevention and referral practice) and the role of exercise in promoting a healthy lifestyle are essential to the practice of sports medicine. The sports medicine physician requires special education to provide the knowledge to improve the healthcare of the individual engaged in physical exercise (sports) whether as an individual or in team participation.
Other Specialty	2080S0012X	Allopathic & Osteopathic Physicians	Pediatrics	Sleep Medicine	A Pediatrician who practices Sleep Medicine is certified in the subspecialty of sleep medicine and specializes in the clinical assessment, physiologic testing, diagnosis, management and prevention of sleep and circadian rhythm disorders. Sleep specialists treat patients of any age and use multidisciplinary approaches. Disorders managed by sleep specialists include, but are not limited to, sleep related breathing disorders, insomnia, hypersomnias, circadian rhythm sleep disorders, parasomnias and sleep related movement disorders.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	2080T0002X	Allopathic & Osteopathic Physicians	Pediatrics	Medical Toxicology	Medical toxicologists are physicians that specialize in the prevention, evaluation, treatment and monitoring of injury and illness from exposures to drugs and chemicals, as well as biological and radiological agents. Medical toxicologists care for people in clinical, academic, governmental and public health settings, and provide poison control center leadership. Important areas of medical toxicology include acute drug poisoning, adverse drug events, drug abuse, addiction and withdrawal, chemicals and hazardous materials, terrorism preparedness, venomous bites and stings, and environmental and workplace exposures.
Other Specialty	2080T0004X	Allopathic & Osteopathic Physicians	Pediatrics	Pediatric Transplant Hepatology	A pediatrician with expertise in transplant hepatology encompasses the special knowledge and skill required of pediatric gastroenterologists to care for patients prior to and following hepatic transplantation; it spans all phases of liver transplantation.
Other Specialty	202K00000X	Allopathic & Osteopathic Physicians	Phlebology		Phlebology is the medical discipline that involves the diagnosis and treatment of venous disorders, including spider veins, varicose veins, chronic venous insufficiency, venous leg ulcers, congenital venous abnormalities, venous thromboembolism and other disorders of venous origin. A phlebologist has attained a minimum of 50 hours of CME units in phlebology-related courses, and is knowledgeable of and trained in a variety of diagnostic techniques including physical examination, venous imaging techniques such as duplex ultrasound, CT and MR, plethysmographic techniques and laboratory evaluation related to venous thromboembolism. The phlebologist is also trained in a variety of therapeutic interventions, which may include compression, sclerotherapy, cutaneous vascular laser, endovenous thermoablation procedures (laser and radiofrequency) endovenous chemical ablation, surgical procedures (e.g., ambulatory phlebectomy, venous ligation), vasoactive medications and the management of venous thromboembolism.
Other Specialty	208200000X	Allopathic & Osteopathic Physicians	Plastic Surgery		A plastic surgeon deals with the repair, reconstruction or replacement of physical defects of form or function involving the skin, musculoskeletal system, craniomaxillofacial structures, hand, extremities, breast and trunk and external genitalia or cosmetic enhancement of these areas of the body. Cosmetic surgery is an essential component of plastic surgery. The plastic surgeon uses cosmetic surgical principles to both improve overall appearance and to optimize the outcome of reconstructive procedures. The surgeon uses aesthetic surgical principles not only to improve undesirable qualities of normal structures but in all reconstructive procedures as well.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	2082S0099X	Allopathic & Osteopathic Physicians	Plastic Surgery	Plastic Surgery Within the Head and Neck	A plastic surgeon with additional training in plastic and reconstructive procedures within the head, face, neck and associated structures, including cutaneous head and neck oncology and reconstruction, management of maxillofacial trauma, soft tissue repair and neural surgery. The field is diverse and involves a wide age range of patients, from the newborn to the aged. While both cosmetic and reconstructive surgery is practiced, there are many additional procedures which interface with them.
Other Specialty	2082S0105X	Allopathic & Osteopathic Physicians	Plastic Surgery	Surgery of the Hand	A plastic surgeon with additional training in the investigation, preservation, and restoration by medical, surgical and rehabilitative means of all structures of the upper extremity directly affecting the form and function of the hand and wrist.
Other Specialty	2083A0100X	Allopathic & Osteopathic Physicians	Preventive Medicine	Aerospace Medicine	Aerospace medicine focuses on the clinical care, research, and operational support of the health, safety, and performance of crewmembers and passengers of air and space vehicles, together with the support personnel who assist operation of such vehicles. This population often works and lives in remote, isolated, extreme, or enclosed environments under conditions of physical and psychological stress. Practitioners strive for an optimal human-machine match in occupational settings rich with environmental hazards and engineering countermeasures.
Other Specialty	2083C0008X	Allopathic & Osteopathic Physicians	Preventive Medicine	Clinical Informatics	Physicians who practice Clinical Informatics collaborate with other health care and information technology professionals to analyze, design, implement and evaluate information and communication systems that enhance individual and population health outcomes, improve patient care, and strengthen the clinician-patient relationship. Clinical Informaticians use their knowledge of patient care combined with their understanding of informatics concepts, methods, and tools to: assess information and knowledge needs of health care professionals and patients; characterize, evaluate, and refine clinical processes; develop, implement, and refine clinical decision support systems; and lead or participate in the procurement, customization, development, implementation, management, evaluation, and continuous improvement of clinical information systems.
Other Specialty	2083P0011X	Allopathic & Osteopathic Physicians	Preventive Medicine	Undersea and Hyperbaric Medicine	A specialist who treats decompression illness and diving accident cases and uses hyperbaric oxygen therapy to treat such conditions as carbon monoxide poisoning, gas gangrene, non-healing wounds, tissue damage from radiation and burns and bone infections. This specialist also serves as consultant to other physicians in all aspects of hyperbaric chamber operations and assesses risks and applies appropriate standards to prevent disease and disability in divers and other persons working in altered atmospheric conditions.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	2083P0500X	Allopathic & Osteopathic Physicians	Preventive Medicine	Preventive Medicine/Occupational Environmental Medicine	A preventive medicine physician who specializes in preventive medicine/occupational-environmental medicine, which is focused on protecting the population from occupational and environmental conditions.
Other Specialty	2083P0901X	Allopathic & Osteopathic Physicians	Preventive Medicine	Public Health & General Preventive Medicine	Public health and general preventive medicine focuses on promoting health, preventing disease, and managing the health of communities and defined populations. These practitioners combine population-based public health skills with knowledge of primary, secondary, and tertiary prevention-oriented clinical practice in a wide variety of settings.
Other Specialty	2083S0010X	Allopathic & Osteopathic Physicians	Preventive Medicine	Sports Medicine	A preventive medicine physician who specializes in the diagnosis and treatment of sports related conditions and injuries.
Other Specialty	2083T0002X	Allopathic & Osteopathic Physicians	Preventive Medicine	Medical Toxicology	Medical toxicologists are physicians who specialize in the prevention, evaluation, treatment and monitoring of injury and illness from exposures to drugs and chemicals, as well as biological and radiological agents. Medical toxicologists care for people in clinical, academic, governmental and public health settings, and provide poison control center leadership. Important areas of medical toxicology include acute drug poisoning, adverse drug events, drug abuse, addiction and withdrawal, chemicals and hazardous materials, terrorism preparedness, venomous bites and stings, and environmental and workplace exposures.
Other Specialty	2083X0100X	Allopathic & Osteopathic Physicians	Preventive Medicine	Occupational Medicine	Occupational medicine focuses on the health of workers, including the ability to perform work; the physical, chemical, biological, and social environments of the workplace; and the health outcomes of environmental exposures. Practitioners in this field address the promotion of health in the work place, and the prevention and management of occupational and environmental injury, illness, and disability.
Other Specialty	2084A0401X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Addiction Medicine	A doctor of osteopathy board eligible/certified in the field of Psychiatry by the American Osteopathic Board of Neurology and Psychiatry is able to obtain a Certificate of Added Qualifications in the field of Addiction Medicine
Other Specialty	2084B0002X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Bariatric Medicine	Bariatric medicine is the medical treatment of obesity and its associated conditions. Bariatric medicine addresses the obese individual with a comprehensive program of diet, exercise and behavior modification, and when indicated, the prescription of appropriate medications as determined by the Bariatric physician. Bariatric physicians are licensed physicians who offer specialized programs in the medical treatment of obesity and its associated conditions.
Other Specialty	2084B0040X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Behavioral Neurology & Neuropsychiatry	Behavioral Neurology & Neuropsychiatry is a medical subspecialty involving the diagnosis and treatment of neurologically based behavioral issues.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	2084F0202X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Forensic Psychiatry	Forensic Psychiatry is a subspecialty with psychiatric focus on interrelationships with civil, criminal and administrative law, evaluation and specialized treatment of individuals involved with the legal system, incarcerated in jails, prisons, and forensic psychiatry hospitals.
Other Specialty	2084H0002X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Hospice and Palliative Medicine	A psychiatrist or neurologist with special knowledge and skills to prevent and relieve the suffering experienced by patients with life-limiting illnesses. This specialist works with an interdisciplinary hospice or palliative care team to maximize quality of life while addressing physical, psychological, social and spiritual needs of both patient and family throughout the course of the disease, through the dying process, and beyond for the family. This specialist has expertise in the assessment of patients with advanced disease; the relief of distressing symptoms; the coordination of interdisciplinary patient and family-centered care in diverse venues; the use of specialized care systems including hospice; the management of the imminently dying patient; and legal and ethical decision making in end-of-life care.
Other Specialty	2084P0015X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Psychosomatic Medicine	Psychosomatic Medicine is subspecialty in the diagnosis and treatment of psychiatric disorders and symptoms in complex medically ill patients. This subspecialty includes treatment of patients with acute or chronic medical, neurological, obstetrical or surgical illness in which psychiatric illness is affecting their medical care and/or quality of life such as HIV infection, organ transplantation, heart disease, renal failure, cancer, stroke, traumatic brain injury, high-risk pregnancy and COPD, among others. Patients also may be those who have a psychiatric disorder that is the direct consequence of a primary medical condition, or a somatoform disorder or psychological factors affecting a general medical condition. Psychiatrists specializing in Psychosomatic Medicine provide consultation-liaison services in general medical hospitals, attend on medical psychiatry inpatient units, and provide collaborative care in primary care and other outpatient settings.
Other Specialty	2084P0800X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Psychiatry	A Psychiatrist specializes in the prevention, diagnosis, and treatment of mental disorders, emotional disorders, psychotic disorders, mood disorders, anxiety disorders, substance-related disorders, sexual and gender identity disorders and adjustment disorders. Biologic, psychological, and social components of illnesses are explored and understood in treatment of the whole person. Tools used may include diagnostic laboratory tests, prescribed medications, evaluation and treatment of psychological and interpersonal problems with individuals and families, and intervention for coping with stress, crises, and other problems.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	2084P0802X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Addiction Psychiatry	Addiction Psychiatry is a subspecialty of psychiatry that focuses on evaluation and treatment of individuals with alcohol, drug, or other substance-related disorders, and of individuals with dual diagnosis of substance-related and other psychiatric disorders.
Other Specialty	2084P0804X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Child & Adolescent Psychiatry	Child & Adolescent Psychiatry is a subspecialty of psychiatry with additional skills and training in the diagnosis and treatment of developmental, behavioral, emotional, and mental disorders of childhood and adolescence.
Other Specialty	2084P0805X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Geriatric Psychiatry	Geriatric Psychiatry is a subspecialty with psychiatric expertise in prevention, evaluation, diagnosis and treatment of mental and emotional disorders in the elderly, and improvement of psychiatric care for healthy and ill elderly patients.
Other Specialty	2084S0012X	Allopathic & Osteopathic Physicians	Psychiatry & Neurology	Sleep Medicine	A Psychiatrist or Neurologist who practices Sleep Medicine is certified in the subspecialty of sleep medicine and specializes in the clinical assessment, physiologic testing, diagnosis, management and prevention of sleep and circadian rhythm disorders. Sleep specialists treat patients of any age and use multidisciplinary approaches. Disorders managed by sleep specialists include, but are not limited to, sleep related breathing disorders, insomnia, hypersomnias, circadian rhythm sleep disorders, parasomnias and sleep related movement disorders.
Other Specialty	208600000X	Allopathic & Osteopathic Physicians	Surgery		A general surgeon has expertise related to the diagnosis - preoperative, operative and postoperative management - and management of complications of surgical conditions in the following areas: alimentary tract; abdomen; breast, skin and soft tissue; endocrine system; head and neck surgery; pediatric surgery; surgical critical care; surgical oncology; trauma and burns; and vascular surgery. General surgeons increasingly provide care through the use of minimally invasive and endoscopic techniques. Many general surgeons also possess expertise in transplantation surgery, plastic surgery and cardiothoracic surgery.
Other Specialty	2086H0002X	Allopathic & Osteopathic Physicians	Surgery	Hospice and Palliative Medicine	A surgeon with special knowledge and skills to prevent and relieve the suffering experienced by patients with life-limiting illnesses. This specialist works with an interdisciplinary hospice or palliative care team to maximize quality of life while addressing physical, psychological, social and spiritual needs of both patient and family throughout the course of the disease, through the dying process, and beyond for the family. This specialist has expertise in the assessment of patients with advanced disease; the relief of distressing symptoms; the coordination of interdisciplinary patient and family-centered care in diverse venues; the use of specialized care systems including hospice; the management of the imminently dying patient; and legal and ethical decision making in end-of-life care.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	2086S0102X	Allopathic & Osteopathic Physicians	Surgery	Surgical Critical Care	A surgeon with expertise in the management of the critically ill and postoperative patient, particularly the trauma victim, who specializes in critical care medicine diagnoses, treats and supports patients with multiple organ dysfunction. This specialist may have administrative responsibilities for intensive care units and may also facilitate and coordinate patient care among the primary physician, the critical care staff and other specialists.
Other Specialty	2086S0105X	Allopathic & Osteopathic Physicians	Surgery	Surgery of the Hand	A surgeon with expertise in the investigation, preservation and restoration by medical, surgical and rehabilitative means, of all structures of the upper extremity directly affecting the form and function of the hand and wrist.
Other Specialty	2086S0120X	Allopathic & Osteopathic Physicians	Surgery	Pediatric Surgery	A surgeon with expertise in the management of surgical conditions in premature and newborn infants, children and adolescents.
Other Specialty	2086S0122X	Allopathic & Osteopathic Physicians	Surgery	Plastic and Reconstructive Surgery	A surgeon who specializes in plastic and reconstructive surgery.
Other Specialty	2086S0127X	Allopathic & Osteopathic Physicians	Surgery	Trauma Surgery	Trauma surgery is a recognized subspecialty of general surgery. Trauma surgeons are physicians who have completed a five-year general surgery residency and usually continue with a one to two year fellowship in trauma and/or surgical critical care, typically leading to additional board certification in surgical critical care. There is no trauma surgery board certification at this point. To obtain board certification in surgical critical care, a fellowship in surgical critical care or anesthesiology critical care must be completed during or after general surgery residency.
Other Specialty	2086S0129X	Allopathic & Osteopathic Physicians	Surgery	Vascular Surgery	A surgeon with expertise in the management of surgical disorders of the blood vessels, excluding the intracranial vessels or the heart.
Other Specialty	2086X0206X	Allopathic & Osteopathic Physicians	Surgery	Surgical Oncology	A surgical oncologist is a well-qualified surgeon who has obtained additional training and experience in the multidisciplinary approach to the prevention, diagnosis, treatment, and rehabilitation of cancer patients, and devotes a major portion of his or her professional practice to these activities and cancer research.
Other Specialty	208G00000X	Allopathic & Osteopathic Physicians	Thoracic Surgery (Cardiothoracic Vascular Surgery)		A thoracic surgeon provides the operative, perioperative and critical care of patients with pathologic conditions within the chest. Included is the surgical care of coronary artery disease, cancers of the lung, esophagus and chest wall, abnormalities of the trachea, abnormalities of the great vessels and heart valves, congenital anomalies, tumors of the mediastinum and diseases of the diaphragm. The management of the airway and injuries of the chest is within the scope of the specialty.

Code	Taxonomy	Type	Classification	Specialization	Definition
Other Specialty	208800000X	Allopathic & Osteopathic Physicians	Urology		A urologist manages benign and malignant medical and surgical disorders of the genitourinary system and the adrenal gland. This specialist has comprehensive knowledge of and skills in endoscopic, percutaneous and open surgery of congenital and acquired conditions of the urinary and reproductive systems and their contiguous structures.
Other Specialty	2088F0040X	Allopathic & Osteopathic Physicians	Urology	Female Pelvic Medicine and Reconstructive Surgery	A subspecialist in Female Pelvic Medicine and Reconstructive Surgery is a physician in Urology or Obstetrics and Gynecology who, by virtue of education and training, is prepared to provide consultation and comprehensive management of women with complex benign pelvic conditions, lower urinary tract disorders, and pelvic floor dysfunction. Comprehensive management includes those diagnostic and therapeutic procedures necessary for the total care of the patient with these conditions and complications resulting from them.
Other Specialty	2088P0231X	Allopathic & Osteopathic Physicians	Urology	Pediatric Urology	Surgeons who can diagnose, treat, and manage children's urinary and genital problems. A pediatric urologist devotes a minimum of 50% of his or her practice to the urologic problems of infants, children, and adolescents. Pediatric urologists generally provide the following services: the evaluation and management of voiding disorders; vesicoureteral reflux, and urinary tract infections that require surgery; surgical reconstruction of the urinary tract (kidneys, ureters, and bladder) including genital abnormalities, hypospadias, and intersex conditions; surgery for groin conditions in childhood and adolescence (undescended testes, hydrocele/hernia, varicocele).

Source: Code classification developed by MDH for study. Taxonomy, Type, Classification, Specialization, and Definition from the National Uniform Claim Committee 2014.

## Appendix F: Other Clinical Specialties Rendering Chronic Pain Procedures

While the Legislature directed MDH to focus in its study on physicians and certified registered nurse anesthetists, interventional pain management for chronic pain is provided by other additional providers. This section provides additional information (Appendix Table G-1) that shows podiatrists, physician assistants, nurse practitioners, as well as other providers that perform chronic pain procedures in Minnesota and may be examined in future analysis.

The data in Appendix Table F-1 shows that including all individual and group providers, using the same chronic pain algorithm as summarized in Appendix B, increases the total number of chronic pain procedure by 12.4 percent, or 93,628 procedures. Physicians and CRNAs are the rendering providers for 87.6 percent (78.4 + 7.8 + 1.4) of all chronic pain procedures, but podiatrists (5.9 percent) and other advanced practice nurse professions (physician assistants, 2.2 percent; and nurse practitioners, 1.0 percent) are also contributing to the chronic pain procedure volume delivered to residents in the state. Future research on chronic pain management services delivery may need to study these other provider types in closer detail in order to refine algorithms used for this study to identify chronic pain procedures. Approaches such as additional diagnosis exclusions or sequencing of procedures for these other professions may to ensure that chronic pain procedures are accurately captured without extending the universe to inappropriately include treatment of acute pain.

**Appendix Table F-1: Distribution of Pain Management Services Delivered in Minnesota, by All Provider Specialty Types (2010 to 2012)**

Provider Specialty Type	Procedures	
	Number	Percent
Allopathic Physicians (MDs)	591,109	78.4%
Osteopathic Physicians (DOs)	58,897	7.8%
Certified Nurse Anesthetists (CRNAs)	10,722	1.4%
Physician Assistants	16,887	2.2%
Nurse Practitioners	7,406	1.0%
Other Advanced Practice Nurse Specialties	664	0.1%
Podiatric Medicine & Surgery	44,451	5.9%
Chiropractic Providers	1,878	0.2%
Behavioral Health & Social Service Providers	28	0.0%
Dental Providers	1,266	0.2%
Eye and Vision Services Providers	242	0.0%
Nursing Service Providers	209	0.0%
Other Service Providers: Specialists	17,565	2.3%
Respiratory Developmental Rehabilitative	2,545	0.3%
Student Health Care	453	0.1%
Technologists, Technicians & Other Technical Service Providers	34	0.0%
<b>Total Number of Procedures</b>	<b>754,356</b>	<b>100.0%</b>

Source: MDH/Health Economics Program analysis of data from the MN APCD for services in 2010 to 2012 (2014).

## Appendix G: Allopathic and Osteopathic Physicians Rendering Chronic Pain Procedures

MDH used the data field in the Minnesota physician licensure data identifying the medical education level to distinguish Doctors of Medicine (MDs) from Doctors of Osteopathy (DOs). The physician specialty was coded from the National Provider Identification taxonomy code and discussed in Appendix E.

Appendix Table G-1 provides the distribution of chronic pain procedure volume by physician specialties for MDs and DOs. A comparison of physicians and osteopaths shows that osteopaths with pain management certification, 50.3 percent versus 40.7 percent, perform a larger share of chronic pain procedures. Each had similar shares of primary care and other physician specialties providing chronic pain procedures, 10.1 percent DOs and 12.7 percent MDs. Overall, 90.9 percent of all chronic pain procedures provided by physicians from 2010 through 2012 were rendered by MDs and 9.1 percent by DOs.

**Appendix Table G-1: Volume and Distribution of Chronic Pain Procedures Performed by Allopathic and Osteopathic Physician Specialties (2010 to 2012)**

Physician Specialty	Allopathic Physician (MD)		Osteopathic Physician (DO)		All Physicians	
	Number of Procedures	Percent of Procedures	Number of Procedures	Percent of Procedures	Number of Procedures	Percent of Procedures
Pain Specialist	240,444	40.7%	29,596	50.3%	270,040	41.5%
Pain-Related Specialty						
Anesthesia	44,478	7.5%	945	1.6%	45,423	7.0%
Physical Medicine	40,816	6.9%	17,777	30.2%	58,593	9.0%
Neurology	34,907	5.9%	1,253	2.1%	36,160	5.6%
Radiology	109,440	18.5%	1,354	2.3%	110,794	17.0%
Neurological/Orthopedic Surgeons	45,920	7.8%	2,030	3.4%	47,950	7.4%
Primary Care Physicians	49,141	8.3%	5,081	8.6%	54,222	8.3%
Other Specialties	25,963	4.4%	861	1.5%	26,824	4.1%
<b>Total Number of Procedures</b>	<b>591,109</b>	<b>100.0%</b>	<b>58,897</b>	<b>100.0%</b>	<b>650,006</b>	<b>100.0%</b>
<b>Percent of All Procedures</b>	<b>90.9%</b>		<b>9.1%</b>		<b>100.0%</b>	

Source: MDH/Health Economics Program analysis of data from the MN APCD for services in 2010 to 2012 (2014).

## Appendix H: Distribution of Pain Management Services Delivered to Minnesota Patients, by Provider Type (2010 to 2012)

**Appendix Table H-1: Distribution of Pain Management Services Delivered to Minnesota Patients, by Provider Type (2010 to 2012)**

Chronic Pain Procedure	Physician Specialties (MDs and DOs)				Certified Registered Nurse Anesthetist (CRNA)
	Pain Specialist	Pain-Related Specialty	Primary Care	Other Specialties	
<i>Non-Surgical Pain Procedures</i>					
Interlaminar Epidural injections	14.9%	19.2%	4.6%	4.0%	45.7%
Transforaminal Epidural injections	19.2%	17.8%	3.5%	1.3%	11.9%
Epidural Lysis and other spinal column lesions	0.1%	0.6%	0.1%	0.0%	1.6%
Autonomic nerve blocks	1.7%	0.3%	0.2%	0.4%	0.2%
Somatic nerve blocks	3.9%	7.4%	16.3%	20.9%	15.7%
Facet neurolytic destruction/radiofrequency ablation	10.9%	3.1%	0.2%	0.4%	0.1%
Paravertebral facet joint injections	28.7%	13.4%	3.3%	2.7%	2.2%
Sacroiliac joint injections	4.5%	4.0%	0.8%	1.1%	4.3%
Somatic nerve destruction	0.6%	8.6%	1.5%	25.4%	0.0%
Other Peripheral nerve destruction	0.3%	0.9%	0.2%	0.3%	0.0%
Trigger point injections	6.6%	6.9%	29.5%	4.4%	18.1%
Tendon injections	1.9%	13.1%	39.1%	22.8%	0.0%
<i>Ambulatory Surgical Pain Procedures</i>					
Spinal Decompression/Discectomy	0.0%	0.1%	0.0%	0.0%	0.0%
Laminectomy/Laminotomy	0.0%	1.6%	0.1%	0.2%	0.2%
Vertebroplasty	0.1%	0.6%	0.0%	0.0%	0.0%
Kyphoplasty	0.0%	0.2%	0.0%	0.0%	0.0%
Neurostimulation	1.5%	0.4%	0.5%	16.0%	0.1%
Intrathecal Drug Pump	4.9%	1.7%	0.1%	0.1%	0.0%
	100%	100%	100%	100%	100%
<b>Total Number of Procedures</b>	<b>270,040</b>	<b>298,920</b>	<b>54,222</b>	<b>26,824</b>	<b>10,722</b>
Total Non-Surgical Pain Procedures	93.4%	95.4%	99.2%	83.6%	99.7%
Total Ambulatory Surgical Pain Procedures	6.6%	4.6%	0.8%	16.4%	0.3%
	100%	100%	100%	100%	100%
<b>Total Number of Procedures</b>	<b>270,040</b>	<b>298,920</b>	<b>54,222</b>	<b>26,824</b>	<b>10,722</b>
Percent of Total Non-Surgical Pain Procedures	40.4%	45.7%	8.6%	3.6%	1.7%
Percent of Total Ambulatory Surgical Pain Procedures	48.9%	37.8%	1.1%	12.0%	0.1%
<b>Percent of All Pain Procedures</b>	<b>40.9%</b>	<b>45.2%</b>	<b>8.2%</b>	<b>4.1%</b>	<b>1.6%</b>

Source: MDH/Health Economics Program analysis of data from the MN APCD for services in 2010 to 2012 (2014).

## Appendix I: Distribution of Pain Management Services Delivered in Minnesota, by Provider Type by Economic Development Region (2010 to 2012)

**Appendix Table I-1: Distribution of Pain Management Services Delivered in Minnesota, by Provider Type by Economic Development Region (2010 to 2012)**

Provider Economic Development Region	Physician Specialties (MDs and DOs)				Certified Registered Nurse Anesthetist (CRNA)	All CRNA, MD, and DO Providers
	Pain Specialist	Pain-Related Specialty	Primary Care	Other Specialties		
EDR 01: Northwest	0.0%	0.1%	3.0%	0.4%	1.9%	0.4%
EDR 02: Headwaters	0.3%	1.7%	4.0%	0.7%	36.0%	1.8%
EDR 03: Arrowhead	5.1%	6.4%	10.9%	3.3%	1.5%	6.0%
EDR 04: West Central	0.8%	4.6%	3.0%	1.8%	3.2%	2.8%
EDR 05: North Central	1.5%	1.8%	3.0%	1.0%	2.9%	1.7%
EDR 06E: Southwest Central	0.3%	1.2%	1.6%	0.6%	1.8%	0.9%
EDR 06W: Upper Minnesota Valley	0.0%	0.0%	0.3%	0.1%	0.0%	0.0%
EDR 07E: East Central	0.4%	0.3%	2.4%	0.3%	21.0%	0.9%
EDR 07W: Central	18.3%	7.2%	14.2%	3.2%	1.1%	12.0%
EDR 08: Southwest	0.3%	0.3%	1.2%	0.1%	3.3%	0.4%
EDR 09: South Central	1.1%	3.9%	4.2%	12.5%	7.7%	3.2%
EDR 10: Southeast	4.8%	8.6%	7.8%	9.3%	5.6%	7.0%
EDR 11: 7 County Twin Cities	<u>67.0%</u>	<u>63.9%</u>	<u>44.4%</u>	<u>66.5%</u>	<u>14.1%</u>	<u>62.9%</u>
	100%	100%	100%	100%	100%	100%
<b>Total Number of Procedures</b>	<b>270,040</b>	<b>298,920</b>	<b>54,222</b>	<b>26,824</b>	<b>10,722</b>	<b>660,728</b>

Source: MDH/Health Economics Program analysis of data from the MN APCD for services in 2010 to 2012 (2014).

## Appendix J: Certified Registered Nurse Anesthetists (CRNAs) Practice Patterns in Minnesota

This study grew out of the 2014 legislative session when major revisions to the Minnesota Nurse Practice Act were also being considered. Given this context, background information on the CRNA workforce in Minnesota is presented below (Tables J-1 and J-2).

According to the MN Board of Nursing, the number of CRNAs applying for registered nurse re-licensure increased by about 8% over the two years ending in February, 2013. Among all Department of Employment and Economic Development (DEED) planning regions the number of resident CRNAs increased the most in the Northwest region (from 68 to 82, a 21% increase), but the greatest number lived in the seven-county Twin Cities metropolitan area, 48% (773/1,627) in February, 2013.<sup>33</sup>

**Appendix Table J-1: Minnesota Licensed Certified Registered Nurse Anesthetists**

Location	Licensed as of April, 2010		Licensed as of February, 2013		Percentage Change
	Nbr.	Percent	Nbr.	Percent	
Out of State	171	11%	164	10%	-4%
Seven County Metro	708	47%	773	48%	9%
Central	119	8%	127	8%	7%
Northeast	104	7%	114	7%	10%
Northwest	68	5%	82	5%	21%
Southeast	284	19%	317	19%	12%
Southwest	<u>50</u>	<u>3%</u>	<u>50</u>	<u>3%</u>	<u>0%</u>
<b>Total CRNAs</b>	<b>1,504</b>	<b>100%</b>	<b>1,627</b>	<b>100%</b>	<b>8%</b>

Source: MDH/Health Economics Program analysis of survey data from the Workforce Analysis Program in the MDH/ORHPC in collaboration with the Minnesota Board of Nursing (2014).

Note: Includes CRNAs renewing 2-year licenses, with location based on mailing addresses in Minnesota Department of Economic Development (DEED) planning regions.

The Workforce Analysis Program in the Office of Rural Health and Primary Care (ORHPC) collaborates with the MN Board of Nursing in an ongoing survey of nurses renewing their licenses. During the two year licensure cycle ending February, 2013 most CRNAs residing in MN reported a hospital work setting (92%, 664/720).

<sup>33</sup> Appendix Figure C-2 provides a reference map of the DEED planning regions within the state.

**Appendix Table J-2: Certified Registered Nurse Anesthetists (CRNA) Work Setting from MDH Office of Rural Health and Primary Care Workforce Survey, 2011-2012**

<b>Work Setting</b>	<b>No.</b>	<b>Percent of Total</b>
Hospital	664	92%
Clinic/office	13	2%
Education	4	1%
Other	<u>39</u>	<u>5%</u>
<b>Total</b>	<b>720</b>	<b>100%</b>

Source: MDH/Health Economics Program analysis of survey data from the Workforce Analysis Program in the MDH/ORHPC in collaboration with the Minnesota Board of Nursing (2014).

Note: Respondents included CRNAs with mailing addresses in Minnesota responding at the time of re-licensure, 2011-2012.

During the 2014 legislative session substantial changes were made to the Minnesota Nurse Practice Act (Minnesota Statutes Sections 148.171-148.285) affecting the four advanced practice registered nurse specialties, including CRNAs. Prior to this, the authority for prescribing drugs and treatments was delegated to advanced practice nurses by collaborating physicians but, when the law takes effect in January 2015, advanced practice nurses in each specialty will be authorized to practice with more autonomy in most care settings.

New language incorporates the scope and practice standards as defined by each specialty’s national certifying body as applicable to Minnesota APRNs (Sec 148.171, Subd. 13). The law explicitly states that APRNs can function independently as primary care providers, can independently order diagnostic tests, and prescribe drug and non-drug therapies. However, an exception was made for CRNA practice specific to performing nonsurgical therapies to treat acute and chronic pain symptoms (148.171, Subd. 21.b-c).<sup>34</sup> In this case, the same level of physician collaboration and supervision is required of CRNAs as had been required previously for all types of care and settings of practice. In order to perform these therapies the new law requires referral and collaboration with a physician working in the same facility. In order to prescribe drugs or treatments in the area of non-surgical pain therapies for chronic pain symptoms, the statute requires a CRNA to have a written prescribing agreement with a collaborating physician.

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<sup>34</sup> The exact statute language regarding the supervisory collaboration listed, “For purposes of providing nonsurgical therapies for acute and chronic pain symptoms, the registered nurse anesthetist and one or more physicians licensed under chapter 147 must have a mutually agreed upon plan that designates the scope of collaboration necessary for providing nonsurgical therapies to patients with acute and chronic pain. The registered nurse anesthetist must perform the nonsurgical therapies at the same licensed health care facility as the physician.” (Minnesota Statutes Sections 148.171, Subd. 21.b).

## Appendix K: Acronym Reference

**Appendix Table K-1: Acronym Reference List**

<b>Acronym</b>	<b>Definition</b>
AANA	American Association of Nurse Anesthetists
ACPA	American Chronic Pain Association
AOA	American Osteopathic Association
APCD	All Payer Claims Database
APRN	Advanced Practice Registered Nurse
ASIPP	American Society for Interventional Pain Physicians
CMS	Centers for Medicare and Medicaid Services
CPT	Current Procedural Terminology
CRNA	Certified Registered Nurse Anesthetist
DEED	Department of Employment and Economic Development
DO	Doctor of Osteopathy
EDR	Economic Development Region
ERS	Economic Research Service
GAO	General Accounting Office
ICSI	Institute for Clinical Systems Improvement
IOM	Institute of Medicine
IPRCC	Interagency Pain Research Coordinating Committee
MD	Doctor of Medicine
MDH	Minnesota Department of Health
MedPAC	Medicare Payment Advisory Commission
MN	Minnesota
NPI	National Provider Identifier
NPES	National Plan and Provider Enumeration System
NUCC	National Uniform Claim Committee
ORHPC	Office of Rural Health and Primary Care
OIG	Office of Inspector General