

Receipt of Physical Therapy and Chiropractic Care by Adults Diagnosed with Chronic Pain: Analysis of the 2016–2018 Rhode Island All Payer Claims Database

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ABSTRACT

OBJECTIVE: To examine trends and factors associated with physical therapy (PT) and chiropractic care use among Rhode Islanders with private or publicly-funded health insurance who were diagnosed with chronic pain from 2016–2018.

METHODS: We measured monthly PT and chiropractic care use from the RI All Payer Claims Database, and conducted logistic regression to identify factors associated with utilization.

RESULTS: There were 284,942 unique adults with chronic pain representing over one-quarter of insured persons in the state. Chiropractic care use remained unchanged but was more prevalent (7.2%) than PT whose use increased minimally from 4.0% (2016) to 4.5% (2018). Traditional Medicare or Medicaid enrollment was associated with lower odds of receiving PT and chiropractic care than in private plans.

CONCLUSIONS: PT and chiropractic care use varied across payers; however, there were little to no changes in their use over time despite clinical guidelines that encourage non-pharmacologic options to manage chronic pain.

KEYWORDS: chronic pain, physical therapy, chiropractic care, opioid, Rhode Island

INTRODUCTION

Improving pain management through safer prescribing practices and better access to opioid alternatives are part of several public health objectives intended to reduce drug-related harms nationally and in Rhode Island.¹⁻³ Chronic pain, defined as pain generally lasting longer than three months, is a common condition with significant impacts on quality of life, and societal and economic costs.² Failure to adequately manage chronic pain can contribute to unnecessary suffering, illicit opioid use, opioid use disorder (OUD) and overdoses.⁴ Opioids, which are sometimes prescribed to manage chronic pain, lack adequate evidence to support their effectiveness and carry substantial safety concerns when used long-term.⁵ Clinical practice guidelines urge clinicians to shift toward nonopioid medications and

non-pharmacologic treatments, and prescribing opioids at low dosages when opioid therapy cannot be avoided.^{6,7}

Despite the emergence of evidence-based guidelines, chronic pain treatment remains a challenge partly due to reliance on opioid therapy and insurance coverage restrictions for non-pharmacologic and complementary approaches.^{8,9} To our knowledge, no recent study has quantified receipt of non-pharmacologic pain treatments across different payers and over time despite the emphasis of their importance in clinical practice guidelines. There is need to also understand the use of opioid alternatives such as gabapentinoid medications (gabapentin or pregabalin) for which off-label use for chronic pain is widespread and new evidence points to substantially increased overdose risk when used concurrently with opioids.¹⁰ This study provides foundational empirical data needed to understand the extent of, and temporal changes in, receipt of non-pharmacologic treatments by Rhode Islanders with chronic pain. Our objective is to assess trends and factors associated with the receipt of physical therapy (PT) and chiropractic care by persons with chronic pain from 2016–2018. Furthermore, we characterize the individuals diagnosed with chronic pain with respect to demographics, comorbid conditions, and use of select medications including prescription opioids and gabapentinoids.

METHODS

We analyzed health care utilization data from HealthFacts RI, Rhode Island's All Payer Claims Database (APCD) which covers approximately 80% of the state's population. The HealthFacts RI APCD collects deidentified medical and pharmacy claims, enrollment, and provider data from publicly-funded (Medicare, Medicaid) and commercial health insurers in the state. We included Rhode Island residents ≥ 19 years of age who were diagnosed with chronic pain from January 2016 to December 2018. Individuals without concurrent enrollment for medical and pharmacy insurance benefits were excluded. Observations in Traditional Medicare were affected by lack of 2018 Part D pharmacy data due to lag time.¹¹ Chronic pain was defined by ≥ 1 diagnosis code highly likely to indicate chronic pain (ICD10: G89.21; G89.22; G89.28; G89.29; G89.4) or ≥ 2 diagnosis codes (≥ 3 months apart) for back pain, neck pain, limb/extremity/joint pain, fibromyalgia, or headache/migraine. We focused on these conditions following previously published algorithms for identifying chronic pain patients,^{12,13} and based

on the potential relevance of nonpharmacologic and complementary approaches in their treatment.¹⁴ We measured treatments and covariates at the monthly level. We identified PT and chiropractic care using procedure codes which are available from authors upon request.

We identified medications through the use of National Drug Codes and created monthly variables for any use of opioids, gabapentinoids, and non-steroidal anti-inflammatory drugs (NSAIDs). We note that NSAIDs use is likely underreported in claims data due to availability over the counter without a prescription. For opioid prescriptions, we included full and partial opioid agonists for pain management excluding buprenorphine-suboxone which is indicated for OUD treatment. We also excluded injectable opioids because of their uncommon use in outpatient settings.

Statistical analysis proceeded in two parts. First, using Joinpoint Regression Program version 4.8.0.1 we estimated the average monthly percent change and conducted tests of trend (no joinpoints/breaks) for PT and chiropractic care receipt from January 2016 to December 2018. We report results for the overall trend and stratified by payer. Second, we examined factors associated with the use of PT or chiropractic care using separate multivariable logistic regression models with generalized estimating equations. The variables in the regression models included payer, year, demographics (age group, sex), mental conditions, alcohol and other substance use disorders, pain conditions, and medication use. The model with chiropractic care as an outcome analyzed a sample that excluded Traditional Medicare enrollees due to highly restricted reimbursement for this service. Traditional Medicare pays for only one chiropractic service – manual manipulation of the spine if deemed medically necessary to correct a subluxation. Due to the large number of observations available in the person-month data, we specified a stricter level of 0.01 for statistical significance. All analyses, except the joinpoint trend analysis, were conducted using SAS version 9.4 software.

The Brown University Institutional Review Board deemed the study not to meet the criteria for human subjects research because the data extract provided to the investigators did not contain identifiable information.

Table 1. Overall sample characteristics and by use of physical therapy or chiropractic care among adults with chronic pain in Rhode Island, 2016 to 2018

Observations in person-months	Overall	Physical Therapy		Chiropractic care	
	N=8,884,906	None N=8,514,793	Received N=370,113	None N=8,245,993	Received N=638,913
	%	%	%	%	%
Age, mean (SD), years	54.3 (17.9)	54.3 (18.0)	56.0 (16.7)	54.4 (18.0)	53.1 (16.5)
19 to 29	10.8	10.9	7.6	10.9	9.9
30 to 44	19.2	19.3	16.6	19.1	20.0
45 to 64	40.1	39.8	46.0	39.7	45.6
65+	30.0	30.0	29.8	30.4	24.5
Female sex	61.2	61.1	64.2	61.2	62.0
Pain-related conditions					
Fibromyalgia	1.3	1.1	5.0	1.0	5.0
Headache/migraine	2.5	2.3	5.0	2.1	6.4
Neck	4.1	3.1	25.2	2.5	24.0
Back	8.9	7.4	44.0	6.5	39.9
Limb	12.5	10.7	54.4	11.0	32.0
Neuropathy	1.4	1.3	2.9	1.2	2.8
Fractures	3.1	2.6	16.1	2.7	9.0
Cancer	1.1	1.1	1.1	1.0	2.1
Mental health conditions					
Depressive disorder	5.8	5.6	9.8	5.6	8.7
Anxiety disorder	6.2	6.0	10.3	5.9	10.4
Sleep disorder	3.0	2.8	5.6	2.7	6.2
Substance use disorders					
Opioid use disorder	1.8	1.8	0.7	1.8	1.6
Alcohol use disorder	0.8	0.8	0.8	0.8	1.1
Cannabis use disorder	0.3	0.3	0.3	0.3	0.5
Select medication use					
Prescription opioids	9.9	9.8	12.9	9.9	10.8
NSAIDs	8.1	7.9	11.9	7.8	11.1
Gabapentinoids	4.9	4.8	7.0	4.9	5.5
Payer					
Commercial	41.5	40.8	57.3	40.1	59.4
Medicare Advantage	15.7	15.7	15.6	15.4	18.4
Traditional Medicare	7.8	8.0	4.1	8.4	0.1
Medicaid	24.2	24.7	11.1	25.0	13.5
Dual with MA	3.0	3.0	3.4	3.0	2.7
Dual with TM	7.9	7.9	8.5	8.0	5.9

SD, standard deviation; MA, Medicare Advantage; TM, Traditional Medicare; NSAIDs, nonsteroidal anti-inflammatory drugs; Gabapentinoids include gabapentin and pregabalin

RESULTS

Our analytic sample included 284,942 unique Rhode Islanders representing approximately one-quarter of the state’s total population. One-third (32.9%, n=93,661) of chronic pain patients analyzed received PT, and two-thirds (66.2%, n=188,559) received chiropractic care, with some receiving both, anytime from 2016-2018. These individuals contributed almost 9 million person-months of observation. The mean age was 54 years and 61% of the sample was female (Table 1). The majority of individuals had Commercial insurance (42%).

Unadjusted data showed little to no change in monthly PT (Figure 1) and chiropractic care (Figure 2) use among people diagnosed with chronic pain in Rhode Island from 2016-2018, overall and by payer (Figure 1). On average, the overall prevalence of PT use was 4.2% per month compared with 7.2% for chiropractic care. The average monthly percent changes (AMPC) during the full period suggested a positive trend in PT use (AMPC=0.5%, 95% CI=0.3% to 0.6%) versus a negative trend for chiropractic care use (AMPC=-0.3%, 95% CI=-0.5% to -0.1%) but with small magnitude (data not shown).

Back, neck, and limb-related pain accounted for majority of PT and chiropractic care use (Table 1). Engagement with these services differed by pain type. On average 20.6%, 26.0%, and 18.1% of people diagnosed with back, neck, and limb pain; respectively, received PT monthly. The average monthly prevalence of chiropractic care use was 32.1%, 42.7%, and 18.3% for back, neck, and limb pain; respectively. PT use increased steadily among individuals with back, neck, and limb pain; whereas, chiropractic care use remained stable or decreased slightly (Figure 3).

Temporal changes in the prevalence estimates of PT and chiropractic care use varied in magnitude and/or direction across payers. Use of these services was consistently higher among those enrolled in Commercial plans or Medicare Advantage than among publicly-insured beneficiaries. For example, the average monthly prevalence of PT use among Commercial, Medicare Advantage, Traditional Medicare and Medicaid were 5.7%, 4.2%, 2.1%, and 1.9% respectively among all chronic pain patients. Individuals dually-enrolled in Medicaid and either Traditional Medicare (4.5%) or Medicare Advantage (4.6%) had higher levels of PT use compared with those with Medicaid or Traditional Medicare alone.

Opioid prescribing among Rhode Islanders diagnosed with chronic pain decreased from ~12% in

Figure 1. Changes in physical therapy use by payer among Rhode Island residents diagnosed with chronic pain from 2016–2018

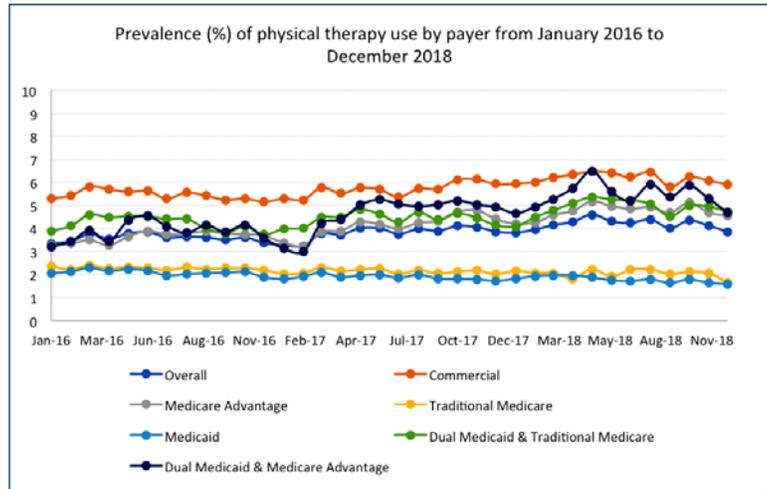


Figure 2. Changes in chiropractic care use by payer among Rhode Island residents diagnosed with chronic pain from 2016–2018

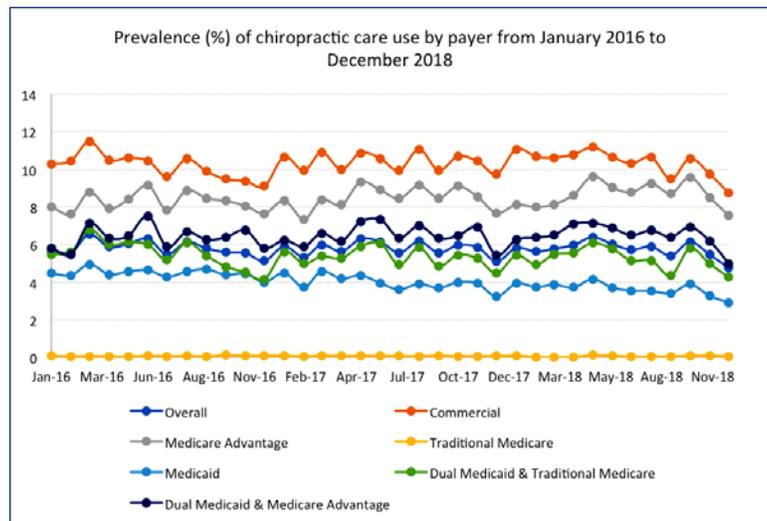


Figure 3. Physical therapy and chiropractic care use in subgroups of chronic pain patients with back, neck, and limb-related pain

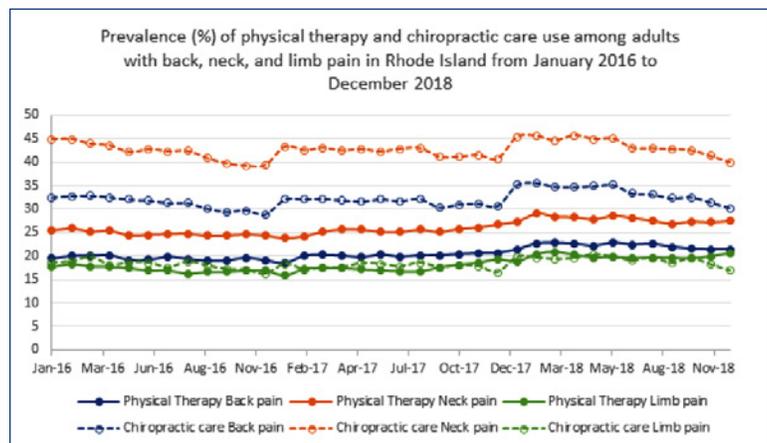


Table 2. Logistic regression results for factors associated with the use of physical therapy or chiropractic care by adults with chronic pain in Rhode Island, 2016–2018

	Use of Physical Therapy	Use of Chiropractic Care
	OR (99% CL)	OR (99% CL)
Year 2017 (reference = 2016)	1.04 (1.02, 1.05)	0.99 (0.98, 1.00)
Year 2018 (reference = 2016)	1.12 (1.10, 1.14)	1.00 (0.99, 1.01)
Payer (reference = Commercial)		
Medicare Advantage	0.47 (0.45, 0.49)	0.79 (0.77, 0.81)
Traditional Medicare	0.17 (0.16, 0.18)	*
Medicaid	0.31 (0.30, 0.32)	0.33 (0.32, 0.33)
Dual with TM	0.38 (0.36, 0.40)	0.34 (0.33, 0.35)
Dual with MA	0.36 (0.34, 0.39)	0.49 (0.47, 0.50)
Age category (reference = 45 to 64)		
18 to 29	1.08 (1.03, 1.12)	1.21 (1.18, 1.23)
30 to 44	1.04 (1.01, 1.07)	1.14 (1.12, 1.16)
65+	1.13 (1.09, 1.18)	0.95 (0.93, 0.97)
Female (reference = male)	1.08 (1.05, 1.11)	0.98 (0.96, 0.99)
Clinical conditions (reference = condition absent)		
Cancer	0.81 (0.77, 0.86)	2.33 (2.25, 2.41)
Fractures	2.21 (2.16, 2.27)	1.74 (1.71, 1.78)
Depressive disorder	1.04 (1.01, 1.06)	1.11 (1.09, 1.13)
Anxiety disorder	1.00 (0.98, 1.02)	1.28 (1.26, 1.30)
Alcohol use disorder	0.79 (0.74, 0.84)	1.12 (1.07, 1.18)
Cannabis use disorder	0.77 (0.69, 0.85)	1.22 (1.13, 1.32)
Opioid use disorder	0.65 (0.61, 0.70)	1.17 (1.13, 1.22)
Medication use (reference = no use)		
Prescription opioids	0.69 (0.67, 0.70)	0.64 (0.63, 0.66)
NSAIDs	0.79 (0.78, 0.81)	0.99 (0.97, 1.00)
Gabapentinoids	0.96 (0.93, 0.99)	0.82 (0.80, 0.84)
RI pain & opioid regulations	1.00 (0.98, 1.02)	0.92 (0.91, 0.93)
Clinical risk group (reference = healthy)		
Acute/minor	2.65 (2.58, 2.73)	1.94 (1.91, 1.98)
Moderate	2.39 (2.31, 2.46)	1.82 (1.78, 1.85)
Significant	2.22 (2.14, 2.30)	1.77 (1.74, 1.81)
Cancer or catastrophic	1.97 (1.80, 2.14)	2.12 (2.02, 2.22)
Pain conditions (reference = condition absent)		
Back pain	4.28 (4.19, 4.37)	5.15 (5.06, 5.25)
Limb pain	5.07 (4.98, 5.17)	2.62 (2.58, 2.65)
Neck pain	2.53 (2.46, 2.60)	3.48 (3.40, 3.57)
Headache/migraine	0.79 (0.77, 0.82)	1.51 (1.47, 1.55)
Fibromyalgia	1.10 (1.05, 1.15)	1.72 (1.65, 1.79)

OR, odds ratio; CL, confidence limits; MA, Medicare Advantage; TM, Traditional Medicare; NSAIDs, nonsteroidal anti-inflammatory drugs; RI, Rhode Island
 * Traditional Medicare was excluded (removing n=696,489 from 8,884,906 total person-months) from the analysis of this outcome because of the very limited coverage for chiropractic care by this payer

January 2016 to ~8% in December 2018 (data not shown). There was a gradual increase in gabapentinoid prescription fills owing to rising gabapentin prescribing. The monthly prevalence of gabapentin prescription fills increased from 3.8% to 5.3%; whereas, pregabalin fills remained low ranging from 0.5% to 0.7% from January 2016 to December 2018.

Results from multivariable logistic regression models indicated greater odds of PT use in 2017 (OR=1.04, 99% CI=1.02 to 1.05) and 2018 (OR=1.12, 99% CI=1.10 to 1.14) relative to 2016 (Table 2). There was no change in chiropractic care use over these years; in 2018 versus 2016 the OR was 1.00, 99% CI=0.99 to 1.01. Adjusting for covariates, the odds of receiving PT or chiropractic care were lower for individuals in all other plan types compared to Commercial plans. Medicare Advantage had a smaller relative difference to Commercial plans than other payers. For PT receipt, Medicare Advantage had OR=0.47, 99% CI=0.45 to 0.49; whereas Traditional Medicare had OR=0.17, 99% CI=0.16 to 0.18 compared with Commercial plans.

The variables associated with PT or chiropractic care use were mostly consistent in the direction of the associations with few exceptions. For instance, while diagnosis with cancer, substance use disorders, or headache/migraines was associated with lower odds of PT, the presence of these conditions was associated with greater use of chiropractic treatment.

DISCUSSION

Our analyses revealed three main findings. First, chiropractic care use was more common than PT among adults with chronic pain in Rhode Island, and monthly receipt of either treatment remained low from 2016 to 2018. Second, use of PT increased slightly among subgroups of chronic pain patients with back, neck, and limb-related pain. Third, private plans appeared to better channel individuals to non-pharmacologic pain treatment relative to Traditional Medicare or Medicaid.

The CDC opioid guideline recommends non-opioid options, both pharmacologic and non-pharmacologic, for chronic pain management outside of end-of-life, palliative, or active cancer care.⁶ In adjusted models, we found that use of PT trended upward; whereas, chiropractic care use remained unchanged from 2016–2018. It is possible that the demand for PT and chiropractic care exceeded the availability of these services in the state thereby creating a ceiling effect on non-pharmacologic treatment utilization. In this context, even clinicians with the best efforts to pursue guideline-directed non-pharmacologic therapies may have to rely on pharmacologic approaches to pain management. Lack of historical data on PT and chiropractic providers licensed in Rhode Island precludes our ability to determine changes in provider availability over the study period. Our analyses did not evaluate the impact of the CDC guideline directly, and

mostly our findings predate the July 2018 Rhode Island state regulations establishing minimum requirements for pain management and opioid prescribing. However, we provide a foundational profile of PT and chiropractic care use that can be tracked and evaluated over time.

Clinical trials for the efficacy, effectiveness, and safety of many nonpharmacologic and complementary approaches to manage chronic pain exist but are subject to methodological issues (e.g., small sample sizes, uncertainty about what represents clinically relevant differences, inconsistent outcomes across trials, lack of participant diversity by age, sex, and race) that contribute to mixed findings and variable interpretations of the robustness of the evidence.^{9,14,15} Notwithstanding, there appears to be a preponderance of positive trials versus negative trials,^{9,14} and recent evidence suggests non-pharmacologic and complementary therapies (e.g., spinal manipulation, massage, acupuncture, multidisciplinary rehabilitation) confer small to moderate, usually short-term benefits, mainly for chronic low back pain.¹⁵

Indeed, additional evidence is needed to inform which subgroups of chronic pain patients could benefit most from specific types of non-pharmacologic treatments. Thus, payers potentially face the dilemma of making coverage decisions based on mixed or weak evidence. This challenge combined with spending concerns may manifest in utilization management strategies that limit broader non-pharmacologic treatment access or use with sufficient regularity to make a difference in pain control and physical function. Nonetheless, others posit that insurance coverage is not current with evidence-based nonpharmacologic pain care that support effectiveness and cost-effectiveness for chronic pain.⁹ Given that federal and state actions in response to the opioid epidemic call for greater use of non-pharmacologic options in chronic pain management, there is need to reconcile these recommendations with payer policies in order to expand access and better align with clinical practice recommendations. Unless more generous insurance coverage is provided and sites for PT and chiropractic care are made more accessible, it will be difficult to design and tailor effective and equitable interventions to comprehensively treat pain and mitigate drug-related adverse events.

Expanding access to non-pharmacologic pain treatments in Medicare offers the potential to bring about greater use of these therapies more broadly because coverage policies in Traditional Medicare are often a benchmark for private payers. Our study found that the odds of a Medicare enrollee receiving PT were dramatically low compared with enrollees in Commercial plans. Although Medicare covers 80% of the cost of a PT treatment visit, it is plausible that paying the out-of-pocket cost is a significant barrier especially for those who lack secondary insurance. In contrast, some Medicare Advantage plans offer routine chiropractic services as an additional benefit. The 2020 decision by the Centers for Medicare and Medicaid Services to cover acupuncture for

Traditional Medicare enrollees with chronic low back pain was an example of the agency learning from the private payers in this aspect of patient care, and potentially marked an important step toward increasing access to nonpharmacologic opioid alternatives.

This study has limitations. First, the study lacked race/ethnicity data; therefore, we could not examine or adjust for racial differences in the use of non-pharmacologic pain treatments. Second, we cannot unequivocally differentiate whether studied treatments were provided for chronic pain or other conditions. Third, the extent to which non-pharmacologic treatments were offered as first-line therapy per guideline recommendations is unknown. Fourth, we were unable to ascertain pain severity or patient preferences toward non-pharmacologic versus pharmacologic treatment from the available data. We also do not know about treatments entirely paid for out-of-pocket or other types of pain treatment procedures (e.g., injections) that were not studied. Fifth, lack of historical data on the availability of PT and chiropractic care services in the state prevents us from understanding supply and demand as a factor in the use of these services. Finally, this study focuses on a single state; therefore, the findings may not be generalizable to the entire U.S. population or to those whose health service utilization is not captured in the Rhode Island APCD (e.g., the uninsured or self-insured). We note, however, that we analyzed data that includes private and public payers. This is a significant contribution as our results suggest that analyses of PT and chiropractic care use limited to one type of payer may not generalize to other payers.

CONCLUSIONS

Although non-pharmacologic options are regarded as a key component of guideline-concordant chronic pain management, we found low and largely unchanged overall monthly rates of PT and chiropractic care use in Rhode Island from 2016-2018. We observed slight increases in PT use among those with back, neck, and limb-related pain. Receipt of PT was higher in commercially insured and Medicare Advantage enrollees compared with Medicaid and Traditional Medicare; and rates of chiropractic care also lagged in Medicaid compared with private payers. Since several actions to improve pain management have focused on changing clinician and patient behaviors around opioid prescribing and use, payer policies for the coverage of non-pharmacologic opioid alternatives deserve more attention. Opportunities to raise awareness about effective nonpharmacologic treatments for chronic pain and practical ways to engage patients with such care should also be considered. Independent of referrals and payer policies, improving the state's capacity to deliver PT and chiropractic care by increasing the number of sites, licensed providers and reducing wait times for appointments could benefit chronic pain patients who require these services.

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Disclaimer

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