

State of MSK Report 2021

Changing Musculoskeletal Trends
Are Redefining MSK Care



Introduction

Musculoskeletal (MSK) medical spend is a top cost driver for many employers. But it doesn't have to be this way. Based on analyzing MSK medical claims data from 2010 to 2020, this report takes a deeper dive into the underlying trends behind these rising costs and offers insights into how employer benefit leaders and health plans can redefine MSK care and better manage spend.

Hinge Health commissioned an analysis of medical claims data for 40+ million Americans covered by leading health plans from 2010 to 2020. Based on this analysis, our State of MSK Report 2021 uncovers:

- ✓ **The latest MSK healthcare trends, including costs and types of treatments and treatment facilities over the last decade**
- ✓ **What these MSK healthcare trends mean for employer benefits leaders and health plans**
- ✓ **How COVID-19 impacted MSK trends in 2020 and what the implications are for the future of MSK care**
- ✓ **Actionable insights for benefits leaders and health plans on how to redefine MSK care and better manage spend**

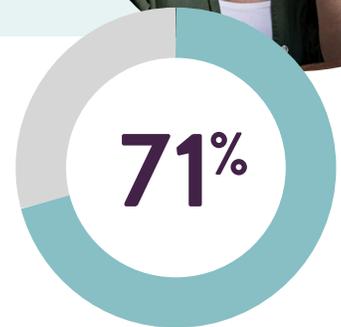
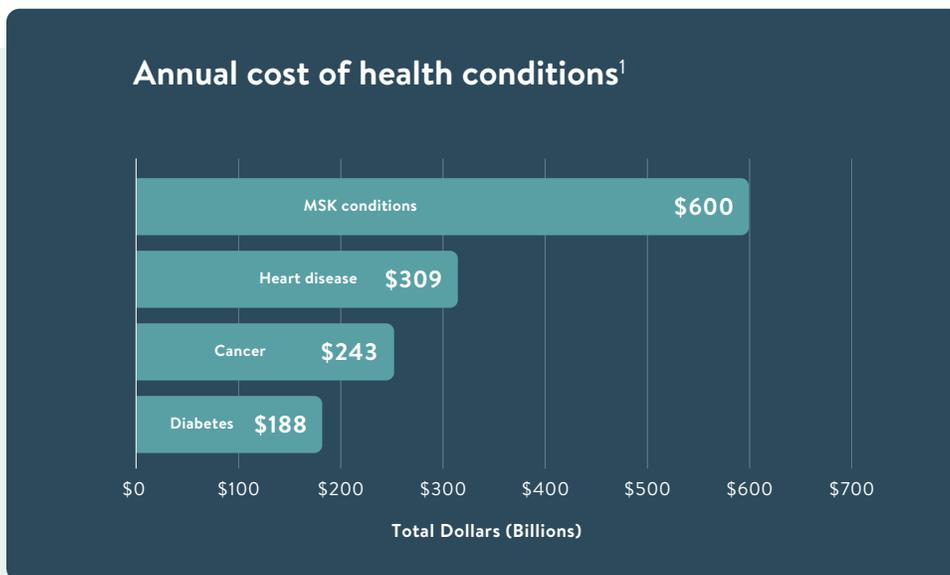
MSK

insight

Why it matters

More than half of the American population suffers from back, shoulder, knee and other joint pain. MSK represents one sixth of all spending in the US healthcare market and is the top cost driver of healthcare spending. To put this in perspective, the annual cost of MSK conditions (including healthcare costs and lost worker productivity) is around \$600 billion, greater than the annual costs of heart disease (\$309 billion), cancer (\$243 billion), and diabetes (\$188 billion).¹

Half of Americans suffer from MSK conditions, resulting in a \$600 billion price tag



71%
of members with back & joint pain are experiencing new or increased pain

Source: Hinge Health Survey Report: New Health Risks in the Remote Workplace, 2020.

The shift to working from home in the last year has also aggravated the issue, with 70% of employees with MSK conditions reporting that their pain has either gotten worse or they are experiencing new pain since remote work.

¹ Gaskin DJ et al. The Economic Costs of Pain in the United States. Relieving Pain in America: A Blueprint. National Academies Press. 2011.

MSK Healthcare Trends 2010-2020

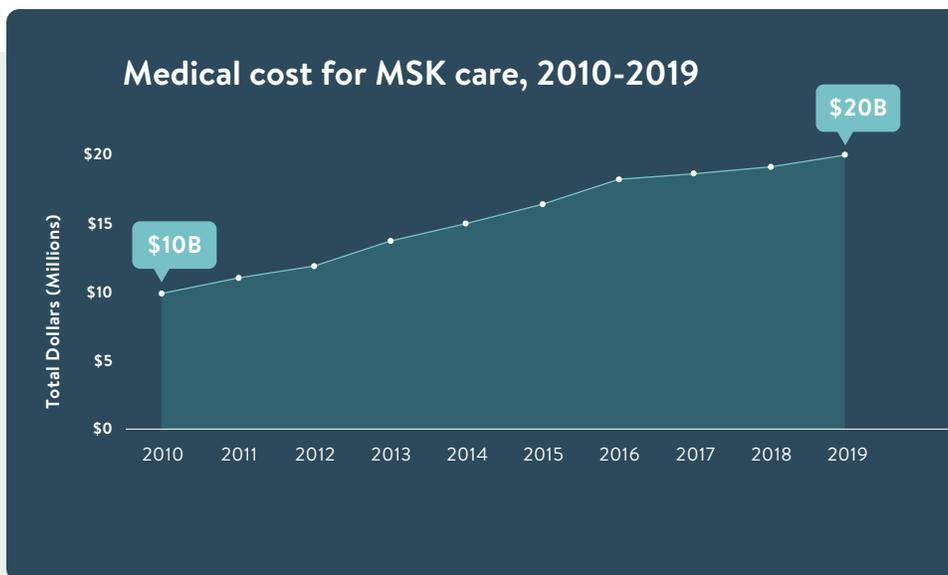
What are the MSK healthcare trends over the last decade? In this section, we'll do a deep dive into MSK care and cost trends and what this means for benefits leaders and health plans. Because 2020 was a unique year, we will look at trends from 2010 to 2019 and then take a closer look at what happened in 2020.

Over the last decade, MSK spend rose despite the MSK population remaining constant

Looking at MSK spend over the last decade, we discovered MSK costs doubled from \$10 billion to around \$20 billion between 2010 and 2019 in our analysis of 40+ million Americans. (Note this is only a fraction of the cost to the US system as a whole).

This doubling of MSK spend was driven by two main trends. First, there was a 40% increase in per-member costs from 2010 to 2019. Second, the number of health plan members in our dataset grew by 42% in this same time period, although the number of members filing MSK medical claims remained roughly constant.

The bottom line: The average MSK cost per member rose over the last decade.



Average MSK spend per member increased by 40% from 2010 to 2019

2x

MSK costs doubled in last decade

Note: Due to the pandemic, 2020 data is separated from this longitudinal trend data and will be discussed in a later section.

> WHAT THIS MEANS FOR EMPLOYER BENEFITS LEADERS AND HEALTH PLANS

Rising costs of MSK care mean employers and health plans should expect MSK to continue to be their top cost driver. Yet despite rising costs, MSK outcomes for members haven't gotten better over the last ten years.² Studies have shown that, despite a 65% increase in health care expenditures for patients with back and neck problems from 1997 to 2006, there has not been a corresponding improvement in patient clinical outcomes.³ In short, spending more money has not correlated with better outcomes for members.

The reality is, the current system is broken

Studies have demonstrated that common approaches to MSK care (surgery, imaging, injections, opioids) do not effectively resolve back and joint pain.⁴ Employer benefits leaders and health plans need to fundamentally approach MSK care differently to reverse this upward pressure on costs. This presents a new urgency for employer benefits leaders and health plans to manage and reduce MSK spend through more innovative forms of care. We'll dive deeper into just what types of MSK care are driving these spiraling costs.



**MSK spend
1997-2006**

≠



**No corresponding improvement
in patient outcomes¹**

Source:¹Martin BI et al. Expenditures and health status among adults with back and neck problems. JAMA. 2008

² Malik, Khalid M et al. Musculoskeletal disorders a universal source of pain and disability. Anesthesiology and Pain Medicine. 2018.

³ Martin, BI et al. Expenditures and health status among adults with back and neck problems. JAMA. 2008.

⁴ Cherkin, DC et al. Time to align coverage with evidence for treatment of back pain. J Gen Intern Med. 2019.

What's behind these cost increases?

In this section, we'll do a deep dive into the types of facilities and treatments driving up MSK costs.

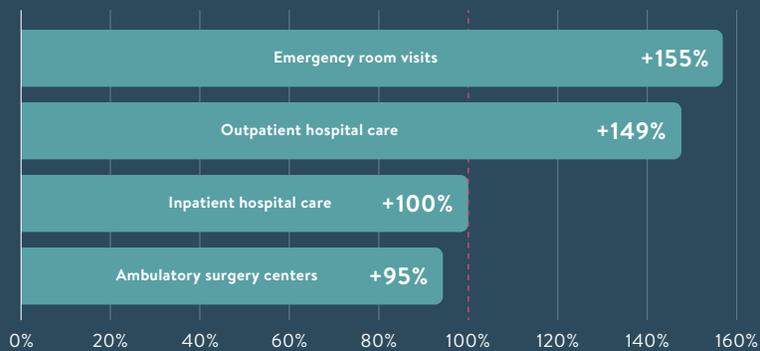
Facilities with fastest-growing MSK spend: ER, outpatient facilities, and inpatient hospitals

The fastest-growing MSK medical claims spend over the last decade came from emergency room visits, which grew 155%. Outpatient hospital care facilities came in a close second, growing 149% in the last ten years. Outpatient care facilities perform MSK surgeries, procedures, and injections without an overnight stay. In contrast, inpatient hospital care, which includes surgeries and procedures that often require expensive overnight stays, grew 100%. Finally, ambulatory care centers which are often billed as modern healthcare services with same-day surgery and procedures at an even lower cost than outpatient facilities, grew 95%.

2x

Total spend doubled in facilities like outpatient and inpatient hospital care and the ER 2010-2019

Fastest-growing MSK costs by facility, 2010-2019

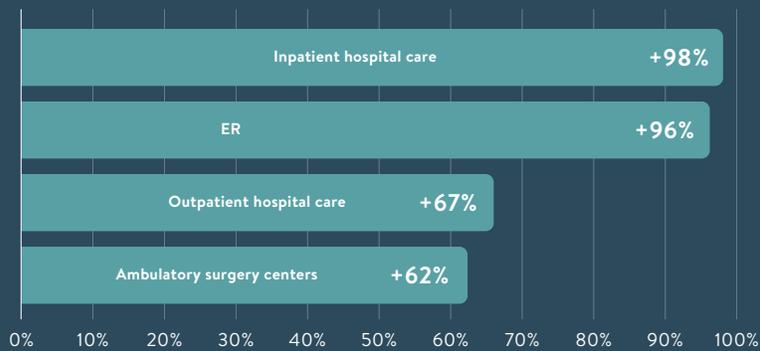


Note: While health plan membership grew 42%, MSK costs grew 155% in the same time period.

The bad news: Growth in facility costs is largely driven by unit cost increases, not demand

This hefty price tag is largely driven by per-member cost increases in the types of treatment and services provided, not an increase in demand. Inpatient hospital unit costs topped the list, growing at 98% over the last decade, with ER coming in second at 96%. Outpatient hospital care (67%) and ambulatory surgery centers (62%) also grew significantly.

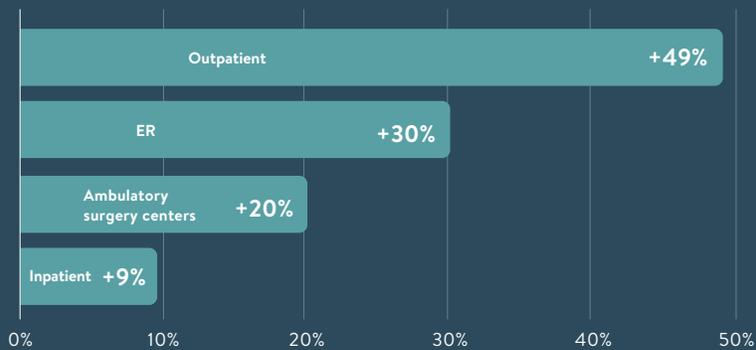
Growth in per-member, per-year costs 2010-2019



The good news: More members are using lower-cost outpatient facilities over the last decade

However, the good news is that more members are using lower-cost outpatient facilities for same-day surgeries and procedures—jettisoning the hefty overnight-stay price tag common at hospitals. MSK outpatient services utilization by members had the highest growth in the last decade at close to 50%. Fewer members opted for the more expensive inpatient hospital care, with this category growing only 9% in the last decade.

Percentage change in members using services in each setting from 2010 to 2019



MSK outpatient services utilization by members had the highest growth in the last decade at close to

50% ▲

> WHAT THIS MEANS FOR EMPLOYER BENEFITS LEADERS AND HEALTH PLANS

Is the rise in outpatient care good or bad?

At first glance, the rise in outpatient care is obviously better for patients, employers, and health plans because there are no overnight costs and hospitalization-related risks of infection. But as outpatient costs rise, employer benefits leaders and health plans might want to take a closer look at what kind of treatments their members are using at these so-called cheaper outpatient centers.

- **Increased access to procedures.** Increased access to ambulatory surgery centers and other outpatient centers, where higher volumes are possible, enables overutilization of procedures like spinal injections.
- **Rise of spine centers.** Back pain has become a lucrative business with the rise of “spine centers” offering injections and less-invasive procedures.⁵
- **Conservative care is better.** Best-practice research has proven that more conservative care like exercise therapy, behavioral health support, and education resolves back and joint pain far more effectively than expensive surgeries.⁶
- **Dependency on short-term pain relief.** The popularity of injections and other procedures could also be leading to a dependency on short-term pain relief rather than addressing the root of the problem through more holistic exercise therapy and lifestyle changes.



Back pain has become a lucrative business with rise of spine centers

⁵ Joyce Tsai. Back Pain Creates a Booming Business. Dallas Business Journal. 2010.

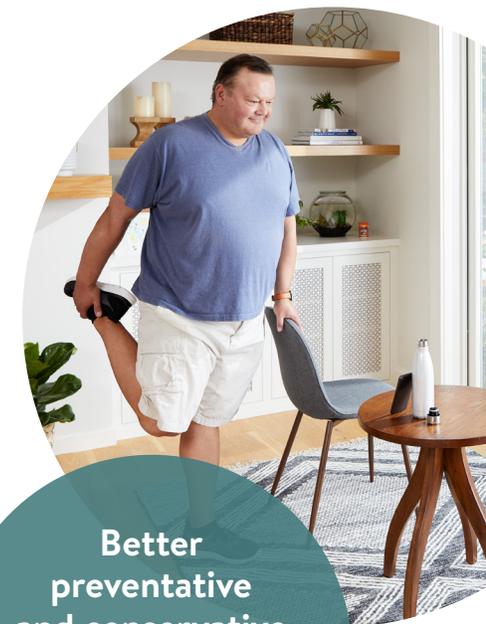
⁶ Ambrose, KR, Golightly, YM. Physical exercise as non-pharmacological treatment of chronic pain: why and when. Best Pract Res Clin Rheumatol, 2015

Benefits leaders should focus on MSK care upstream, rather than downstream

Finally, the ER tops the list as the fastest-growing facility for MSK medical claims. While some of these medical claims are likely traumatic incidents like car accidents, other acute MSK injuries might have been avoided through better prevention programs earlier in a member's journey.

Benefits leaders and health plans should focus their efforts upstream—earlier in a patient's MSK journey—with prevention programs and conservative care before MSK issues lead to expensive surgeries and ER visits downstream.

- **Better care starts at the acute phase.** Better MSK care during the acute phase can send a member down a better path of recovery through regular exercise therapy, lifestyle changes, and MRI avoidance—reducing the likelihood of an acute injury ever turning into chronic pain or leading to surgery.
- **Prevention programs by job type.** Prevention programs like advice and exercise therapies by job type can help to prevent injuries from occurring in the first place.
- **Expert Medical Opinion can guide members.** Having pre-surgery clinical support through Expert Medical Opinion services or a Center of Excellence can help educate members on their treatment options and avoid overutilization of surgery or guide members to high-quality, low-cost surgery providers.



**Better
preventative
and conservative
care can set a
member on the
right path**

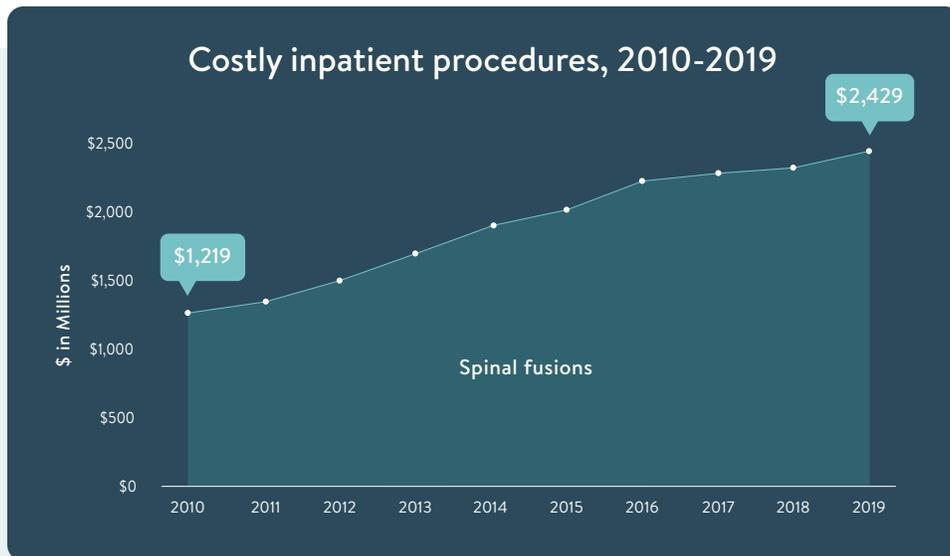
Deep dive: What treatments are driving up MSK costs?

MSK unit costs are on the rise, but what treatments are the biggest culprits?

Inpatient spinal fusions at hospitals are still the biggest culprit when it comes to high costs

Spinal fusions were still the most expensive procedure in inpatient hospital medical claims during the last 10 years. In fact, total costs for inpatient spinal fusions more than doubled from \$1.2 billion to \$2.4 billion between 2010 and 2019 in our dataset of 40+ million Americans.

More members are turning to spinal fusions, and the types of treatments and procedures are becoming more expensive at an even faster rate.⁷ Looking at medical claims data, the unit cost of treatment has been growing rapidly. For example the per-facility claim cost for inpatient spinal fusions rose 89% from 2010 to 2019. Studies have identified expensive new supplies, implants, and services as the drivers of rising spinal fusion costs.⁸



2x

Spinal fusion costs at hospitals have doubled

⁷ Martin, BI, et al. Trends in lumbar fusion procedure rates. Spine (Phila Pa 1976). 2019.
⁸ Beckerman, D, et al. Cost analysis of single-level lumbar fusions. Global Spine J. 2020.

> WHAT THIS MEANS FOR EMPLOYER BENEFITS LEADERS AND HEALTH PLANS

As spinal fusion costs skyrocket, there's even more urgency to provide alternative forms of treatment

While spinal fusions are more commonly being performed, they are also growing more expensive. This is in part due to the adoption of more expensive techniques, implants, and biologics, even though these “innovations” may not demonstrate long-term outcomes.⁹

For example, the spine implant market was worth \$12 billion globally in 2019, and while it declined in 2020 due to the pandemic, studies predict it will recover and grow to \$13.8 billion by 2023.¹⁰ In addition, the emergence of minimally invasive spine surgical approaches combined with spinal implants are adding to the popularity of these more expensive treatments. This dynamic contributes to the growing price tag of spinal fusions. Yet often, spine fusion surgery can be avoided. **The bottom line: There's even more urgency for benefits leaders and health plans to offer alternative treatments to avoid spinal surgeries when possible.**

Not all surgeries are created equal

For patients who end up having surgery, not all surgeries are created equal. Surgeon-based choices about the type of surgery and implants have a large impact on cost. But often this extra expenditure does not correlate with improved outcomes.⁹ Educating patients about more cost-effective treatment options, including various surgical options, should be a part of this approach. Using the Expert Medical Opinion service is an ideal mechanism to incorporate this level of detail and second-opinion advice from an unbiased source.



Expensive treatments, not demand, are driving up the unit cost of spinal fusions

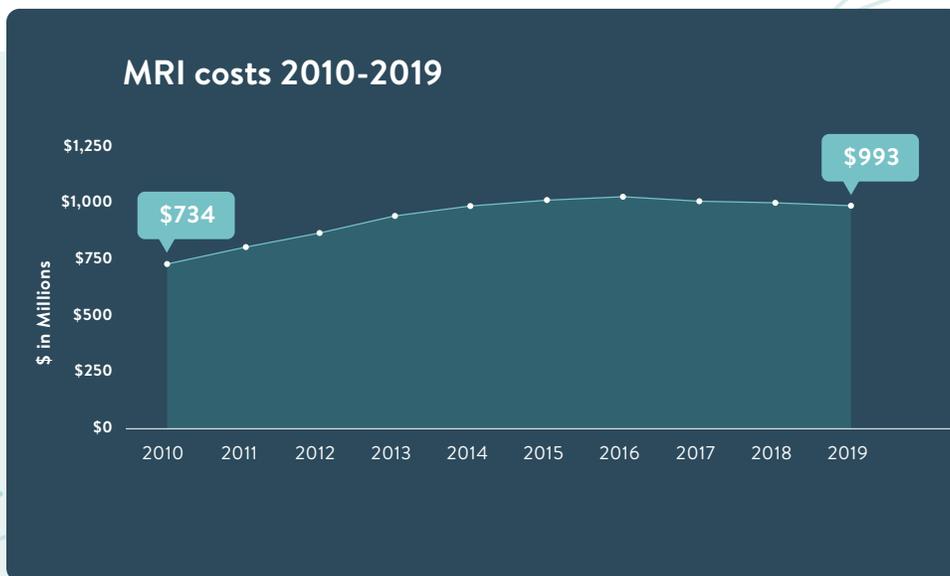
⁹ Reisener, MJ, et al. Trends in lumbar spinal fusion-a literature review. J Spine Surg. 2020; Beckerman, D. Cost analysis of single-level lumbar fusions. Global Spine J. 2020

¹⁰ Spine Implants Global Market Report 2020-30. Business Research Company. 2020.

MRI costs are still a leading source of MSK costs due to demand

MRIs have still been a big-ticket item for MSK medical claims over the last decade. From 2010 to 2019, costs for MRIs in outpatient facilities' and physician offices' medical claims increased by 35%. In this case, the growth is driven largely by increasing demand for MRIs, not the unit cost. The number of facility claims for outpatient MRIs rose by 46%. Although there has been some recent leveling off of costs for MRIs, the oversubscribing of MRIs, either by physicians or patients who demand it, is still a trend to keep an eye on.¹¹

MRI costs are driven by demand, not unit cost



35%
increase in MRI spend

¹¹ Levin, D, et al. Trends in outpatient MRI. Journal of the American College of Radiology. 2015.

> WHAT THIS MEANS FOR EMPLOYER BENEFITS LEADERS AND HEALTH PLANS

It starts with an MRI, but all roads lead to surgery

Unfortunately, MRIs can be a profitable business line for larger group practices, especially orthopedics. The fact that the number of facilities submitting claims has increased over the last ten years is not a great trend for benefits leaders and health plans. What's worse, this increased demand in MRIs and imaging can have a negative impact on MSK care.

- **Early MRI imaging leads to worse pain.** Studies have shown that early MRI and imaging (e.g., showing bulging discs in a patient's spine) often result in the patient feeling like they are incapacitated, and their MSK pain spirals out of control rather than improving.¹²
- **It's not best practice.** This overreliance on MRIs is also against best-practice guidelines.¹³
- **MRI leads to surgery.** Studies have also shown this imaging leads to even more invasive procedures like surgery and related high costs.¹⁴
- **Avoid MRIs early in the process.** Avoiding MRIs and imaging early in the process and instead focusing on conservative exercise therapy and lifestyle changes can help members go down a better path toward recovery.

Benefits leaders and health plans will need to intervene earlier in a member's MSK journey to guide them to more conservative, evidence-based care programs. Offering Expert Medical Opinion throughout a member's MSK journey and can help steer members away from unnecessary MRIs and get them on the right road to recovery.



Avoid MRIs early in a member's MSK journey

¹² Graves, JM, et al. Early imaging for acute low back pain: one-year health and disability outcomes. *Spine*. 2012; Webster BS, et al. Relationship of early magnetic resonance imaging for work-related acute low back pain. *J Occup Environ Med*. 2010

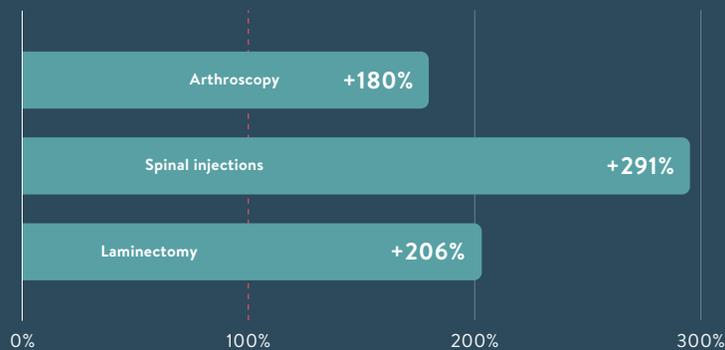
¹³ Wáng, YXJ, et al. Informed appropriate imaging for low back pain management. *Journal of Orthopaedic Translation*. 2018.

¹⁴ Lemmers GPG, et al. Imaging versus no imaging for low back pain: a systematic review. *Eur Spine J*. 2019.

Costs of less-invasive procedures have tripled

The costs of less-invasive procedures like arthroscopy, spinal injection, and laminectomy in outpatient and ambulatory surgery centers have also tripled. Arthroscopy, where orthopedists insert a small camera for diagnosis or repair, increased by 180% from 2010 to 2019. Laminectomy, a surgical procedure that relieves pressure on the spinal cord, increased 206% in the last decade. Finally, spinal injections grew by 291%. Again, the expensive technologies used in these treatments are driving up cost. Unit costs for arthroscopy grew by 95% and unit costs for laminectomy grew by 98%. These less-invasive procedures at outpatient and ambulatory surgery centers have grown in popularity as alternatives to traditional surgery, but they may not be the best bang for the buck.

Outpatient and ambulatory surgery centers medical claims cost increase, 2010-2019



> WHAT THIS MEANS FOR EMPLOYER BENEFITS LEADERS AND HEALTH PLANS

At first glance, it seems that the growth of less-invasive procedures like spinal injections is a positive outcome for members. In the long run, easy access to these procedures at outpatient “spine centers” is leading to an overreliance and dependence on “quick fixes” to pain management. Again, lifestyle changes and exercise therapy can ultimately provide members with lasting pain relief at a fraction of the cost.



**Easy access
to less-invasive
procedures are
actually driving up
MSK spend**

How COVID-19 impacted MSK spend in 2020

This past year was a unique year. As members opted to avoid elective MSK surgeries to minimize their COVID-19 exposure, MSK medical claims dropped to an all-time low.

In 2020, MSK spend dropped significantly

When the pandemic hit, MSK medical claims dropped overall by 20% in 2020 when compared to 2019. By quarter, the second and third quarters saw the biggest dip, at 26% and 29%, respectively.

MSK medical claims decline by quarter in 2020 vs 2019



In 2020, MSK spend dropped by

20%

when compared to 2019

Not surprisingly, costs decreased the most in inpatient and ER facilities

As members sought to avoid hospitals during the pandemic, inpatient and ER facilities saw a 40% drop in MSK medical claims in the third quarter of 2020 when compared to 2019. Outpatient and ambulatory surgery centers also witnessed a decline in MSK medical claim spend, dropping by 28% and 25%, respectively.

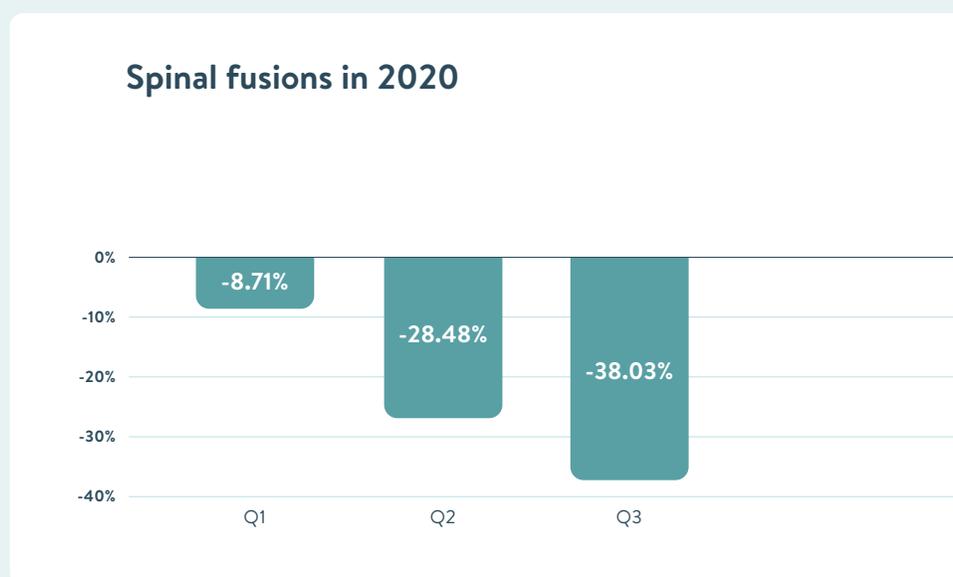
Drop in MSK medical claims in 2020 vs 2019 by facility



Decline
in MSK spend
of 40% for
ER and inpatient
hospital care

In particular, spinal fusion in inpatient hospitals decreased in 2020 due to COVID-19

Expensive spinal fusions saw a 28% drop in the second quarter of 2020 and 38% dip in the third quarter as members avoided unnecessary hospital visits.



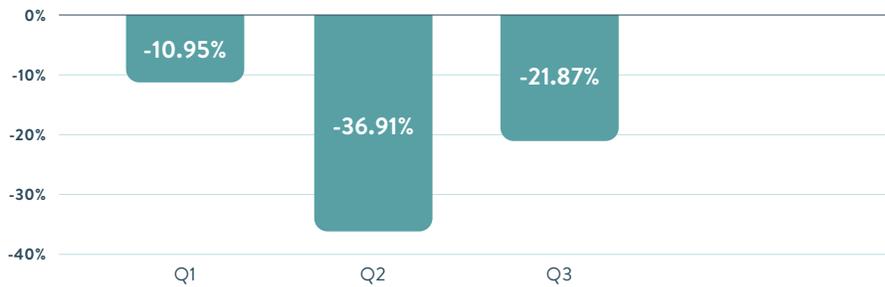
Spinal fusions on the decline in **2020** ▼

Note: Includes professional and facility claims

Spinal injections in ambulatory surgery centers also decreased due to COVID-19 in 2020

Spinal injections in ambulatory surgery centers also saw a dip in the second quarter of 2020, when most of the country was under shelter-in-place orders, and continued to remain low into Q3.

Spinal injections in 2020

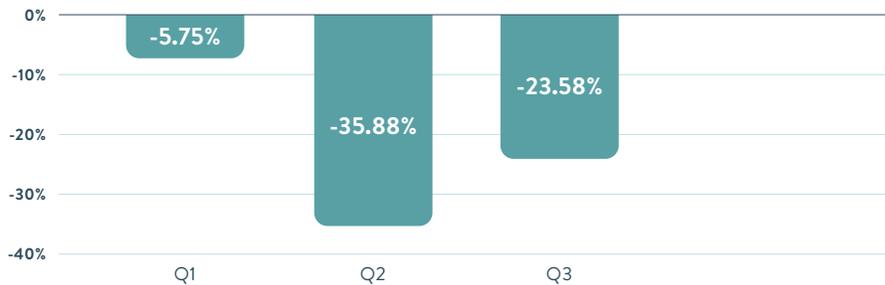


Spinal injections nose-dived in 2020

Imaging and other diagnostic radiology in outpatient centers also decreased due to COVID-19 in 2020

Imaging dived in the second quarter of 2020 by 36% and remained low into Q3.

Diagnostic radiology in outpatient centers in 2020



**Imaging
dipped by
36% in Q2**

Predicted surgery backlog means it will take months post-COVID to get an MSK surgery

In fact, even post-COVID, there will still be barriers for members to access MSK surgeries. New research in the Journal of Bone and Joint Surgery predicts it will be 7-16 months before the healthcare system can perform 90% of the COVID-related backlog of back and joint surgeries.¹⁵

Their modeling predicts that even at optimistic levels, after 2 years, there will be a cumulative backlog of more than 1 million MSK surgeries.

Beyond the pandemic, backlog of MSK surgery predicted up to 7-16 months



Source: Jain, Amit, et al. SARS-CoV-2 Impact on elective orthopaedic surgery. The Journal of Bone and Joint Surgery. 2020

¹⁵ Jain, Amit, et al. SARS-CoV-2 impact on elective orthopaedic surgery. The Journal of Bone and Joint Surgery. 2020.

> WHAT THIS MEANS FOR EMPLOYER BENEFITS LEADERS AND HEALTH PLANS

The good news is that these big-ticket items like surgeries, imaging, and injections—that have traditionally driven MSK costs up—are at an all-time low. Even after COVID-19, due to the surgery backlog at hospitals and outpatient centers, members may have to wait months in pain until they can receive elective surgery. Employer benefits leaders and health plans have a unique opportunity to wean their members off these expensive treatments. Studies have shown time and time again the ineffectiveness of treatments like surgery and injections and the more effective route of exercise therapy and lifestyle change for resolving back and joint pain.¹⁶

2021 opens the door for benefits leaders and health plans to redefine MSK care away from an overreliance on these expensive and unnecessary treatments. Of course the bad news is that members' musculoskeletal pain is being left untreated and they are likely suffering in silence.

- **Offer digital MSK care.** Digital care is a scalable way for your members to get best-practice care to reduce or avoid pain and prevent costly surgeries.
- **Go beyond just physical therapy.** MSK care is complex. One-size-fits-all doesn't work for your members. Offer a holistic approach for the whole body with a complete clinical team of physical therapists, physicians, health coaches, and other specialists who are integral to behavioral support and lifestyle changes.
- **Ensure that MSK care is accessible.** With the expiration of the CARES Act in 2021, physical therapy-only solutions that are not First Dollar Coverage may require high member out-of-pocket spend. Look for digital MSK solutions that have designed their programs to be First Dollar Coverage to keep spend low for your members.

Low MSK spend in 2020 presents opportunities to redefine MSK care beyond COVID-19



Digital MSK solutions make best-practice care accessible and improve clinical outcomes.

¹⁶ Ambrose, KR, Golightly, YM. Physical exercise as non-pharmacological treatment of chronic pain. Best Pract Res Clin Rheumatol, 2015

How did this drop in MSK claims impact industries?

Finally, industries across the board are witnessing a drop in MSK medical claims due to the pandemic. In addition, the services sector, which includes professional services in business, law, and engineering as well as the hotel and entertainment industries, was the largest sector with MSK claims in 2020, followed by the public sector and manufacturing.

Drop in MSK spend in 2020 by industry



The service sector had both the highest MSK spend and the largest decline in 2020

Note: “Services” includes hotels and other lodging places; establishments providing personal, business, repair, and amusement services; health, legal, engineering, and other professional services; educational institutions; membership organizations, and other miscellaneous services.

Redefining MSK care in 2021 and beyond



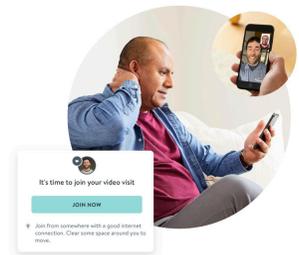
2021 offers opportunities for benefits leaders and health plans to redefine MSK care and keep medical spend low while getting ahead of the large backlog of elective MSK surgeries. Here’s how Hinge Health’s Digital MSK Clinic can help you redefine MSK care and reverse the MSK cost trend while also providing better outcomes for members.

- **Go beyond digital physical therapy:** Four in five employers turn to Hinge Health to solve high MSK spend because we go beyond digital physical therapy. To address each member’s unique physical and behavioral health needs, Hinge Health pairs advanced wearable technology with a full care team that includes doctors, physical therapists, expert specialists (such as nutritionists), and health coaches.
- **The only end-to-end Digital MSK Clinic™:** Hinge Health’s Digital MSK Clinic has an MSK program for everybody and every body part. Other MSK solutions have a one-PT-fits-all approach that falls short. At Hinge Health, we have dedicated programs to meet the unique needs of every individual—from acute care to chronic care, physical therapy video visits, specialists, health coaches and Expert Medical Opinion. We guide them on the right path of recovery every step of the way.
- **Proven and credible:** Hinge Health is validated at scale with more customers than all other MSK solutions combined and 100% client retention. Established partnerships also offer easy contracting and billing through your carrier or PBM. Hinge Health has invested millions to design a Digital MSK Clinic with First Dollar Coverage in mind.

Prevention



Acute



Chronic



Expert Medical Opinion



4 in 5 employers with a digital MSK solution partner with Hinge Health

Hinge Health is the only solution:

- Designed with First Dollar Coverage in mind
- Validated by researchers at the most rigorous US academic institutions with multiple randomized control studies, 2-year outcomes, and large-scale 10,000-participant studies

Clinical outcomes at scale

The only solution with 10,000+-participant studies and 2-year outcomes validated by researchers at leading US universities.^{17, 18, 19, 20}

- **69% pain reduction** – 4x better than opioids
- **Depression and anxiety** cut in half
- **2 of 3** surgeries avoided



300+ customers, 100% client retention










¹⁷ Smittenaar (2017), ¹⁸ Mecklenburg (2018), ¹⁹ Bailey (2019), ²⁰ Bailey (2020).



Hinge Health is pioneering the world’s most patient-centered Digital MSK Clinic. We reduce MSK pain, opioid use, and surgeries by pairing advanced wearable technology with a comprehensive clinical care team, including doctors of physical therapy, physicians, health coaches, and more. Available to millions of members, Hinge Health is the #1 Digital MSK Clinic for health plans and employers, including Boeing, Salesforce, and US Foods.

Learn more at www.hingehealth.com