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THE USES AND LIMITATIONS OF DIAGNOSIS AND PROGNOSIS IN THE DEVELOPMENT OF FUTURE CARE NEEDS IN MUSCULOSKELETAL INJURIES

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Introduction

Determining the reasonable costs associated with an injured individual's future medical care needs requires a comprehensive evaluation of all factors influencing the nature, current status, and likely progression of the injury and the person's other health conditions. Recommendations for the type, quantity, timing, and duration of future care should be based on evidence-based literature and objective data about the individual. Key considerations include the patient's age, sex, pre-existing and comorbid conditions (such as diabetes, obesity, or cardiovascular disease), prior treatment, and current clinical status. These data are typically gathered from a thorough review of medical records, patient interviews and examinations, consultations with treating providers, relevant medical literature, and other supporting documentation. If the person making the recommendations is denied access to any source of information (e.g., denied permission to interview the injured person or treating physicians), this should be noted in the report.[1]

2. Although published life care planning standards are the gold standard for recommending future care, an emerging trend has been the use of abbreviated approaches that rely primarily on diagnosis and prognosis—commonly called "prognosis-based cost projections." This paper examines the applications and limitations of relying on prognostic assumptions to forecast future and lifelong care needs for individuals with non-catastrophic musculoskeletal (MSK) injuries.

Background

3. In recent years, prognosis-based medical cost projections have become common, particularly in personal injury litigation. A prognosis refers to the expected course, outcome, or recovery trajectory associated with a specific diagnosis.[2] Prognostic determinations can be influenced by a range of factors, including injury severity, pre-existing or comorbid medical conditions and their severity, symptom duration and intensity, psychological status, age, gender,

[1] International Association of Rehabilitation Professionals, *Standards of Practice for Life Care Planners*, 4th ed. (Glenview, IL: IARP, 2022), p. 12, https://cdn.ymaws.com/rehabpro.org/resource/collection/D5B16132-B4BE-4918-BA5A-1BABE8C2E1A4/iarp-standards-of-pratice.pdf, accessed October 6, 2022.
[2] "Prognosis," Cleveland Clinic, https://my.clevelandclinic.org/health/articles/prognosis, accessed November 24, 2025.

past injuries, and the results of past treatments. Additionally, in cases involving catastrophic injury or severe chronic conditions, a physician may determine an individual's life expectancy is shorter than the population-based average or median, affecting the projected total cost. Although some professionals advocate the use of prognosis-based projections, this method cannot be considered equivalent to—or a substitute for—a comprehensive life care plan as a basis for recommendations for medically necessary future care due to a specific non-catastrophic injury.

4. Life care planning is supported by standards of practice and consensus guidelines developed by professional organizations to ensure that recommendations for future care are reasonable, reliable, valid, and consistent.[3] In contrast, there are no generally accepted standards or methods to determine future care needs for soft-tissue MSK injuries based solely on a person's primary diagnosis and age. This is more problematic in cases where an injured person has received multiple diagnoses by multiple providers—some of which may be duplicative, inconsistent across providers, or unsupported by objective medical findings. Such variability can lead to the inclusion or exclusion of necessary treatment and medications and to unreliable cost estimates.

5. For example, a patient evaluated by several providers for low back pain with imaging that shows only age-appropriate changes (such as lumbar facet joint spurring) may receive a wide range of diagnosis codes: strain of muscle, fascia, and tendon of the lower back (S39.012A); low back pain, unspecified (M54.50); lumbar degenerative disc disease (M51.36); lumbar spondylosis or facet syndrome (M46.96); vertebrogenic low back pain (M54.51); lumbar spinal stenosis (M48.06); other intervertebral disc displacement (M51.27); and other or unspecified dorsopathies (M53.2X7). This raises critical methodological questions: Which diagnosis should determine future care needs? Should the diagnoses be considered cumulatively or independently? And is there a clear reason why certain diagnoses inform the prognosis while others do not? The patient's primary diagnosis and age are not enough information for a clinician to develop a reasonable individualized treatment plan to treat an injury or illness that meets

[3] Cloie Johnson, Caroline Williams, Amy MacKenzie, and Brook Feerick, "Consensus and Majority Statements Since 2000: Updated at the 2025 Life Care Planning Summit," *Journal of Life Care Planning* 23, no. 2 (2025): 75.

generally accepted standards of care. For this reason, diagnosis-based projections lack reliability and clinical validity.

Use of Diagnosis Code(s) and Prognoses for Future Care Determinations

6. While prognostic information can offer valuable insight into long-term care needs for individuals with catastrophic or chronic progressive conditions—such as spinal cord injuries, severe brain conditions, cancer, amyotrophic lateral sclerosis (ALS), and Alzheimer's disease—its usefulness is far more limited for common soft-tissue MSK injuries. Recovery patterns for MSK conditions are highly variable and make generalized prognostic assumptions unreliable. There is substantial evidence of favorable outcomes for common mild to moderate MSK injuries, yet this evidence is rarely reflected in prognosis-based future care estimates. Regardless of whether a document is presented as a medical cost projection, a life care plan, or another type of future care report, all recommendations must be based on a reasonable foundation and tailored to the individual's specific clinical circumstances.

7. One example of a method for a prognosis-based cost projection states:

- Determining a claimant's prognosis requires a thorough understanding of the claimant.
- Gather up-to-date information about the individual, their condition, … as well as any other factors impacting the needs of the individual.
- Identify any research that best suits the individual's needs/condition.
- Collaborate as necessary with other medical experts and/or treating providers about research results, state prognosis research results clearly in the life care plan, including the methods used in obtaining those results.[4]

8. Instead, in a prognosis-based future cost estimate, the evaluator identifies one or more ICD-10 diagnosis codes and recommends a standardized prognosis and treatment plan associated with those diagnoses. Under this approach, the projected care needs—including the

[4] Rebecca Mendoza Saltiel Busch, Andrew Busch, Thomas Garzillo, and Dena Ramsey, "The Role of Prognosis Research in Projecting Healthcare Expenses," *AANLCP Journal of Life Care Planning* 24, no. 3 (Summer 2024): 13–23, https://www.aanlcp.org/wp-content/uploads/2024/08/AANLCP-Summer-2024-Journal.pdf.

type and frequency of medical treatment—remain the same for all individuals assigned the same diagnoses, no matter the specific circumstances of their injury(ies), personal medical history, or comorbid conditions. When lifelong care is assumed, cost calculations are extended across the individual's residual life expectancy.

Example: ICD-10 M51.16 (Lumbar Disc Herniation with Radiculopathy)

9. The following example shows a prognosis-based future care projection for ICD-10 code M51.16 (lumbar disc herniation with radiculopathy) in two patients with similar injuries but different backgrounds.

> **Patient A:** 18-year-old white male rear-ended by a pickup truck while driving a compact sedan with resultant low back pain and pain down the right buttock. An MRI scan of the lumbar spine one week after the accident showed osteophytes (bone spurs) and focal disc herniation at L4–L5 on the left. The radiologist noted no acute injuries. The patient's treating provider diagnosed a lumbar strain. He had twelve weeks of physical therapy, muscle relaxers, and non-steroidal anti-inflammatory medication, and was pain free and released from care by his treating providers. His final examination showed mildly reduced range of motion in the lumbar spine, and his provider recommended continued home exercises and said he could resume full activities.
>
> **Patient B**: 56-year-old Hispanic female rear-ended by a pickup truck while driving a compact sedan with resultant low back pain and pain down the right buttock. An MRI scan of the lumbar spine one week after the accident showed bilateral osteophytes and a focal disc herniation at L4–L5 on the left. The radiologist noted no acute injuries. The patient's treating provider diagnosed a lumbar strain. She had twelve weeks of physical therapy, muscle relaxers, and non-steroidal anti-inflammatory medication, and was pain free and released from care by her treating providers. Her final examination showed mildly reduced range of motion in the lumbar spine, and her provider recommended continued home exercises and said she could resume full activities.

10. A prognosis-based future care projection was performed using the ICD-10 code M51.16 (lumbar disc herniation with radiculopathy), not a lumbar strain as diagnosed by the treating provider, and without consideration of the level and expected symptoms of diagnostic findings (symptoms on the right but disc herniation on the left). An unusual onset of care was projected to begin ten years after the event. These treatments were recommended as needed solely due to the accident. (Note: A review of the medical literature reveals no standardized prognosis for ICD-10 code M51.16.)

Future Care Based on Prognosis of ICD-10 M51.16 (Example)

	Patient A	**Patient B**	Cost per unit
Remaining Life Expectancy	60 years	27 years	
Initiation and Duration of Care	Beginning at age 28 to end of life	Beginning at age 66 to end of life	
Evaluations (99213)	Once every year for life	Once every year for life	$210.52
Rehabilitation (97110;4 modalities = 1 unit therapeutic exercises)	12 units a year for life	12 units a year for life	$333.56
Diagnostics: Lumbar Spine MRI (72148)	Once every 5 years for life	Once every 5 years for life	$2051.29
Chiropractic Manipulation (98940)	12 units a year for life	12 units a year for life	$67.12
Total Lifetime Cost	**$271,447**	**$92,291.00**	

Variability and Limitations

11. In the example above, the projected cost of future care varies only because of the person's age and residual life expectancy. This shows that these prognosis-based future cost estimates could be generated ***before*** reviewing medical records for past treatment and other diagnoses, without interviewing the injured individual, without consulting treating providers, without assessing comorbid conditions, and without considering the person's current symptoms.

Such an approach is not a reliable basis for recommending future care needs for common soft-tissue MSK injuries arising from a single event. It ignores the individualized nature of patients, injuries, and recovery, and risks misstating the person's actual clinical and functional needs.

12. Outcomes for a disc herniation in the above example vary widely and depend on many individual factors, including age, injury severity, comorbidities, prior treatment response, history of earlier injuries, neurological findings, genetic propensity, and current clinical status. Many cases of disc herniations are asymptomatic and found incidentally,[5] and even large disc herniations are less likely to develop a progressive nerve injury if improved after treatment.[6] Therefore, applying a fixed prognosis without an individualized assessment is unreasonable and unreliable.

13. Looking at the above examples and other reports, the author of the prognosis-based reports did not review prior medical records or consider these additional details. Other pertinent information apparently considered non-factors includes:

Patient A

- Six-year history of playing school football as an offensive lineman
- Prior injury to the left shoulder, arthroscopic debridement for impingement syndrome; resumed play after six months
- Soft-tissue neck injury last year playing football; recovered and resumed play
- Concussion six months ago, resumed play two months later

Patient B

- Type II diabetes
- High blood pressure
- Fibromyalgia/chronic pain syndrome

[5] Ziyad Almushayti, Fahad Alshehri, Hassan Alwadaani, et al., "Incidental Findings During Degenerative Intervertebral Disc Disease Evaluation at Magnetic Resonance Imaging of the Lumbar Spine," Medical Science 25, no. 107 (Jan. 2021), https://discoveryjournals.org/medicalscience/current_issue/v25/n107/A9.htm.
[6] Zhijia Ma, Pengfei Yu, Hong Jiang, et al., "Conservative Treatment for Giant Lumbar Disc Herniation: Clinical Study in 409 Cases," *Pain Physician* 24, no. 5 (Aug. 2021): E639–E648, https://www.painphysicianjournal.com/current/pdf/NzI5NA%3D%3D/137/Article-PDF.

- Smoker for 25+ years
- Morbid Obesity: height 5'4", weight 275 pounds, body mass index (BMI) of 47.2 (normal BMI between 18.5 and 24.9)[7]

14. Both examples have different values for factors that are critical to consider when developing future care recommendations. Obesity is independently associated with a higher risk of disc degeneration and herniation, including both the cervical and lumbar spines, and this risk increases with higher BMI. A recent MRI-based study found higher BMI is associated with increased odds of intervertebral disc herniation.[8] Genetics are also contributory to the development of disc herniation. The other factors important to consider in the above examples are prior football injuries, diabetes, fibromyalgia, and smoking. All these contribute to the development and continuation of degenerative disease, arthritis, and general health. By determining all future treatment is solely due to one event, the author ignores important contributions to the mechanisms of injury and ignores the natural history of the findings.

15. If the author has not interviewed or examined the individual, does not consider resolution of symptoms or current condition, does not consider prior or comorbid conditions, or does not speak to treating physicians, using a diagnosis code and recommending a standard treatment "prognosis" for that code is not individualized. An author cannot ignore the patient's history or current condition as a non-factor and consider their future care recommendations as reliable and necessary based solely on one event. There is also great variability in the literature on "prognosis," depending on these details. Using these models fails to adapt to clinical changes or account for the dynamic nature of the patient's response to treatment.

16. A recent case (2026) illustrates the legal risks associated with prognosis-based future care projections. In this matter, the court granted a motion to strike expert testimony after

[7] "Calculate Your BMI," National Heart, Lung, and Blood Institute, https://www.nhlbi.nih.gov/calculate-your-bmi, accessed November 24, 2025.
[8] M. Teraguchi, N. Yoshimura, H. Hashizume, et al., "Prevalence and Distribution of Intervertebral Disc Degeneration Over the Entire Spine in a Population-Based Cohort: The Wakayama Spine Study," *Osteoarthritis and Cartilage* 22, no. 1 (2014): 104–10.

determining the expert report did not meet the required standards for qualification under applicable evidentiary rules.[9]

17. The court determined the expert's opinions were inadmissible because they were unreliable, lacked an adequate factual foundation, and were irrelevant to the issues before the court. The expert had not interviewed the injured person or his treating physicians. Notably, none of the plaintiff's treating providers had recommended future care due to the event that was the subject of the litigation.

18. Additionally, the expert testified at deposition that he selected a diagnosis to be "plugged into" a prognosis-based projection before a making a complete review of the medical records.[10] Based on these deficiencies, the court granted the motion to strike, precluding the expert from offering testimony, opinions, or evidence at trial or at any hearing in the matter.[11]

Evidence from Medical Research

19. There are over 30 prognostic models for treating low back pain. Few have successfully translated to clinical practice.[12] Methodological challenges and shortcomings in using a prognostic model for patients with spinal disorders and other MSK injuries are common and challenging. Results of these studies are rarely validated externally with actual patient results. Evidence of outcome improvement from prognosis-based care is limited. Psychosocial, behavioral, and contextual factors are often more predictive of outcomes than diagnosis or

[9] *Quontravius Smith vs. Sebron Nickerson, J.B. Hunt Transportation Inc., and J.B. Hunt Transport Services Inc.*, Defendants' Motion to Strike, Exclude, and/or Limit the Testimony of Dr. Thomas Garzillo, DC, filed December 11, 2025.
[10] *Quontravius Smith vs. Sebron Nickerson; J.B. Hunt Transportation Inc., and J.B. Hunt Transport Services, Inc*., Defendants' Motion to Strike, Exclude, and/or Limit the Testimony of Dr. Thomas Garzillo, DC, filed December 11, 2025.
[11] *Quontravius Smith vs. Sebron Nickerson; J.B. Hunt Transportation Inc., and J.B. Hunt Transport Services Inc*., Order on Defendants' Motion to Strike, Exclude, and/or Limit the Testimony of Dr. Thomas Garzillo, DC, February 10, 2026.
[12] Adrian C. Traeger, Markus Hübscher, and James H. McAuley, "Understanding the Usefulness of Prognostic Models in Clinical Decision-Making," *Journal of Physiotherapy* 63, no. 2 (Apr. 2017): 121–125, https://doi.org/10.1016/j.jphys.2017.01.003, accessed November 29, 2025.

clinical measures. The table below gives relevant study information and limitations of using prognosis to determine medically reasonable treatments for MSK injuries.

Study	Study focus	Study Type	Implication for Prognosis-Based Treatment Planning
Wingbermühle et al. (2021)[13]	Spinal disorders (low back pain, spinal stenosis, disc disease)	Methodological review	Models may perform well in development but fail in new populations, leading to misleading treatment guidance.
de Vos Andersen et al., (2017)[14]	General MSK pain	Prospective cohort	Primary pain site diagnosis had little impact on the strength of predictions and did not add any significant predictive ability. Treatment should remain individualized.
Naye et al. (2023)[15]	Various MSK rehabilitation conditions	Systematic review (46 studies)	Prognostic tools for MSK rehab lack robustness; relying on them may lead to overconfidence or inappropriate care stratification.
Nieminen (2021)[16]	Non-specific low back pain	Systematic review	Prognostic factors should include pain intensity, higher body weight, and biomechanical, psychological, and psychosocial data for chronicity in low back pain.
Silva et al. (2022)[17]	Recent-onset low back pain	Systematic review	Prediction models do not perform well at discrimination and lack rigorous methods and acceptable ability.

[13] Roel W. Wingbermühle, Alessandro Chiarotto, Bart Koes, et al., "Challenges and Solutions in Prognostic Prediction Models in Spinal Disorders," *Journal of Clinical Epidemiology* 132 (Apr. 2021): 125–130, https://doi.org/10.1016/j.jclinepi.2020.12.017.
[14] Nils-Bo de Vos Andersen, Peter Kent, Jakop Hjort, and David Høyrup Christiansen, "Clinical Course and Prognosis of Musculoskeletal Pain in Patients Referred for Physiotherapy: Does Pain Site Matter?" *BMC Musculoskeletal Disorders* 18, no. 1 (Mar. 2017):130, DOI: 10.1186/s12891-017-1487-3.
[15] Florian Naye, Simon Décary, Catherine Houle, et al., "Six Externally Validated Prognostic Models have Potential Clinical Value to Predict Patient Health Outcomes in the Rehabilitation of Musculoskeletal Conditions: A Systematic Review," *Physical Therapy* 103, no. 5 (2023): 1–10, https://doi.org/10.1093/ptj/pzad021.
[16] Linda Nieminen, Liisa Pyysalo, and Markku Kankaanpää, "Prognostic Factors for Pain Chronicity in Low Back Pain: A Systematic Review," *Pain Reports* 6, no. 1 (Apr. 2021): e919, DOI: 10.1097/PR9.0000000000000919.
[17] Fernanda G. Silva, Leonardo Op Costa, Mark J. Hancock, et al., "No Prognostic Model for People with Recent-Onset Low Back Pain Has Yet Been Demonstrated to Be Suitable for Use in Clinical Practice: A Systematic Review," *Journal of Physiotherapy* 68, no. 2 (Apr. 2022): 99–109, DOI: 10.1016/j.jphys.2022.03.009.

Discussion & Conclusions

20. Numerous models attempt to provide prognosis-based treatment for MSK issues. Few, if any, have been validated or shown to be useful in clinical practice. When predicting future care needs for someone with an injury, it is critical to consider the individual circumstances that affect those needs.

21. While a prognosis can help medical professionals identify potential treatment paths and likely recovery outcomes, it is inappropriate to use a primary diagnosis and age alone to determine future care needs. Even in cases involving catastrophic injuries or chronic conditions, any method that does not include a detailed patient history, a thorough examination of the patient's current condition, collaboration with treating providers or specialists, and other essential clinical data can produce unreasonable and unreliable treatment recommendations and cost projections. Such an approach risks overestimating or underestimating reasonable future care because it fails to account for complicating or mitigating factors. A cost projection based solely on a limited record review after an event, without understanding the patient's current condition, relevant medical history, comorbidities, or input from treating providers who know the patient best, cannot be considered medically reasonable or economically reliable.

22. Prognosis should serve as one input of many to clinical judgment. Recommendations for future care must incorporate all factors influencing the individual and their injuries—not ignore them. Psychosocial and behavioral factors must also be considered, as they significantly influence outcomes. The medico-legal use of prognostic models requires further ethical guidance, methodological development, and professional consensus to determine whether such approaches can be considered reasonable or reliable for determining future care needs. Today, a prognosis-based methodology—particularly for non-life-threatening and MSK injuries—is neither reasonable nor reliable for projecting future care needs or associated costs.

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