Washington State Hospital Association

DASH
Data Analytics Service Hub

Washington State Hospital Association

Analysis of the Month
Diagnostic Excellence
Spinal Cord Compression

Situation and Background

Back pain is non-specific and a common patient complaint among many healthcare settings. Many acute back pain episodes are self-limiting. Spinal cord compression (SCC) can result from numerous atraumatic and traumatic causes. Spinal cord compression can occur from a wide range of underlying conditions. Additionally, there is significant overlap between signs and symptoms of back pain and risk for SCC. There is also broad differential diagnosis to SCC. This article will focus on atraumatic causes of spinal cord compression, including degenerative spondylosis with myelopathy, metastatic disease of the spine, primary spinal cord malignancy, spinal epidural abscess, and spontaneous or iatrogenic spinal epidural hematoma.[1]

Delay in identifying that the patient who is presenting with SCC can lead to devastating and debilitating symptoms for the patient. It can lead to a malpractice claim against hospitals as well as medical professionals. Emergency Department (ED) diagnosis of SCC is complex, often requiring an

MRI scan. In some cases access to an MRI is limited, which further compounds the difficulty of identifying patients with SCC.

The goal of this analysis is to learn more about the incidence of and associated variables of potential delayed diagnosis of SCC. We will accomplish this goal by looking at our Washington Discharge Dataset. The Washington Discharge Dataset is WSHA's data collection program, which collects monthly hospital-based claims from hospitals. DASH (Data Analytics Service Hub) and DASH Premium are WSHA's analytic layers on top of the Washington Discharge Dataset, which provides dashboards and ad-hoc explorer capabilities to hospital members.

Summary of Findings

We pulled ED visits (January 2022 – September 2023) from the Washington Discharge Dataset that had a subsequent acute inpatient stay within 30 days of their initial ED visit. We filtered the acute inpatient claims to only patients who have a diagnosis code of a SCC (please see the Limitations & Other Considerations section for a complete list).

Then, we looked back at the ED visits to see what diagnoses were present on the ED visit. If the ED visit had at least one of the possible SCC diagnoses, then we consider that to be "Identified". Otherwise, it was "Not Identified".

In total, we have 4,447 ED visits in this dataset. Overall, we saw a 64.5% identification rate for those visits.
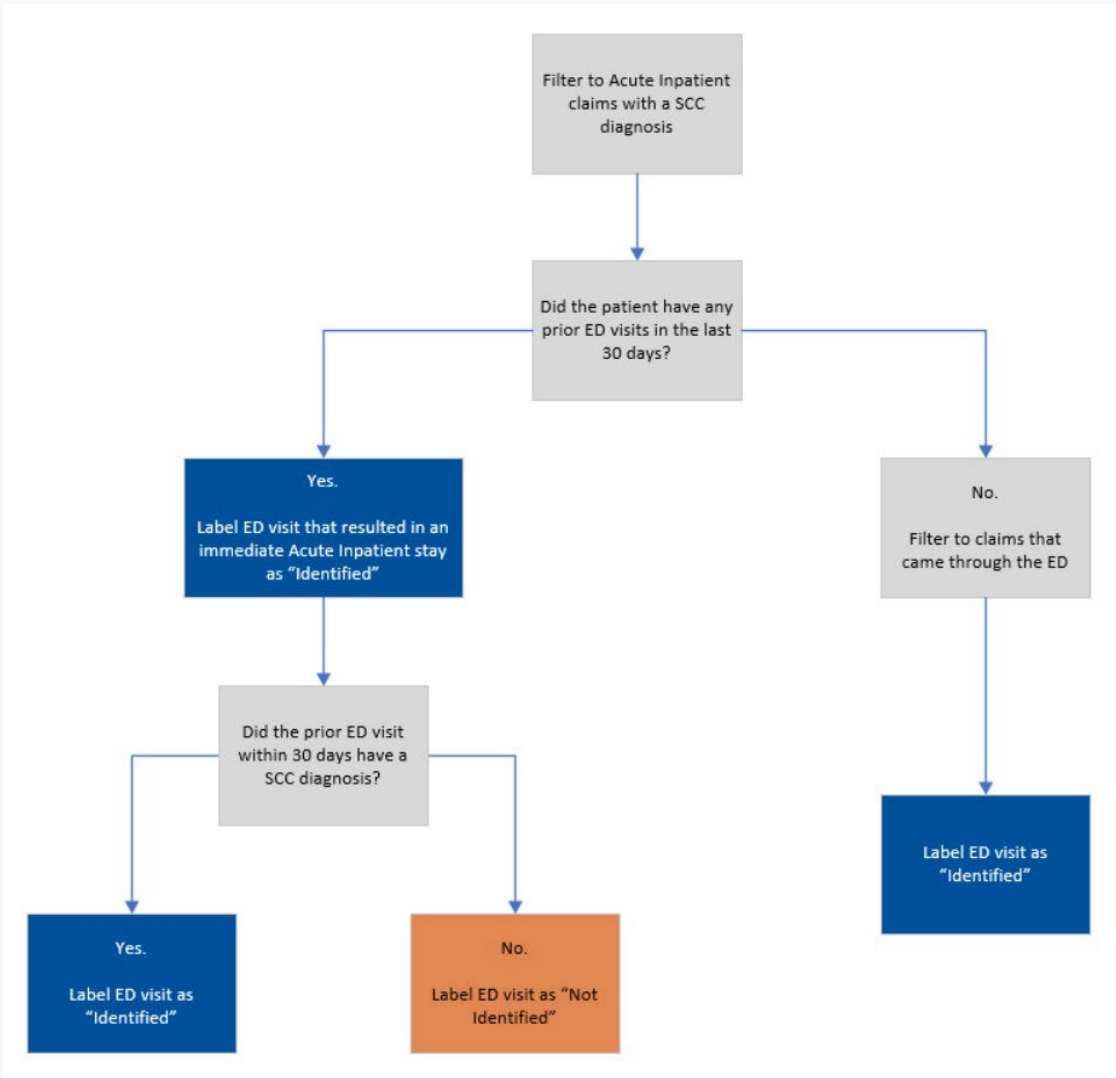
Figure 1: Data flow diagram

In all future visualizations in this analysis, refer to the color legend below.

Figure 2: Color legend for ED visit diagnosis of SCC

Data Exploration

The ideal way SCC is identified is through the use of an MRI. Using the Washington Discharge Dataset, we are able to measure the successful identification rate by those patients who received an MRI in the ED, and those that didn't.
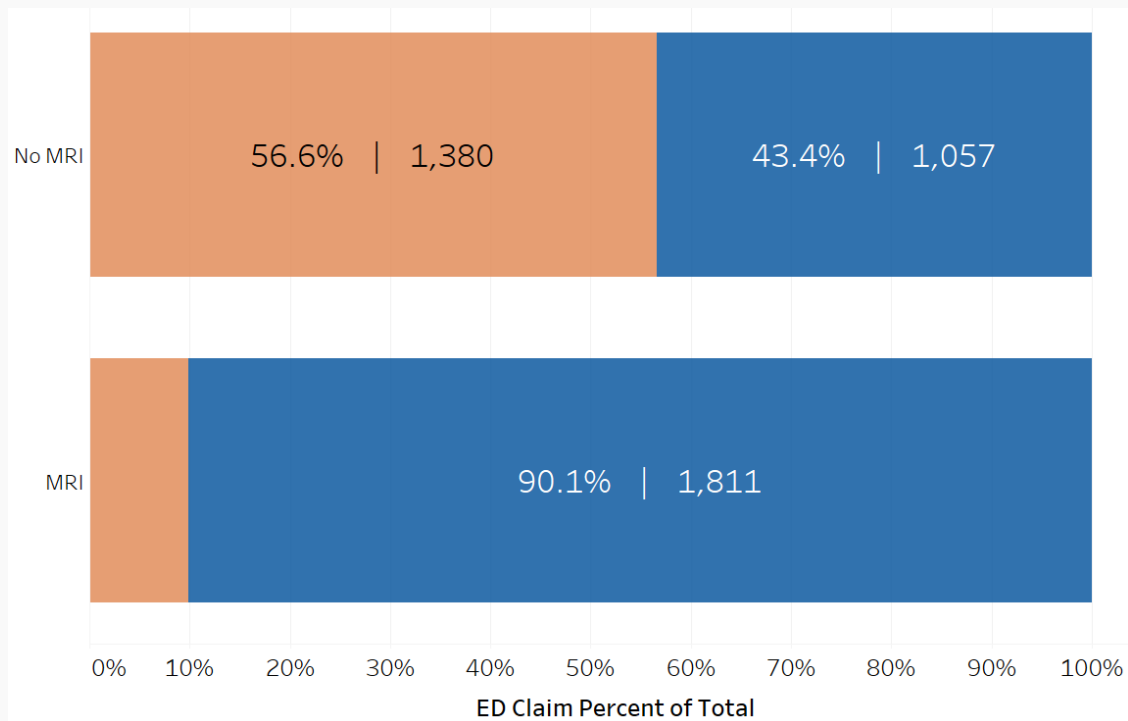

Figure 3: Breakdown by receipt of MRI during ED visit

This indicates that if a patient did not receive an MRI in the ED, the patient was identified as having SCC 43.4% of the time. This contrasts with the 90.1% of the time patients were identified as having SCC when they did receive an MRI.

Another avenue of which to explore data is by demographic. Specifically, looking at sex assigned at birth in combination with age can help us discover if there are inequalities with how care is being delivered to some patients.

First, we can look at the rate by sex assigned at birth. Overall, male patients appear to have this diagnosis more frequently than female patients. When looking at the identification rate, there is a gap of 1.5 percentage points. Overall, the identification rates do not appear significantly different. In the

future, we could also look at gender identity as this might align more with patient gender expression.
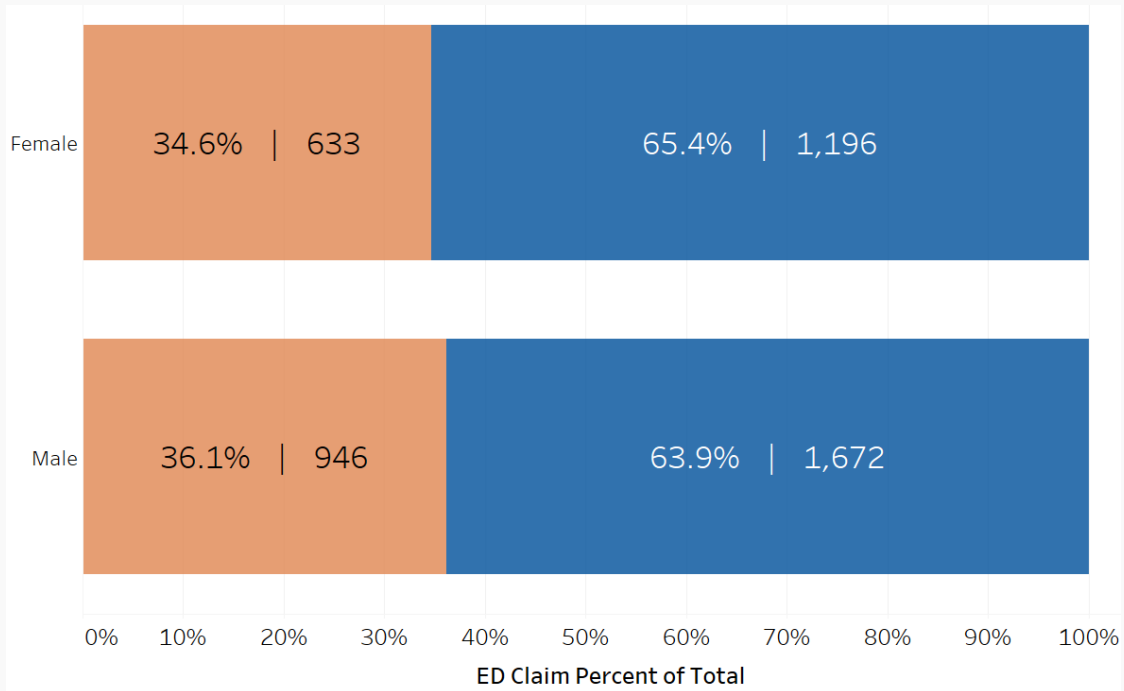

Figure 4: Breakdown by sex assigned at birth

Next, we investigate the breakdown by age. This diagnosis starts becoming much more prevalent after 30 years of age, with it peaking by the time a patient is in their 60's. As a patient ages, the identification rate generally increases as well.
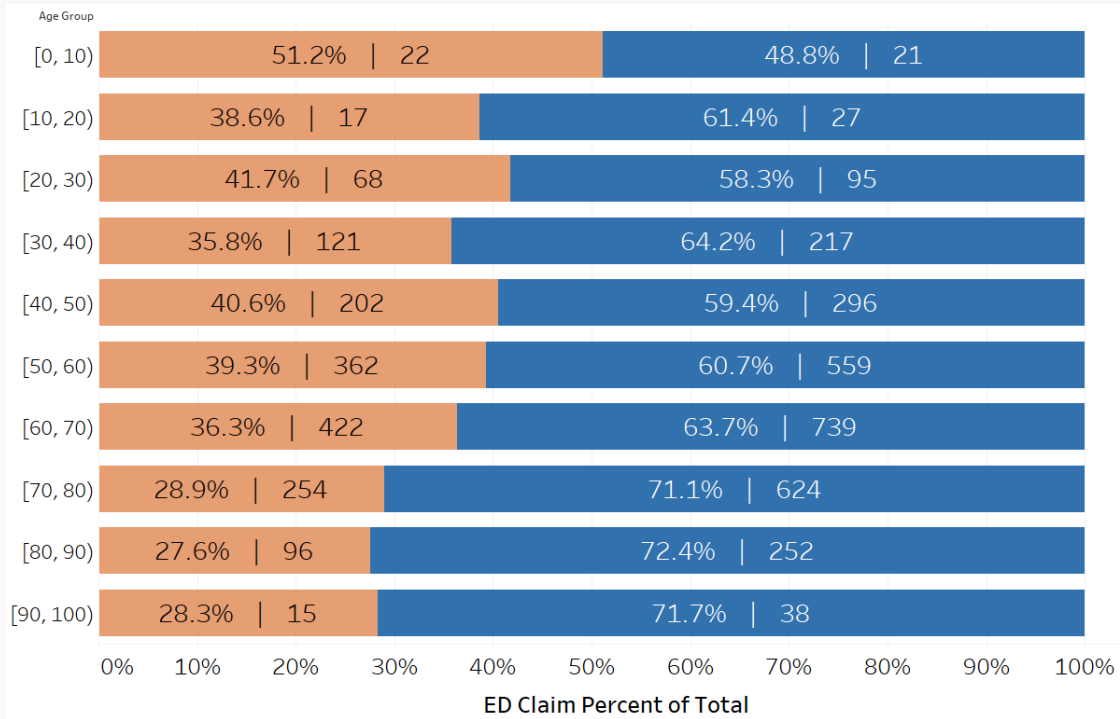
Figure 5: Breakdown by age group

When we compare the distributions between sexes assigned at birth, there appears to be a higher identification rate for female patients between the ages of 30 to 40. However, the inverse is true as patients age: male patients get identified with this diagnosis at a higher rate.
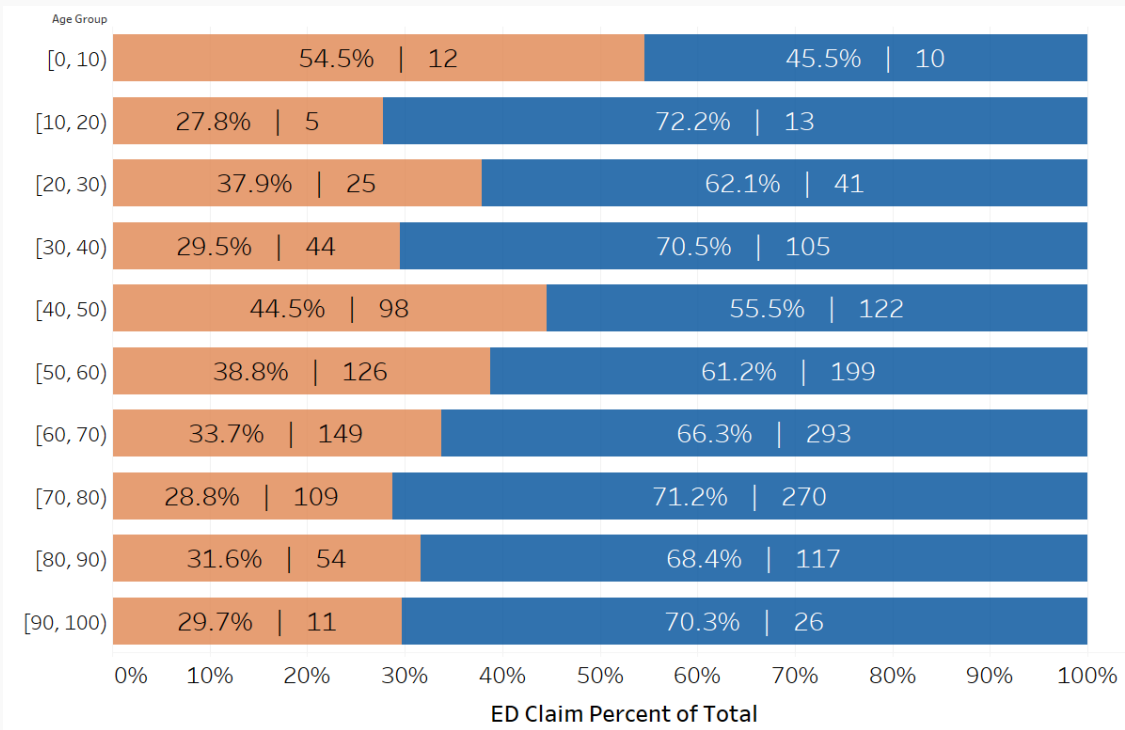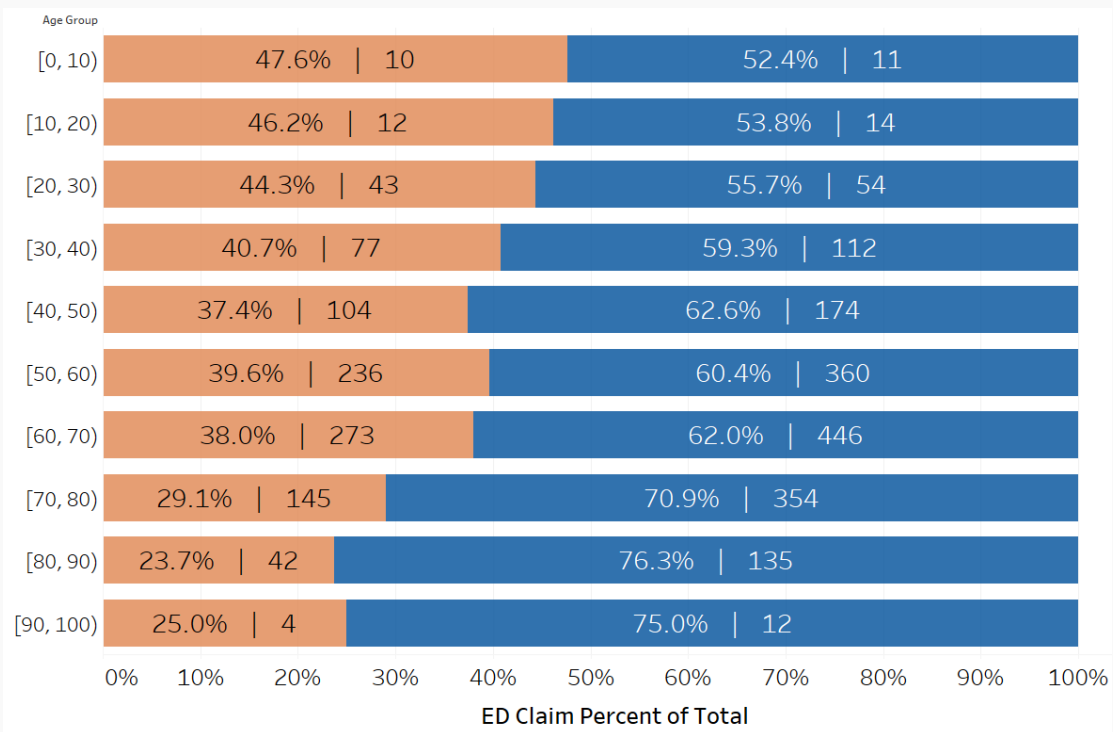
Figure 6: Breakdown of female patients by age

Figure 7: Breakdown of male patients by age

Finally, it can be illuminating to understand how diagnoses were coded for patients who were not successfully identified as SCC in the ED.
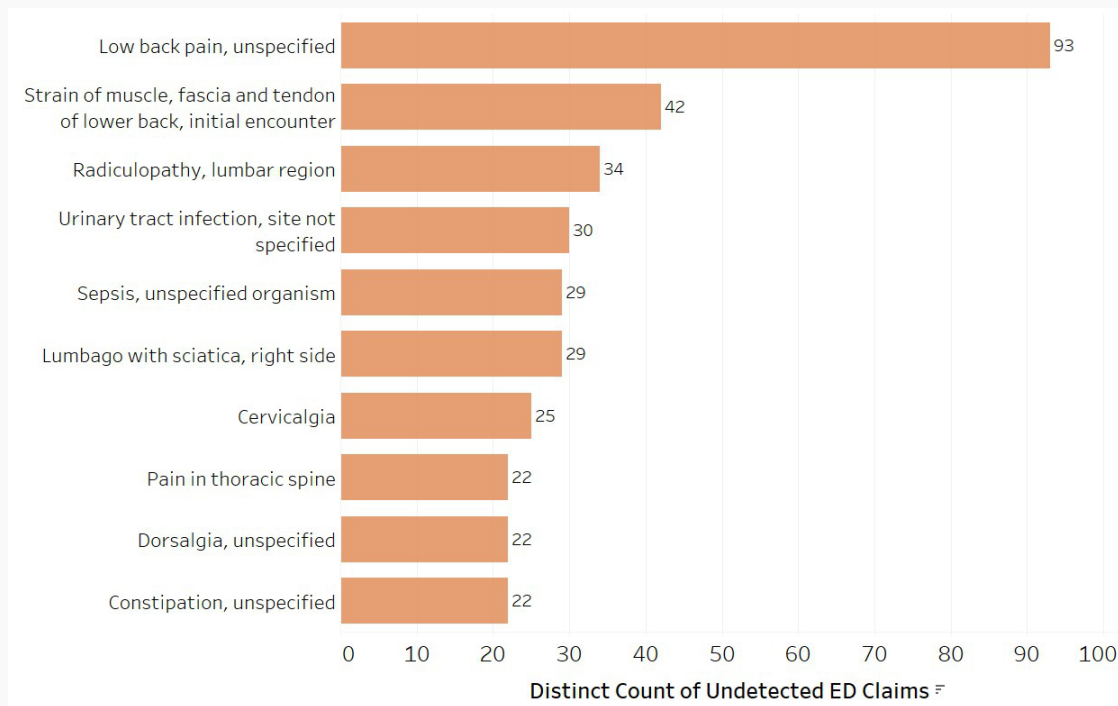

Figure 8: Top 10 principal diagnoses for undetected spinal cord compression during ED visit

SCC is complex and difficult to diagnose. Many of the frequently encountered principal diagnoses closely resemble SCC yet they may not provide comprehensive assessment of SCC.

Limitations & Other Considerations

This data comes from the Washington Discharge Dataset, WSHA's data program that collects all WA state hospital-based claims data. Data is collected monthly, with a lag time of approximately three months. Therefore, near real-time data is not possible to collect or act upon as patients are experiencing suboptimal outcomes. This data is to be used for aggregate, historical analysis as a tool for better understanding patient outcomes and experiences.

The Washington Discharge Dataset only collects data that is present on the UB-04 form. In addition, some

hospitals only report a maximum of 25 diagnoses, due to Medicare limitations. This could result in misidentification of claims that did have one of the correct diagnosis codes in the ED but were truncated due to a limit of 25 diagnoses per claim.
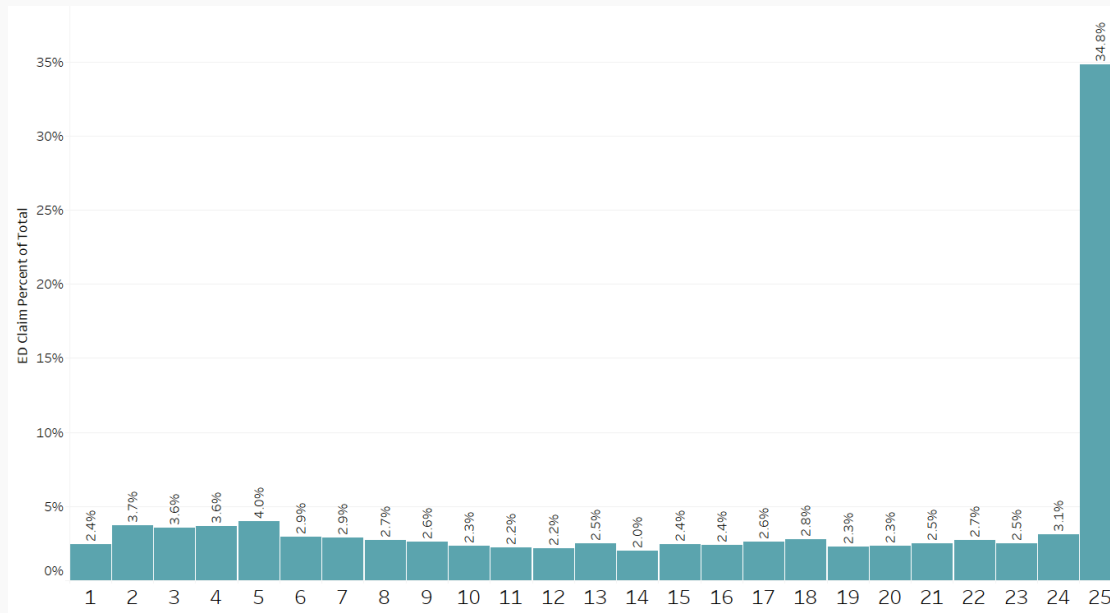

Figure 9: Maximum number of diagnoses per claim

List of spinal cord compression injury diagnoses used in this analysis:

G061, G062, G834, G9520, M4620, M4621, M4622, M4623, M4624, M4625, M4626, M4627, M4628, M4630, M4631, M4632, M4633, M4634, M4635, M4636, M4637, M4638, M4639

For more dashboards and ad-hoc explorers, please visit DASH and DASH Premium on analytics.wsha.org. If you have any questions or want to learn more, please contact dataanalytics@wsha.org.

Recommendations

This analysis demonstrates the significant difficulties inherent in making the critical diagnosis of spinal cord compression, a high-risk debilitating disease. The disease is often misdiagnosed as low back pain or muscle strain, which are much more common. Emergency department clinicians should maintain a high index of suspicion for patients with back pain and high-risk features or red flag symptoms suggestive of spinal cord compression. Hospitals need to ensure

access to MRI for emergency department patients with suspicion of cord compression. ED staff upon discharge can educate patients about worsening symptoms and stress importance of all recommended follow up care.

References

1. Singleton JM, Hefner M. Spinal Cord Compression. [Updated 2023 Feb 13]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK557604/