Missed charge capture opportunities—often referred to as ‘charge capture leakage’—continue to plague hospitals and health systems nationwide, resulting in millions of dollars of lost revenue. It’s an unfortunate reality that’s only exacerbated by decreased reimbursement, increased regulatory burden, and slim operating margins.

In addition, an industry-wide shift toward value-based reimbursement is well underway. By 2018, the Department of Health and Human Services (HHS) hopes to tie nearly all (90%) Medicare fee-for-service payments to a value-based payment model, such as an alternative payment model (APM) or a population health-based payment model. Some of these models take into consideration the predicted vs. actual cost of care associated with an inpatient admission as well as certain outpatient services rendered for a defined period of time post-discharge. Healthcare organizations are financially rewarded for high quality, low cost care, and they’re penalized when the cost of care exceeds a target amount based on historical claims data. Going forward, payment adjustments for physicians under MACRA (Medicare Access and CHIP Reauthorization Act) are also subject to a composite score that takes quality and resource utilization into account; and may be positive or negative depending on the physician’s performance.

In these reimbursement models, it’s important to remember that without accurate charge capture, the total cost of care is inaccurate as well. The goal is to capture all relevant charges to ensure an accurate target price on which future reimbursement is based. Thus, comprehensive charge capture spanning inpatient and outpatient settings plays a critical role both today and in the future.

To ensure financial viability, hospital and health system executives must proactively address the problem of charge capture accuracy to prevent leakage, and compliance issues. This requires a holistic and data-driven approach that embraces both hospital and health system-owned physician practices. The question is, how can executives manage this process across the entire healthcare spectrum to achieve positive and sustainable results? The answer may lie in the power of data mining and predictive analytics.

This white paper examines the following:
- Common reasons why hospitals and health systems inadvertently omit charges
- Importance of integrating charge data from hospitals and physician practices
- Existing and emerging technology that helps address the problem of charge capture leakage

EXECUTIVE SUMMARY

Hospitals and health systems have struggled with charge capture leakage for decades. As much as 1% of a healthcare organization’s annual net revenue is lost due to problems with charge capture. This may sound like an insignificant amount. However, consider a hospital that generates $750 million in annual revenue. One percent of this is $7.5 million.

On the physician practice side, there is less certainty about the frequency and impact of charge capture leakage. This lack of certainty is problematic. Without a clear sense of how often charges are missed—and the subsequent effect on revenue—hospital and health system executives are often unable to devote ongoing resources that are necessary to drive process improvement and ensure revenue integrity.

The good news is that technology may be able to help. In the mid-2000s, healthcare organizations began to use predictive analytics and other forms of machine learning to address charge capture leakage and achieve sustainable results. These real-time data-driven techniques often help pinpoint specific operational inefficiencies, enable organizations to accelerate cash flow and capture millions of dollars in new annual recurring net revenue. Forward-thinking hospitals and health systems are using data aggregation and analytics techniques to unite professional and institutional charge data and enable a more holistic approach to charge reconciliation.

THE ROOT CAUSES OF CHARGE CAPTURE LEAKAGE:

People
One of the biggest risk areas associated with inadequate charge capture is manual charge entry. This method of charge entry introduces a whole host of opportunities for errors and omissions because it requires individuals to enter charges correctly. Attention to detail is paramount. Even the slightest distraction could result in a significant error. In addition, updated and ongoing education is critical. Without frequent training, it’s not uncommon for data mining and predictive modeling technologies to uncover significant patterns of missing charges as well as charging inaccuracies. These patterns occur simply because staff members input or omit certain charges based on outdated guidance. These individuals often operate in good faith without even knowing that they’re enabling revenue loss.

These discrete pockets of missed charges can go undetected for months or even years. That’s because payers don’t alert organizations when charges are omitted. Medicare and Medicaid Recovery Auditors, for example, are required to report underpayments that they identify during retrospective reviews; however, the reality is that RAC auditors are not reviewing every claim and they are compensated to find overpayments, so they are much more common. Only 3% of hospitals had an underpayment determination by a RAC auditor nationwide, according to recent RACTrac data. Forty percent of hospitals had an overpayment. If healthcare organizations don’t take it upon themselves to identify these missed opportunities, the endless cycle of charge capture leakage continues.

Processes
Despite the Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 that spurred widespread adoption of electronic health records (EHR) nationwide, many healthcare organizations continue to rely on manual charge capture processes, including charge tickets or superbills. These paper-based checklists usually include only the most common procedures performed within a department or clinical specialty, thus they are ripe with opportunity for missed charges.

Medical implants are another area of revenue vulnerability subject to both missed charges and carve outs. Even in highly-sophisticated health systems, charging for implants is frequently a manual process. Someone in the operating room removes a product sticker from the sterile container holding the implant and affixes it to a paper-based implant log. This log—often a rudimentary notebook—is subsequently (and manually) sent to a charge clerk who uses the stickers to identify the specific type of implant that surgeons used during the procedure. The opportunities for error are obvious: Stickers don’t remain affixed to the log, or individuals forget to remove the stickers from the sterile containers. Either way, the end-result is the same: missed charges.

3 American Hospital Association’s RACTrac Survey, 3rd quarter 2016. http://www.aha.org/content/16/16q3-ractracresults.pdf
Systems

The ability to automate charge capture based on clinical documentation within EHR systems has unfortunately led to a false sense of revenue accuracy. There are three reasons why this fallacy occurs:

1. Organizations believe that their clinical documentation is thorough and complete. This may not be true, in which case the codes derived from the information are also inaccurate, incomplete, or both.
2. Organizations believe that their EHR systems include accurate medical codes. This may also not be true—since EHR vendors are dependent on people to complete upgrades or manually update coding to reflect regulatory changes.
3. Organizations assume charges flow correctly from systems, such as from the lab, to patient accounting, however breakdowns in interfaces or human error re-keying data into other systems creates break-downs and missing charges.

Simply put, charge capture automation increases efficiency, but at what cost? When left unmonitored, automated processes lead to repeated errors and omissions—all while giving the false impression that the system is working as intended.
Improving the charge capture process is certainly possible—even when organizations generate millions of claims that include tens of millions of potential relevant data points. However, a successful approach requires a departure from the inefficient manual process of searching for missed charges. Instead, optimized charge capture requires more advanced data-mining and predictive modeling.

With data-mining and machine-learning, hospitals and health systems draw upon exponentially greater data points to identify and predict patterns of charging anomalies. These rapid and highly accurate predictions are tailored to the organization and can be used in real time for corrective action and risk mitigation.

When data analytics technology pulls information from the CDM as well as commercial and governmental reimbursement terms, the hospital or health system can also assign a net revenue impact to all charging anomalies. In addition, machine-learning algorithms constantly adapt to the hospital or health system’s charging data, clinical practices, payer contracts, and EHR configurations that evolve over time. This ongoing adaption and evolution isn’t possible with a manual review process. There’s simply too much data as well as non-uniform forces that drive changes across healthcare data sets. Going beyond analytics, predictive modeling identifies over-charging risk, DRG anomalies, and other coding variances.

Consider the complexity of finding missing charges for a spinal cage device. Exhibit 1 demonstrates how data mining and machine learning is able to find multiple data relationships that improve the probability of predicting missing charges related to implantation of a spinal cage device. In this case, Predictive Analytics found 18 accounts that were missing a charge for the spinal cage device (i.e., HCPCS code C1713). This translated to $215,000 in lost revenue.

What makes this example of data mining so compelling is not simply that it identified a needle in a haystack, but it identified a needle that the health system believed no longer existed. In this particular instance, the health system had been made aware that they were not always effective at charging for implantable devices such as rods, screws, plates and—of course—spinal cages. They approached the issue intelligently, by first making an assessment that a “normal” spinal fusion case, of this type, included charges for 7.2 distinct implants (defined as a chargeable line item under the 0278 revenue code).

To remedy the missing implant charges, the health system implemented a rule that would hold spinal fusion accounts for review if they had less than 7 implants. Preliminary testing revealed the mathematical reality—that such a rule would effectively flag half of all spinal fusions for review. The team quickly pivoted, assessed the distribution of implant volumes and realized that anything with 5 or less implants was greater than one standard deviation below the mean and thus warranted review. This was a sensible approach to identifying an issue and setting parameters around it.

As a cost of doing business, the health system accepted that this rule would create false positives for certain surgeons that preferred to handle their spinal fusions with minimal instrumentation. They considered ‘false positives’ a small price to pay for remediying the issue of missing implants.
The fact that machine algorithms identified 18 accounts containing this exact charging error, however, proved that the rules approach did not remedy the issue. How could this be? Though sensibly designed the health system’s approach was plagued by its necessary broadness. Predictive Analytics found accounts that were missing charges contained 7, 8, even 10 or more implants. Implant was defined by the 0278 revenue code – which meant that a $200 k-wire or $150 bowl of bone wax would often satisfy the condition that implants be present, while a $20,000+ implant would in fact be missing.

Predictive analytics and machine-learning algorithms are not biased towards or limited to simply counts of revenue code occurrences. As demonstrated in the visual, the algorithms incrementally build on probabilities using several pieces of data dynamically versus forcing but a single criteria. What is more, implicit in the notion of machine-learning is that these algorithms are constantly adapting. What was the superior means of identifying this miss today may not be the most reliable way of making that identification tomorrow; machine-learning algorithms account for this by always adapting.

**EXHIBIT 1: MISSING CHARGES FOUND WITH RULES AND PREDICTIVE ANALYTICS**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td># CONDITION</td>
<td>VALUE</td>
<td>PROBABILITY OF MISSING CHARGES</td>
</tr>
<tr>
<td>1 IF Charge Type ‘GENERAL/SPINAL/EPIDURAL SUPPLY’</td>
<td>is Present</td>
<td>13.5.%</td>
</tr>
<tr>
<td>2 AND IF Charge Type ‘XR Guidance Spine Injection’ (CPT=77003)</td>
<td>is Present</td>
<td>32.5%</td>
</tr>
<tr>
<td>3 AND IF Charge Type ‘Implantarble Device – Carbon Fiber Rod’</td>
<td>is NOT Present</td>
<td>50.5%</td>
</tr>
<tr>
<td>4 AND IF DRG 460 ‘Spinal Fusion Except Cervical w/o MC’</td>
<td>is Present</td>
<td>93.6%</td>
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Predictive analytics, data-mining and automated rule-based audits have made it possible for healthcare organizations to prevent inpatient revenue loss due to charge capture leakage. However, hospital and health system executives must look beyond the inpatient setting and apply these same techniques to their physician practices. Over time, hospitals continue to acquire physician practices in what has become an increasingly competitive healthcare environment that practically demands strategic alignment. Nearly 35% of physicians said they are employed directly by a hospital, according to a recent survey conducted by the Physicians Foundation.4

However, when charge capture leakage plagues the practice, it also plagues the hospital or health system that owns the practice. Even when health systems have charge-capture mechanisms in place, these resources may not necessarily be scalable or suited to professional billing. Thus, physician practices continue to struggle with the following:

- Missed charges due to coding anomalies and imperfect charging patterns
- Under-coding of professional claims
- Improper code assignment that negatively impacts reimbursement and/or payer-based incentives/bonuses
- Overlapping/duplicative professional and institutional charges that creates audit risk
- Improperly assigned place of service codes that lead to inaccurate reimbursement

More generally, the disconnect between hospital and physician charging data makes it difficult for CFOs and financial leaders to gain a holistic view of their health system’s financial performance. By uniting this data, health systems lay the groundwork to deploy predictive analytics across the entire enterprise.

Once deployed, these technologies can:

- Enhance charge capture accuracy in the inpatient and outpatient settings
- Flag code discrepancies between professional and hospital billing data
- Provide an outline for process improvement across the entire health system

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Possessing an accurate and comprehensive picture of all charging data allows hospitals health systems to dig more deeply into charges associated with individual patients, entire populations of individuals, or even subsets of these populations. Data can also be leveraged for the following purposes:

• Provide ongoing training.
• Develop best practices for charge capture.
• Perform strategic planning in the context of community practice acquisitions and affiliations.
• Assess the financial viability of opening new facilities or adding certain service lines. Nearly one in three executives (31%) plan to drive growth by launching new segments or lines of business—a jump from 17% last year, according to a recent survey of more than 450 healthcare executives conducted by CapitalOne.5

Charge data integration between hospitals and physician practices also improves patient satisfaction and engagement. That’s because staff members can access financial data across multiple settings to answer billing questions more effectively.

CONCLUSION

In a complex and dynamic healthcare environment characterized by big data, organizations simply can’t rely on manual processes to identify missed charges. Data mining techniques make it possible to look for thousands of revenue opportunities on each claim simultaneously. By making tens of thousands of predictions per second we’re able to analyze hundreds of claims per minute in real-time, allowing for accurate charge capture on the front-end. Data mining also helps easily pinpoint larger patterns of charge capture leakage so organizations can perform root cause analyses, implement process improvement, and mitigate additional risk.

In an era of MACRA and value-based purchasing, charge capture is paramount. Hospitals and physicians are rewarded for providing high quality, low-cost care. However, the target price that CMS and other payers use to determine reimbursement rewards or penalties must be accurate. When providers inadvertently omit charges, they provide a false—and oftentimes lower—total cost of care. Hospitals and health systems must closely examine charge capture processes in their physician practices to ensure that revenue loss isn’t going undetected and affecting the bottom line for the entire system. Accurate charge capture drives accurate reimbursement both today and in the future.

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