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COST SAVINGS ANALYSIS REPORT

How a US Trauma Center increased cost-savings and revenue by deploying Snap & Go - computer vision data capture technology at the point of care.

US TRAUMA CENTER: COST SAVINGS ANALYSIS REPORT

Introduction

This case study analyzes the cost savings and increased revenue achieved by using an effective point of use data capture tool.

We showcase the benefits of introducing new image recognition technology in procedure rooms, as an alternative to traditional work processes such as barcode scanning and ERP/EHR system data entry.

US healthcare providers commonly use these methods of documentation, but both can lead to incomplete or incorrect EMR records, which will have an organization-wide impact, including risk-management and revenue.

Lack of confidence in POU data can be seen to sap workforce hours by prompting additional organizational activities to review, validate and correct clinical records.

This Case Study looks at the financial impact of poor POU data capture on a US Level 1 Trauma Center. We will see how a data issue from the surgical setting acted like a stone cast into water, with the ripples being felt across the organization.

We look at how embracing new technology for POU data collection will improve cross-organizational efficiency, and how this simple action can achieve 99% data integrity and seven figure cost savings.

Goals

1. Calculate the estimated costs of inefficient implant data-capture at the point of use
2. Determine the value and ROI when switching to computer vision technology, replacing barcode scanning and manual entry onto ERP/EHR systems as the method of surgical data capture
3. Identify an effective tool that can achieve 100% itemization and charge capture in surgery

This case study looks at the cost savings and increased revenue that a US Trauma Center with 10 OR's can make by improving utilization documentation.

We look at how new computer-vision technology is adding speed and accuracy to point-of-care data capture and the impact this has on operational and clinical performance.

The Challenges

The Director of Perioperative Services at a US Level 1 Trauma Center was aware that full usage data was not always captured during surgery - an issue that can have serious repercussions for patient safety, regulatory compliance and case revenue.

Documentation issues at the point-of-care were frustrating busy Circulating Nurses. The Trauma Center relied on barcode scanning as their main data capture tool, and this was supplemented by the manual keying-in of data, known to be both time consuming and error prone.

In a bid to reconcile the items documented on the EHR with actual consumption, every two weeks the hospital selected a high value case and undertook a management level audit. Missing items were then retroactively recorded on hospital systems.

Resources did not allow for all high value cases to be audited, so a more accurate way of documenting utilization at the point of use was viewed by the Director of Perioperative Services as a better way of achieving full and timely documentation.

Clinical Workforce

About the Clinical Team:

- There are 30-32 staff per shift
- The team is made up of Head Nurses, RNs and Surgical Techs.
- Surgeries take place 24/7 across the surgical suites, with the clinical team covering the different shifts and operating rooms.

Issues with POU data capture were identified across all OR Rooms.

Staff had data collection problems during most surgeries. Items could not be scanned into the ERP due to certain SKUs not being on the hospital system - it turned out this was due to the maximum storage having been reached. This meant many items had to be manually entered by staff.

The Director of Perioperative Services noted that when a system requires items to be entered manually, the data is only as good as the time and effort that the nurse can give the task... and often, this is very limited.

RN Time

In total the Trauma Center manages 6,000 operations a year.

The hospital estimated that up to 40 minutes additional supply chain admin was required. This is additional charting outside of the case, that is required in order to enter items which would otherwise remain missing from the ERP.

These are items that had coding issues or where the nurse simply ran out of time and was unable to quickly record the data using the tools available.

Post-procedural admin takes an average of 15-20 mins per low/medium value case and 30-40 mins per high value case.

- Based on 6,000 surgeries a year, post procedural admin carried out by nurses averaged 2,145 hours a year.
- The average cost of an RN salary is \$46 an hour
- The cost of non-productive nurse time spent on documenting inventory outside of surgery is estimated to be over \$98,670 a year!
- In addition, there is the cost associated with the Trauma Center back-filling the RNs who had to leave the procedure room to continue with documentation. Another nurse would need to be called in to prepare for the next surgery so that turnover time was not compromised. So, the cost of post surgery documentation is actually DOUBLE the above figure due to these backfilling costs,

When taking account of backfilling, the total cost of non-productive nurse time rises to over \$197,340 a year.

Documentation Issues

There were several POU data collection barriers:

System Limitations

- The ERP's item maximum prevented further items being added, so hundreds of items remained outside of the system.
- Barcode scanning did not always pick up the full data required, necessitating manual data-entry of the missing information
- Manual entry is error prone and leads to unrecorded items.

Inventory Issues

- Not all items come in packaging that contains a barcode (eg. screws and plates)
- Substitute/relief items were not on the system
- Multiple one-time use items/procedure packs were not on the ERP
- Manual counting and inputting were prone to errors

Post Surgical Revenue Reconciliation

Implant documentation

In order to check the accuracy of EMR records and make sure that the items for medical billing were complete and correct, management held a regular, formal review process.

A high value case (typically ortho or ortho spine) was selected for review every two weeks, and all surgery records would be compared:

Limited staff time

- Nurses only have limited time to attempt to record utilization:
- Patient care needs to be maintained
- The clinical team needs observation and support
- Trauma cases are particularly challenging and, in many cases, there is no time to chart during surgery. After surgery the bag of used supply packaging needs to be tackled, but system limitations combined with a lack of staff time, often result in unrecorded items.

- Agency and Traveler Nurses need to be watched and audited.
- Patient chart in the EMR
- Nursing documentation
- Surgeon procedure dictation record
- Implant record

Missing items were often spotted during these checks, for example, C-arm drape, sutures, dressings, staple guns etc.

Higher cost items could also be missing from the chart; screws, plates, K-wires and implants/devices.

FACTS & FIGURES

- 460 beds
- 10 Operating Rooms
 - 125 cases a week
 - Cost of running OR room per minute (excluding staff costs) \$90 a minute
- 6,000 surgeries a year
 - surgical trauma injuries
 - trauma orthopedics,
 - spinal injuries
 - vascular injuries
 - General, Gyn
 - Urology and Plastics
- 1,500 orthopedic cases a year
- 125 cases a week
 - 40 high value cases
 - 80 medium/low value cases
- Typical cases include
 - femur fractures
 - hip arthroplasty
 - head injuries and burns
 - lacerated liver/spleen ruptured aorta
 - crushing injuries to limbs traumatic amputation.
- Surgeries take 3 to 12 hours with the cost of implants often reaching around \$80,000.
- The average cost of implants per year is over \$10,000,000.

The impact of missing items on the EMR rebounds across the organization, affecting inventory management, revenue capture and patient safety.

The POU is a vital data collection point, where timely, accurate data needs to be fed into hospital systems for cross organizational usage.

Examples of documentation issues with some big dollar implications:

The Trauma Center highlighted a case where EPIC had indicated a discrepancy in the charting on a case.

"We could see that those items that could be scanned in had been entered - but that all the other products were missing. Over \$20,000 of potentially lost charges were picked up. On reviewing other cases, missing charges fluctuated from \$500 to \$2,000 to \$10,000 per case."

They also describe another occasion where Finance found a huge case that had no charges and discuss the amount of time and work it took to rectify this:

"I checked the implant sheets, OR records, count sheets, did interviews with staff involved and found \$48,000 of items that "

ere not charged or accounted for. It took 6 to 8 hours over the course of 3 days, plus a counselling session which took over 2.5 hours to prepare."

Handling recalls

When utilization documentation is carried out manually, or by using traditional barcode scanning methods, it can lack accuracy and result in data gaps.

In the case of a product recall, this causes issues in tracking and tracing the affected patients.

The Trauma Center estimates that using their original POU data capture methods, a product recall took 10-12 hours of team time. This involved searching through implant books, looking for product information, and scouring medical records to locate the affected patients. Even when they had finished the task there was never complete certainty that every patient who consumed the product was reached.

Without an efficient point-of-care utilization record, medical device and implant recalls are a time-consuming and imprecise pursuit.

Failure to identify and contact patients costs lives and risks expensive litigation.

Having an accurate documentation tool provides the hospital and patient with security.

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The cost of inefficient data capture

We have looked at the following issues:

- Clinical workforce experiencing documentation issues
- The different reasons for non documentation
- How rectifying non-documentation during surgery can drain RN admin time
- How post surgical reconciliation is required to 'catch' missed charges

Now we are going to investigate the financial implications of these issues.

The cost of undertaking post-surgical audits:

The twice-monthly audits regularly identified missing charges from \$500 to \$10,000. For higher-value cases, missing charges could reach \$20,000.

Because the Trauma Center realized they had an issue, the larger, more intricate surgeries were always double-checked by The Director of Perioperative Surgery and Assistant Director of Finance. This could take up to two hours per case, depending on the length of the surgery and involved the Head Nurse making case adjustments.

In addition, a further 1-hour meeting was held with the Chief of Surgery and Chief Nursing Officer for each case..

Audits of 1 high-value case was undertaken by six staff every two weeks

The cost of management time to audit 4 cases per month was \$20,449.20 a year*.

The cost savings from post surgical audits:

On average, these initial post surgical audits on complex cases saved the hospital up to \$20,000 a month, adding \$240,000 of income a year that would have been lost without intervention.

These figures reduced after training took place but missed income continued to be an issue. Our figures below are conservative.

Annual cost of missed case charges

High-value cases:

Average lost income per mid-value complex case** is around \$500
 $\$500 \times 40 \text{ cases per week} = \$20,000$
 $\$20,000 \times 52 \text{ weeks} = \$1,040,000$

Medium value cases:

Average lost income per medium value** case is around \$100
 $\$100 \times 40 \text{ cases per week} = \$4,000$
 $\$4,000 \times 52 \text{ weeks} = \$208,000$

Low value cases:

Average lost income per low value** case is around \$50
 $\$50 \times 45 \text{ cases per week} = \$2,250$
 $\$2,250 \times 52 \text{ weeks} = \$117,000$

Total missed income a year on all case types: \$1,365,000



"Items that could be scanned in had been entered - but that all the other products were missing. Over \$20,000 of potentially lost charges were picked up. On reviewing other cases, missing charges fluctuated from \$500 to \$2,000 to \$10,000 per case."

*Salary figures for calculations available upon request.

** High value complex cases from \$30,000-\$60,000.
- Calculations based on mid value of \$45,000
Medium value cases \$20-30,000
Low value cases \$10k)

The Solution

The Director of Perioperative Services endorses the use of the Snap & Go point of use data capture tool, as a quicker and more accurate way to record utilization.

Computer vision technology is used to take an image of each product's packaging. AI and machine learning technology then quickly identify items, with the help of a global SKU database.

Implementing image recognition and AI technology at the point of use means that the Circulating Nurse's only responsibility is to take a 'snap' of the product - which takes just 3 seconds.

The automated system takes care of identification and charting in the EHR, ERP and MMIS.

The Director of Perioperative Services indicated that the interoperability of the Snap & Go system makes it easy to achieve complete and accurate item and charge capture in hospital systems. This supports full regulatory compliance, optimized billing, accurate inventory management and improved patient safety.

Conclusion

Hospitals across the US share the same POU documentation challenges and computer vision technology is proving to be a game changer.

In a Level 1 US Trauma Center with 10 Operating Rooms, we calculate the total ROI of using image recognition technology to capture utilization to be: \$1,582,789

Accurate documentation during surgery has an organizational impact:

- accurate billing
- full reimbursement
- full inventory vision

Let's revisit the Trauma Center's original challenges:

Challenge 1: Items being regularly missed off the EMR and medical billing.

Solution: Snap & Go can achieve 100% itemization

Challenge 2: Data gaps causing concerns for patient safety, regulatory compliance, and reimbursement

Solution: Full and accurate documentation is achieved by Snap & Go, providing optimum patient safety, full regulatory compliance, and maximum revenue

- accurate restocks
- increased patient safety
- improved regulatory compliance
- reduced wastage
- reduced costs
- higher revenue

Organizations that achieve data integrity at the point of use no longer need to 'chase their tail' - and can finally rest assured that they have accurate clinical records. There is no longer that post surgery rush to identify and rectify missing EMR data.

Challenge 3: Missing case charges lead to post-case reconciliation to rectify gaps in the EHR

Solution: When POU technology is trusted and data integrity is achieved, case documentation audits are no longer required.

Using image recognition technology at the point of use provides a proactive, effective solution that saves hospitals significant costs, while at the same time reducing RN admin and boosting income.

Total cost of inefficient utilization capture per year: \$1,582,700

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