UCIRVINE | INTERNAL AUDIT SERVICES

Surgical & Perioperative Services

Internal Audit Report No. I2021-601

March 26, 2021

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March 26, 2021

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UCI HEALTH

RE: Surgical & Perioperative Services Audit
        Report No. I2021-601

Internal Audit Services has completed the review of Surgical & Perioperative Services and the final report is attached.

We extend our gratitude and appreciation to all personnel with whom we had contact while conducting our review. If you have any questions or require additional assistance, please do not hesitate to contact me.

Sincerely,

Mike Bathke
Director

Attachment

C: Audit Committee
    Joseph C. Carmichael, MD, Chief - Division of Colon & Rectal Surgery – UCI Health
    Julio Harriague, Senior Project Manager – Program & Performance Management Office/
      Office of the Chief Executive Officer – UCI Health
    Connie Marseilles, Materials Management Specialist III for Clinical Supply Chain – UCI
      Health
    Sandra Reichle, Clinical Supply Chain Manager – UCI Health
    Susanna Rustad, Executive Director, Operations - UCI Health

I.   MANAGEMENT SUMMARY

At the request of Supply Chain Management, Internal Audit Services (IAS) completed a review of Surgical & Perioperative Services (S&P) in FY 2021. The objectives of our review were to assess key processes and systems utilized in providing surgical and perioperative services at the University of California, Irvine Medical Center (UCIMC) and related locations.

Based on the results of the audit work performed, some internal controls need improvement to minimize risks and support best business practices.

The following concerns were noted:

Preference Card Usage – Of 3,596 active preference cards in the Epic systems database, 1,231 cards remained unused for surgical cases for 361 days or more of the audit date. Further details related to this issue are provided in Section V.1.

Preference Card Editing – Furthermore, of 367 preference cards edited by Clinical Nurse IVs, 71 (19%) had not been edited/updated within six months prior to the audit date. Preference cards need to be monitored and edited more frequently and deactivated when necessary. This issue is discussed in Section V.2.

Restocking of Unused Surgical Supplies – Surgical supplies that are picked for a surgery are not always used during a surgery. As a result, these supplies (i.e., "go-backs") need to be restocked and entered back into the inventory system. However, these go-backs are not being restocked in a timely manner, resulting in inventory concerns. This issue is discussed in Section V.3.

Physical Inventory Security – Security concerns exist over physical inventory stored in the "Outback." The Outback is the main storage facility at UCIMC. The Outback is the primary location where surgical supplies utilized by the operating rooms (ORs) are stored. This issue is discussed in Section V.4.

Medical Center Central Supply Facilities – Unlike most hospitals, space limitations at UCIMC do not accommodate adequate storage space for a comprehensive central supply facility. As a result, departments have developed other, less optimal, means for storing needed surgical supplies. This issue is discussed in Section V.5.

Outback Inventory Storage – The Outback has reached capacity to store sufficient supplies for the ORs. In addition, departments other than the ORs are using the Outback as their storage supply facility as well. The Outback needs to have additional space in order to meet departmental/patient demands. This issue is discussed in Section V.6.

II.   BACKGROUND

At UCIMC, physicians perform procedures in 29 surgical specialties at the Douglas Hospital, UCI Health Chao Family Comprehensive Cancer Center (CFCCC), and the Gavin Herbert Eye Institute (GHEI). The Douglas Hospital uses 18 standard ORs and two hybrid ORs to perform surgical procedures. Currently, there are approximately 1,800 cases performed in the ORs each month. Perioperative care is provided before and after surgery and commonly includes admission, anesthesia, surgery, and recovery.

In S&P's workflow, there are many interdepartmental processes. Once a surgical order is entered into the Epic system, a case is generated and a surgery is scheduled. In order to ensure that the proper instruments and supplies are on hand for each surgery, Epic automatically selects a preference card based on the Current Procedural Terminology (CPT) code for the procedure scheduled.

Each preference card provides a list of supplies requested by each surgeon for a particular surgical procedure. Preference cards assist surgical staff with the preoperative setup of instruments and supplies for each surgery. Preference cards may be customized to suit each surgeon's individual needs for each surgery. At the time of our review, over 5,000 preference cards were in use.

With surgeries, there are three potential outcomes for surgical supplies. Supplies can be used, wasted, or reused in a surgery. Supplies that can be reused are defined as "go-backs." The Sterile Processing Department (SPD) employees were initially responsible for returning go-backs to the Outback.

The Outback is the primary storage facility for all surgical supplies, and is in close proximity to the ORs and the SPD. The surgeons and surgical staff depend on Outback and SPD management and staff to provide surgical supplies to the ORs in a timely manner.

The Executive Director of Perioperative Services is responsible for managing S&P and reports to the UCI Health Chief Operating Officer (COO). The Executive Director is supported by an OR Manager and staff (137.5 FTEs) and an SPD Manager and staff (45.87 FTEs). In the provision of S&P services, a coordinated effort is required among S&P, the ORs, and SPD.

III.   PURPOSE, SCOPE, AND OBJECTIVES

The primary purpose of this audit was at the request of Supply Chain Management who had concerns regarding the usage and editing of preference cards and inventory management. This audit included an assessment of key processes utilized in providing surgical and perioperative services at UCI Douglas Hospital.   The scope focused on FY 2020 and prior fiscal years as necessary.

The audit included the following objectives.

1. Verify that Clinical Nurse IVs review preference cards for recent usage and are deactivated when they become obsolete;
2. Verify that Clinical Nurse IVs edit preference cards in a timely manner in collaboration with the practicing surgeons. Clinical Nurse IVs are required to review and/or edit preference cards periodically and document when the cards were reviewed;
3. Determine that accountability of go-back supplies exists and is adequate to ensure that wasted and/or unused supplies are tracked and reported by accountable personnel;
4. Verify that a central warehouse exists and is adequate for the storage of all medical/surgical supplies;
5. Evaluate the adequacy of the allotted space for storing surgical supplies at the UCI Douglas Hospital;
6. Verify the proper safeguarding of surgical supplies in the Outback storage facility; and
7. Determine that ingress/egress to the Outback is properly controlled and monitored.

IV.   CONCLUSION

Based on the review, IAS concluded that controls and processes need improvement. Internal controls and processes need strengthening in the areas of preference card editing and usage, accountability over wasted surgical supplies, unused supplies returned to the Outback, and physical inventory storage capacity and security.

During the course of audit test work, S&P management indicated impending implementation of new Epic feature sets as part of an OpTime Optimization project. Epic is an electronic medical record (EMR) system that UCI Health implemented in November 2017. S&P management stated that this optimization effort would include new dashboards and reports to improve preference card analysis and functionality; IAS encourages future exploration of the Epic feature sets to enhance the use of Epic EMR.

In a planned phase II of this audit, IAS will review the following:

1. Review charge capture/accuracy of surgery supply charges relative to supply costs;
2. Determine the cost variance in planned supply costs among all surgeons who perform surgeries under a given CPT code;
3. Verify that planned supply items (types, quantities, and costs), as documented on the preference cards, are in agreement with the supply items actually used in surgery cases; and
4. Verify that chargeable supply items used in the ORs are billed fully, accurately, and in a timely manner.

Observations were discussed with management, who formulated action plans to address the issues. These details are presented below.

V.   OBSERVATIONS AND MANAGEMENT ACTION PLANS

1. Preference Card Usage

Background

In operating room processes, preference cards are used to specify the surgical supplies requested by the surgeon in performing a particular surgery case. Outdated preference cards may create inefficiencies.

Observation

Using an Epic database that contained all active preference cards, an analysis was performed of all cards used prior January 1, 2020[1]. The purpose of the analysis was to determine the timeliness with which each active card was utilized in a surgery. The analysis consisted of grouping the cards into four different time ranges that preceded January 1, 2020. Preference cards not used within a certain time range may indicate cards that have become obsolete and require deactivation.

Of the 3,596 preference cards that IAS evaluated, 1,231 preference cards still remained unused 361 days or more prior to January 1, 2020. Moreover, 2,342 (65%) were not used in surgeries occurring within 90 days prior to January 1, 2020. Please see the table below.

# of Days Since Preference Cards Used/ Not Used	Preference Cards Not Used	Percentage of Cards Not Used	Preference Cards Used	Percentage of Cards Used
361+	**1,231****	76%	390	24%
181 to 360	1,621	81%	368	19%
91 to 180	1,989	85%	353	15%
0 to 90	2,342	65%	1,254	35%

Total: 2,365*

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[1] Due to COVID-19 pandemic, IAS decided to test the population of preference cards prior to January 1, 2020 to ensure that the impact that COVID-19 had on UCIMC elective surgeries, patient census, staffing changes/shortages/priority adjustments, and/or other operational disruptions/changes would not affect preference card testing results.

Note: In order to derive to the original 3,596 preference card population, calculate all preference cards used (i.e., 2,365*) and then add to this amount the number of preference cards that were still not used after 361+ days (i.e., 1,231**).

Management Action Plan

Clinical Nurse IV (CNIV) Staff:

1. By April 30, 2021, we will establish a process to complete a biannual review of all preference cards for accuracy and necessity. All reviews will be electronically documented with initials and review/edit dates in Epic.

2. By April 30, 2021, the CNIVs will review and update preference cards scheduled for the next 30 days.

3. Prior to June 30, 2021, our CNIV staff and preference card administrators will evaluate preference card utilization. They will electronically document this evaluation with initials and evaluation dates in Epic.

    Note that UCI Health Information Services (IS) will correct data integrity issues with Epic by June 30, 2021. Preference cards with no utilization for two years will be evaluated for necessity or marked as inactive. IS is unable to work on resolving these issues until the date noted above due to other priorities and COVID-related tasks.

OR Management:

1. By May 31, 2021, we will evaluate the need for additional resources and/or processes to ensure that responsible staff adequately maintain preference cards continuously.

2. Prior to June 30, 2021, OR management and preference card administrators will monitor and review preference card analytics each quarter to assist with evaluation to ensure that preference cards are necessary, available, accurate, and maintained. The reviewer will document, initial, and date the reviews.

    As stated above, by June 30, 2021, IS will correct data integrity issues with Epic related to this process. IS is unable to work on resolving these issues until the date noted above due to other priorities and COVID-related tasks.

2. Preference Card Editing

Background

As with preference card usage, preference cards that are not edited for an extended period of time may indicate that the cards are obsolete/outdated and

should be deactivated from the system. Moreover, preference cards that are not periodically edited, updated, and/or deactivated by CNIVs, as deemed necessary, may result in case costs increases, delays in surgeries, and/or increased risk of patient infections.

Observation

Based on the data analytics testing performed, IAS verified whether preference cards were edited in a timely manner to ensure that cards were being maintained and kept up-to-date. Based on our review of 367 preference cards that were edited prior to January 1, 2020[2], 71 (19%)* of the cards had not been edited/updated in the prior six months. Please refer to the table below.

Days Since Last Edit	# of Cards Edited	Percentage
361+	14*	4%*
181 to 360	57*	15%*
91 to 180	256	70%
31 to 90	22	6%
0 to 30	18	5%
Total:	367	100%

Therefore, it appears that preference cards may need to be updated more frequently or otherwise noted in the system as inactive cards to ensure that only necessary and relevant cards are available for selection by surgeons and surgical staff. This best practice also promotes efficiency of preference card management, as surgical staff would only maintain and manage active/updated cards. Per Supply Chain Management, clean and up-to-date preference cards are also essential for UCI's implementation and go-live of the WaveMark system application for both patient charging and inventory management, which utilizes point of use capture in the OR.

Management Action Plan

CNIV Staff:

1. By April 30, 2021, we will establish a process to complete a biannual review of all preference cards for accuracy and necessity. All reviews will be electronically documented with initials and review/edit dates in Epic.

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[2] Note that for preference card editing testing, IAS requested a revised report from IS that would remove all global edits (i.e., edits impacting all preference cards simultaneously) from the report. This request was made because it was conveyed to IAS that global edits were not a good indication of whether preference cards were being edited consistently. Therefore, removing these global edits from the data would result in much more useful data for Operations/Supply Chain Management. However, IS informed IAS that global edits could not be removed from the report that was used for testing purposes.

2. By April 30, 2021, the CNIVs will review and update preference cards scheduled for the next 30 days.

3. Prior to June 30, 2021, our CNIV staff and preference card administrators will evaluate preference card utilization. They will electronically document this evaluation with initials and evaluation date in Epic.

   By June 30, 2021, IS will correct data integrity issues with Epic. Preference cards with no utilization for two years will be evaluated for necessity or marked as inactive. IS is unable to work on resolving these issues until the date noted above due to other priorities and COVID-related tasks.

4. By May 31, 2021, we will work with surgeons annually to ensure all preference cards are reviewed and edited, if necessary. All annual reviews will be electronically documented with initials and review/edit dates in Epic.

5. By May 31, 2021, we will conduct daily review of cards for next day cases in order to review and update/edit cards for accuracy. We will document this review as previously indicated.

6. By May 31, 2021, we will meet with surgeons, schedulers, and/or other surgical staff on an ongoing basis to develop a process to ensure that planned procedure card variances are communicated to case pickers and surgical staff so that items are not wasted due to variances. We will document this process.

OR Management:

1. By May 31, 2021, we will evaluate the need for additional resources and/or processes to ensure that responsible staff adequately maintain preference cards continuously.

2. Prior to June 30, 2021, OR management and preference card administrators will monitor and review preference card analytics each quarter to assist with evaluation to ensure that preference cards are necessary, available, accurate and maintained. The reviewer will document, initial, and date the reviews.

   By June 30, 2021, IS will correct data integrity issues with Epic. IS is unable to work on resolving these issues until the date noted above due to other priorities and COVID-related tasks.

3. **Restocking of Unused Surgical Supplies**

Background

Surgery supply items are picked by SPD staff, based on preference cards, and placed on case carts that are transported to the ORs to be used during surgeries. However, some of these surgical supplies may end up not being used during surgeries for various reasons. Some of these reasons may include the item being incorrect, an oversupply, additional procedures were not performed, or the item was simply not needed during the surgery.

Observation

When unused surgical supply items need to be returned to stock (referred to as "go-backs"), restocking issues may occur because these supplies may not be returned to the proper storage location in a timely manner. Go-backs that are not restocked may also affect inventory supply par levels because they may not be documented in the inventory system as returned items to inventory thereby resulting in inventory overages. Inaccurate charge capture may also occur if an unused billable supply was not returned to inventory and erroneously charged during the procedure, resulting in third party payer and patient overbilling.

One of the reasons that go-backs may not be returned to stock in a timely manner is because the Outback is not continuously staffed. Another reason is that it appears that no specific surgical staff or department is currently assigned this responsibility, even though the restocking of go-backs was initially the responsibility of the SPD. However, SPD states that their priority is case picking and cleaning and sterilizing instruments.

Often times, several bags filled with go-back supplies accumulate in storage facilities waiting to be restocked. It was brought to IAS's attention that runners who are responsible for running case carts up to ORs should also be responsible for separating the go-backs by storage locations for restocking purposes. IAS notes that the only go-back items that are re-entered automatically into the inventory system are radio-frequency identification (RFID) items (i.e., higher priced supplies that have an attached magnetic location-monitoring device).

Management Action Plan

Supply Chain Management:

1. By April 30, 2021, we will perform ad-hoc changes to stock levels based on updated preference cards to reduce waste and go-backs. We will document these changes.

2. By June 30, 2021, we will add personnel to take responsibility of restocking go-backs and assign this task to specific personnel to avoid overstocking and

waste, including within the Outback area. We will review the go-back process in the "Clean Core" or "Core" area, which is a sterile storage area located in the main corridor between all ORs, after the WaveMark implementation.

3. By June 30, 2021, the installation of WaveMark in the OR Core will organize supplies to one stocking location. The review of all products in the OR will lead to the removal of supplies from other stocking locations and will eliminate redundancies, thus streamlining inventory. OR Clinical Staff will need to be orientated and trained in the process of sending only Outback supplies to the Outback and for Core items to remain upstairs on the second floor.

4. By June 30, 2021, we will provide better accountability of supply function as subject matter experts. Automation of the documentation process during case, charge capture, and reordering will all go through WaveMark.

5. By June 30, 2021, we will continue the use of automated processes with future system enhancements.

6. Due to the COVID-19 pandemic, UCI executive management announced hiring freezes. However, we will continuously monitor opportunities for improvement over the next year or two, including evaluating the need for additional personnel to provide case picking of supplies, to reduce inefficiencies, standardize, and implement best practices - similar to UCLA's model.

OR Management:

1. By June 30, 2021, we will align to, and document the alignment of, the CNIV process of reviewing schedule changes with surgeons and appropriately prune the preference cards, increasing efficiencies in case picking of supplies and decreasing go-backs.

4. **Physical Inventory Security**

Background

The Outback is an inventory storage facility located on the first floor of the Douglas Hospital and adjacent to the SPD. A Clinical Supply Chain manager and staff members administer services. The Outback primarily stocks supplies utilized by ORs located on the second floor directly above the Outback and the SPD. An external vendor and an offsite, internal distribution center supply the Outback. They make daily supply deliveries to the Outback on a set schedule. The Outback contains approximately 1,800 different stock items in its storage facility.

Observation

Security concerns exist over physical inventory stored in the Outback. There are both internal and external entrances into the Outback. Some of the entrances (particularly those that are outside entrances) can be secured and where ingress and egress can be controlled. Badge access protects other entrances; however, security can be compromised through "tailgating," where one person closely follows another. Perhaps the highest risk to inventory safeguarding results from unrestricted access to the Outback through the SPD.

Compounding this inventory security concern is the interdepartmental difference in operating hours among the Outback, SPD, and the ORs. Specifically, the SPD and OR hours are continuous, as opposed to the Outback. Clinical employees frequently need to enter the Outback at times when Outback staff are unavailable in order to obtain supplies and other items that are needed immediately.

Inadequate security measures over Outback ingress and egress, coupled with the difference in operating hours between the Outback, SPD, and ORs, prevent the Clinical Supply Chain manager from adequately safeguarding physical inventory. They do not adequately maintain accountability over the Outback's physical inventory.

Management Action Plan

Supply Chain Management:

Currently, we perform physical inventory on a daily basis from Monday through Saturday. Additionally, we will implement the following management action plans as further physical inventory security control measures over the Outback:

1. By April 30, 2021, Clinical Supply Chain will limit access to the Outback, to essential personnel only, during business hours. This will include questioning all who enter who do not have regular business in the Outback. After business hours, SPD will take the lead on limiting access to the Outback to essential personnel only and will also question all who enter who do not have regular business in the Outback.

2. By April 30, 2021, the Outback dock door and the external dock door will only be accessible continuously by badge reader.

3. By June 30, 2021, we will revisit the process to review supplies stocked in the basement Omnicells to provide rarely needed supplies for the inpatient floor procedures.

4. By April 30, 2021, we will complete the Kanban build for the inpatient floors providing better visibility of needed supplies. An on-going review of supplies and addition of supplies to the floors will occur with WaveMark.

5. By April 30, 2021, SPD will divide duties of case picking among SPD staff. Designated staff will pull instrument and other designated staff will pull supplies thereby limiting staff in the Outback.

6. By June 30, 2021, we will add personnel to take responsibility of restocking go-backs. Preference card updates will decrease go-backs.

7. By June 30, 2021, we will provide better accountability of supply function as subject matter experts. We will continue to use automation to enhance services with the recently adapted WaveMark system. We will perform supply monitoring six days a week and monitor usage spikes monthly or as needed through WaveMark. We will review spikes to determine if this was due to caseload or from other sources.

8. By the end of the fiscal year, June 30, 2022, we will memorialize and incorporate some of these process changes above (namely, one and seven above) into our internal policies and procedures. Note that currently we are in the midst of a system overhaul and are unable to update our policies and procedures. Additionally, the former department training syllabus was halted due to COVID-19. We will be presenting all new training in our monthly team meetings.

9. Due to the COVID-19 pandemic, UCI executive management announced hiring freezes. However, we will continuously monitor opportunities for improvement over the next year or two, including evaluating the need for additional personnel to provide case picking of supplies, to reduce inefficiencies, standardize, and implement best practices - similar to UCLA's model.

5. Medical Center Central Supply Facilities

Background

The UC Irvine Douglas Hospital opened in March 2009, featuring modern facilities for conducting the latest medical research and physician training. The seven-story hospital has a number of state-of-the-art operating rooms. However, the hospital's space limitations could not accommodate space for a comprehensive central supply facility. A central supply facility is responsible for receiving, storing, and distributing medical and surgical supplies and equipment for an entire hospital.

Observation

Because the Douglas Hospital does not have a dedicated central supply facility, hospital departments have developed other means to procure needed supplies and equipment. In particular, the Outback business unit at Douglas hospital, primarily responsible for maintaining and distributing supplies and equipment to surgical units, is also serving as a supply warehouse for many other clinical units within Douglas.

As surgical services at the Douglas hospital continue to grow, the Outback may not have sufficient resources to serve as the Douglas hospital central supply facility. Currently, the Outback is challenged to provide high quality services to the surgical units and to serve as a supply warehouse for the Douglas hospital

Management Action Plan

Supply Chain Management:

1. By April 30, 2021, we will add a badge reader to the staging dock entrance to increase security of the Outback and eliminate "tailgating" and/or "piggybacking" into the room. In addition to badge access, we will place signage restricting access to authorized personnel only on the external dock door and the internal dock Outback door.

2. By April 30, 2021, Clinical Supply Chain will limit access to the Outback to essential personnel only, during business hours. This will include questioning all who enter who do not have regular business in the Outback. After business hours, SPD will take the lead on limiting access to the Outback to essential personnel only and will also question all who enter who do not have regular business in the Outback.

   By the end of the fiscal year, June 30, 2022, we will memorialize and incorporate these process changes above into our internal policies and procedures. Note that currently we are in the midst of a system overhaul and are unable to update our policies and procedures. Additionally, the former department training syllabus was halted due to COVID-19. We will be presenting all new training in our monthly team meetings.

3. By September 30, 2021, we will review additional areas/space for a Central Supply Storeroom at the Medical Center.

6. **Outback Inventory Storage**

Observation

The surgical practice at UCI Health is experiencing continuous growth, which is outstripping the capacity of the Outback business unit to maintain sufficient

supplies on hand to accommodate the growing number of surgeries at the Douglas hospital. For some time, Outback management has utilized just-in-time inventory processes to alleviate storage space limitations within the Outback. However, the Outback unit has few permanent options to store additional inventory at its current location. As a result, future growth in surgical practices may be impeded.

Management Action Plan

Supply Chain Management:

1. By April 30, 2021, we will continue to review stock needs on a quarterly basis and perform ad-hoc changes to stock levels as needed when preference cards are updated.

2. By April 30, 2021, we will continuously use WaveMark analytics to remove and/or reduce unneeded supplies.

3. By May 31, 2021, we will encourage real-time communications with new and departing physicians (onboarding and off-boarding processes to include Supply Chain) in order to update preference items to ensure maximization of current footprint.

4. By September 30, 2021, we will review additional areas/space for a Central Supply Storeroom at the Medical Center.

5. By September 30, 2021, we will assess other areas available for an addition/extension of current Outback location.