STERILE PROCESSING PROGRAM
OPERATIONAL, STAFFING, AND FUNCTIONAL SPACE PLANNING ANALYSIS

PREPARED FOR:
Royal Inland Hospital
Kamloops, British Columbia
CAN-547

PREPARED BY:
Sullivan Healthcare Consulting Canada Co.
London, Ontario
June 23, 2010

FINAL REPORT

FOR MANAGEMENT DISCUSSION PURPOSES ONLY
Copyright © 2010 Sullivan Healthcare Consulting Canada Co.
06/10
INTRODUCTION

Royal Inland Hospital (RIH) has engaged Sullivan Healthcare Consulting Canada Co. (SHC) to perform a workload analysis to determine staffing, equipment, and facility requirements for the sterile processing department (SPD) to operate efficiently and effectively, including the implementation of a complete case cart system. Currently, there are significant concerns regarding the efficacy of the current SPD facility.

A workload model was first developed for the sterile processing program. Staffing, equipment needs, and facility/functional space planning were determined accordingly. This report also provides recommendations for the sterile processing program requirements at RIH aimed at achieving quality, process, and customer service excellence.

A review of the SPD program by SHC was conducted in 2006, which concluded that the staffing requirement was in excess of program requirements at that time. However, as current data will show, both volumes and case complexity have increased at RIH within the past four years, significantly impacting workload in the SPD.
CURRENT OPERATIONAL ISSUES IMPACTING PRODUCTIVITY

Findings and Conclusions

- The reporting structure for the sterile processing program at RIH is designed within SHC best practice parameters, aligned to the surgery department. Furthermore, SPD also owns responsibility for ancillary sterile processing and high level disinfection in the ambulatory care unit (ACU), which includes endoscope reprocessing.

- The current staffing in the SPD consists of an SPD manager, five lead technician positions (working positions with limited supervisory authority), and 29.6 sterile processing technicians. Total departmental labour equates to approximately 35.6 FTEs. Currently, there is insufficient support in terms of dedicated management and supervisory roles in the SPD. SHC recommends a one manager/supervisor to ten technicians factor when determining management/leadership requirements for an SPD, indicating that the current structure does not provide adequate resources for these functions, which include:
  - Program planning and management.
  - Customer planning and interactions.
  - Training and education.
  - Policy, procedure development and management.
  - Hiring, and performance evaluation and management.
  - Timesheets and payroll.
  - Daily (shift) supervision, problem-solving and quality assurance.
  - Staffing assignments and work flow direction.

- Currently, there is no formal competency-based orientation, training and education program. Furthermore, a significant number of SPD staff members have less than three years of experience, negatively impacting both productivity and quality.

- Review of case volumes between 2006 and 2010 indicate significant program growth and complexity at RIH (see Figure 1). This data indicates the following:
  - Case volumes (within the main OR and ACU/endoscopy area) have increased by 15 percent.
  - Of these cases, total joint procedures have increased by 47 percent.
  - Clinic activity has increased by 22 percent.
## FIGURE 1

**Productive SPD Workload Calculation**

**UPDATED: FRIDAY, MARCH 26, 2010**

All Surgical Cases - 1S3 = 437

Face to Face Visits (1S3 = 450) for particular Departments

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Surgical Cases</strong></td>
<td>Operating Room</td>
<td>10,883</td>
<td>10,715</td>
<td>11,049</td>
<td>11,108</td>
<td>11,230</td>
<td>9,748</td>
</tr>
<tr>
<td></td>
<td>Offsite Surgical</td>
<td>372</td>
<td>480</td>
<td>439</td>
<td>200</td>
<td>396</td>
<td>626</td>
</tr>
<tr>
<td></td>
<td>Day Care/SA</td>
<td>5</td>
<td>3,018</td>
<td>3,332</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gastroenterology</td>
<td>3,897</td>
<td>4,153</td>
<td>5,151</td>
<td>5,199</td>
<td>5,717</td>
<td>5,577</td>
</tr>
<tr>
<td></td>
<td>Opth-Surg</td>
<td>333</td>
<td>289</td>
<td>138</td>
<td>93</td>
<td>38</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Daycare Surgery</td>
<td>2,406</td>
<td>2,815</td>
<td>2,706</td>
<td>2,599</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td><strong>Surgical Cases Sub Total</strong></td>
<td>17,980</td>
<td>18,452</td>
<td>19,486</td>
<td>19,189</td>
<td>20,399</td>
<td>19,489</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Visits Face to Face</strong></td>
<td>GI Lab</td>
<td>1,114</td>
<td>917</td>
<td>953</td>
<td>916</td>
<td>971</td>
<td>810</td>
</tr>
<tr>
<td></td>
<td>General Medical Clinic</td>
<td>1,310</td>
<td>1,344</td>
<td>1,353</td>
<td>1,359</td>
<td>1,633</td>
<td>1,845</td>
</tr>
<tr>
<td></td>
<td>General Surgery</td>
<td>3,311</td>
<td>3,845</td>
<td>3,845</td>
<td>3,207</td>
<td>3,881</td>
<td>3,733</td>
</tr>
<tr>
<td></td>
<td>ENT Clinic</td>
<td>115</td>
<td>106</td>
<td>141</td>
<td>148</td>
<td>137</td>
<td>186</td>
</tr>
<tr>
<td></td>
<td>Opth Clinic</td>
<td>1,519</td>
<td>1,624</td>
<td>1,774</td>
<td>1,762</td>
<td>1,982</td>
<td>1,949</td>
</tr>
<tr>
<td><strong>Visits Face to Face Sub Total</strong></td>
<td>7,789</td>
<td>7,636</td>
<td>8,064</td>
<td>7,442</td>
<td>8,614</td>
<td>8,523</td>
<td></td>
</tr>
</tbody>
</table>

Total of Surgical Cases and Face to Face Visits 25,769 26,088 27,550 26,631 29,013 28,012

**UPDATED: FRIDAY, MARCH 26, 2010**

Total Joints (Hip and Knees) - 1S1 = 4371025 & 4371030

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Hips and Knees (Totals Only)</strong></td>
<td>IP HIP FRACTURE TOTAL</td>
<td>22</td>
<td>14</td>
<td>30</td>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IP HIP REVISION TOTAL</td>
<td>23</td>
<td>23</td>
<td>27</td>
<td>32</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IP HIP ELECTIVE TOTAL</td>
<td>132</td>
<td>118</td>
<td>151</td>
<td>120</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Hips - Total</strong></td>
<td>177</td>
<td>155</td>
<td>208</td>
<td>175</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IP KNEE FRACTURE TOTAL</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IP KNEE REVISION TOTAL</td>
<td>5</td>
<td>1</td>
<td>2</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IP KNEE ELECTIVE TOTAL</td>
<td>201</td>
<td>176</td>
<td>253</td>
<td>237</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Knees - Total</strong></td>
<td>253</td>
<td>213</td>
<td>305</td>
<td>297</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| **Hip and Knee Sub Total** | 0 | 349 | 430 | 368 | 513 | 472 |

Source: Royal Inland Hospital OR and SPD records, May 1, 2005 –March 4, 2010
A count of trays processed (month of January 2010) as compared to the number of procedures performed calculates a “trays per case” factor of 5.2. This factor as determined by SHC in 2006 was 3.5, indicating an increase of approximately 48 percent in trays processed per case. This is indicative of the growth in total joint procedures as well as the increased quantity and complexity of instrumentation used in many services (i.e., spine, maxilla-facial, etc.).

Based on the increased volume and complexity of services, the workload analysis indicates that the complement of 34.6 FTEs (inclusive of both lead technician and technician positions, all considered workingproductive) is sufficient, if not slightly excessive, to perform the services provided by the SPD, provided the following issues are addressed:

- Vacant positions are filled, trained, and working effectively.
- Current staff is provided full and proper training and education.
- Facility issues are addressed, and instrument flow and equipment deficiencies are corrected. Services provided by SPD are revised in accordance with the recommendations in this report (e.g., reducing portering responsibilities). The total department FTEs equate to 35.6 (one SPD manager, five lead technicians, and 29.6 technicians). Although the most recent additions to staffing increase the complement to higher than the recommended level, RIH should seek the reduction via slow attrition while allowing adequate time for process changes and further staff development and education.

Interviews with SPD management and staff members indicate a strong desire to provide quality service. Furthermore, recent “lean” initiatives have had a positive impact on organization and productivity within the SPD, including the following actions:

- Reduction of clutter within key areas of the department.
- Total joint case process refinement.
- Preference card/pick list refinement.

To address recent issues regarding productivity and quality in SPD, the following initiatives have also been implemented:

- Scheduling of cases requiring instrumentation beyond inventory capabilities has been reduced, to ensure there is adequate reprocessing time to properly turn around trays required for reuse on the same day.
- Proper postoperative care of instrumentation has been reinforced, and instruments are sent to SPD in an organized manner. Enzymatic spray gels are being trialed for use.
- Additional tray inspections have been implemented within the SPD assembly area. However, it should be noted that this further affects overall productivity in the department, especially given current facility and staffing issues.
Currently, there are two washer disinfectors, three steam sterilizers, one Sterrad (gas plasma) unit, and one cart washer. Capacity analysis indicates that a total of four washer disinfectors and four high-vacuum sterilizers are required to maintain instrument flow during peak reprocessing hours. Also, having only one Sterrad unit poses a potential risk in the event that the unit goes down for repair as there is not a back-up to this unit. As more heat-sensitive items are required for surgical procedures, the need for turnaround capabilities with the complement of Sterrad units needs to be considered.

The current cart washer has the capacity to manage the current demand on carts and utensils, including the demand when the case cart system is fully implemented. However, consideration should be given to future needs when determining functional space requirements and departmental layout.

Current square footage for the SPD equates to 9,156 square feet (850.6 square meters). The consultant concludes that the space (footprint) occupied by the SPD is sufficient in size to accommodate the program, including the full implementation of the desired case cart system. The consultant projects the square footage requirements of the SPD to be approximately 8,350 square feet (or 776 square meters). However, there are significant issues regarding layout, flow, and size of specific areas, including:

- The decontamination area is grossly undersized by at least 300 square feet (28 square meters), representing the greatest bottleneck to proper processing in the department. Furthermore, there is not sufficient linear wall space to accommodate the four recommended washer disinfection units (and space for five should be provided to accommodate future growth potential).

- The cart washer unloads directly into the assembly area, creating congestion in this section.

- House tray and basin assembly stations are located directly adjacent to the washer disinfector unloading areas. Surgical instrument processing tables in the assembly area are located in areas segregated from the linear flow between the decontamination and sterilization areas. Flow for surgical instrumentation (for what represents greater than 80 percent of all instrument processing activity) is not designed for efficiency.

- Currently, there are no dedicated elevators between the OR and SPD for the transport of dirty and clean items (or case carts) between the two areas. This is a significant contributing factor to the inability to fully implement the recommended case cart system.

- A small reprocessing area within the OR core is maintained for first stage decontamination of surgical instrumentation, prior to delivery to SPD. This area (and activity performed here) is in part required due to the inadequacy of the SPD decontamination room.

- The current OR core is deficient in space for storage (equipment, supplies and instrumentation). Complete implementation of the case cart system, including the relocation of the majority of instruments and supplies to SPD, would provide needed equipment storage space, and help decongest the department. In addition, the closing and renovation of the current OR reprocessing area for storage should be pursued.
These efforts depend on the renovation of the current SPD, including the identification of dedicated elevators for transport.

- The SPD has assumed many duties for departments (i.e., clinics) that are not central to their operations and detract from efficiency within the department. Furthermore, communication and planning between the SPD and clinics is not optimal, causing interruptions in workflow in SPD, including:
  - Portering services between the SPD and clinics.
  - Procedure cart management and distribution.
  - Scheduling of procedures requiring endoscopes. Currently, no notice of pending procedures is provided to the SPD until the day of the procedures.

- Resource nurses are not provided adequate and dedicated time for preference card management and instrument tray design and utilization management.

- There are no forums in place for SPD and OR personnel to interact, plan, and problem-solve.

- There is currently no instrument tracking system used. Current data collected does not provide for measurement of labour productivity or quality output at the individual employee level. SPD-specific information systems are available that not only track instrument location, but also track activity and quality output per employee, shift, period, etc. These systems also provide instructional information concerning SPD functions (i.e., proper inspection and assembly of specific trays), which increases instrument assembly accuracy.

- In the ACU, the room utilized for endoscope reprocessing is small. In addition, time and motion studies combined with increasing volumes indicate the need for an additional scope washer unit. In contrast, the endoscope storage room is larger than required for current use. The ACU manager has recommended renovations that would create a reprocessing area in the current endoscope storage room and conversion of the current reprocessing area for endoscope storage.

In conclusion, inefficiency and errors in the SPD are the result of the following:

- Facility and equipment bottlenecks.
- Scheduling practices and insufficient instrument inventories.
- Staff training and education deficits.
- Interruptions and lack of focus on core departmental activities.
RECOMMENDATIONS

SHC recommends the following steps, segregated into short-term and long-term recommendations, to address current productivity and quality concerns and to ensure a sustainable, quality-driven, best practice sterile reprocessing program is developed.

Recommendations deemed critical for immediate program turnaround, and the development of long-term program improvements include:

- Hiring of the two recommended supervisory positions and revision of the five lead technician positions to further support quality assurance and productivity.
- Refocusing quality assurance measures on critical, problematic instruments and trays.
- Refining the scheduling process by:
  - Assessing the current complement of instrumentation.
  - Inputting tray inventory data into the OR scheduling system.
  - Scheduling cases in accordance to tray complement (i.e., resource-checking), and allowing for proper turnaround of instrumentation.
  - Identifying and purchasing additional instrumentation to meet the demands of the surgery schedule where gaps are identified.
- Committing to required facility and equipment renovations, and developing a strategy for continuation of services during the renovation period.

Short-Term Recommendations

1) Hire two SPD supervisor positions to support the manager role, one of which will also act as the department educator. The implementation of additional management support/leadership positions is considered a critical step in improving quality output and productivity within the SPD, especially given current staff development, facility and equipment status.

The SPD supervisor/educator position will primarily work on the day shift, and be responsible for:

- The development of yearly competencies for SPD personnel.
- The development of a competency-based orientation plan and checklist for newly hired SPD employees (encompassing all responsibilities within the consolidated department).
The review and development of sterile processing policies and procedures.

This position requires an in-depth knowledge of sterile processing, strong educator and communication skills, and the ability to organize and facilitate meetings and lead groups in a teaching environment. The ideal candidate must be familiar with CSA standards, AAMI standards, and infection control protocols.

The second SPD supervisor position will be responsible for overall departmental operations, staffing, assignments, discipline, etc. This individual will primarily supervise the afternoon shift.

2) Revise the role of SPD lead technician to act as liaison to the service groups, and provide guidance and expertise to other SPD technicians. Provide for five SPD lead technician positions. In addition to providing direct SPD technician duties, lead technicians will also perform the following:

- Act as department leaders, providing direction and problem-solving in the absence of supervisory support.
- Align with OR services and/or service groupings and act as liaison to their respective service(s).
- Participate in OR service group meetings and in-services.
- Act as proctor and provide training and mentoring support to new employees, as coordinated by the SPD supervisor/educator.

There should be one lead technician on the midnight shift, to provide direction and coordination of activities. In addition, there should be one lead technician aligned to two to four services within the OR (grouped according to like specialty), to act as the liaison between SPD and the respective resource nurses.

3) Focus current quality assurance actions (instrument tray double-checks) on trays and instruments that have been identified as problematic (orthopaedics, instruments with lumens, rongeurs, and kerrisons, etc.). Charge lead technicians with review and sign-off of the identified trays.

4) Ensure the total complement of hired SPD technicians equals 31.5 FTEs, inclusive of the five lead technicians (including relief). This complement includes providing service within the OR core, and ensures daily coverage of three technicians in the ambulatory care center. Total recommended departmental FTEs equate to 34.5, as shown in the following table:
As previously stated, it is recommended that the current complement of technicians be maintained while the supervisor positions are established, and reduction to the recommended level happen through attrition. This will compensate for current quality and productivity gaps caused by facility and equipment issues, and by training and education deficits among the current staff.

5) Develop a competency-based orientation and education program for SPD technicians. Ensure the developed program requires specific, hands-on demonstration of key departmental activities (sterilizer operation and testing, decontamination practices, etc.), and demonstration of competency regarding each specific tray processed within SPD. Begin with basic trays (basic laparotomy, minor, basic orthopaedic, etc.) and then move to specialty trays and tools. Conduct at least monthly in-services to provide refresher information on reprocessing topics and/or current quality issues.

6) Implement an OR/SPD task force. This group should consist of the SPD manager, resource nurses, the surgical services supply chain supervisor, and select OR and SPD staff members. This team can review and update policies and procedures as necessary. Immediate agenda items should include further defining the handling of instrumentation throughout the entire instrument use and reprocessing cycle, the refinement of instrument tray contents, and the revision of preference card contents. The OR/SPD task force will also monitor quality and performance indicators and review results on a regular basis. As issues and program improvement ideas are identified, the team will develop and implement solutions.

7) Refine the surgery scheduling process to ensure availability of instrumentation for all cases:

- Update the equipment list within the OR information system to include instrument trays (and quantities of each).
- Schedule cases to match resources (instrument availability) and reduce/eliminate turnaround requirements.
- If instruments are required to be turned around within the same day, ensure adequate time is provided for proper turnaround. There should be approximately four
hours from the time the instruments are made available from the earlier case to the time they are needed for the next case.

- Identify and purchase instruments where needed to ensure a proper complement to match the routine schedule.

8) Develop service agreements between the SPD and other departments (ED, L&D, cancer clinic, etc.) and define the following:

- Par levels of trays used by each department.
- Replenishment cycles.
- Portering needs: Services provided should ensure SPD technicians can remain within the SPD area and OR core. Other departments should take responsibility for the delivery of instruments and supplies to and from SPD.
- Scheduling of procedures (i.e., scope procedures in the cancer clinic) to ensure proper planning and preparedness by SPD, and avoid last-minute chaos.

9) Eliminate the use of procedure carts, and develop par levels for required supplies and instruments on each unit that utilizes procedure carts.

---

**Long-Term Recommendations**

1) Renovate the existing SPD facility to develop a best practice reprocessing environment:

- Allocate the following for each of the major SPD areas, to provide (at a minimum) the following square footage by functional area:

  - Decontamination: 1,082 sq ft
  - Preparation and packaging, and sterilization: 1,979 sq ft
  - Storage, distribution and case carts: 4,139 sq ft
  - Office space, break rooms, locker rooms, etc.: 1,150 sq ft

- Design the optimal layout to ensure proper and efficient flow. Relocate the cart washer to feed out into the storage/case cart area. In the preparation and packaging area, locate OR instrument assembly tables close to the feed out area of the washer disinfectors. House tray and basin tables can be located in adjacent areas, and this work should be batch-processed (to the extent possible) during non-peak OR processing times.

- Ensure the following equipment is included in the design:

  - Four washer/disinfectors (provide space for a fifth unit).
  - Four steam sterilizers (provide space for a fifth unit).
Two gas plasma (Sterrad) units.
Two dedicated elevators (one clean and one dirty return) between the OR and SPD.

Ensure the renovation plan provides for continued operations during the renovation. This will likely require the development of a new decontamination area while the current area continues to be operational.

2) Upon development of the new SPD facility, proceed with the implementation of a full case cart system. Utilize the OR/SPD task force to oversee refinement of pick tickets and the decrease of supplies and instruments in the OR sterile core. In addition, remove all reprocessing activities from the core and utilize the current OR reprocessing area for additional equipment storage.

3) Identify and implement a robust SPD management and instrument tracking system. An effective system will provide tray documentation tools, sterilizer record keeping (instrument logging), instrument location tracking, instrument repair and replacement management, and SPD staff productivity monitoring capabilities. Consultant experience indicates that these information systems usually have a return on investment of less than two years (averaging 14 months).