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Barber Management
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ENHANCED TRAUMA AND ELECTIVE SURGERY IN THE NORTHWEST

DRAFT: Vision Document

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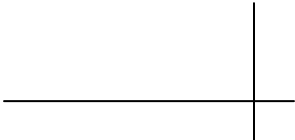
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Executive Summary

The Northern Health (NH) Service Plan for 2009/10 - 2011/12, identified a number of priority goals, objectives, strategic initiatives and performance targets. Included as one of the key strategic objectives was the intention to establish and implement plans for surgical services in each Health Services Delivery Area (HSDA), including working to reduce wait times with a particular focus on orthopaedic surgery during 2009/10.

Barber Management Consulting Inc. (BMCi) was engaged to support Northern Health to meet the planning commitment outlined in the Service Plan. The work explored the current service delivery model and defined options for enhanced regional surgical services in the Northwest Health Services Delivery Area (NWHSDA). The foundational document described both the NWHSDA governance and service delivery models currently in place and identified opportunities for improvement through a set of recommendations that support the delivery of high quality sustainable surgical services to the NWHSDA population. The project approach and process of engagement with key NH interdisciplinary stakeholders and the analysis undertaken was grounded in principles of continuous quality improvement. The cornerstone of this approach was a commitment to embracing the NH guiding principles of working collaboratively in partnership, treating others with respect, compassion & empathy, while demonstrating integrity, stewardship and keeping the outcomes focussed on quality and patient safety.

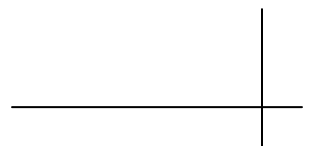
Founded in 'gap analysis' between the current and future state of regional service delivery, the analysis of NWHSDA surgical services explored service approaches and levels across the NWHSDA sites. The recommendations focused on governance and service delivery in order to bridge gaps and were proposed and assessed on the basis of service delivery urgency, implementation feasibility, alignment with best and relevant practice as well as population health impact.

This document is a summary of the recommendations with a focus on setting the vision and defining a strategy to meet the goals.

The key recommendations included:

- Strategic context
 - Development of a Regional Surgical Coordinating Committee, tasked with re-aligning the surgical services from five independent and autonomous sites to a more cohesive and collaborative systems model across the HSDA;
 - Creation of a Change Leadership position to lead the transition and support the Committee;
 - Designation of a medical lead to provide medical leadership to the Change Leadership position and Committee;
 - Development of a communication plan that includes community and physician engagement;
- Operational context
 - Clear designation of each site in terms of service delivery, patient acuity and procedure complexity aligned with the BCTAC trauma designation;
 - Implementation of a population health planning model for elective services that supports the shifting demographics of the Northwest, is grounded in evidence and supported by robust data and information;

- Comprehensive impact analysis and program planning incorporating physical infrastructure and including investment in required one time capital equipment and operating budget adjustments for ongoing salary and non salary needs.
- Improvements to the health human resource planning across the NWHSDA ; and
- Site level quality improvement and assurance initiatives to improve the delivery of services.



Introduction: History and Context

Background

The context for the provision of health care in rural BC requires consideration of a number of key issues: the geographic dispersity, the aging population, rising burden of chronic disease, human resource and health infrastructure challenges, as well as the socio-economic population profile.

The NWHSDA surgical service current state review was completed in the fall, 2009 and built on previous operational reviews including a more detailed review of orthopaedic surgery. These reviews focused on the service delivery required to improve patient care, provider experience and operational sustainability and provided a quantitative and qualitative perspective of the current service delivery, articulated steps toward developing a vision for the future and identified gaps to meeting that vision.

Based on the historical reviews and pressures to improve the delivery of surgical services in the Northwest, the NWHSDA leadership requested the development of a vision for a model of surgical care. The new vision would be grounded in the foundational principles of NH and would address the multisite emergent/trauma surgeon call schedule, diagnostic infrastructure and the distribution of resources. The new model would aim to ensure that patient care was:

- more equitable, with access to a coordinated range of local, regional and provincial services for all residents of the Northwest, regardless of where they live;
- more effective and efficient, with all services coordinated in sites large enough to recruit and retain health professionals and achieve economies of scale; and
- focused on high quality surgical care with accountabilities for achievement of established outcomes;

While continuous quality improvement was the impetus for the previous reviews, NH's principles of treating people with respect, compassion, and empathy while demonstrating integrity, stewardship and quality; in a spirit of collaboration and integrity was the cornerstone of the approach in setting a vision.

A broadly supported analysis of Northwest's surgical services included engagement of representatives from medicine, nursing and other clinical areas as well as administration through a Steering Committee for the project effort.

A cursory literature review, leveraging previous reviews was conducted to inform the vision and to provide evidence.

Founded in the "gap analysis" between the current and future state of service delivery at the region's hospitals, the vision identifies types and levels of service at the key NWHSDA sites. The recommendations focus on both the governance and service delivery in order to bridge gaps and were proposed and assessed on the basis of service delivery urgency, implementation feasibility, alignment with best and relevant practice and population health impact.

Future State

The surgical services future state focused on both the strategic context such as vision, governance and planning and the operational context, incorporating key components of access, efficiency, sustainability and quality of care.

Where data was not accessible during the project, the report outlines the type of analysis that would support the recommendations and options.

The recommendations attempt to strike a balance between the desired state and what could reasonably be supported by the realities at the local level. While much of the change required to improve the delivery of surgical services in the NWHSDA is within management control, the significance of resource constraints (human, financial, capital, physical space and equipment), the engagement of the internal stakeholders and the support of the communities must not be underestimated. The level of commitment from all stakeholders to the implementation of change will determine the degree of success.

Strategic Context

Guiding Principles

The development of a robust surgical program in the NWHSDA should be grounded in a set of basic principles, be driven by a common vision for service delivery, aligned with broader corporate strategies and be true to the realities present. Aligning the planning from both a strategic perspective (i.e. planning based on a vision and set of guiding principles) and a pragmatic perspective (i.e. planning around existing structures where feasible and adjacent programs) is essential. Misalignment may result in competing priorities of the organisation or the inability to overcome the constraints posed by health human resource supply, physical space and surgical and/or diagnostic equipment constraints.

Pollett, et al. in their 2002 paper: *The future of rural surgical care in Canada: a time for action*, created a set of principles as follows:

- All Canadians have a right of access to essential surgical services;
- Surgical services, particularly of an urgent or emergent nature, should be available within a reasonable distance of patients' homes;
- Surgical services should conform to a uniformly high standard of care;
- Surgeons who provide these services and the nursing staff who assist them must be appropriately trained and credentialed;
- Surgeons must be committed to the maintenance of professional competence and progressive continuing education;
- Surgeons must have sufficient support to perform these duties, including physical resources, colleagues and opportunities for personal and professional development.

It is recommended that NWHSDA adopt a set of guiding principles, such as those presented by Pollett to guide the developmental phase. The guiding principles would allow clear articulation of the end goal and would assist in guiding the decision making during the planning phase.

Vision

Creating a common vision would provide a platform to communicate the desired future state. During the interview process, participants were asked what they envisioned as the future state of the NWSHDA surgical services. The following articulates those responses:

To effectively manage the emergent, urgent and elective surgical cases in a coordinated and efficient manner; maintaining appropriate access to services which does not place an unreasonable burden on patients or care providers; optimizing physical space and equipment in a sustainable manner.

It is recommended that NWHSDA adopt a common vision at the onset of the planning for surgical services that aligns with the overall NH vision as noted in the NH Vision – A Picture of 2015.

Aligning goals to meet this vision requires courage and commitment. What follows is a roadmap to meet the vision which outlines specific and incremental steps that, although difficult, if followed would yield the desired results.

Governance, Leadership, and Communication

The governance of the surgical services redesign must align with the strategic vision developed for the HA and respect the constraints of the geography, demographics and service realities.

Improvements to the delivery of surgical services across the NWHSDA will require unwavering, consistent and strong leadership willing to make unpopular but necessary changes to the status quo.

It is recommended that the NWHSDA strike a Regional Surgical Coordinating Committee (RSCC) which would be tasked with re-aligning the surgical services from five independent and autonomous sites to a cohesive, integrated and collaborative systems model across the HSDA.

In order to support a model of change, the RSCC would be constituted with key stakeholders representing surgeons, anaesthesiology, nursing, risk/quality and administration. Allied health (OT/PT, pharmacy, diagnostics, etc) and support services (CSD, housekeeping, purchasing, etc) could attend by invite as required. The committee would link to the NH Surgical Council, other HSDA executive and medical committees and to site level structures such as OR management committees and LMACs. The key goal of the committee would be to improve the standard of care through coordination and collaboration between sites. This would be accomplished by:

- indentifying and engaging of key stakeholders (local, regional and provincial)
- developing and reviewing policies, guidelines and service levels at an NWHSDA level and implemented at the site level;
- providing input into the annual operating and capital budget processes;

- monitoring the financial and operational performance of each site;
- managing waitlist and access issues;
- providing oversight and evaluation for research, teaching and innovative projects;
- participating in provincial and regional supply chain purchasing decisions; and
- communicating program goals and successes to external stakeholders.

Strong linkage and collaboration with the NH Surgical Council should be managed by designating representatives from the committee as opposed to duplicating effort.

It is recommended that the NWHSDA create a Change Leader position to lead the transition and support the Committee. Designation of a medical lead to provide medical leadership to the Change Leader position and Committee is also recommended.

The efforts required to lead the changes proposed cannot be accomplished without dedicated and experienced resources. Management of the process redesign, site level changes and change management activities requires a resource with strong clinical and leadership qualities, a proven expertise in complex and successful organization change and the ability to engage medical, clinical and administrative leaders. The individual should also possess the ability to communicate effectively with community leaders and understand the importance of monitoring and evaluation.

The Change Leader would report directly to the Chief Operating Officer and would facilitate and support the RSCC. For this position to be effective, dedicated business support resources should be allocated to facilitate the data analysis and budget development.

The Medical Co-leader must also be a dedicated resource during the transformation. It is anticipated that the role would require less than 1 FTE of effort including the role of RSCC Chair. The capacity for this role could be generated by focusing existing administratively paid physicians who demonstrate key leadership qualities to this task, however, clear delineation around role, responsibility, deliverables and time commitments is essential.

It is recommended that the NWHSDA create a communication plan specifically for the redesign.

Clear communication of the vision and direction to both internal and external stakeholders is critical to the success of the changes. Development of a communication plan coordinated with the NH's Communication Department is recommended. As suggested by stakeholders, the communication plan should borrow from the Northern Cancer Control Strategy approach which outlined the continuum of cancer care, engaged communities and rallied around a vision that improved access to the broad cancer services, rather than focusing on a single institution or modality solution. To further increase the probability of success, community engagement sessions with Senior Administration and local representatives would ensure consistent messaging was provided throughout the planning, implementation and review processes.

Operational Context: A Systems Model for Delivery of Care

The most obvious gap noted in the existing service delivery structure was the absence of a cohesive and collaborative model. The model of five independent and autonomous sites was not sustainable from a number of perspectives including: human resources, physical space and equipment limitations and financial and operational viability.

A more cohesive and collaborative model was articulated as a desired future state by both clinical and administrative participants. While concerns were raised around potential loss of services at the smaller sites, it was clear that there would be support for a well designed system of care which aimed to optimize each site's scope of practice. Although this is obvious for urology and ENT given the distribution of surgeons, it is as important to coordinate into a single program the orthopaedic and general surgery programs to improve both elective and emergent/trauma care.

Therefore, the essential task is to re-align surgical services to a more cohesive and collaborative systems model with a common vision, consistent policies and practices, and a standard set of clinical practice guidelines. The benefits of a single program with multiple sites include improved coordination of care which allows for improved distribution of resources. For example, the lack of available resources (beds, OR time, staff) for elective surgery in the larger sites whose mandate is to maintain emergent capacity was identified as a quality of care issue analogous to providing emergent care in the absence of the appropriate backup resources in smaller centres.

Site Designation

Beyond implementation of a common set of standards or protocols, a decision on what type of surgery should be offered at each site is critical to ensuring a robust and viable program. The improvement in coordination and consolidation of medical and surgical services, both elective and emergent, across the NWHSDA, was suggested in the interviews as well as previous studies^{i,ii,iii}.

However, it was clear that maintaining local surgical services provides improved access for patients closer to home and benefits the broader service delivery for all sites. For example, the presence of a vibrant local surgical program requires that the site maintain other critical services such as anaesthesia and diagnostics, which in turn support additional core services such as an obstetrical program (operative anaesthesia as well as elective regional (epidural) analgesia) and an ER (IV sedation and airway management). In addition, providing a breadth of service in a facility will contribute significantly to the recruitment and retention of multidisciplinary clinical teams. The best example of this was in Smithers where they have developed a robust "visiting surgeon" model in the wake of years trying to recruit a General Surgeon.

As a result, ***it is recommended that each site be assigned a clear designated level of service delivery, patient acuity and procedural complexity.*** This includes delineating what procedures are done by local surgeons (GP-S or Fellow-trained), the capacity for surgical outreach or visiting surgeons and the support for pre and post surgical coordination and intervention in the home community for patients who must travel to receive service. Moreover, these role descriptions should set out the expectations for services that would be provided at all times and those that would be available periodically.

Stakeholders indicated that a “hub and spoke” model of service was desirable as long as the service delivery was improved in terms of access, outcome and sustainability and did not undermine core services at the local hospital. For this to be realized, the focus was to coordinate emergent/trauma surgery in the hub while reallocating elective procedures and outreach services in the spokes.

Detailed and robust data and information, which was not available during this project, is required to complete this work.

Trauma/Emergent Surgery

The impact of emergent surgery on the elective slates is well documented in the literature and was identified as a major contributing factor in OR delays, cancelations, hospital flow and increased staff overtime in the NWHSDA sites.

The small volumes, distribution of facilities, and the limits of surgical specialties has contributed to a dispersed model of care for the NWHSDA. The primary example of this is the existing region emergency call for General and Orthopaedic Surgery.

Shared regional calls exist for orthopaedics (KHHC & PRRH) and General Surgery (MMH, KHHC & PRRH). While the shared call is required to manage the call burden for the individual surgeons, the model creates issues such as the creation of inpatient capacity/access and misalignment with diagnostic equipment (CT available in MMH) and ICU/CCU (MMH & PRRH) access. Moreover, the call is based on each surgeon's availability rather than using a systems approach to coordinate services and other resources.

Interviewees indicated that confusion remains for who is on call, although when pressed for further information it was revealed that this was predominately directed at orthopaedic call.

A recent study (in pre-publication) was completed to explore the impact of this distributed trauma service in the NW. The lead author of the study, Dr. Richard Simons^{iv}, was interviewed and indicated that the core goal for any trauma program is reduction of preventable mortality and morbidity. He went on to say that to meet this goal the following should be met:

- Clear designation of trauma sites, with required services, equipment and staff;
- Call schedule aligned with provider and site services;
- Improved activation of LLTO

Dr. Simons' study and a trauma services review completed by Sierra Systems in 2008 indicated that the current structure of trauma services was sub-optimal. Designation of sites and efforts to coordinate services were identified as key priorities.

It is recommended that the RSCC align surgical services within a trauma site designation and designate a single level 3 trauma site for the NWHSDA.

The Trauma Association of Canada has set guidelines for the development of trauma systems in Canada. The articulated vision of a trauma system includes major trauma centres providing acute care services to the most seriously injured and a network of regional sites that care for all injured patients. Their approach aims to optimize

trauma care across a network of acute sites given available resources and the ability to move patients expeditiously to the required level of care. British Columbia adopted these guidelines and has begun to set up a system of trauma services across the province.

Input from the 2008 trauma service review based on the TAC Guidelines and expert clinical input from Dr. Richard Simons indicate that the NWHSDA would be best served by consolidating trauma services around a single level 3 site in the Northwest. Below is an excerpt from the TAC Guidelines:

Level III Centres may be required to provide initial care to major trauma patients in their jurisdiction and definitive care to all secondary level trauma cases. The ability to deal with specific injuries will depend on available surgical subspecialties and services. In general, more complex or multisystem trauma cases (ISS>15) or those requiring intense resource commitment, will be transferred to Level I or Level II Centres. Stabilization of major trauma patients prior to transfer, including if necessary operative stabilization, is an important function of Level III Centres. It is an expectation that timely bedside consultation is required of all available surgical subspecialties on an as needed basis (usually within 30 minutes) and even more rapidly for Trauma Team Leaders and General Surgeons (20 minutes)

This consolidation of services provides optimal and sustainable care of the injured through improved surgeon call coordination, optimization of surgical and diagnostic equipment and space requirements, a critical mass of emergent service delivery options, while maintaining lower-risk/lower-intensity elective procedures closer to the home of the patients.

It is recommended that the RSCC designate Mills Memorial as the level 3 trauma site for the NWHSDA.

Based on the geographic centrality of Terrace, the availability of CT and a critical mass of surgical, emergency, diagnostics and critical care staff, it is recommended that Mills Memorial Hospital be designated as the Level 3 Trauma site for NWHSDA. Although, no site possesses all the requirements of a full level 3 site, MMH is best suited to play the role.

Key requirements for a level 3 site are summarized below:

- Program Requirements
 - Demonstrated commitment to priority treatment of severely injured patients
 - Assure adequate resources and staff (as per level requirements)
 - Demonstrated financial support to trauma program
 - Trauma Registry participation/funding
 - Quality Improvement programs including process and outcome measures
 - Injury prevention programs
- 24 hour trauma team response to include:
 - General Surgery emergency department bedside consultation (per defined local protocol, max 20 min response)
 - In house advanced airway intervention capability at all times
- Protocols in place for recognition of major trauma patient, communication and transport to appropriate level of care within the Trauma System
- 24-hour hospital coverage by the following surgical services:
 - Trauma Surgeon, General Surgeon (max 20 min)

- Orthopaedic Surgery
- Non-Surgical Specialties for care of the trauma patient:
 - Radiology
 - Anesthesia
 - Critical Care
 - Internal Medicine
 - Emergency Medicine
 - Social Work
- Diagnostic and Interventional Radiology
 - Immediate plain film radiography (in-house tech)
 - Technologist on Call with 30 min response
 - Ultrasonography (excluding FAST)
 - CT Technologist on Call with 30 min response
- Rehabilitation
 - Timely access to comprehensive and coordinated Rehab services in acute phase (Physiatrist on staff and allied health)
 - Access to comprehensive long term rehab program
 - Protocols for referral for rehabilitation (acute and long-term)
- Operating Room
 - 30 minute call back for operating room staff for immediate surgery
- Blood Bank and Laboratory System
 - Available on site 24 hours per day
 - Blood bank system capable of providing unmatched blood within 10 minutes
 - Accredited by Canadian Blood Services and labs

It is recommended that the RSCC consolidate emergent orthopaedic surgery to Mills Memorial.

This improved coordination of services is most profound for Kitimat and Terrace given their proximity and potential consolidation and sharing of catchment areas. This would benefit both the operation of the sites and access to services for the communities. For example, consolidation of orthopaedics would allow KHHC to focus on the high volume low risk elective cases (given the lack of an ICU, diagnostic equipment and staff and bed pressures) while MMH, with its ICU and expanded lab and DI, could focus on the multi-system trauma and more intensive elective cases. Currently, of the 500-600 orthopaedic surgeries completed in Kitimat in 2008/09, roughly 80% of them were admitted directly as elective surgery while 20% were admitted through the ER. The future model could maintain much of the local elective cases in Kitimat (avoiding potential cancelations due to emergent cases) while completing the higher complexity cases (multi-system trauma or high co-morbid elective patients) in Terrace. Of course, this model is predicated on the assumption that the surgeons would participate in multiple site service delivery, a practice that is currently happening to some degree.

It is recommended that the RSCC consolidate emergent general surgery to Mills Memorial.

Unlike orthopaedic surgery, the capacity for more than one site to perform general surgery, through Fellow-trained GS or GP-S, remains. However, consolidation of call for emergent surgery should occur in MMH. Of the more than 5000 general surgery cases performed in NWHSDA, roughly 12% were inpatient. Although a weak proxy for urgent versus elective cases (and until more detailed data is made available), it seems reasonable that the volume of SDC general surgery is sufficient to maintain elective or minor trauma services across a number of sites.

It is recommended that the RSCC designate PRRH, KHHC, BVDH and WMH as a network of level 5 trauma sites for the NWHSDA.

Level 5 designation is reserved for facilities in rural setting with no immediate access to a major trauma centre (Level I – III Centre). Resuscitative emergency department capability, operative stabilization if available, and access to air evacuation is essential. The level 5 facility may be required to provide some definitive care to secondary level trauma cases depending on available surgical specialties and clinical services as they would receive any adult or paediatric trauma patient within their catchment area. However, most trauma cases would be rapidly transferred to the nearest appropriate Trauma Centre following stabilization.

Elective Surgery

Elective surgery supply and demand are best planned using a Population Health perspective.

Although the population of the NWHSDA is expected to remain relatively flat with only a slight 2% growth over the next 15 years, the aging of the population is significant.

It is recommended that the RSCC develop predictive models for the surgical services based on evidence presented in the literature. The simplest model is to look at existing utilization controlling for age and gender and predicting for a future cohort based on population changes. This method is not without error given that the known factors for current utilization are influenced by supply variables such as surgeons, ORs, staff and bed availability, financial constraints and elective slate disruption - elective cases postponed to accommodate emergent cases.

The ability to do simple demand modeling based on historical utilization provides a starting point for planning, while the capacity to do this level of modeling currently exists within NH.

Simply based on the assumption that age-specific per capita use remains constant, it is reasonable to expect significant increases in the magnitude of 15–50% in demand for surgical service over the next 5-10 years although these increases will vary widely by specialty.

A US study^v (using 2001 as a baseline) predicted that population aging will have a profound impact on the utilization of surgical resources.

Of the surgical specialties examined in the US study, ophthalmology was predicted to have the largest forecasted increase in work (15% by 2010; 47% by 2020). Orthopaedics and urology were predicted to increase by 28% and 35%, respectively, by 2020. Orthopaedics surgery was predicted to have smaller gains than urology as a result of the significant number of procedures performed in patients under the age of 45.

It is therefore recommended ***that the planning for elective surgical services pay particular attention to the ophthalmology, urology and orthopaedics services.***

Per Capita Utilization Rates Waitlists and Referral Rates

The 2008/09 data made available shows that there is good utilization of both inpatient and surgical day care for residents of the NWHSDA. In fact, all NWHSDA communities, with the exception of Stikine (113.1 per 1000 pop)

and Queen Charlotte (118.0 per 1000 pop) show dramatically higher surgical utilization (from 135.2 in Smithers to 155 in Kitimat) than the provincial average for rural communities (115.6 per 1000 pop).

Looking at the longest wait times (as captured in the SPR data which does not include the consultative wait), the greatest opportunities exist to explore service improvements for residents of Kitimat and Smithers waiting for General Surgery, Orthopaedics and Urology procedures. Wait times for residents of Smithers may be a function of the visiting surgeon schedule, while waits for residents of Kitimat, (and beyond for those not registered on the SPR system) were attributed to availability of Surgeons, beds and cancellations due to emergent procedures. While utilization remains high the fact that long waits continue to exist suggests that opportunities exist to actively manage waitlists. However, data that was provided was insufficient to identify where the opportunities exist.

Moreover, limitations in the data that were made available prevented detailed evaluation of opportunities for repatriation. However, further analysis could provide opportunities to improve the referral process and allow for improved distribution and repatriation of cases.

It is recommended that RSCC incorporate referral analysis and waitlist data into their volume predictions.

This is best done by estimating the degree to which repatriation can reasonably be expected. For example, estimating the volume of elective surgery that could be managed closer to home - i.e. repatriating the majority of cases for elective procedures that are currently performed in the NWHSDA or site. This requires data at the procedural level including fields that indicate where the cases were performed and where the patient resides.

Patient Acuity and Procedure Complexity

Beyond defining the site service levels based on a relative scale of emergent care, it is ***recommended that the RSCC also define the types of cases performed at each site by the patient acuity and procedural complexity.***

Incorporating clinical decision support tools for predicting risk, such as the American Society of Anaesthesiologists (ASA) score will further define the level of surgical services for each site. For example, the committee may decide to limit surgical services in sites without critical care backup to ASA 1 and 2. Moreover, defining the types of procedures done based on their relative complexity may also be used to define the cases done in each site.

System Efficiencies

OR Booking

It is recommended that RSCC develop and implement a standard/common OR Booking system, with preference to an electronic format.

The OR Booking office staff are very knowledgeable and maintain positive rapport with the surgeons and OR staff. However, there are no written NH or NWHSDA booking guidelines. There was an awareness of the Surgical Patient Registry processes but at the time of the site visits, staff were unaware of the increased requirements for waitlist management and auditing through the MoHS.

The practice of scheduling patients varies slightly across the sites. While the majority of the booking and scheduling is handled by the OR booking offices, in Prince Rupert, the surgeons' offices book all procedures and provide the lists to the OR.

Moreover, there was some concern raised by the GP Surgeons in Smithers related to their elective surgery schedules. They expressed that OR time is allocated primarily on historical practices and does not reflect current demand.

Due to a lack of a surgical information management system, all processes are manual and efficiency data cannot be easily extracted. Kitimat and Smithers maintain manual statistics or one-off reports on indicators such as average case duration/procedure per surgeon, first case start times, and as a result a robust system with timely data is not possible. Surgical site infection reporting is not routinely shared with site physicians and staff.

Pre-Surgical Screening

It is recommended that RSCC develop and implement a standardized pre-surgical screening process and accessible via telehealth modalities for patients required to travel for services.

Limited pre-surgical screening clinics exist (Kitimat and Terrace) and processes are not standardized across the HSDA. The OR Booking Clerks typically review the patient booking packages and flag those cases that require an anaesthetic consult. The local orthopaedic surgeon in Kitimat has established a prehabilitation/surgical optimization clinic for arthroplasty patients. This is commendable and could be explored as an option for expansion within the HSDA to benefit all arthroplasty patients.

There was an HSDA-wide desire for the creation of a standardized pre-surgical screening process that would allow all elective patients to be screened via telephone or clinic visit and be based on criteria established in collaboration with anaesthesiologists. Such a program could include the ability for reciprocity of pre-surgical assessment using standardized tools and guidelines at the nearest facility to the patient and the assessment provided to the operating facility.

Challenges and Areas for Improvement

Although not as striking as the issues identified in the section above, a number of stakeholders identified challenges that need to be addressed as part of, or ahead of, the redesign of the surgical program. These including productivity and patient flow, human resource shortages, surgeon call, physical space limitations and aging equipment and performance improvement and data management. Opportunities to address these challenges are outlined briefly below.

Productivity and Patient Flow

Surgical Inpatients

Bed capacity issues were noted at Kitimat, Terrace and Prince Rupert.

Scheduled (elective) and unscheduled (emergent, urgent) surgical cases compete for the same resources. When demand is high, elective surgeries are cancelled or postponed. Although not entirely predictable, the use of historical utilization data of emergent cases by time of day, day of week and seasonal variation should be used to improve the planning of elective slates. This requires:

- Collecting accurate data on demand for scheduled and unscheduled surgery;
- Collecting accurate data on the volume and arrival patterns of patients representing different components of unscheduled surgical demand: emergent, urgent, semi-urgent, and non-urgent surgeries;
- Determining the average waiting times that would be tolerated for each type of unscheduled surgical demand (e.g., average waiting time for emergent surgeries should not exceed 20 minutes);
- Applying queuing theory to determine the number of OR hours needed for unscheduled demand, based on the average waiting times for different levels of urgency (emergent, urgent, etc.);
- Using information about scheduled case demand, duration, turnover times, and the prime time to estimate the number of OR hours needed for scheduled surgeries.

Patients designated as Alternate Level of Care (ALC) continue to play a significant role in the ability to maintain OR slates. ALC patients occupying beds reduce the availability of beds for surgical inpatients which in turn causes postponements or cancellations in the OR slate.

It is suggested that the practice in KHHC of transporting orthopaedic trauma patients, immediately following phase 1-2 recovery, back to their home facility for recovery be reconsidered.

Day Care Surgery

The RSCC should review the surgical data to ensure optimization of day care surgery. This data was not made available during the review and therefore a baseline is not included in the report.

It is recommended that a review of patient flow in Kitimat be conducted to improve coverage when the Switchboard operator takes breaks as this currently delays the preoperative preparation process and delays the OR.

Operating Rooms

All documentation (e.g. case records) was completed manually and as a result, efficiency indicators such as first case starts, turnover times, elective room utilization, etc were, where done, compiled manually by the managers/supervisors.

Opportunities for electronic OR systems should be explored as part of the Information Management and technology strategic and tactical plan.

It is recommended that a process review and value stream map (to determine which steps add value and which do not) for Prince Rupert surgical cases be completed to eliminate delays of up to 2-3 hours for patient preparation (insertion of lines and/or epidurals) in PAR where the needed supplies, equipment and trained staff are not consistently available.

It is recommended to standardize the capital equipment list and processes for review by the RSCC, sites and RHDs. A lack of transparency or understanding about capital equipment decision making was raised as an issue by several stakeholders.

Continue efforts on Regional clinical practice standard development with Gil Lainey as the lead.

Maintain competencies through the provision of in-services as well as attendance at Peri-operative Registered Nurses of BC (PRNBC) chapter events and provincial meetings as funding allows. Alternatively, OR staff may work in another surgical facilities (e.g. Hazelton nurses work in Smithers) to enhance and maintain skills and competency.

Seek opportunities for team-based training with physician colleagues. This may be facilitated by utilizing reverted CME funding.

Increase the emphasis on quality improvement and risk management through improved mortality and morbidity rounds, access to information regarding surgical site infections and other standard surgical quality measures (eg. low mortality CMGs, etc.).

Review Wrinch Memorial Hospital's summary of innovations– see Appendix C - Wrinch Memorial Hospital Proposed Innovations

PAR

Work towards fully cross trained staff in all sites so that coverage of OR, PAR and DCS departments is seamless. Similar to the OR standards development, the NWHSDA may wish to consider the development of working group(s) responsible for the development of PAR (or DCS, PSS) specific standards of care.

CSR

The processing areas within Smithers and Hazelton are small and face some structural challenges for best flow and work design. Any renovations or redevelopment of these or other surgical areas must include the involvement of the processing staff and NH practice leader to ensure that these areas meet standards now and for the future.

It is recommended to review the practice of open pan flash sterilization of cystoscopes in Prince Rupert as this is not in accordance with national standards – it is understood through follow-up that this has occurred but an on-site review has not been conducted.

Health Human Resources

Health human resources were examined specifically within the review. This included both medical and clinical staff mix as well as standards in training and assessment. Site level vacancies and workforce planning activities were examined for physicians and nursing. It is recommended that a more detailed review of allied health and support service staff would be recommended as part of the impact analysis during the program planning phase.

Physicians

Recruitment of additional surgeons is critical to the enhancement and sustainability of the surgical program in the NWHSDA. For example, data from the Canadian Institute for Health Information indicates that Canada has 3.7 orthopaedic surgeons per 100,000 population, less than the Canadian Orthopaedic Association recommendation of 4.5 orthopaedic surgeons per 100,000 people to meet the needs of the population in a timely manner. Using the current population of the NWHSDA, one would expect to have 2.8 to 3.4 FTEs orthopaedic surgeons. Although use of physician to population ratios has been called into question for rural or regional workforce planning because services are often obtained outside the geographic region they continue to provide a benchmark for comparison.^{vi}

Although current site-level vacancy lists exist, it is recommended that a robust physician resource plan for the NWHSDA be developed in concert with NH as a whole. Leveraging expertise and resources from Corporate Medical Administration, along with local community leadership is required. Moreover, it is recommended that the surgical outreach model developed in Smithers be examined for other like communities – see Appendix A - Detailed Summary of Smithers’ Surgeon Outreach Model

Further, it is recommended that the recruitment efforts be better coordinated. For example, the recruitment visits should be coordinated within NH allowing all 3 HSDA’s an opportunity to meet and tour candidates. The biggest costs, especially for International Medical Graduates (IMG’s), are the flights to NH. Once in NH, ensuring all candidates experience many communities, within reason, increases the probability that they will select NH to practice, even if the preconceived location was not a fit.

The current or projected vacancies per location are presented in Table 1.

Table 1 - Physician Resource Plans

Facility	Specialty	
Bulkley Valley District Hospital (Smithers)	<ul style="list-style-type: none"> • ENT 	<ul style="list-style-type: none"> • Urology
Wrinch Memorial Hospital (Hazelton)	<ul style="list-style-type: none"> • Family Practice (1-2) 	<ul style="list-style-type: none"> • Anaesthesiology
Kitimat General Hospital (Kitimat)	<ul style="list-style-type: none"> • Anaesthesiology 	
Mills Memorial Hospital (Terrace)	<ul style="list-style-type: none"> • ENT • Radiology 	<ul style="list-style-type: none"> • Urology • Anaesthesiology
Prince Rupert Regional Hospital (Prince Rupert)	<ul style="list-style-type: none"> • Family Practice (5) 	<ul style="list-style-type: none"> • Anaesthesiology

Training and Skills Maintenance

Consideration of team based training over individual Continuing Medical Education (CME) should be explored by the surgical and anaesthesia staff.

The RSCC should review the reverted CME money available in the communities and consider leveraging it to bring training exercises into the communities which would benefit the whole surgical team. The utilization of training mannequins may be available through UNBC or one of the local community colleges to facilitate this training. Coordination with Vancouver General Hospital's Center of Excellence for Simulation Education and Innovation (CESEI) would also provide opportunities to explore improved surgical training, education and skills assessment and maintenance. It is recommended that the RSCC explore opportunities to partner with the local academic institutions and CESEI.

Nursing Staff

Vacancies for peri-operative/peri-anaesthesia nursing staff during the site visits are reported in Table 2

Table 2 - RN Vacancies by Site

Facility	Specialty
Bulkley Valley District Hospital (Smithers)	• 3 OR/PAR RNs
Wrinch Memorial Hospital (Hazelton)	• None
Kitimat General Hospital (Kitimat)	• None
Mills Memorial Hospital (Terrace)	• 2 OR/PAR RNs (one position frozen)
Prince Rupert Regional Hospital (Prince Rupert)	• None

To plan for the future, the NWHSDA should to consider rolling workforce planning exercises that delineate the historical data around attrition, examine current age distribution of staff, project need in the upcoming 5 years, and develop actions plans to manage future demand.

Training and Skills Maintenance

The centers such as Terrace or Prince Rupert, with a larger staffing pool organizationally, could explore the potential to add OR LPNs to the staffing complement. The NWHSDA has a good supply of LPNs through local colleges and OR LPN training could be brokered through Grant MacEwan (Alberta) or SIAST (Saskatchewan). This could be supported in a manner similar to the current OR RN education which is provided through Grande Prairie Regional College and supported by the NH Professional Practice Office (PPO).

The NWHSDA should consider requiring enrolment in formal training of all peri-operative and peri-anaesthesia personnel through educational institutions to avoid the potential weaknesses incurred with internal or “train-on-the-job” experience.

Dental Staff

The use of non-NH staff for dental surgery requires review.

PGRH has addressed this issue in past by hiring all dental assistants as HEU employees which addresses liability issues but creates issues of additional cost and logistical management of the on- and off-staffing of these individuals. A second option would be to develop a contract with the dental surgeons which outline the requirements they must meet for their employees. This could be developed in collaboration with Ruby Fraser, NH Quality and Risk Manager and implemented as part of the annual credentialing process.

Central Sterile Reprocessing (CSR)

The NWHSDA currently employs only certified CSR technicians which should be maintained in the future. As part of the workforce planning exercise that is updated annually, the issues of human resource planning should encompass CSR personnel.

A process review of CSR using tools such as value stream mapping is recommended. Processing activities and scheduling hours would be examined for all sites but in particular for PRRH. There may be opportunities to minimize overtime and improve workflow and coverage through the staggering shifts of CSR positions in this facility.

Physician Call Coverage

Improve communication regarding orthopaedic coverage which was characterized as “hard to access” and with “inadequate communication” as to which site was providing the call. This will obviously be improved through consolidation of trauma services.

Physical Site

The review did not include an architectural or engineering assessment. However, there have been previous physical space reviews of the MMH site recently (reports not made available for this review) that indicate the requirement for major renovation or replacement of the site to accommodate increased service volumes and programs. In our physical tour of the site it is clear that renovations and maintenance of the existing surgical areas is required. Specifically, modifications were noted to improve surgical flow for obstetrics patients and to accommodate expansion or enhancement of other specialties as necessary in MMH. Architectural design work has been commissioned and the OR has been slated for renovation but the work has yet to be started.

Expansion of services would require a redesign of existing space in the physical OR of MMH. This would encompass removal of walls to increase the size of the OR suites to improve flow and accommodate equipment intensive orthopaedic surgery. Currently standards for the size of OR suites range from 630 ft² to 725 ft². However, depending on the age of the equipment being used there may be requirements for larger ORs to accommodate the older and presumably larger equipment (carts, trays and C-arm).

It is recommended that an architectural or engineering assessment of the sites, especially MMH, be completed as part of the impact analysis for redesign.

An alternative that should be investigated further is the purchase of portable OR/PAR-suites that can be attached to the exterior of the current site. Not only does this provide immediate (operational within 6-9 months of order) OR physical capacity, but can serve as a main OR during the renovations of the existing space. The availability of a portable OR also enables NH to relocate it in the future if it is no longer needed at the MMH site.

For example, solutions such as Mobile Medical’s Mobile Surgery Unit™ offer: (<http://www.mobile-medical.com/mobilemedical-pdf/MSU.Brochure.300106.pdf>)

- Operating rooms and recovery areas designed to meet or exceed U.S. healthcare standards
- Critical Care resources (physical and human resources) to meet required shifts in acuity and complexity
- Pre-op / post-op areas with capacity for two or three patients (depending upon configuration) Centralized nurses station designed for easy visual and electronic monitoring of all systems
- Soiled utility room designed separate from the “clean” area
- Clean utility room designed to maintain proper sterilization of instruments
- Integrated medical gases zoned for activation with required shut-off valves

This option can be secured for between \$2.5M and \$3M, depending on configuration, and would provide flexibility for NH in the future – see Appendix B - Mobile Medical International Corporation’s Mobile Surgery Unit.

It is further recommended that the program plan be supported by a robust impact assessment of the physical plant, medical and surgical equipment and support services. Moreover, development of staffing models (MD, RN, Allied Health) and bed management models based on existing practice standards is warranted.

Monitoring Performance Improvements and Patient Safety (QA/CQI)

During the information gathering phase for this project, it became evident that extracting data was a difficult task. Few persons know whether certain data existed or, if it did, how to query databases to extract it. As a first step, NH should document the process that enabled retrieval of the data requested by BMCi for this report. Following that, effort should be directed to determine data to be captured for current and future requirements in support of the RSCC. Data collection and dissemination solutions would then be adapted for both current (manual) and future (electronic) processes. Internally, itemized data requirements for surgical program development, impact assessments and monitoring can be solicited from the RSCC the NH Surgical Committee, MACs, etc, and producers of the annual Region or Authority reports.

NH may want to select a set of indicators that demonstrate progress toward Accreditation Canada readiness, to inform itself, its staff and the public of its efforts and successes. Indicators to support future programming and resourcing needs might also be sought. Agencies to be consulted in the development of a set of indicators include Provincial Surgical Councils and Expert Groups, other Health Authorities, the Ministry of Health, and vendors of surgical services information systems and admission-discharge-transfer systems.

Scheduled (elective) and unscheduled (emergent, urgent) surgical cases compete for the same resources. When demand is high, elective surgeries are cancelled or postponed. Although not entirely predictable, the use of historical utilization data of emergent cases by time of day, day of week and seasonal variation should be used to improve the planning of elective slates. This requires:

- Collecting accurate data on demand for scheduled and unscheduled surgery;
- Collecting accurate data on the volume and arrival patterns of patients representing different components of unscheduled surgical demand: emergent, urgent, semi-urgent, and non-urgent surgeries;
- Determining the average waiting times that would be tolerated for each type of unscheduled surgical demand (e.g., average waiting time for emergent surgeries should not exceed 20 minutes);
- Applying queuing theory to determine the number of OR hours needed for unscheduled demand, based on the average waiting times for different levels of urgency (emergent, urgent, etc.);
- Using information about scheduled case demand, duration, turnover times, and the prime time to estimate the number of OR hours needed for scheduled surgeries.

It is recommended that predictive models be developed to assist in the planning and management of surgical services.

Quality reviews should be formalized with a case review schedule rather than continue in the current ad hoc fashion. Region-wide surgical rounds are encouraged. Case reviews should be planned to extend beyond MMH to all sites that provide surgical services.

Focus on continuous learning and quality improvement should be the goal rather than review of incidents or near misses.

Standardized terms of references for OR Management Committees should be established with input from the RSCC. These committees should be multidisciplinary in nature and provide a forum for planning of equipment needs, slowdowns, manpower management and clearly establish lines of communication between site, HSDA and NH surgical and medical structures.

Improvements to secure data flow between the hospital-based systems, the Surgeons' offices and the Family Practice offices should be explored and work plans developed.

Appendix A - Detailed Summary of Smithers' Surgeon Outreach Model

The current Smithers visiting surgeon structure evolved following significant attrition of well established surgeons in the Smithers community. The community felt strongly that their surgical program should be preserved and initial focus was on replacing surgeons. This recruitment drive was unsuccessful and through hard work, dedication and collaboration by the administrative, physician and nursing leaders with key community leaders, the key focus became timely access to elective surgical services by bringing the surgeons to the community rather than forcing the local residents to travel to surgeons. The community was largely galvanized by this new initiative which led to the development of Operation Keyhole - a successful funding drive to raise donations for the purchase of minimally invasive equipment and instrumentation which would be used locally and was needed to attract and retain the visiting surgeons. Currently, the site plans to further engage the community through the re-establishment of the Operation Keyhole drive in order to raise more awareness and funding for needed equipment and instrumentation.

It was noted that financial and in-kind support for the surgeons was a crucial component to facilitating realignment of surgical resources. Visiting surgeons now come on a regular basis supported by Northern and Isolation Travel Assistance Outreach Program (NITAOP) funding and use the NH Health Information System (Cerner), office and examination space critically co-located beside the program's clerical support, OR Booking and surgical suites. This allows the visiting surgeons to maintain flexibility in assessing patients, completing surgical or endoscopic procedures as well as providing call coverage to stabilize and transport trauma patients as needed. As a rule, patients seen during one visit will have their procedures scheduled and completed for the same surgeon's next visit. Urgent patients are scheduled while the visiting surgeon is on site being careful to schedule any major or inpatient cases (those requiring incision) early enough in the week to ensure that the patient's recovery and discharge can be managed by that surgeon. Accommodation is provided through an NH owned house in the community and travel expenses are covered.

The visiting surgeon interviewed during the site visit conveyed a great deal of personal and professional satisfaction in this arrangement. Although, he commented that remote access to view slates, etc once the surgeon returns to his/her primary work would be appreciated. Kudos were expressed for the high functioning GP anaesthesia support. He concluded by indicating that the program keeps the pressure off the flagship facilities while providing a high standard of care and competency.

Currently, succession planning is managed by the surgeon or physician securing an equivalent replacement prior to departure and is facilitated through the partnerships with UNBC medical student placements with the Smithers physicians. Due to the success of this surgical structure and positive feedback from the community, there are few physician vacancies and it was noted that there are physicians self referring themselves as candidates for the program. While there are no "lifers", the dedication of the staff and community coupled with the work life balance opportunities has been successful and the wait list for opportunities for physician is now described as 6-12 years long.

Appendix B - Mobile Medical International Corporation's Mobile Surgery Unit

LICENSING AND ACCREDITATIONS of MMIC's MSU™ was strategically designed to comply with issues of life safety, quality patient care, and compliance with state licensing guidelines and Medicare certification requirements from its inception.

Licensing & State Regulations

To be recognized and operational, healthcare facilities must be:

State licensed; a process whereby designated state employee/consultants tour the physical plant and review the policies and procedures that govern every activity of the facility in detail

Surveyed by the Centers for Medicaid and Medicare Services (CMS), formerly HCFA, to ensure compliance with its policies and procedures

MMIC received CMS approval in October 1997. In March 1998, California officially licensed the first Mobile Surgery Unit™ as a freestanding ambulatory surgery center (ASC); the first time in the history of U.S. healthcare that a Mobile Surgery Unit™ was licensed as a freestanding surgery center.

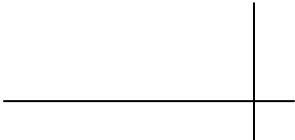
Since then, Florida has passed legislation allowing Mobile Surgery Units™ to be licensed for use in their Department of Corrections and Virginia now has two operational units. Other states have either reviewed or are in the process of reviewing applications for their specific requirements.

Accreditation for Quality

For further quality assurances, MMIC undertook and passed two national inspections to obtain full healthcare accreditation. The benchmarks that MMIC has achieved for highest quality U.S. standards in mobile facilities include:

Joint Commission on Accreditation of Healthcare Organizations (JCAHO)

Accreditation Association for Ambulatory Health Care (AAAHC)



Appendix C - Wrinch Memorial Hospital Proposed Innovations

Medical and Administrative staff at Wrinch Memorial Hospital proposed innovations to manage patients in Hazleton. The proposals included both opportunity for OR time as well as bed availability for the most elective procedures performed on patients without co-morbidities and a location for post recovery convalescence and rehab for Upper Skeena resident treated at other hospitals . Specifics include:

1. Endoscopies: with 2 upper and 2 lower GI scopes, available nursing staff and clinic space for surgeons to see patients between procedures the site could perform 9-10 procedures per day.
2. Orthopaedics: the site maintains basic orthopaedic instruments and a drill for K-wire percutaneous pinning. Taking advantage of the orthopaedic surgeon who travels to Smithers every 4-6 weeks, minor procedures such as pin and plate removals and carpal tunnel releases could be performed on local and surrounding patients.
3. ENT: Visiting surgeons could benefit by providing access for local and distant patients.
4. Pathology: A relocation of a pathologist has created an opportunity for frozen sections and other anatomical procedures to be performed at WHM.
5. Maternity: outreach to communities such as Dease Lake, Iskut and Telegraph Creek would not only provide options for resident of those communities but would benefit staff with increases in the volume and mix of patients at WMH.
6. Ophthalmology – noting that the residents are underserved for diagnostic and interventional ophthalmology, the Wrinch Memorial Hospital expressed an interest in offering these services to their local area.

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