Examining Tools, Processes & Resources to Promote Communication and Teamwork in the Perioperative Setting

Summary Report

Communication and Teamwork for Surgical Care Safety Project

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INTRODUCTION/PURPOSE

Adverse events occur with greater frequency in surgical patients as compared to other patients in the healthcare system (Amato- Vealey, Barba & Vealey, 2008). One of the leading causes of adverse events is communication failure between care providers (Morris & Hoke, 2015). Communication breakdown or omission can occur as the patient transitions throughout the perioperative continuum of care. Information shared between providers at 'handover' or 'handoffs' can be missed or inaccurate. Patient safety evidence suggests communication between each provider and team of providers in the perioperative setting is required to facilitate continuity of information and patient care, and to prevent medical errors (Johnson, Logsdon, Fournier & Fisher, 2013).

The role of CPSI is to develop a national strategy on patient safety. As part of its Strategic Plan, CPSI has undertaken the goal of accelerating the pace and dissemination of patient safety improvements. One area of focus identified by CPSI include surgical care safety. Effective communication and teamwork in the perioperative setting is a key focus in delivering safe surgical care to patients and families. The purpose of this report is to provide a summary of the literature from 2007- 2016 of tools and resources to promote communication and teamwork and enhance patient safety in the surgical setting, specifically in the immediate pre, intra and post-operative periods (CPSI, 2017). For the purpose of this report the following terms were defined as:

DEFINITION of TERMS:

Surgical patient defined as any patient undergoing a surgical procedure.

Handover/handoff defined as the transfer of care from one health care provider or group of providers to another. The terms handover and handoff are often used interchangeably and will both be used in this review to describe a point in transition of care of the surgical patient.

Preoperative period defined as the period immediately before or within close proximity of the patient's surgical procedure.

Intraoperative period defined as the period from the time the patient enters the operating room until the time the patient exits the operating room.

Postoperative period defined as the period immediately after the patient leaves the operating room after the surgical procedure.

Perioperative period encompasses all three periods described above (pre, intra and postoperative).

Handover tools, processes, protocols defined as any tools, checklists, guiding processes or frameworks that are intended or used to enhance team communication during handovers in the pre, intra and postoperative period.

Team communication defined as transfer of pertinent patient information during the perioperative handover between interprofessional members of the health care team, specifically nursing, anaesthesia and surgical providers and other allied health care professionals.

White literature peer-reviewed articles.

Grey literature consisted of web resources, reports and policies.

Abbreviations found throughout the report. OR- operating room**;** PACU- postanaesthetic care unit; ICU- intensive care unit; CVICU- cardiovascular intensive care unit; PICU- paediatric intensive care unit; PPACU- paediatric postanaesthetic care unit; PCICU- paediatric cardiac intensive care unit; QI- quality improvement, RTC- randomized clinical trial

SEARCH STRATEGY

The electronic data bases PubMed, Medline, and CINHAL were searched using the keywords specific to each perioperative period. The inclusion criteria for the white literature were peer-reviewed journal publications only, written in English and published from 2007 - 2016. Further, inclusion criteria included a sample or direct link to a "perioperative tool, checklist, handover/handoff process, and/or standardized process/protocol/framework". Additionally, the reference list of the eligible articles was screened by 2 reviewers to identify relevant articles that could have been missed during the search. Details related to the tool/process, location, setting and study methods or article type were collated in a table.

Preoperative period. Search terms for the preoperative period included: *handover, handoff, preoperative, interdisciplinary communication, interprofessional relations, communication, checklist, practice guideline, organizational innovation, transition of care, patient discharge, continuity of patient care, interdisciplinary collaboration, checklist, operating room, preadmit department,* and *preoperative admission checklist* in various combinations to explore literature related to a preoperative transfer of care process.

The literature search related to preoperative handovers yielded 55 articles. Overall, 7 articles were found related to communication, teamwork and information transfer during the handover or preparation of the surgical patient in the pre-admit, pre-operative holding or immediate preoperative period that included a checklist, tool, process or a protocol (Appendix A. Table 1).

Intraoperative period: Search terms for the intraoperative period included: *handover, handoff, intraoperative, interdisciplinary communication, interprofessional relations, communication, checklist, practice guideline, organizational innovation, transition of care, patient discharge, continuity of patient care, interdisciplinary collaboration, checklist, operating room,* and *surgical safety checklist* in various combinations to explore literature related to a intraoperative transfer of care process.

The literature search related to intraoperative handovers yielded 191 articles. Overall, 12 articles were found to fit the above criteria (Appendix B. Table 2).

Postoperative period: Search terms for the postoperative period included: *handover, handoff, postoperative, interdisciplinary communication, interprofessional relations, communication, checklist, practice guideline, organizational innovation, transition of care, patient discharge, continuity of patient care, interdisciplinary collaboration, checklist, operating room, postanaesthetic care unit,* and *anaesthesia recovery room* in various combinations to explore literature related to a postoperative handover process.

The literature search related to postoperative handovers yielded 187 articles that were reviewed for relevance (Figure 3). Overall, 19 articles were found to fit the above criteria (Appendix C-F. Table 3-6).

The primary outcome of this review was to identify existing tools, processes and frameworks developed, implemented and adopted to enhance team communication in the perioperative setting. As such the articles and tools/processes/frameworks were not necessarily screened for applicability, credibility, reliability and outcomes.

WHITE LITERATURE

SUMMARY: PREOPERATIVE PERIOD

The literature related to preoperative handover was limited to describing an approach to team communication and teamwork processes, tools or frameworks. There were seven articles included in the review under this category. Four articles were related to the entire perioperative experience: pre, intra and postoperative period and three articles were related to preoperative admission or holding area.

The checklists and processes in the preoperative period were related to transfer of required documentation and patient preoperative preparation, such as labs, interventions, surgical preparation and consults. The focus was not on face-to-face communication and interprofessional verbal communication (de Vries et al., 2009; Gaucher et al., 2016). The checklists were developed with the input of the multiple teams involved with the patient during the preoperative period, such as nursing, surgery, anaesthesia and other allied HCPs, and included sections to be

completed by the specific team (Morris & Hoke, 2015; Siragusa et al., 2011; Sullivan, 2011). The checklist was a part of the patient's chart and followed the patient throughout the surgical journey (de Vries et al., 2009; Sulivan, 2009).

One article was specific to using a communication mnemonics for easy recollection of the information during the verbal handover (Morris & Hoke, 2015).

Articles related to the preoperative period often focused on how to manage preoperative conditions that can affect the patient during the surgical period, such as sleep apnea, diabetes, cardiac issues. Checklists and processes are developed and addressed in the literature; however, these were not specific to interprofessional communication or transfer of care points but rather were used to inform the patient preparedness and fittingness for surgery and to help with postoperative planning and care (Fong & Sweitzer, 2014).

Conclusion

Evidence suggests that preoperative preparation of the patient increases efficiency and improves patient specific preparation (Gaucher et al., 2016; Siragusa et al., 2011). Effective patient preparation identifies comorbidities and ASA (American Society of Anesthesiologists) classification risks to prevent surgical cancelations and further optimize patient outcomes during the intraoperative and postoperative period.

SUMMARY: INTRAOPERATIVE PERIOD

Overall, 12 articles were found related to communication, teamwork and information transfer during the intraoperative period that included a checklist, tool, process or a protocol.

The most commonly described process or tool to facilitate communication, teamwork and to improve patient care and safety during the intraoperative period in the literature was the Surgical Safety Checklist (SSC). The SSC was developed by the World Health Organization and rolled out as a part of the 2007 Safe Surgery Saves Lives initiative. The SSC was intended to improve teamwork and information transfer among all members of the perioperative team (surgery, anaesthesia and nursing). The SSC is divided into three check-in times: sign-in, briefing and sign-out and is universally applicable to any surgical setting (WHO, 2009). Literature for the intraoperative period was predominantly related to the implementation or modification of the WHO SSC or the evaluation of its effectiveness. The checklists applicable to the intraoperative period were available in a write-in format (Ahmed et al., 2013) and some as colorful posters/laminated versions on the wall in the OR or throughout the unit (De John, 2009; Haynes et al., 2009). One checklist was created as an electronic version (McCarroll et al., 2015). A shared responsibility exists in completing the checklist although the team leading the implementation and completion the SSC varied. For example, the surgical residents led the

checklist in Chaudhary et al.'s (2015) study whereas the nurses led the checklist completion in a study by Chard and Makary (2015)

In 2009, Haynes et al. suggested that the implementation of the WHO SSC in the perioperative setting improved patient outcomes. Lepanluoma et al. (2014), Alnaib et al. (2012), Haugen et al. (2013), Panesar et al. (2011), Treadwell et al. (2014) described improved patient safety, improved communication and teamwork and decrease in complications with the surgical safety checklist.

However, studies have suggested that the implementation of the SSC did not affect patient safety as originally reported. Specifically, limited consideration of human factors and other limitations affected initiatives directed at minimizing surgical errors. O'Leary et al. (2016) found that the implementation of the SSC had no effect on the proportion of paediatric patients with perioperative complications before and after the implementation of the SSC. The study included 28, 772 surgical procedures (14 458 pre and 14 314 post implementation of the SSCL) from 116 hospitals in Ontario, Canada (O'Leary et al., 2016). Likewise, comparing the data from before and after the implementation of the SSC in 101 Ontario hospitals (n=109,341 pre and 106, 370 post-implementation), Urbach et al. (2014) found there was no impact on surgical mortality rates or complications following the implementation of the SSC.

Issues with compliance and team adherence to the protocol/pathway were also described (Garson et al., 2014). Barriers to successful implementation and uptake of a standardized process included existing hierarchies and perceived relevance of the items on the checklist (Alnaib et al., 2012; Morgan et al., 2013)**.** The applicability of the checklist to certain settings was also a factor.

Some studies described modification of the SSC to fit the specific setting by either adding items or changing/removing items, although the removal of items was not recommended (Ahmed et al., 2013; Burbos & Morris, 2011; DeJohn, 2009; McCarroll et al., 2015; Morgan et al., 2013). For example, in addition to the SSC Ahmed et al. (2013) created a checklist applicable to robotic-assisted procedures in urology. McCarroll et al. (2015) created a Robotic Operating Room Computerized Checklist (RORCC) applicable to robotic-assisted gynecologic procedures. Other studies also elaborated on the applicability of the WHO SSC to certain perioperative settings specifically small ambulatory surgical settings (DeJohn, 2009; Morgan et al., 2013). For example, during her interviews with perioperative staff DeJohn (2009) suggested that the AORN and Joint Commission standards and recommendations for handoff were not applicable to smaller surgical centers. Many of these settings opted to create a modified SSC version that would be applicable to their case population (DeJohn, 2009; Morgan et al., 2013). Literature was also found related to the intraoperative period and creating pathways specific to surgical settings and patient populations (Garson et al., 2014; Chaudhary et al, 2015) or reflecting specific communication needs of the team, i.e. anaesthesia handoffs, nursing changeover handoff (McCarroll et al., 2015; Pukena et al, 2014).

Staff education played a role in successful implementation of the SSC. One study from the UK, found there was a significant increase of compliance with the SSI use after a 1-day teamwork and communication training intervention of the perioperative staff (surgeons, anaesthetists and nurses) based on aviation *Crew Resource Management* training used to improve the safety of flying (Morgan et al., 2015). Similarly, simulation training during intraoperative handoff communication between anaesthesia residents was shown to improve the intraoperative communication and retention after one year (Pukenas et al., 2014).

In addition to the WHO SSC, there were also mnemonics and acronyms described as a useful aid to effective communication (Agarwala et al., 2015; Chard & Makary, 2015; Johnson et al., 2013). However, these were often used as an addition to the WHO SSC or to expand on specific issues (i.e OR crisis checklist).

Conclusion

The evidence suggests that standardization of intraoperative communication during transitions of care improves teamwork, communication and patient outcomes by reducing mortality and complications associated with surgery. The literature also suggests that support and creation of patient safety leadership training and infrastructure is crucial for successful implementation and sustainability of the intraoperative standardized process (Johnson et al., 2013; O'Leary et al., 2016)

SUMMARY: POSTOPERATIVE PERIOD

Overall there were 19 articles found related to communication, teamwork and information transfer during the handover of the surgical patient from the operating room in the immediate postoperative period that included a checklist, tool, process or a protocol (Tables 3,4, 5 & 6). There were seven articles related to handovers from the OR to PACU (Napgal et al., 2010; Napgal et al., 2013; Petrovic et al., 2015; Potestio et al., 2015; Robins et al., 2015; Salzwedel et al., 2013; Weigner et al., 2015), six articles relevant to OR-ICU (Gleicher & McGhee; 2014; Petrovic et al., 2012a; Petrovic et al., 2012b; Salzwedel et al., 2013; Yagn and Zhang, 2016), seven articles related to paediatric OR to ICU/PACU (Agarwal et al., 2012; Boat & Spaeth, 2013; Craig et al., 2012; Kim et al., 2012; Low et al., 2012; Vergales et al., 2015; Zavalkof et al., 2011) and nine articles discussing existing communication mnemonics used during surgical handovers (Amato-Vealey et al., 2008; Caruso et al., 2015; Fablia et al., 2016; Funk et al., 2016; Grover and Duggan, 2013; Kitney et al, 2016; Nasarwanji et al., 2016; Sandlin, 2007; Wheeler, 2015).

The articles under the postoperative category were divided into three groups (OR-PACU, OR-ICU, OR-paediatric PACU/ICU) based on the destination of the transfer. Articles were also included that related to communication mnemonics and the postoperative period. The articles

included were either describing the development, application, implementation and/or evaluation of a postoperative handover/handoff process/protocol or a checklist.

The articles shared similar reasons for leading to the development of a standardized postoperative handover process. Reasons noted included existing tensions between staff at the end of the procedure, dissatisfaction with the existing handover report, local problems/incidents and patient safety issues, miscommunication leading to adverse events, attempts to improve the quality because of existing inconsistencies, lack of structure, content and execution or any combination of the above (Boat & Spaeth, 2013; Gleicher and McGhee, 2014; Fablia et al., 2016; Kim et al., 2012; Low et al, 2013; Vergales et al., 2015, Salzwedel et al., 2016; Yang and Zhang, 2016). Another key driver in some studies was the need to develop a process that would address the complexity of the surgical patient (Fablia et al., 2016; Gleicher & McGhee, 2014; Salzwedel et al., 2016; Vergales et al., 2015).

The implementation of a postoperative checklist was often correlated with the implementation of a protocol to standardize the handover process (Boat & Spaeth, 2013; Kim et al., 2012; Petrovic et al., 2012a; Napgal et al., 2013; Vergales et al, 2015; Weinger et al., 2015). The aim of the standardized process was to streamline and standardize the postoperative handover, promote face-to-face communication and team members' presence during the handover, increase the quality and the effectiveness of the handover and improve satisfaction of the participants (Agarwal et al., 2012; Boat & Spaeth, 2013; Fablia et al., 2016; Gleicher and McGhee, 2014; Kim et al., 2012; Low et al., 2012; Nasarwanji et al., 2016; Vergales et al., 2015; Yang and Zhang, 2016).

The aim of the checklist was to identify information that needs to be communicated, facilitate communication between the team members and improve the quality of the information. A number of postoperative handover checklists and processes were developed and shaped with the input of the health care professionals involved in the study and also incorporated existing literature, staff feedback and expert opinions (Napgal et al., 2010; Potestio et al., 2015; Robins et al., 2015; Salzwedel et al., 2013; Weigner et al., 2015). Other handover tools were developed by incorporating existing communication mnemonics such as SBAR or ISBAR (Caruso et al., 2015; Funk et al., 2016; Grover and Duggan, 2013; Kitney et al, 2016).

Another commonality amongst the developed standardized processes was the emphasis on all team members being physically present and engaged in a face-to-face handover. Similarly, emphasis was placed on minimizing interruptions and distractions during the handover report and not starting the handover until the patient monitors were applied and connected. Additionally, many checklists required the participants of the handover to stop all activities and concentrate on the handover, participate in face-to face communication and the involvement of various members of the healthcare team (Bonifacio et al, 2013; Kim et al., 2012; Robins et al., 2015; Vergales et al., 2015).

Most checklists included information on patient identification, medical history, intra and postoperative periods, concerns and the provision of a question period at the end of the report (Agarwal et al., 2012; Robins et al., 2015). Some checklists were specifically divided into preoperative, intraoperative, and postoperative information (Caruso et al., 2015; Zavalkof et al., 2011). The participation of the team members and the requirements for who was expected to participate varied (see Table 1, 2, 3 and 4). With some studies it was not clear who used the postoperative checklist, i.e. anaesthesia, surgical providers, OR nurses (Kim et al., 2012; Low et al, 2012; Robins et al., 2015).

Checklist implementation was often associated with educational sessions prior to implementation to support an increase in compliance and effectiveness (Caruso et al., 2015; Low et al., 2012; Zavalkof et al., 2011). The checklist was either provided to the healthcare professional as a laminated version or was attached to the wall, stretcher or the patient bed (Boat & Spaeth, 2013; Caruso et al. 2015; Low et al., 2012; Robins et al. 2015; Salzwedel et al., 2013). Different types of checklists were used, such as a write-in checklist (Agarwal et al., 2012; Funk et al., 2016; Zavalkof et al., 2011), electronic versions of the checklist (Boat & Spaeth, 2013; Kim et al., 2012; Vergales et al., 2015), read-do and challenge-to-do checklists (Low et al., 2012; Petrovic et al., 2012a; Napgal et al, 2010), and read-do checklists only (Salzwedel et al., 2013). A flow checklist was also described and it was based on a challenge and respond system that facilitated the movement of the patient throughout the perioperative period (Low et al., 2012).

In general the studies suggested an overall improvement in communication, increased efficiency, teamwork, interaction between the various team members, information omission, and satisfaction with the implementation of a standardized postoperative handover process (Agarwal et al., 2012C; raig et al., 2012; Petrovic et al., 2012a; Napgal et al., 2013; Vergales et al., 2015; Zavalkof et al., 2011). An increase in the quality and quantity of the information transferred, and increased reliability of the handover was also noted as it was easier for the participants to ask questions and in general the structured process was seen as a positive addition to practice (Boat & Spaeth, 2013; Caruso et al., 2015; Gleicher & McGhee, 2014; Salzwedel et al., 2013; Salzwedel et al., 2016; Vergales et al., 2015). A decrease in post-handover phone calls for additional information was described in a few of the studies (Kim et al., 2012; Robins et al., 2015). Fewer interruptions were described with the implementation of a standardized handover (Gleicher & McGhee, 2014).

Gleicher and McGhee (2014) found an improvement in patient care postoperatively with the standardized process. Additional and other studies found a decrease in postoperative complications, such as early extubation or weaning off the ventilator and improvement of patient outcomes in the first 24 hours after surgery (Agarwal et al., 2012; Yang & Zhang; 2016). The standardized process also significantly improved the surgical/medical presence where anticipation of possible escalation to more serious problems could be addressed resulting in improved patient safety (Gleicher & McGhee, 2014; Zavalkof et al., 2011). Minimal impact of the standardized process implementation on the duration of the handover in eight studies was

described (Caruso et al., 2015; Craig et al., 2012; Funk et al., 2016; Kim et al., 2012; Low et al., 2013; Robins et al., 2015; Salzwedel et al., 2016; Zavalkof et al., 2011). The handover duration increased in three studies (Gleicher & McGhee; 2014; Potestio et al, 2015; Salzwedel et al., 2013).

Paediatric handover additional information. Paediatric handover processes and checklists were specific to cardiac surgery patients (Agarwal et al., 2012; Catchpole et al., 2007; Craig et al., 2012; Vergales et al., 2015; Zavalkoff et al., 2011) One paediatric article was related to a general OR-paediatric PACU handover (Boat and Spaeth, 2013) and one study was specific to postoperative management of airway paediatric patients (Kim et al., 2012).

Most of the paediatric handover processes included communication between the OR and the ICU 30 minutes before the patient arrival to the unit. This early communication allowed the ICU to prepare and organize before the patient's arrival and ease the transition between teams. Some processes, specifically related to OR-ICU transfer included communication and completion of a checklist or an information sheet to be completed about the patient between the OR and ICU 30 minutes prior to arrival (Agarwal et al., 2012; Craig et al., 2011; Vergales et al, 2015). This communication was from the anaesthesia team to the PCICU nursing team and provided details about the patient to be relayed to the rest of team to anticipate the needs after the patient arrival. In one study, the implementation of a standardized handover led to significant improvement in early extubation and hence positively affected the patient postoperative outcomes (Agarwal et al., 2012)

Communication mnemonics additional information. Effective communication during handovers has also been widely established with the use of communication mnemonics such as SBAR, ISBAR, I PASS THE BATON, etc. However, the use of mnemonics is often problematized in the literature for: 1. lack of validation of effectiveness, 2. various interpretation of the same work used in different mnemonics and 3. vague information on why the specific information is included in the mnemonics (Nasarwanji et al., 2016). As such, it is necessary to customize even known mnemonics such as SBAR, PETTS, or ISBAR and add context specific to the individual setting (Fablia et al., 2016; Funk et al., 2016; Grover and Duggan, 2013; Kitney et al, 2016). The articles under this category provided an overview of the most commonly used communication mnemonics and how they can be specifically tailored to the perioperative setting.

Conclusion

The reviewed articles suggested a standardized handover process improves the quality of the handover, teamwork, communication and information transfer. The recommendations arising from the literature are to engage frontline staff during the development and implementation of standardized handover processes, to address local context, and provide is simple and easy to use (Boat & Spaeth, 2013; Gleicher & McGhee, 2014; Kim et al., 2012; Yang & Zhang, 2016; Zavalkof et al., 2011).

GREY LITERATURE

Websites and links for provincial, territorial and First Nations health ministries, health quality councils, and health authorities across Canada including Alberta (AB), Saskatchewan (SK), British Colombia (BC), Manitoba (MB), Ontario (ON), Quebec (QC), New Brunswick (NB), Newfoundland, Nova Scotia (NS), Prince Edward Island (PEI), Yukon Territories (YT), Nunavut (NU), Northern Territories (NT) and First Nations Health Council (FNHC) were searched for tools and resources to support effective communication and teamwork in the perioperative period. Similar to the white literature, results were refined to fit the criteria for including a sample or a direct link to "perioperative tool, checklist, handover/handoff process, and standardized process/protocol/framework".

MINISTRIES of HEALTH:

Overall two findings included references to a toolkit promoting effective communication, interprofessional collaboration and improvements in perioperative practice (Primary Care Interprofessional Toolkit, 2012; Reference Guide and Toolkit for Improvements in Perioperative Practice in Ontario, 2010). An additional tool was also provided to help patients streamline their care in the perioperative setting (SaskSurgery). Other results revealed general information about surgery and expectations **(**PEI) or guidelines towards preoperative lab testing (MB) which did not fit the criteria for this report.

The SSCL was the most cited checklist with regards to communication and teamwork in the perioperative period (World Health Organization Surgical Safety Checklist)

Ministries of Health grey literature summary:

SaskSurgery - Health regions in Saskatchewan are working toward universal implementation of surgical safety checklists in all hospital operating rooms. This site provides information about clinical pathways that have been developed by patients and providers using best practice guidelines. The tool is for patients to access to help streamline care provided in specialized clinics for procedures including hip and knee replacement, spine, prostate, bariatric and pelvic floor surgeries, along with acute stroke and lower extremity wound care (SaskSurgery)

Manitoba Health, Seniors and Active Living- Primary Care Interprofessional Toolkit (2012) was developed and revised as a means of integrating interprofessional, collaborative care and providers in optimizing the care provided to patients by primary care physicians. In this toolkit, successful integration of providers is facilitated by leadership commitment, communication within the team, and team development. Multiple links are referenced that support, for example, the use of SBAR as a communication tool that helps standardize and structure communication, and set expectations relating to what is to be communicated (Primary Care Interprofessional Team Toolkit)

Reference Guide and Toolkit for Improvements in Perioperative Practice in Ontario: Perioperative Coaching Teams 2005-2010 - This toolkit was developed as a coaching guide to quality improvement initiatives in perioperative practice in Ontario. Six themes frame the content of the kit. Each theme contains definitions, as well as common areas of focus and common strategies. Embedded within the 'leadership' theme is a reference to 'Communication within OR Department', but no references are made to specific communication tools. (Reference Guide and Toolkit for Improvements in Perioperative Practice in Ontario: based on the experience of the Perioperative coaching teams between 2005-2010)

HEALTH QUALITY COUNCILS:

Health Quality Councils of BC, AB, SK, MB, ON, QC, NB, FN were included in the search. Overall there were multiple references to the WHO Surgical Safety Checklist (SSCL) (World Health Organization Surgical Safety Checklist) or modified version of the SSCL.

Some findings included strategies and worksheets, for example the PDSA worksheet (Improving Teamwork & Communication in Surgery, 2012) or how to implement the SSCL (Surgical Safety Checklist: How: The How-To Guide, 2009). Further details were provided and relevant to general reports on the SSCL implementation and general safety overviews, for example Comprehensive Unit Based Safety Program (CUSP), or prevention of pneumonia mnemonics (ICOUGH), SSI and UTI prevention. Additional results were related to articles or resources either assessing teamwork or communication or enhancing safety in the perioperative setting that did not fit the criteria for this project.

Health Quality Councils grey literature summary:

British Columbia Patient Safety and Quality Council (BCPSQC) - This council was created in 2008 by the British Columbia government to enhance patient safety, reduce errors, promote transparency, and identify best practices to improve patient care. Quality improvements are implemented through the 'Surgical Quality Action Network'. A notation regarding the adoption of a 'pre-surgery checklist' at all 24 participating sites is included, but it does not refer to the tool. Surgical improvement activities are aimed at improving culture, teamwork, and communication in the surgical environment. The activities are supported by a variety of educational webinars and training programs. Some of the initiatives are part of a guide which include closed loop communication and SBAR (How does your team communicate?, 2012).

The Health Quality Council search specific to BC yielded several articles relating to team training and team development. As an example, the article by Edmondson, Bohmer and Pisano discusses their study in 16 major centres regarding how teams learn i.e. implementation of a difficult new procedure. The findings suggest that the most successful teams were designed for learning; their leaders framed the challenge so that team members were highly motivated to learn; and an environment of psychological safety fostered communication and innovation. (IESE Publishing).

Providence Health Care (2013) developed a customized version of the SSCL which required the presence of the anaesthesiologist, nurses, and the surgeon or a delegated surgical team member in the beginning of the day (An overview of the Surgical Safety Checklist compliance and its common pitfalls in Providence Health). The use of the SSCL is further evaluate in a case study (A Multi-Faceted Progress Evaluation of the Use of the Surgical Safety Checklist).

Saskatchewan's regional and tertiary hospitals surgical and critical care units implemented daily interdisciplinary rounds to meet their needs for communication. A guide to implementation or interdisciplinary rounds is part of Module 1 in the Emergency Department Waits and Patient Flow Initiative: Patient Flow Toolkit (2015) (Emergency Department Waits and Patient Flow Initiative: Patient Flow Toolkit: Module 1: Interdisciplinary Rounding).

Institute for innovations and improvement, British Colombia, implemented learning module based on QI which describes how to use the PDSA cycle and SMART aim principles as a part of *The Productive Operating Theatre: Handover* initiative developed by NHS Institute for Innovation and Improvement (UK, 2010). The module was directed to the managers, theater and recovery matrons, theater, recovery and ward staff, surgeons, anaesthetists and improvement leads. Samples of handover proforma in the various stages of the perioperative period are provided (The Productive Operating Theatre: Building teams for safer care™– Handover, 2010).

- Ward practitioner to theater practitioner handover proforma
- Anaesthetic to recovery handover proforma
- Theater practitioner to recovery practitioner handover proforma
- Recovery practitioner to ward practitioner handover proforma

HEALTH AUTHORITIES

The health authorities of BC, AB, SK, MB, FN, NL, NS, PEI, Atlantic, QC provinces and territories were included in the search. Most information found under the health authorities was related to required organizational practices (ROPs) and accreditation requirements or to corporate policies, standards and procedures on the use and implementation of the SSCL. Further information was related to other issues relevant to perioperative practice, for example the SSI, pneumonia prevention, or delirium assessment. Many links required sign in or the information was only available through the organizational intranet.

Health authorities grey literature summary:

Managing Obstetrical Risk Efficiently (MOREOB) Program was designed to create a culture of safety in obstetrics and offers Team Communication: A Critical Safety Issue video to use simulation and work together on improving communication. Some tools addressed in the video

and power point includes SBAR (Team Communication: A Critical Safety Issue. MOREOb 2013 - using Simulation as a tool in working together, 2013)

Alberta Health Services- includes information on the policy, SSCL (Safe Surgery Checklist) version and Ophlamology (Ophthalmology version)and C-section(C-Section version) SSCL version available, includes information about local anaesthetic and info on neonate. Also tools and resources on training and implementation. Also includes Safe Surgery Checklist process flowchart (Safe Surgery Checklist).

Saskatoon Health Region included an obstetric specific version of the SSCL aside from the WHO SSCL in their policy (Policy Number 7311-60-026: Surgical Safety Checklist, 2016).

TeamSTEPPS was developed following the 1999 publication *To Err Is Human* issued by the Institute of Medicine. In this report, deaths related to medical errors were reported at nearly 100,000 annually in the United States. Leaders in federal safety research and initiatives, including the Department of Defense (DoD) and the Agency for Healthcare and Research and Quality (AHRQ), sought to identify causative factors. Teamwork and communication have been cited as important factors in providing safe patient care. Teamwork relies on the ability of members to communicate in order to optimize patient outcomes. TeamSTEPPS is an evidence-based teamwork system that improves communication and teamwork skills among healthcare professionals. Many tools and strategies comprise the TeamSTEPPS model including STEP, CUS, DESC Script, SBAR, and collaboration. Institutions are guided by experts to tailor training programs and strategies based on needs identified through a site assessment combined with a survey of the site culture. Once completed, training is provided based on competencies derived from a shared set of team knowledge, skills and attitudes. Curriculum delivery models include case studies and scenarios, multimedia and simulation. The TeamSTEPPS approach can incorporate all tools and strategies, or a dosing strategy which limits the selection of tools at various times. As an example, the institution may use a DESC Script for conflict resolution. Expected outcomes include mutual trust, and foremost, patient safety (https://www.ncbi.nlm.nih.gov/books/NBK43686/)

PROFESSIONAL ORGANIZATIONS:

Nursing, surgical and anaesthesia related professional organizations such as The Operating Room Nurses Association of Canada (ORNAC), The Royal College of Physicians and Surgeons of Canada (RCPSC) and the Canadian Anaesthesia Association (CAS) were included in the search. Most information found under the professional organizations was related to the importance of effective communication in relation to patient safety. The RCPSC speaks about communication in the context of conflict and conflict resolution by discussing the importance of communication and the role of emotion and how to engage in good communication. The CAS collaborates with other organizations, for example CPSI, the Institute for Safe Medication Practices (ISMP) Canada, American Society of Anesthesiologists, or the Anesthesia Patient

Safety Foundation among others, to ensure improved outcomes for patients. The ORNAC also provides links to CPSI, ISMP, the Safer Healthcare Now! initiative and the WHO SSCL.

APPENDIX A. Table 1. ***Articles Including a Tool, Checklist and/or Process Supporting Preoperative Transition of Care Points and Patient Assessment/Preparation***

Tool/Checklist included	References	Year	Type	Setting	Location
SURPASS Checklist MAPS for Handoff Communication	**de Vries,** E. N., Hollmann, M. W., Smorenburg, S. M., Gouma, D. J., & Boermeester, M. A. (2009). Development and validation of the SURgical PAtient Safety System (SURPASS) checklist. *Quality and Safety in Health Care Journal, 18*(2), 121-126. doi:10.1136/qshc.2008.027524 **de Vries,** E. N., Prins, H. A., Crolla, R. M. P. H., den Outer, A. J., van Andel, G., van Helden, S. H., . . . SURPASS Collaborative Group, (2010). Effect of a comprehensive surgical safety system on patient outcomes. *The New England Journal of Medicine, 363*(20), 1928-1937. doi: 10.1056/NEJMsa0911535 **de Vries,** E. N., Prins, H. A., Bennink, M. C., Neijenhuis, P., van Stijn, I., van Helden, S. H., . . . Boermeester, M. A. (2012). Nature and timing of incidents intercepted by the SURPASS checklist in surgical patients. *BMJ Quality and Safety, 21*(6), 503-508. doi: 10.1136/bmjqs-2011-000347	2009 2010 2012	n/a QI-Prospective pre and post-implementation	Perioperative setting (all phases)	Amsterdam, Netherlands
PAC Patient Pathway Preoperative Pathway Checklist	**Siragusa**, L., Thiessen, L., Grabowski, D., & Young, R. S. (2011). Building a better preoperative assessment clinic. *Journal of PeriAnesthesia Nursing, 26*(4), 252-261. doi:10.1016/j.jopan.2011.05.008	2011	QI	PAC	Winnipeg, Manitoba, Canada
Pre-procedure Checklist	**Sullivan**, E. E. (2009). The evolution of preoperative holding areas. *Journal of*	2009	Theoretical paper	Preoperative holding area	Boston, Massachusetts, US

	PeriAnesthesia Nursing, *24*(2), 119-121. doi:10.1016/j.jopan.2009.01.005				
TIME	**Morris,** A. M., & Hoke, N. (2015). Communication is key in the continuum of care. *OR Nurse*, *9*, 14-19 16p. doi:10.1097/01.0RN.0000470791.60125.11	2015	Theoretical paper	Perioperative setting	Pennsylvania, Philadelphia, US
The AMBUPROG Checklist	**Gaucher,** S., Boutron, I., Marchand-Maillet, F., Baron, G., Douard, R., Bethoux, J-P., AMBUPROG Group Investigators. (2016). Assessment of a standardized pre-operative telephone checklist designed to avoid late cancellation of ambulatory surgery: The AMBUPROG multicenter randomized controlled trial: e0147194. *PLoS One, 11*(2). 1-14. doi:10.1371/journal.pone.0147194	2016	RTC	Multidisciplinary ASU	France

*haematology, cardiology, internists, labs, office clerks, pharmacology, support staff
**ASUs- ambulatory surgical units. PAC- preoperative assessment clinic. QI- quality improvement. RTC-randomized clinical trial. SURPASS- Surgical Patient Safety System Checklist. TIME- together, identify patient, mark patient site for regional anaesthesia and explain anaesthesia. MAPS- medications, allergies, procedure/pertinent information, special needs.

APPENDIX B. Table 2. ***Articles Including a Tool, Checklist and /or Process Supporting Interprofessional Communication and Teamwork in the Intraoperative Period***

Tool/Checklist Name	References	Year	Type	Setting	Location
MAPS for Handoff Communication SSC	**De John,** P. (2009). ASCs take steps to improve handoffs. *OR Manager*, *25*(1), 26-27, 29. Retrieved from http://www.ormanager.com/	2009	Interview article	ASC	Denver, Colorado, US
Elements of the SSC	**Haynes,** A. B., Weiser, T. G., Berry, W. R., Lipsitz, S. R., Breizat, A.-H. S., Dellinger, E. P., . . . Safe Surgery Saves Lives Study Group (2009). A Surgical Safety Checklist to reduce morbidity and mortality in a global population. *The New England Journal of Medicine*, *360*(5), 491-499. doi: 10.1056/NEJMsa0810119	2009	Prospective study (pre-post)	Perioperative setting	Boston, Massachusetts, US
SSC	**Burbos,** N., & Morris, E. (2011). Applying the World Health Organization Surgical Safety Checklist to obstetrics and gynaecology. *Obstetrics, Gynaecology & Reproductive Medicine*, *21*(1), 24-26. doi: http://dx.doi.org/10.1016/j.ogrm.2010.09.009	2011	Theoretical paper	Obstetrics and gynaecology	Norwich, UK
SSC for Robotic Surgery	**Ahmed,** K., Khan, N., Khan, M. S., & Dasgupta, P. (2013). Development and content validation of a surgical safety checklist for operating theatres that use robotic technology. *BJU International*, *111*(7), 1161-1174. doi:10.1111/bju.12010	2013	HFMEA methodology	Robotic procedures (urology)	London, UK
SWITCH for OR Hand Off SWITCH for Front Desk Hano Off SWITCH for Anaesthesia Hand Off	**Johnson,** F., Logsdon, P., Fournier, K., & Fisher, S. SWITCH for safety: Perioperative hand-off tools. *AORN Journal*, *98*(5), 494-507. doi:10.1016/j.aorn.2013.08.016	2013	QI	Perioperative setting	Portland, Oregon, US

SSC Modified SSC	**Morgan,** P. J., Cunningham, L., Mitra, S., Wong, N., Wu, W., Noguera, V., . . . Semple, J. (2013). Surgical safety checklist: Implementation in an ambulatory surgical facility. *Canadian Journal of Anesthesia/Journal canadien d'anesthésie, 60*(6), 528-538. doi: 10.1007/s12630-013-9916-8	2013	Unspecified	Ambulatory Care Center	Toronto, Ontario, Canada
Joint-PSH Pathway	**Garson,** L., Schwarzkopf, R., Vakharia, S., Alexander, B., Stead, S., Cannesson, M., & Kain, Z. (2014). Implementation of a total joint replacement-focused perioperative surgical home: A management case report. *Anesthesia & Analgesia, 118*, 1081-1089. doi: 10.1213/ANE.0000000000000191	2014	QI	Pre, intra, post and discharge periods	Irvine, California, US
Intra-Operative Handoff Checklist	**Pukenas,** E. W., Dodson, G., Deal, E. R., Gratz, I., Allen, E., & Burden, A. R. (2014). Simulation-based education with deliberate practice may improve intraoperative handoff skills: A pilot study. *Journal of Clinical Anesthesiology, 26*(7), 530-538. doi: 10.1016/j.jclinane.2014.03.015	2014	Pre-post test pilot	Anaesthesia Residents	Camden, New Jersey, US
Emergency trauma OR setup checklist WHO SSC Central line insertion care team checklist APSF PIPS checklist Intraoperative handoff checklist	**Agarwala,** A. V., Firth, P. G., Albrecht, M. A., Warren, L., & Musch, G. (2015). An electronic checklist improves transfer and retention of critical information at intraoperative handoff of care. *Anesthesia and Analgesia, 120*(1), 96-104. doi:10.1213/ane.0000000000000506	2015	Theoretical paper	Perioperative setting	Nashville, Tennessee, US

Checklist for treatment of LAST					
WHO SSC (1st ed.) AORN's Comprehensive Surgical Checklist. The Safe Surgery 2015 Checklist template. Communication Pathways: 5Ps, I PASS the BATON, SBAR, SWITCH	**Chard,** R., & Makary, M. A. (2015). Transfer-of-care communication: Nursing best practices. *AORN Journal, 102*(4), 329-339; quiz 330-342. doi:10.1016/j.aorn.2015.07.009	2015	Theoretical article	RN communication	Fort Lauderdale, Florida, US
Hospital Surgical Patient Safety Checklist WHO SSC (1st ed.)	**Chaudhary**, N., Varma, V., Kapoor, S., Mehta, N., Kumaran, V., & Nundy, S. (2015). Implementation of a Surgical Safety Checklist and postoperative outcomes: A prospective randomized controlled study. *Journal of Gastrointestinal Surgery, 19*(5), 935-942. doi: 10.1007/s11605-015-2772-9	2015	Prospective RCT	Gastro-intestinal and hepato-pancreatico-biliary surgery	New Delhi, India
RORCC	**McCarroll,** M. L., Zullo, M. D., Roulette, G. D., Mendise, T. M., Ferris, E., Zolton, J., Andrews, S., J. & von Gruenigen, V. E. (2015). Development and implementation results of an interactive computerized surgical checklist for robotic-assisted gynecologic surgery. *Journal of Robotic Surgery, 9*(1). 11-18. doi 10.1007/s11701-014-0482-z	2015	Prospective and retrospective study (pre- post)	Robotic-assisted gynecology procedures	Ohio, US

APPENDIX C. Table 3. Articles Including a Tool, Checklist and/or Process Supporting Postoperative Transition of Care Points and Patient Assessment/Preparation

Tool/Checklist Included	References	Year	Type	Setting	Location
Postoperative Handover Proforma	**Nagpal,** K., Abboudi, M., Manchanda Ch., Vats, A., Sevdalis, N., Bicknell, C., Vincent, Ch., & Moorthy, K. (2013). Improving postoperative handover: A prospective observational study. *The American Journal of Surgery, 206*(4). 494-501. doi: 10.1016/j.amjsurg.2013.03.005.	2013	Prospective pre-post interventio n study	OR-PACU	London, UK
Checklist Patient Handover PACU	**Salzwedel,** C., Hans-ürgen, B., Kühnelt, I., Appel, D., Haupt, O., Maisch, S., & Schmidt, N. G. (2013). The effect of a checklist on the quality of post-anaesthesia patient handover: A randomized controlled trial. *International Journal for Quality in Health Care. 25*(2). 176-181. doi:http://dx.doi.org/10.1093/intqhc/mzt009	2013	RTC	OR-PACU	Germany
The Perioperative Hand Off Protocol	**Petrovic,** M. A., Martinez, E. A. & Aboumatar, H. (2012b). Implementing a perioperative handoff tool to improve postprocedural patient transfer. *The Joint Commission Journal on Quality and Patient Safety, 38*(3). 135-142. Retrieved from http://www.jcrinc.com/the-joint-commission-journal-on-quality-and-patient-safety/	2015	Prospective unblinded cross-sectional	OR-PACU	Baltimore, US
PACU Handoff Checklist	**Potestio,** C., Mottla, J., Kelley E., & DeGroot, K. (2015). Improving post anesthesia care unit (PACU) handoff by implementing a succinct checklist. *APSF Newsletter, 30*(1). 13-15. Retrieved from http://www.apsf.org/newsletters	2015	QI	OR-PACU	Washington, DC, US
Handoff Checklist	**Robins,** H.-M., & Dai, F. (2015). Handoffs in the Postoperative Anesthesia Care Unit: Use of a	2015	QI	OR-PACU	New Heaven, Connecticut, US

	Checklist for Transfer of Care. *AANA Journal, 83*(4), 264-268. Retrieved from http://www.aana.com/newsandjournal/Pages/aanajournalonline.aspx				
The Vanderbilt Perioperative eHandover Report form (SBAR) Post-Anesthesia Handover Evaluation Tool	**Weinger,** M. B., Slagle, J. M., Kuntz, A. H., Schildcrout, J. S., Banerjee, A., Mercaldo, N. D., . . . France, D. J. (2015). A multimodal intervention improves postanesthesia care unit handovers. *Anesthesia & Analgesia, 121*(4), 957-971. doi:10.1213/ane.0000000000000670	2015	QI	OR-PACU/ PPACU	Tennessee, US

** OR-operating room. PACU- periAnaesthetic care unit. PPACU-paediatric periAnaesthetic care unit. QI- quality improvement. RTC-randomized clinical trial.

APPENDIX D. Table 4. Articles Including a Tool, Checklist and/or Process Supporting OR-ICU Handovers- Adults:

Tool/Checklist included	References	Year	Type	Setting	Location
The Perioperative Hand Off Protocol	**Petrovic,** M. A., Aboumatar, H., Baumgartner, W. A., Ulatowski, J., A., Moyer, J., Chang, T. Y., … & Martinez, E. A. (2012a). Pilot implementation of perioperative protocol to guide operating room-to-intensive care unit patient handoffs. *Journal of Cardiothoracic and Vascular Anaesthesia, 26*(1), 11-16. doi:10.1053/j.jvca.2011.07.009 **Petrovic,** M. A., Martinez, E. A. & Aboumatar, H. (2012b). Implementing a perioperative handoff tool to improve postprocedural patient transfer. *The Joint Commission Journal on Quality and Patient Safety, 38*(3). 135-142. Retrieved from http://www.jcrinc.com/the-joint-commission-journal-on-quality-and-patient-safety/	2012a 2012b	Pilot Prospective unblinded cross-sectional	OR-ICU/CSICU	Baltimore, US
Cardiac Surgery OR to ICU Handover Overview Cardiac OR to CVICU Checklist and Transfer Note	**Gleicher,** J. & McGhee, I. (2014). Improving cardiac operating room to intensive care unit handover using a standardized handover process. (CPSI Studentship 2013-2014). *Canadian Patient Safety Institute.* Retrieved from http://www.patientsafetyinstitute.ca/en/toolsResources/Research/studentships/pages/studentships2013.aspx	2014	QI	OR-ICU Cardiac	Toronto, Ontario, Canada
Checklist for Patient Handover Handover Items and Assessment	**Salzwedel,** C., Mai, V., Punke, M. A., Kluge, S. & Reuter, D. A. (2016). The effect of a checklist on the quality of patient handover from the operating room to the intensive care unit: A randomized controlled trial. *Journal of Critical Care 32*(4).170–174). doi:http://dx.doi.org/10.1016/j.jcrc.2015.12.016	2016	RTC	OR-ICU	Germany

Postoperative Handover Protocol	**Yang,** J.-G., & Zhang, J. (2016). Improving the postoperative handover process in the intensive care unit of a tertiary teaching hospital. *Journal of Clinical Nursing*, *25*(7-8), 887-1172, doi:10.1111/jocn.13115	2016	Pretest/post -test study	OR-Neuro ICU	China

*****Critical care team, internists and intensivists

** CSICU-cardiac surgery intensive care unit. CVICU-cardiovascular intensive care unit. OR-operating room. QI- quality improvement. RTC-randomized clinical trial

APPENDIX E. Table 5. Articles Including a Tool, Checklist and/or Process Supporting OR-ICU/PACU Handovers- Paediatric:

Tool/Checklist Name	References	Year	Type	Setting	Location
Handover Intervention Structure	**Craig,** R., Moxey, L., Young, D., Spenceley, N. S. & Davidson, M. G. (2011). Strengthening handover communication in pediatric cardiac intensive care. *Pediatric Anaesthesia, 22*(4). 393-399. doi:10.1111/j.1460-9592.2011.03758.x	2011	Prospective interventional Study	OR-PICU Cardiac and general	UK
Post-cardiac Surgery Handover Tool	**Zavalkoff,** S. R., Razack, S. I., Lavoie, J. M., & Dancea, A. B. (2011). Handover after pediatric heart surgery: A simple tool improves information exchange. *Pediatric Critical Care Medicine, 12*(3), 309-313. doi: 10.1097/PCC.0b013e3181fe27b6	2011		OR-PICU Cardiac	Montreal, Quebec, Canada
Paediatric Cardiac Patient Handover Pathway Cardiac Nursing Report	**Agarwal,** H. S., Saville, B. R., Slayton, J. M., Donahue, B. S., Daves, S., Christian, K. G., . . . Harris, Z. L. (2012). Standardized postoperative handover process improves outcomes in the intensive care unit: A model for operational sustainability and improved team performance. *Critical Care Medicine, 40*(7), 2109-2115. doi:10.1097/CCM.0b013e3182514bab	2012	Prospective observational study	OR-PCICU Cardio-thoracic	Nashville, Tennessee, US
Massachusetts General Hospital/Massachusetts Eye and Ear Infirmary Airway Checklist (electronic)	**Kim,** S. W., Maturo, S., Dwyer, D., Monash, B., Yager, P. H., Zanger, K., & Hartnick, C. J. (2012). Interdisciplinary development and implementation of communication checklist for postoperative management of pediatric airway patients. *Otolaryngology - Head & Neck Surgery, 146*(1), 129-134. doi: 10.1177/0194599811421745	2012	Prospective study	OR-PICU Airway patients	Boston, Massachusetts, US
Flow Checklist Series Departure & Arrival Perioperative	**Low,** D. K., Reed, M. A., Geiduschek, J. M., & Martin, L. D. (2013). Striving for a zero-error patient surgical journey through adoption of aviation-style challenge and response flow checklists: A quality	2012	QI	OR-PPACU Cardiac	Seattle, Washington, US

Checklists	improvement project. *Paediatric Anaesthesia, 23*(7), 571-578. doi:10.1111/pan.12121				
Intraop anaesthesia checklist (electronic) PACU Handoff Checklist	**Boat,** A. C., & Spaeth, J. P. (2013). Handoff checklists improve the reliability of patient handoffs in the operating room and postanesthesia care unit. *Pediatric Anesthesia, 23*(7), 647-654. doi: 10.1111/pan.12199	2013	QI	OR-PPACU	Cincinnati, Ohio, US
OR Preliminary Report Sheet ICU Bedside Report Cognitive Aid Handover Sustainment Poster	**Bonifacio,** A. S., Segall, N., Barbeito, A., Taekman, J., Schroeder, R., & Mark, J. B. (2013). Handovers from the OR to the ICU. *International Anesthesiology Clinics, 51*(1), 43-61. doi:10.1097/AIA.0b013e31826f2b0e	2013	Theoretical Guide	OR-ICU	US
Children's Heart Center Postsurgical Summary (electronic)	**Vergales,** J., Addison, N., Vendittelli, A., Nicholson, E., Carver, D. J., Stemland, C., . . . Gangemi, J. (2015). Face-to-face handoff: Improving transfer to the pediatric intensive care unit after cardiac surgery. *American Journal of Medical Quality, 30*(2), 119-125. doi:10.1177/1062860613518419	2015	QI	OR-PICU Cardiac	Charlottesville, Virginia, US

*perfusionists, pharmacists, electrophysiology, ICU nurses, PCICU clerk, internal/critical care medicine, respiratory therapists, ward clerks

**OR- operating room. ICU-intensive care unit. HCPs-healthcare professionals. PICU-paediatric intensive care unit. PCICU-paediatric cardiac intensive care unit. PPACU- paediatric postanaesthetic care unit. QI-quality improvement.

APPENDIX F. Table 6. Articles Including a Standard Communication Mnemonics Supporting OR-ICU/PACU Handovers:

Tool/Checklist Name	References	Year	Type	Setting	Location
SBAR I PASS the BATON SHARQ 5Ps (1st and 2nd version) Handoff Report Form Pre & Post-operative Handoff Report Form	**Sandlin,** D. (2007). Improving patient safety by implementing a standardized and consistent approach to hand-off communication. *Journal of PeriAnesthesia Nursing, 22*(4), 289-292. Retrieved from http://www.jopan.org/	2007	Theoretical guide	Perioperative setting	Nashville, Tennessee US
Elements of the Preoperative to Intraoperative Handoff Communication Elements of the Intraoperative to PACU Handoff communication Elements of the PACU to Inpatient Unit Handoff Communication	**Amato-Vealey,** E. J., Barba, M. P., & Vealey, R. J. (2008). Hand-off communication: A requisite for perioperative patient safety. *AORN Journal, 88*(5), 763-774. doi:10.1016/j.aorn.2008.07.022	2008	Theoretical guide	Preop-intrap Intraop-PACU PACU-floor unit	Providence, Rhode Island, US
SBAR	**Grover,** A., & Duggan, E. (2013). Chinese whispers in the post anaesthesia care unit (PACU). *Irish Medical Journal, 106*(8), 241-243. Retrieved from http://imj.ie/	2013	n/a	OR-PACU	Dublin, Ireland
I PASS the	**Wheeler,** K. (2015). Effective handoff	2015	n/a	Perioperative	Burlington,

BATON	communication. *Nursing Critical Care, 10*(6), 13-15. doi: 10.1097/01.CCN.0000472849.85679.c4			handoffs	Massachusetts, US
I-PASS format	**Caruso,** T. J., Marquez, J. L., Wu, D. S., Shaffer, J. A., Balise, R. R., Groom, M., . . . Sharek, P. J. (2015). Implementation of a standardized postanesthesia care handoff increases information transfer without increasing handoff duration. *The Joint Commission Journal on Quality and Patient Safety, 41*(1), 35-42. Retrieved from http://www.jcrinc.com/the-joint-commission-journal-on-quality-and-patient-safety/	2015	Prospective cohort study	OR-PACU paediatric	Stanford, California, US
PETS Protocol SBAR Form	**Fabila,** T. S., Hee, H. I., Sultana, R., Assam, P. N., Kiew, A., & Chan, Y. H. (2016). Improving postoperative handover from anaesthetists to non-anaesthetists in a children's intensive care unit: The receiver's perception. *Singapore Medical Journal, 57*(5), 242-253. doi:10.11622/smedj.2016090	2016	Prospective interventional	OR-PCICU	Singapore
ISBARQ Checklist	**Funk,** E., Taicher, B., Thompson, J., Iannello, K., Morgan, B., & Hawks, S. (2016). Structured handover in the pediatric postanesthesia care unit. *Journal of PeriAnesthesia Nursing, 31*(1), 63-72. doi:10.1016/j.jopan.2014.07.015	2016	Observational pre-post-quality	OR-PPACU	Durham, North Carolina, US
ISBAR Cue Card	**Kitney,** P., Tam, R., Bennett, P., Buttigieg, D., Bramley, D., & Wei, W. (2016). Handover between anaesthetists and post-anaesthetic care unit nursing staff using ISBAR principles: A quality improvement study. *ACORN: The Journal of Perioperative Nursing in Australia, 29*(1), 30-35. Retrieved from https://www.acorn.org.au/journal/	2016	Pre, Post-test QI	OR-PACU	US
Handover Mnemonics Synthesis	**Nasarawanji,** M.F., Badir, A., & Gurses, A. P. (2016). Standardizing handoff communication: Content	2016	Synthesis	Handover mnemonics (n=27)	Istanbul, Turkey

	analysis of 27 handoff mnemonics. *Journal of Nursing Care Quality, 31*(3), 238-244. Retrieved from http://journals.lww.com/jncqjournal/pages/default.aspx				

*ICU personnel, paediatricians

**HCPs-healthcare professionals. ICU-intensive care unit. I-PASS- illness severity, patient summary, action list, situation awareness, and synthesis by receiver. I PASS the BATON- introduction, patient, assessment, situation, safety concerns ... the ... background action, timing, ownership, next. ISBAR- introduction, situation, background, assessment and recommendations. ISBARQ- introduction, situation, background, assessment, recommendations and questions. OR- operating room. PCICU- paediatric/children intensive care unit. PETS- pre-handover equipment handover, timeout and sign out. PPACU- paediatric postanaesthetic care unit. SBAR- situation, background, assessment and recommendations. SHARQ- situations, history, assessment, recommendations, questions. 5Ps (1st version) – patient, plan, purpose, problem, precautions. 5Ps (2nd version)- patient, precautions, plan of care, problems, purpose.

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Alnaib, M., Samaraee, A. A., & Bhattacharya, V. (2012). The WHO surgical safety checklist: A review. *Journal of Perioperative Practice, 22*(9), 289. Retrieved from http://www.afpp.org.uk/books-journals/Journal-of-Perioperative-Practice

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