

# OR TO ICU HANDOVER IMPROVEMENT TOOLKIT

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The content and methods described in the toolkit were developed by the Durham Patient Safety Center of Inquiry (PSCI) as part of two Veteran's Affairs (VA) National Center for Patient Safety funded projects to improve Operating Room to Intensive Care Unit handovers. Established in 2007, the Durham PSCI is an inter-professional team of health care providers, human factors engineers, and business experts that works to improve the safety, reliability, and quality of medical care provided to patients in peri-operative environments. The authors would like to acknowledge the contributions of Al Bonifacio, RN BSN MHA CEN.

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## How to Use this Toolkit

### Toolkit Description

The Operating Room (OR) to Intensive Care Unit (ICU) Handover Improvement Toolkit is designed to help clinical team leaders transform the transfer of care for surgical patients into a safer, faster, and more reliable process. This document is a “one stop” reference that guides users through the handover improvement process, from initial assessment to sustainment. The next chapter provides background information about OR to ICU handovers, while the remaining two chapters provide specific ‘how-to’ instructions and tools to improve handovers.

**User requirements:** This toolkit was designed to be used by clinicians, patient safety officers, quality improvement staff, and others regardless of research or process improvement expertise. Users, however, should be fluent with Microsoft Word, Excel, and PowerPoint. Users should also be familiar with their own current handover process, have sufficient time to perform this work, and ideally hold a leadership role (formal or informal) in the institution.

Symbols used in this guide:



**Toolkit item and description**



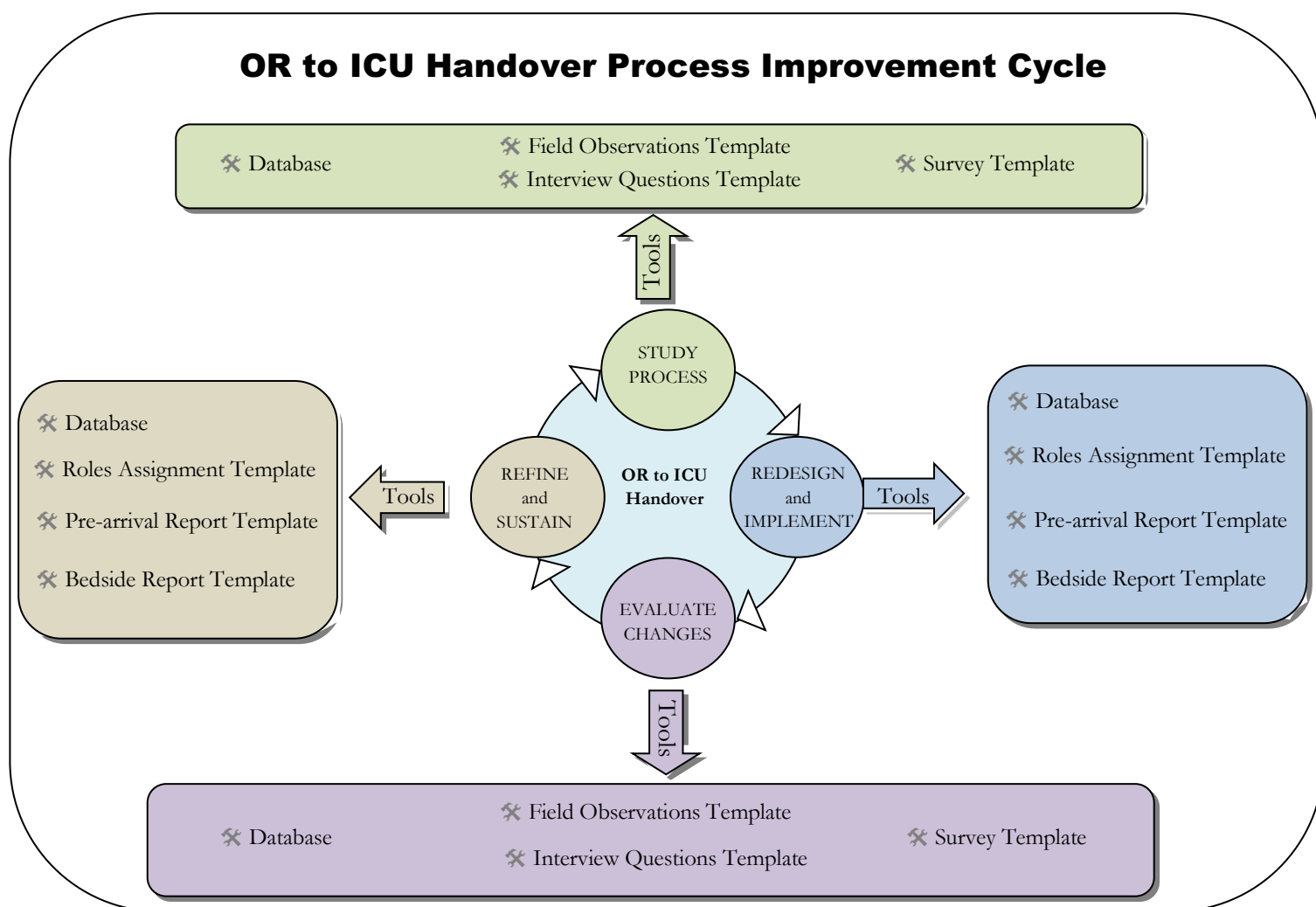
**Critical Point**



*This toolkit uses an iterative, four-step, continuous quality improvement cycle to improve handovers.*

## Toolkit Overview and Contents


This toolkit uses the PLAN-DO-STUDY-ACT framework which has been adapted to the redesign of handovers (see diagram below). The tools provided in this toolkit are displayed next to the process step with which they should be used.\* The Database will help store and analyze the data collected during the redesign process.




\* The tools included in this kit were designed for use with this model, however they can also be used with other process improvement models.

## Making the Case

*Patient handovers:† the transfer of information, professional responsibility, and accountability between individuals and teams to ensure that continuity of care is maintained.<sup>1</sup>*

 “Handovers are fraught with technical and communication errors.”

 Handover failures account for half of the sentinel events rooted in “communication failures” ... and also for 20% of all malpractice claims in the United States.

**P**atient handovers are increasingly being recognized as vulnerable episodes in care that are fraught with technical and communication errors,<sup>1,2</sup> and linked to adverse events and patient harm.<sup>3-5</sup> The Joint Commission reports that handover failures account for half of the sentinel events rooted in “communication failures”<sup>1</sup> and according to a recent study, 20% of all malpractice claims in the United States.<sup>6</sup>

These facts, as well as concerns regarding resident workload restrictions and demands to improve healthcare performance and outcomes, are driving increased interest in patient handovers. The Joint Commission, for example, required implementation of “a standardized approach to handover communications including an opportunity to ask and respond to questions” as a 2006 National Patient Safety Goal (National Patient Safety Goal 02.05.01).<sup>7</sup> The Accreditation Council for Graduate Medical Education, recognizing the impact of new resident work hour mandates on continuity of care,<sup>8</sup> now requires that clinical assignments minimize the number of patient care transitions; ensure and monitor structured handover processes; and ensures trainees are competent in handover communications.<sup>2</sup> Despite these efforts to address handover safety, patient handovers remain vulnerable points in the continuum of care.

## The OR to ICU Handover


OR to ICU handovers involve the interdepartmental transfer of patients who are physiologically compromised and often high-risk. This type of handover differs from other handovers as it requires the simultaneous monitoring and physical transport of both the patient (in certain cases actively managing the patient) and equipment which is followed by

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† The terms *handover* and *handoff* are used interchangeably in the medical literature to describe the transitions in patient care as defined above. We prefer the term *handover* (and use it in this chapter) because we feel it conveys a clearer sense of teamwork and continued commitment to the seamless care of the patient.

communication and transfer of responsibility between more than two groups of clinicians of different work areas and backgrounds (surgery, nursing, and anesthesiology). The unpredictability and high risk of patient deterioration during this period also requires that handover standardization efforts allow teams to effectively detect and manage any complications that may arise.


### Complications of the Physical Transfer

 Physical transport is a vulnerable time with high risk for hemodynamic instability, equipment failure, and inadequate monitoring.


Physical movement of patients, especially turning side-to-side and subsequent movement to a bed or stretcher, poses the risk of hemodynamic instability from shifts in blood volume or other physiologic changes as well as displacement of intravascular lines or drains, and other emergencies. IV poles holding critical infusions, monitoring equipment, circulatory assist devices, or other critical adjuncts are often difficult to maneuver and add to the task overload of the transport teams. Dislodgement of important lines and tubes due to insufficient personnel, crowded hallways, elevators, or poor coordination of bed movement are common sources of technical and attention mishaps.

Postoperative care transitions routinely involve a minimum of two interruptions in monitoring: 1) a transfer from the fixed OR system to a mobile transport monitor and 2) a transfer from the transport monitor to the fixed ICU system. Inadequate maintenance of equipment (missing cables, depleted batteries, non-functional components), accidental disconnections, and tangled cables exacerbate this risk. Inattention of the transport team or distraction related to multi-tasking may likewise lead to interruptions in patient monitoring.

### Complications of the Information Transfer

 The accurate and efficient transfer of information is especially vulnerable to error.

The OR to ICU handover also requires the accurate and efficient transfer of complicated and vast patient information between two teams, which is a dynamic and complex process. The exchange has been found to be especially vulnerable to error. As the exchange must occur between two functionally distinct teams, participants may prioritize and share information based on their experience and clinical responsibilities, making assumptions about what is appropriate to include or leave unsaid.<sup>9</sup> For example, an anesthesiologist may focus on the “anesthesia data set” (e.g. airway difficulties, intake and output, etc.) while the receiving nurse might be more interested in different issues. Furthermore, differences in communication style, hierarchical constraints, and lack of structure confound the process.<sup>10</sup> In PACU handovers, for example, Chang et al. reported that although deliverers of a handover thought their report contained “the most important piece of information,” receivers disagreed 60% of the time.<sup>11</sup>

 The physical or functional absence of key team members is a critical barrier to the exchange of information.

The absence of key participants is a critical barrier to the transmission of accurate and appropriate information.<sup>10</sup> However, it is important to understand that physically present does not equal functionally present. If a report is delivered quietly, physically separated from one or more members of the care team, or to different members at different times, the risk of data omission, miscommunication, and confusion increases as team members are unable to cross-check with each other and verify information, plans, and instructions.



*Information transfer should occur between members not engaged in other tasks and in an environment free of distractions.*

Another common error and route to handover failure is distraction and inattention caused by simultaneously attempting to absorb the information while performing handover-related tasks. For example, calibrating a blood pressure transducer while simultaneously receiving a report may result in poor information comprehension and retention. Furthermore, the risk of error in task performance is greatly increased as many handover related tasks also require cognitive processing to ensure continual patient stability and proper equipment functionality. In addition, participants are routinely subject to auditory and visual distractions, interruptions, demands due to other critical responsibilities, and an array of time pressures. These factors combine to place handovers at high risk for communication failure, adverse events, and patient harm.



*Transfer of responsibility must be formal and explicit.*

### **Transfer of Responsibility**

The final step in the handover is the formal transfer of responsibility for the patient. An often informal rather than explicit<sup>12</sup> transfer may lead to lack of clarity regarding ultimate responsibility and has been identified as a significant problem, especially in units in which different aspects of care are shared among different clinicians or teams.

In summary, patient handovers represent a vulnerable period during a patient's hospitalization. OR to ICU handovers are especially risky, because patients are often sick and unstable, requiring extensive monitoring and support equipment; the process requires simultaneous monitoring and management while performing the physical transfer; and the teams involved are often multiple, with differing cultures and communication styles. Standardizing the process through a careful redesign has the potential to increase safety and provider satisfaction.


## The Handover Redesign

### Before Getting Started

#### Build your Team

**T**he handover improvement team should have the right mix of members with current handover knowledge, quality improvement experience, and influence with the front-line staff and leaders. The team should also be representative of all areas and disciplines involved and have adequate time to perform this work.

#### Prepare the Field

 *Projects are lost and won in their preparation.*

Prior to beginning the project, it will be important to prepare the working environment and staff for the impending change in current handover practice. The likelihood of success in changing the handover process will be determined by how well it is accepted by the end-users. Therefore, the identification and engagement of all parties who will be impacted by the project (*stakeholders*) is important. Gaining the support of formal and informal leaders whose approval and support will ultimately determine the success or failure of the project (*key stakeholders*) is essential. Remember, gain as much support as possible, but don't expend valuable energy and time on "immovable objects." Staunch resisters will eventually follow in suit once the improved process becomes an expected routine.

 *Stakeholder engagement is important. Key stakeholder support is essential. Gain support by establishing a sense of urgency, identifying specific needs, and inviting participation.*

Explicit support in writing, and ideally, active involvement from formal leaders at all levels gives the project legitimacy and establishes expectations for subordinates. Gaining early support from front-line personnel who possess influence over resources and staff is equally important. The key is to establish a sense of urgency by sharing the inherent vulnerabilities in handovers; then gain support by inviting stakeholders to help with developing solutions to meet their specific needs.

Prior to beginning the project, inform staff members through scheduled meetings, posters, and e-mail. Prepare for challenges and hang-ups, even from those you would not expect. Gain support of individuals and groups by using a communication style that best fits your audience. For example, humorous, small, casual meetings will work for some, while formal presentations would be a better form of communication for others.



Allow staff members the opportunity to decline observation should they wish to defer.  
Inform staff that no identifying information will be recorded other than job title.

## STEP 1: Study Your Current Handover Process

The purpose of this step is to gain a clear and accurate understanding of the handover process. The methodical study of the process will help with developing solutions that address root, and not proximal, causes of errors. Both quantitative (observational) and qualitative (contextual) data will be collected and analyzed to develop solutions. The amount of data collected will depend on available resources.

## Field Observations

An objective and detailed description of current handovers can be achieved by direct field observations. An observer can use a tailored version of the handover observation tool to collect data. Two observers may be needed if the complexity of the handovers or amount of data to be collected are great. For example, one observer can observe the physical transfer while the other observes the information transfer.

Five to ten observations of handovers of complex cases (eg cardiac, thoracic, intubated patients) should be adequate to identify systems vulnerabilities and gain a clear understanding of the current handover process.

Some staff members will naturally feel nervous, judged, or fear that these observations will result in poor performance appraisals or may even hold legal issues. Remember to warn staff of the observations, appropriately address their concerns, and reassure them that this is being performed strictly to improve the quality of the handover.

**Filed  
Observations  
Tool**



Double click icon to access tool

**The Field Observations Tool:** Remember that the purpose of performing observations is to capture what is “actually happening,” *not* what “should be happening.” The data from the observations will be used to “paint a picture” of the handover process.

**Tailoring the Tool:** Usability means everything. Tailor the tool's design and content to best fit your local handover process. First, organize the large text blocks to best follow the flow or pattern of the current handover. Then modify the contents within each block to fit your informational needs. Once tailored, observers should pilot the form on several observations to determine usability and gain familiarity with the tool.

Drag, drop or paste the text boxes to best match the current flow of handover

# Check boxes to best advantage

The diagram illustrates two forms used for patient identification and anesthesia reporting. The left form, titled 'Patient Identification', includes fields for 'Start Time', 'Location', 'Patient Identification', and 'Baseline Vitals'. It also has checkboxes for 'Allergies', 'Home Meds', and 'In'. The right form, titled 'REPORT: Anesthesia', includes fields for 'Start Time', 'Location', 'Patient Identification', and 'Baseline Vitals'. It also has checkboxes for 'Allergies', 'Home Meds', and 'In'. A red arrow points from the 'Patient Identification' field in the left form to the 'Patient Identification' field in the right form, indicating a data transfer or comparison.

**Patient Identification**

Start Time: \_\_\_\_\_ Location: \_\_\_\_\_

Patient Identification: \_\_\_\_\_

Baseline Vitals: \_\_\_\_\_

Allergies: \_\_\_\_\_

Home Meds: \_\_\_\_\_

In: \_\_\_\_\_

**REPORT: Anesthesia**

Start Time: \_\_\_\_\_ Location: \_\_\_\_\_

Patient Identification: \_\_\_\_\_

Baseline Vitals: \_\_\_\_\_

Allergies: \_\_\_\_\_

Home Meds: \_\_\_\_\_

In: \_\_\_\_\_

**Notes:**

Time Completed: \_\_\_\_\_

Time Completed: \_\_\_\_\_

Tailor contents in text boxes to fit specific handover and resource needs

[illegible]

**Entering and Analyzing Observational Data:** Enter the data from the observation tool onto the “Observation Data” sheet of the Smart Database.

## Contextual Analysis

By combining contextual data to what is observed, investigators will be better able to recognize patterns in handovers and identify subtle or rare events not captured due to a small sample size. Through **surveys** and **interviews**, investigators can draw upon the experiences, perspectives, and ideas of handover team members to gain deeper insight into the process and develop solutions that better fit the needs of end users. In addition, this invitation for staff to participate in the process will help gain their very important buy-in.

## Surveys

Short, customized surveys can be used to quickly gather perspectives and ideas from a large number of people. The survey should be administered to all OR/ICU staff, trainees, and staff physicians at the beginning of the project. These data will be used in redesign of the handover. Surveys may then be re-administered after the implementation phase to evaluate the staff's perceptions on the changes made.

To encourage honesty, anonymity should be protected by creating a secured box or envelope where completed surveys can be deposited. No identifiable information should be gathered other than role and work area (i.e. ICU RN). Another option would be administer the survey as an internet poll.

### Survey Template



Double click icon to access tool

**The Survey Template:** The questions on the survey template can be tailored to meet your needs as with any MS Word document.

**Entering and Analyzing Survey Data:** Data from the surveys can be entered into the “Survey Data” sheet of the Database. Modify the Survey Data sheet to match the questions on the survey. Then transfer the responses from the hardcopy surveys onto the Survey Data sheet. Key concepts identified from this sheet can then be copied and pasted onto the “Subjective Coding” tool of the Database.

Another option is to identify key concepts from the hardcopy surveys and transfer them directly onto the “Subjective Coding” tool. Though this will save time, an electronic record of survey responses will be sacrificed.

## Interviews

Next during this ‘study’ phase is to conduct several interviews with front line staff to get a complete picture of the process from the different users’ points of view. A group that is representative of the OR and ICU teams should be ideally selected for interview. Interviews may be conducted by one or two members of the project team.

Interview each staff member individually in a private location to encourage the candid sharing of information. Reassure the participant that the opinions shared during the interview will be completely confidential and will not impact performance appraisals.

Responses may either be recorded as handwritten notes, or preferably, on a portable voice recorder. If recording, ensure that the participant grants permission prior to recording and destroy the voice file promptly after its data are transcribed or analyzed. Also ensure that no identifying information is included in the transcripts or written notes.

### Interview Questions Template



Double click icon to access tool

**Entering and Analyzing Interview Data:** Contextual data from interviews, whether full transcripts or interviewer notes, can be entered into the “Interview Data” sheet of the Database. First, modify the Interview Data sheet to match the interview questions, then transfer the data. The key concepts can then be identified, copied, and pasted onto the “Subjective Coding” tool.

Another option is to identify key concepts directly from the transcripts, notes, or audio recording and recording them directly onto the “Subjective Coding” tool. Though this will save time, an electronic record of the interview responses will be sacrificed.

OR to ICU Handover Interview Questions	
Interview Questions	Notes
1. In the current handover process, is anyone in particular responsible for giving and receiving each type of information?	
2a. Do you find that the location of the handover (i.e. PACU / ICU or both) affects the information being transferred? Can you tell me about that? Does one location seem to work better for information exchange than another?	
2b. Do you use any tools or accessories (i.e. forms or checklists) to help during the handover? Describe the hand device about them. What do they fail to do?	
2c. (For OR personnel) How do you determine the order of the information you present?	

### Database



Double click icon to access tool

### The Database

The Database is an Excel workbook that consists of four sheets: one for each of the three data sources (e.g. interviews, surveys, observations), and an open coding worksheet. Instructions for using the sheet for each data source can be found in their respective sections. Gaining familiarity with the Database prior to initiating data collection will help with “seeing the big picture.”

## STEP 2: Redesign the Handover Process

Use the data collected through observations, surveys and interviews and summarized in the Database to identify strengths and vulnerabilities in your handover process. Then use the Handover Redesign Suggestions below as a list of ideas to develop some possible strategies. List the strategies you wish to implement and then use the following templates to construct a new handover process that incorporates these strategies. Change only what needs to be changed. Though the examples shown illustrate a valid model, do not allow it to hinder creativity.



### Solutions

*smorgasboard!! Use the items listed as is, or as ideas to create your own solutions. Change only what needs to be changed.*

Handover Redesign Suggestions	
General	<ul style="list-style-type: none"> <li>• Standardize as much as possible, but not beyond that (flexible standardization)</li> <li>• Use Checklists</li> <li>• Avoid mixing information transfer and tasks</li> <li>• Develop a formal handover training curriculum</li> </ul>
Process	<ul style="list-style-type: none"> <li>• Standardize roles and process</li> <li>• Perform the report at the bedside</li> <li>• Ensure adequate notification of patient arrival to allow ICU RN to prepare (30min and rolling call)</li> <li>• Ensure all parties are present for entire handover</li> <li>• Visual verification of pumps and infusions</li> <li>• Rapid head-to-toe assessment by team</li> <li>• Create contingency plan in case of unexpected patient instability</li> <li>• Concludes only after consensus is achieved</li> </ul>
Information Transfer	<ul style="list-style-type: none"> <li>• Standardize the information transfer</li> <li>• Use checklists to guide the information transfer</li> <li>• Sterile cockpit (talk only about patient being handed over)</li> <li>• Create a 'minimum dataset'</li> <li>• Provide updates of critical patient status changes from OR to ICU</li> <li>• Eliminate environmental distractors</li> </ul>
Teamwork	<ul style="list-style-type: none"> <li>• Assign a handover leader</li> <li>• Call out vital signs</li> <li>• Verbal acknowledgement that receiving team is prepared to receive report</li> <li>• Callout and acknowledge critical patient information</li> <li>• Empower individuals to insist team follow new strategies</li> <li>• All team members allowed to speak or ask questions</li> <li>• Verbal acknowledgement of assumption of care</li> </ul>

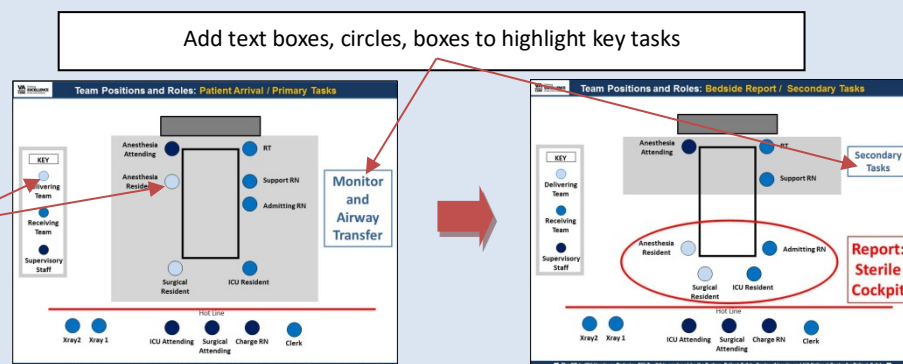
## Positions and Roles Template



Double click icon to access tool

Create colored dot for each person and drag into position

**Positions and Roles Template:** This template allows you to position team members and broadly define team actions (main processes) throughout a *typical* bedside handover. This tool can also be used as a teaching and promotional aid during the implementation and sustainment phases.



## Pre-arrival Report Template



Double click icon to access tool

**Pre-arrival Report Template:** The pre-arrival report template is an example of a 'minimum dataset' that can be used to prepare the ICU for patient arrival. It can either be completed by the anesthesia provider and delivered as part of a report or used by the receiving nurse as a guide on which to take notes.

## Bedside Report Template



Double click icon to access tool

**Bedside Report Template:** The bedside report template can be used as a cognitive aid (or checklist) to ensure all pertinent information is transferred during the handover. Note the 3 key 'moments' of the suggested handover process: (1) physical transfer; (2) information transfer; and (3) opportunity for questions and formal transfer of responsibility. Simply reorganize, reformat, and modify the contents of each box to meet your local needs.

## Testing your Solution

Prior to implementation, simulate the new handover process in a controlled environment to detect faults in the design. Though high fidelity manikins will enhance the realism of tasks, similar results can be achieved by “walking through” the process without a manikin. Inviting stakeholders to participate will allow them to identify problems, promote a sense of ownership, and generate support for the proposed changes.

## STEP 3: Implementation

### Preparation

Many would agree that strategy development is easy when compared to implementation and sustainment - this will be your greatest challenge yet. Leadership and patience will be put to the test. It would help to revisit some of the leadership suggestions discussed in the preparation section.

Adequate preparation for implementation is absolutely crucial. In the weeks prior to implementation, widely distribute informative emails, flyers, posters, and newsletter articles. Educate the staff in the new handover strategies through easy-to-understand checklists and protocols. Create handouts with data from the literature and those collected in the study to substantiate the changes. Make this material easily available in break rooms, nursing stations, education classrooms, OR spaces, and other common areas.

Conduct Q&A sessions and brief presentations during OR and ICU staff meetings. Meet with leaders to secure their support and engagement throughout the process. Introductions by formal leaders, informal support by front-line champions, and a genuine demonstration of enthusiasm by process owners help in generating excitement and buy-in. Most importantly, promote the effort by informal conversations in hallways, break rooms, and other common areas.

Training must be impactful, engaging, efficient, and fit into the workflow of the different groups. Consult your facility’s education and simulation departments to develop training programs that will be effective for your location. Leaders should demonstrate their support of the program by participating in the training programs.

### Implementation

Actual implementation of the new handover process, the “go live” day, should be a celebrated event (i.e. candy and balloons!). Invite executive leadership, front-line managers, and other key stakeholders to visit as their presence lends legitimacy to the project. Project leaders

 *Redesign is easy  
-when compared to  
implementation –  
pack well and better  
eat your Wheaties.*

#### KEYS TO A SUCCESSFUL IMPLEMENTATION

- 1 PREPARE YOURSELF AND TEAM FOR THE TOUGH TASK AHEAD
- 2 ALIGN LEADERS
- 3 INFORM THE FIELD
- 4 GAIN SUPPORT THROUGH PRESENTATION AND CONVERSATION
- 5 GO LIVE DAY SHOULD BE A CELEBRATED EVENT
- 6 FLOOD AREA WITH RESOURCES TO SUPPORT STAFF THROUGH CHANGE
- 7 SUSTAIN SUPPORT FOR 2WKS THEN SLOWLY WITHDRAW SUPPORT UNTIL PROCESS ESTABLISHED

should be present for and actively coach every handover for the initial implementation period. Provide step-by-step instructions to the staff prior to and during the process. Immediately after the handover, conduct a short debriefing to reinforce proper behaviors, solicit opinions and suggestions, address concerns, and provide reassurance that the process is being followed closely to ensure that it works. Most importantly, take the opportunity to thank the staff for their support.

Project leaders should also be present to address any unforeseen complications that may arise as a result of this change in process. This level of active coaching in the new handover by process owners or front-line leaders is crucial to success. The level of support can be scaled down as the process gains traction.

## Evaluating Change


An evaluation of the new handover to determine if it is achieving its intent should be performed when the new handover is being performed correctly and regularly with little prompting. A general rule is 70% compliance<sup>‡</sup> of the new handover sustained over one month.

Modify the data collection tools used in the initial study of the handover to fit the changes made. Using all the tools to determine effectiveness may not be necessary. For example, defer post-intervention observations if interviews and surveys will suffice, or limit observations to the identification of a few important key concepts such as the bedside report in a sterile cockpit.

Be flexible and allow the feedback from staff to guide further changes. It's ok to eliminate entire steps if they are determined to be of little value. Again, use data gathered from staff feedback, literature and observations to help refine the process but don't allow current to shift backwards.

## STEP 4: Refine and Sustain

If implementation is a sprint, then sustainment is a marathon. Use the post-intervention data collected to further refine the process. This iterative process of continuous improvement should be repeated to evaluate its impact and search for unintended consequences that may need attention for as long as the process is in practice. The frequency and scope of subsequent reevaluation will be determined by how well or poorly the process is accomplishing the purpose for which it was created. For example, if the handover is found to be working well according to a survey administered one year after implementation, then very fine refinements can be made using these data. However, if the handover is found to be seriously flawed or has become obsolete due to external systems changes, then repeating this

 *Implementation is easy when compared to sustainment. Sorry.*

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<sup>‡</sup> A high, but not perfect level of procedural compliance is desirable as this allows for process flexibility

quality improvement process to its fullest extent to extensively redesign the process may be necessary.

Even with a solid implementation, converting the new processes into the “new business as usual” requires considerable effort delivered over a long period of time. The handover, which took so long to implement, will slowly disappear if not tended to properly. A short, but effective, handover training program for rotating residents and new staff should be included into orientation. Regular meetings with front-line leaders and bedside champions will be needed to ensure old habits don’t return. Continue to distribute new material and display sustainment posters about the new process. Lastly, share success stories of how the new handover process has made work easier, relationships with team members stronger and patient care safer.

Congratulations - you have made it to the end of this toolkit. Hopefully, your OR to ICU handover process is now a safer and more reliable process. For more information on perioperative handovers, please visit [www.handoffs.org](http://www.handoffs.org) or email us. Good luck!

## Notes:



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