Learn From Defects Tool – Perioperative Setting

What is a defect? A defect is any event or situation that you don't want to repeat. This could include an incident that caused patient harm or put patients at risk for harm, such as a patient fall.

Problem statement: If a patient is harmed in the perioperative area, a typical first response is to help that individual patient, and perhaps even blame his or her providers. This is known as "first-order" problem solving because each situation is treated as if it were unique. First-order problem solving focuses on the here and now, work-arounds, and "quick fixes." Too few perioperative teams take the opportunity to learn how the defect happened at a systems level, and how to stop it from happening again. This is known as "second-order" problem solving because it addresses the underlying causes of the defect.

Purpose of this tool: This tool helps you with second-order problem solving. Specifically, it helps your team organize ideas about how a defect happened, think about problems and solutions at a systems level, and follow up with evaluation plans to ensure your solutions worked.

Who should use this tool? You need diverse perspectives to assess and troubleshoot your care delivery system. All staff involved in the care system that produced a defect should be present when that defect is evaluated. At a minimum, this should include the surgeon, anesthesia provider, nurse, administrator, and other specialized professionals as appropriate (e.g., for a medication defect, include pharmacy staff; for an equipment defect, include clinical engineering staff).

How to use this tool: Complete the form below for at least one defect per quarter, asking the following questions.

I. **What happened?** Provide a clear, thorough, and objective explanation of what happened.

II. **Why did it happen?** Create a list of factors that contributed to the incident and identify whether they harmed or protected the patient. Rate them by how severe and how common they are.

III. **How will you reduce the likelihood of the defect happening again?** Create a plan to reduce the likelihood of this defect repeating. Complete the tables to develop interventions for each important contributing factor, and rate each intervention for its strength. Choose the interventions that you will use based on strength and feasibility. List what you will do, who will lead the intervention, and when you will follow up to evaluate the intervention's progress.

IV. **How will you know the risk is reduced?** Describe how you will know if you have reduced the risk of a defect repeating. Survey frontline staff involved in the incident to determine whether the plan has been implemented effectively and whether risk has been reduced.

The appendix has an example case study that helps you understand the learning from defects process and use of the tool. It shares a based-on-real-life story about a surgical safety team using the Learn From Defects tool to improve care in their perioperative area.

I. What happened?

Reconstruct the timeline and explain what happened. For this investigation, put yourself in the place of those involved – and in the middle of the event as it was unfolding – to understand what they were thinking and the reasoning behind their actions or decisions.

II. Why did it happen?

Investigate your care delivery system. Identify harmful and protective contributing factors at each level of your care system in the table. Harmful contributing factors contribute to patient harm; protective factors contribute to patient safety.

System Level	Harmful Contributing Factor	Protective Contributing Factor
Patient characteristics		
Task factors		
Individual provider factors		
Team factors		
Work environment		
Departmental factors		
Hospital factors		
Institutional factors		

III. How will you reduce the likelihood of this defect happening again?

Focus your efforts on the most important contributing factors. Rate each harmful contributing factor by (1) how much it contributed to the defect, and (2) whether it will likely show up again in the future.

Harmful Contributing Factors	Contributed to Defect 1 (a little) to 5 (a lot)	Likely To Show Up Again 1 (not really) to 5 (definitely)

Conduct a brainstorming session about interventions to address the most important contributing factors. Refer to the Strength of Interventions Chart below for examples of strong and weak interventions. Also consider your protective contributing factors when designing your intervention.

Strength of Interventions

Weaker Actions	Intermediate Actions	Stronger Actions
• Double check • Warnings and labels • New policy or procedure • Training and education • Additional study or analysis	• Checklists or cognitive aid • Increased staffing or reduced workload • Redundancy • Enhance communication (e.g., check-back, SBAR) • Software enhancement or modifications • Eliminate lookalike and sound alike drugs • Eliminate or reduce distractions	• Architectural or physical plant changes • Tangible involvement and action by leadership in support of patient safety • Simplify the process or remove unnecessary steps • Standardize equipment and process of care map • New device usability testing before purchasing • Engineer forcing functions into work processes

SBAR = situation, background, assessment, recommendation and request

Carefully consider your resources before implementing your intervention. Determine the level of attention your intervention requires by considering the level of support it is likely to receive, and how well the intervention addresses the contributing factor. You can use the following table as a worksheet.

Interventions To Address the Harmful Contributing Factor	**Intervention Addresses the Factor*** 1 (not well at all) to 5 (really well)	**Key Stakeholders****	**Level of Stakeholder Support** 1 (strong opposition) to 5 (strong support)	**Level of Attention Needed** 1 (not much) to 5 (a lot)

*An intervention that addresses the factor really well but has strong opposition requires a lot of attention; an intervention that addresses the factor really well and has strong support requires less attention. You might pay some attention to an intervention that doesn't address the factor well, if it has strong support; but probably very little attention to an intervention that doesn't address the factor well and has strong opposition.

**Who controls resources? Who needs to have input on your intervention?

Choose your interventions and develop an action plan. Improve your chances of success by anticipating and troubleshooting sources of resistance. Finally, ensure accountability by assigning responsibility for efforts, and establish a followup date to evaluate intervention success.

Chosen Intervention	**Anticipated Sources of Resistance**	**Opportunities To Reduce Resistance**	**Who's in Charge of These Efforts?**	**Followup Date**

IV. How will you know the risk is reduced?

Ask frontline staff involved in the defect whether the interventions improved care. At your followup date, complete the "Describe Defect" and "Interventions" sections and have staff rate the interventions. Of course, opinions about the success of interventions are subjective. Your team will need to collect data to objectively measure how successfully an intervention was implemented and how well it reduced the risk of a defect from repeating.

Describe Defect:

Interventions	**Intervention Was Implemented Effectively** 1 (Strongly disagree) to 5 (Strongly agree)	**Intervention Reduced the Likelihood of Defect Repeating** 1 (Not at all) to 5 (Definitely)

Appendix: Example Case Study

Problem statement: If a patient is harmed in the perioperative area, a typical first response is to help that individual patient, and perhaps even blame his or her providers. This is known as "first-order" problem solving because each situation is treated as if it were unique. First order problem solving focuses on the here and now, work-arounds, and "quick fixes." Too few perioperative teams take the opportunity to learn how the defect happened at a systems level, and how to stop it from happening again. The Learn From Defects (LFD) process is known as "second-order" problem solving because it addresses the underlying causes of the defect.

Purpose of this Example Case Study: This example case study helps you understand the LFD process and use of the LFD tool. Specifically, it shares a based-on-real-life story about a surgical safety team using the LFD tool to improve care in their perioperative area by answering the following four questions:

I. **What happened?** Provide a clear, thorough, and objective explanation of what happened.

II. **Why did it happen?** Create a list of factors that contributed to the incident and identify whether they harmed or protected the patient. Rate them by how severe and how common they are.

III. **How will you reduce the likelihood of the defect happening again?** Create a plan to reduce the likelihood of this defect repeating. Complete the tables to develop interventions for each important contributing factor, and rate each intervention for its strength. Choose the interventions that you will use based on strength and feasibility. List what you will do, who will lead the intervention, and when you will follow up to evaluate the intervention's progress.

IV. **How will you know the risk is reduced?** Describe how you will know if you have reduced the risk of a defect repeating. Survey frontline staff involved in the incident to determine whether the plan has been implemented effectively and whether risk has been reduced.

You may wish to start by familiarizing yourself with the LFD tool. Then review this example case study about the LFD process and use of the tool.

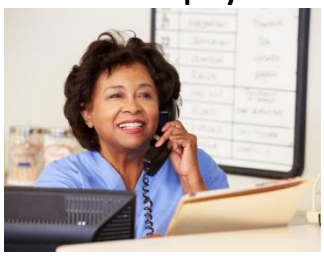
Who should use this tool? The LFD process is a crucial component of your patient safety work, but it can be challenging to implement, and takes a fair amount of time. The surgical safety team lead or a designee should review the example case study in preparation for the first LFD meeting, and develop a strategy for completing the LFD process. This preparation will help to ensure that the LFD meeting is a success.

How to use this tool: Review the example case study before you hold your first LFD meeting. When you are ready to hold your LFD meeting, use the LFD tool to collect your team's ideas.

I. What happened?

Reconstruct the timeline and explain what happened. For this investigation, put yourself in the place of those involved – and in the middle of the event as it was unfolding – to understand what they were thinking and the reasoning behind their actions or decisions. Try to view the world as they did when the event occurred.

How this can play out:



We knew from our Perioperative Patient Safety Assessment and normothermia audit data that our patients were leaving the operating room (OR) cold. We sent an email to our frontline staff inviting them to a meeting to investigate our temperature management processes. ***Even though we had audit data on 10 patients, we used the Learn From Defects tool on two or three patient cases, so the group didn't get overwhelmed.*** *For example, one patient came into the OR with a temperature of 36.4°C, but was admitted to the post-anesthesia care unit (PACU) with a temperature of 35.3°C. We walked through her case from preoperative (preop) area to PACU, to get as much detail as possible about how she ended up hypothermic.*

– Surgical safety team Nursing Champion

II. Why did it happen?

Investigate your care delivery system. Patient safety or patient harm is a product of that system. Contributing factors from all levels of your system impact care delivery and, ultimately, patient outcomes. Identify harmful and protective contributing factors at each level of your care system in the table below. Harmful contributing factors contribute to patient harm; protective factors contribute to patient safety.

How this can play out:

The team leader guided the conversation as we told our hypothermic patients' stories from each discipline's perspective. She reinforced that this conversation wasn't about blaming each other, but about identifying flaws in the system that made it possible for hypothermia to occur. Every few minutes, she would stop the conversation so we could identify the contributing factors at play, and she'd write them on a white board at the front of the room. ***We came up with a lot of ideas. They just poured out once we felt like someone was finally listening to our concerns about the way things got done.*** *Once the flow of ideas slowed down, the team leader reviewed each level of the system – patient level through institutional level – to make sure we had identified as many contributing factors as possible.*

– OR scrub technician, surgical safety team member

System Level	Harmful Contributing Factor	Protective Contributing Factor
Patient Characteristics	*The patient was dehydrated from being NPO (nothing by mouth) and having a bowel preparation.*	
Task Factors	*The patient's midsection was exposed during surgery.*	*There is an intraoperative upper body warming protocol.*
	The patient's abdominal cavity was irrigated with saline before closure.	*Irrigation is warmed.*
	The temperature probe might not be accurate.	
Individual Provider Factors	*The OR staff like to work in a cool OR.*	
Team Factors	*Lack of role clarity regarding who is responsible for normothermia maintenance.*	
Work Environment	*Normothermia is a lower priority during the OR case.*	*Patient warmers are readily available.*
Departmental Factors		*Staff from the entire perioperative area are working together on the Safety Program for Surgery.*
Hospital Factors		*The central stores department reliably delivers patient warmers to perioperative units when needed.*
Institutional Factors		*Hospital leadership prioritizes patient safety.*

III. How will you reduce the likelihood of this defect happening again?

One method you can use to reduce the likelihood that a defect will happen again is to—

- Focus your efforts on the most important contributing factors.
- Conduct a brainstorming session about interventions to address the most important contributing factors.
- Choose your interventions (prioritized by feasibility and likelihood of success) and develop an action plan. Anticipate and plan for resistance.

Focus your efforts on the most important contributing factors. Rate each harmful contributing factor by (1) how much it contributed to the defect, and (2) whether it will likely show up again in the future. Then discuss your list, and create a plan to weigh your scores. For example, you may focus on all harmful contributing factors that get a score of 5 in either column, or those with the highest number after columns are multiplied. The choice is up to your team, but be clear about why you are weighting scores and prioritizing harmful factors as you are.

How this can play out:

We listed out all of our harmful contributing factors on a dry erase board at the front of our conference room. Then we had a discussion about how to do the scoring. We decided to score by consensus, instead of averaging everyone's individual numbers, since most of the meeting participants agreed on the scores. ***After scoring, we decided to focus on any contributing factor with a 5 in either column. Since those harmful factors either contributed to the event a lot or were very common, we felt that they impacted care significantly and should be addressed.***

— PACU Nurse, surgical safety team member

Harmful Contributing Factors	Contributed to Defect 1 (a little) to 5 (a lot)	Likely To Show Up Again 1 (not really) to 5 (definitely)
The patient was dehydrated from being NPO and having a bowel preparation.	*2*	*4*
The patient's midsection was exposed during surgery.	*5*	*5*
The patient's abdominal cavity was irrigated with saline before closure.	*5*	*5*
The OR staff like to work in a cool OR.	*3*	*5*
The temperature probe might not be accurate.	*2*	*5*
Normothermia is a lower priority during the OR case.	*3*	*4*
Perioperative units believe the OR is responsible for normothermia maintenance.	*4*	*5*

The highlighted sections are those with a 5 in either column, and represent the contributing factors that the team will address in the remaining LFD steps.

Conduct a brainstorming session about interventions to address the most important contributing factors. Refer to the Strength of Interventions Chart below for examples of strong and weak interventions. Also consider your protective contributing factors when designing your intervention.

Strength of Interventions

Weaker Actions	Intermediate Actions	Stronger Actions
• Double check • Warnings and labels • New policy or procedure • Training and education • Additional study or analysis	• Checklists or cognitive aid • Increased staffing or reduced workload • Redundancy • Enhance communication (e.g., check-back, SBAR) • Software enhancement or modifications • Eliminate look-alike and sound- alike drugs • Eliminate or reduce distractions	• Architectural or physical plant changes • Tangible involvement and action by leadership in support of patient safety • Simplify the process or remove unnecessary steps • Standardize equipment and process of care map • New device usability testing before purchasing • Engineer forcing functions into work processes

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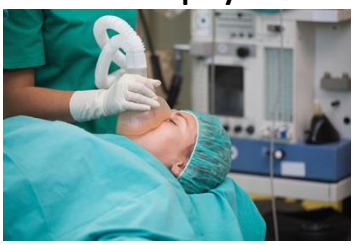
How this can play out:



After scoring our harmful contributing factors, we were a little stumped. *How were we going to address the fact that surgeons like the OR cool when they're operating? We obviously couldn't change the way our surgeons worked best.*

We started with something easier: The clinicians' skepticism about esophageal probe temperature readings. A lot of our anesthesia providers wanted to trial the bladder temperature probes that the cardiac surgery service used. Confirming accuracy of the esophageal temperature readings with bladder temperature probes became our first potential intervention.

Then we tackled the more challenging problems. We had already worked with operating room technicians to keep the irrigation in the blanket warmer so that warm irrigation was available for all patients. ***One nurse said, "Our patients are coming to the operating room cold. Can we find a way to make them warmer before they come into the OR? We will always need to have our patients uncovered in the OR for a short time for positioning."***

– Surgical safety team Anesthesia Champion

Carefully consider your resources before implementing your intervention. Determine the level of attention your intervention requires by considering the level of support it is likely to receive, and how well the intervention addresses the contributing factor.

How this can play out:

We thought that preop patient warming might be feasible. We just had to figure out the most effective way to do it. *We looked at our list of positive contributing factors, and noticed that patient warmers were readily available. What if we warmed patients with forced air warmers before the case? Warmers would definitely raise our patients' temperatures sufficiently. The OR staff liked the intervention, because it reinforced the message that the whole perioperative team is responsible for patient outcomes. The preop staff was concerned that the intervention would slow down their preop processes. We knew we'd have to earn perioperative staff buy-in, since the rest of the team wanted to give it a try.*

– OR Scrub Technician, surgical safety team member

Interventions To Address the Harmful Contributing Factor	**Intervention Addresses the Factor** 1 (not well at all) to 5 (really well)	**Key Stakeholders**	**Level of Stakeholder Support** 1 (strong opposition) to 5 (strong support)	**Level of Attention Needed** 1 (not much) to 5 (a lot)
Confirm esophageal probe temperature readings with bladder probes	*5*	• *Finance* • *Central Supply Department* • *All clinicians*	• *3* • *5* • *5*	*3*
Use forced air warming in prep area	*5*	• *Preop nurses* • *OR clinicians* • *Central supply department*	• *3* • *5* • *3*	*4*
Reinforce use of warm irrigation fluid in OR	*3*	• *OR scrub techs*	• *3*	
Reinforce use of upper body warmers in OR	*3*	• *OR clinicians*	• *3*	

The highlighted sections are those with a five in the Intervention Addresses the Factor column, and represent the interventions the team will implement in the remaining LFD steps.

Choose your interventions and develop an action plan. Determine the amount of attention your team can devote to an intervention, and factor that into your choice. Then, improve your chances of success by anticipating and troubleshooting sources of resistance. Finally, ensure accountability by assigning responsibility for efforts, and establish a follow-up date to evaluate intervention success.

How this can play out:

After a lot of discussion, the preop staff got on board. We reassured them that we would work with our Central Supply Department to ensure that warmers were readily available on the preop unit. We also decided that the intervention would be piloted for one month. If our clinicians hated it, we'd consider trying something new. ***Then we assigned leaders for each intervention to establish accountability and a chain of command.***

– Surgical safety team Surgeon Champion

Chosen Intervention	Anticipated Sources of Resistance	Opportunities To Reduce Resistance	Who's in Charge of These Efforts?	Followup Date
Confirm esophageal probe temperature readings with bladder probes	*Finance personnel, since bladder probes are more expensive*	*Present data on bladder probe accuracy to finance personnel*	*Senior executive*	*One month from implementation*
Use forced air warming in preop area	• *Preop staff, since it increases their workload* • *Central Supply Department might not have enough forced air warmers*	• *Pilot for 1 month* • *Connect with central supply department manager to determine feasibility*	• *Preop nurse manager & CUSP team leader* • *Nurse champion*	*One month from implementation*

IV. How will you know the risk is reduced?

Ask frontline staff involved in the defect whether the interventions improved care. At your followup date, complete the "Describe Defect" and "Interventions" sections and have staff rate the interventions. Of course, opinions about the success of interventions are subjective. Your team will need to collect data to objectively measure how successfully an intervention was implemented and how well it reduced the risk of a defect from repeating.

How this can play out:

Our patients loved preop forced air warming! They were more comfortable in the preop area, and that made our staff happier, too. ***Even better, our audit data showed that nearly all of our patients were normothermic perioperatively after our intervention was implemented.*** *The bladder temperature probe trial went really well, too. We found that the esophageal probes we had been using were just as accurate as the bladder probes. They were actually more accurate than bladder probes during colon surgery, because the bladder probe readings dropped a lot when the patient's abdomen was irrigated during the procedure. We decided to go back to esophageal probes, but continue the forced air warming preoperatively as standard procedure.*

– Preoperative Nurse, surgical safety team member

Describe Defect: *Patients admitted to the PACU hypothermic*

Interventions	**Intervention Was Implemented Effectively** 1 (strongly disagree) to 5 (strongly agree)	**Intervention Reduced the Likelihood of Defect Repeating** 1 (not at all) to 5 (definitely)
Trial bladder temperature probes	*5*	*1*
Use forced air warmers preoperatively	*4*	*5*

AHRQ Pub. No. 16(18)-0004-16-EF
December 2017