

Using a Quality Improvement Approach to Improve Environmental Cleaning Practices



Presenter

Ruth Carrico, PhD, APRN, FNP-C, CIC

Associate Professor, Division of Infectious Diseases
University of Louisville School of Medicine

Contributions by

Dan Bennett CHESP, M-CHEST, T-CHEST

St. Joseph's Hospital-North

David Calfee, MD, MS

Cornell Medical Center

Association for the Health Care Environment



Learning Objectives

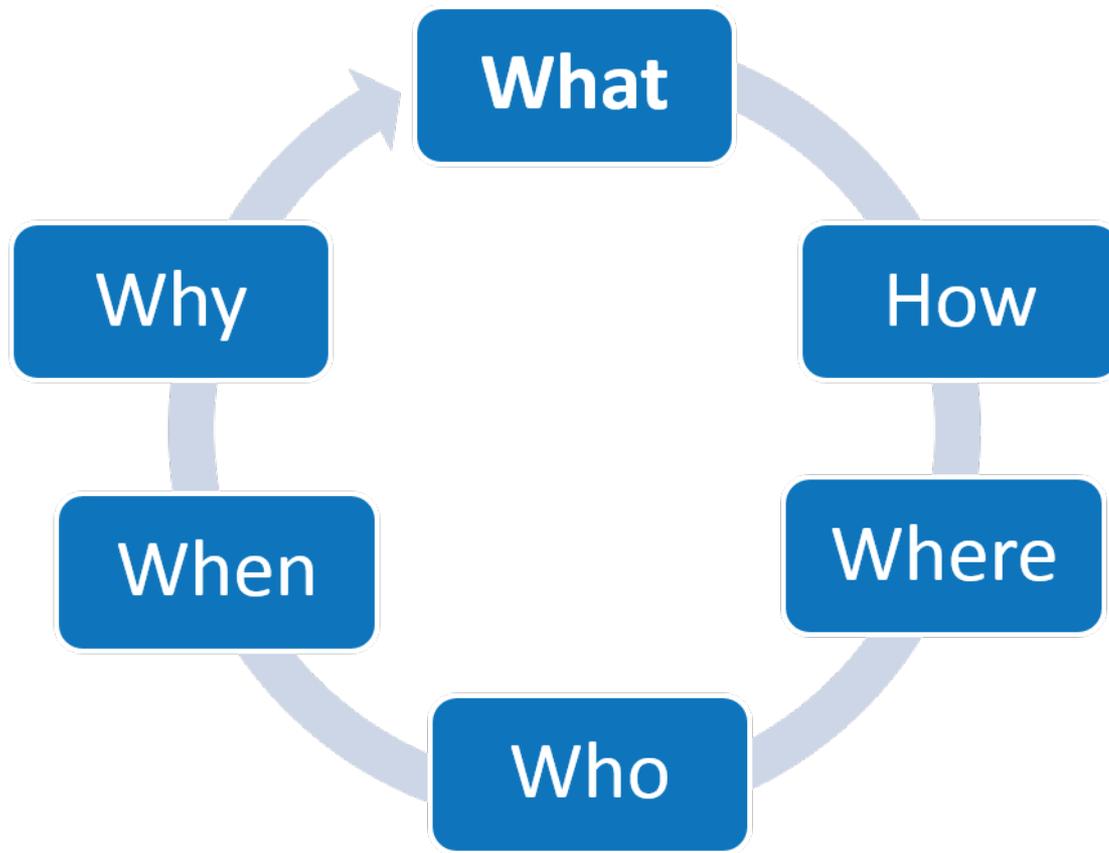
Explore strategies that can be used for process monitoring of environmental cleaning practices

Identify specific activities that may be used to provide feedback on performance

Provide examples of resources that may be helpful with performance monitoring



A Problem



Challenges

Need to prevent pathogen transmission

Need to prevent patient and/or staff illness

Need to reduce the burden of illness in a particular area



Why Are We Interested in Process Monitoring?

We are interested in improvement

To improve, we must understand:

- What we are doing well
- What we are not doing well
- What else is impacted by these actions
- What needs to change



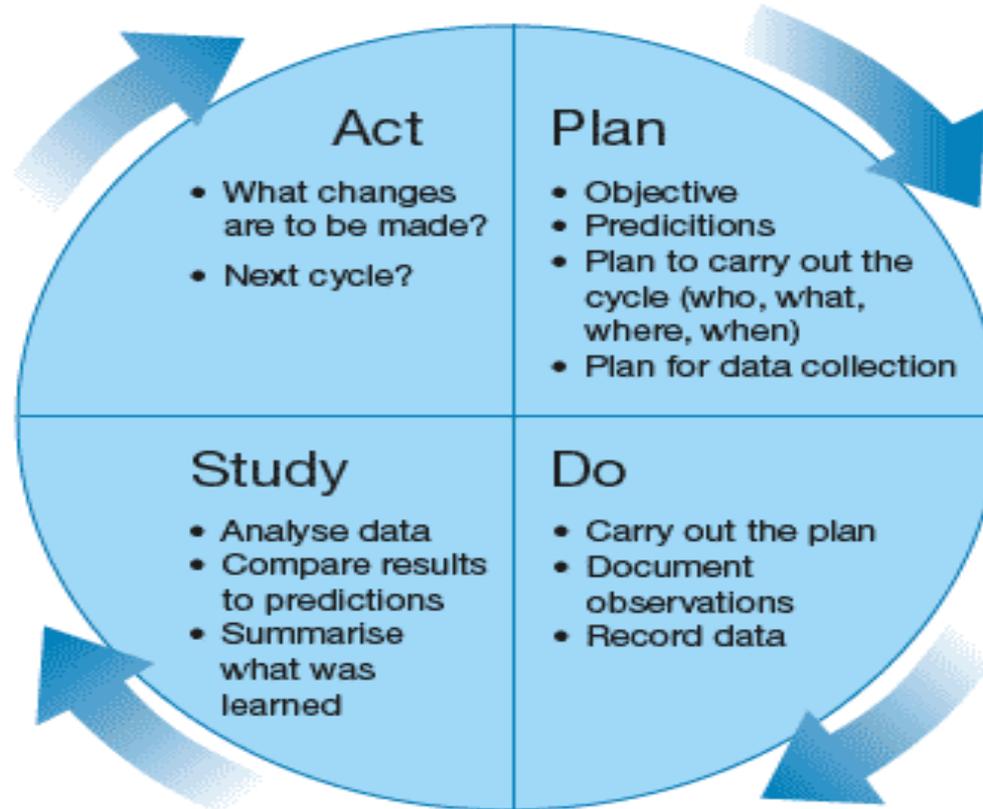
Process monitoring is an integral part of performance improvement

Performance improvement methodologies:

- PDSA—Plan, Do, Study, Act
- PDCA—Plan, Do, Check Act
- FADE—Focus, Analyze, Develop, Execute
- Scientific Method—Assess, Plan, Intervene, Evaluate



Plan Do Study Act (PDSA)



Deming WE. *The New Economics for Industry, Government, and Education*. Cambridge, MA: The MIT Press; 2000.



Framing Process Monitoring

What do we want to achieve or what are we trying to accomplish?

What changes can we make that will create the outcome we want?

How will we know those changes worked?

These questions are the link between **PROCESS** monitoring and **OUTCOME** monitoring

- We try to change what we are **DOING** so the **RESULT** is improved



Rapid Cycle Change for Improving Environmental Disinfection

Repetition and continuous reach toward improvement

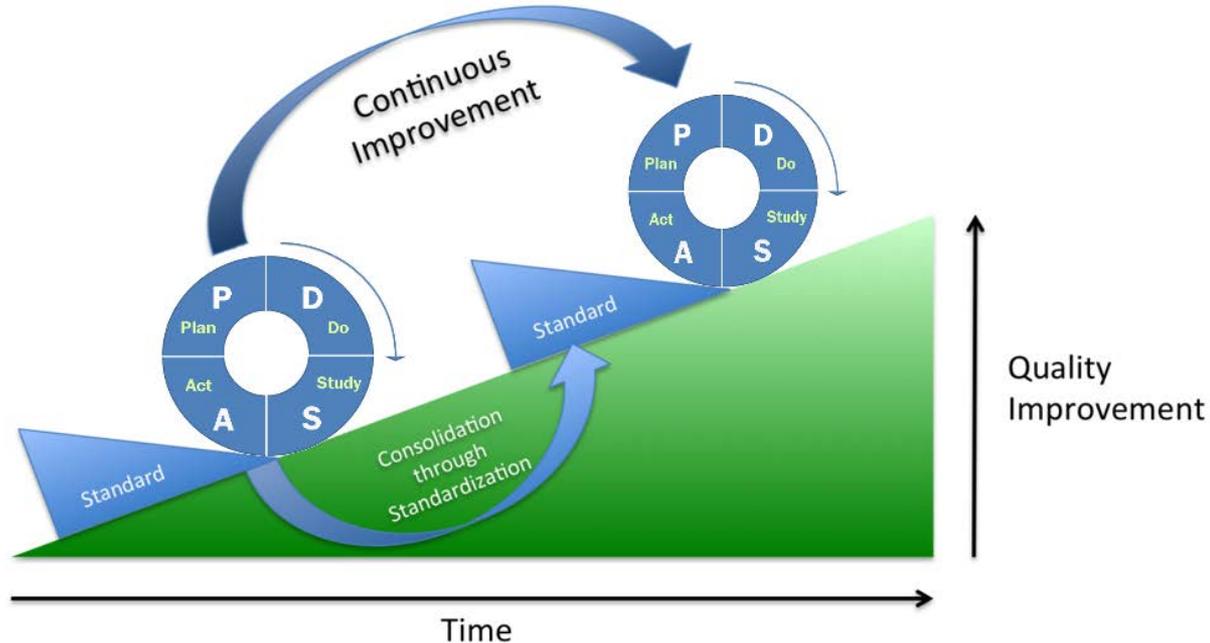


Image from by Johannes Vietze (Own work), https://commons.wikimedia.org/wiki/File%3APDCA_Process.png
Edits by Michael Burk, MD, CC BY-SA 3.0 via Wikimedia Commons. Available at <http://creativecommons.org/licenses/by-sa/3.0/>



PLAN: Step 1

What Process Are We Going to Monitor?

What process are we going to monitor?

- Cleaning and disinfection methods
- Attention to a specific detail
- Handling and management of supplies and equipment
- Teamwork
- Communication
- Workload
- Supervisory level responsibilities
 - Assignments, monitoring how staff perform, communication, leadership



PLAN: Step 2

Who Will Collect What Data?

What is our data collection process?

- Paper or electronic (Keep it simple)

Who is performing the monitoring?

- What training or education do they need?
- What tools do they need?

Who is being monitored?

- Technicians, supervisors, contract personnel
- Specific units or areas

[CDC Environmental Checklist for Monitoring Terminal Cleaning](#)

[CDC: Options for Evaluating Environmental Cleaning](#)



PLAN: Step 3

How Will You Monitor and Collect Data?

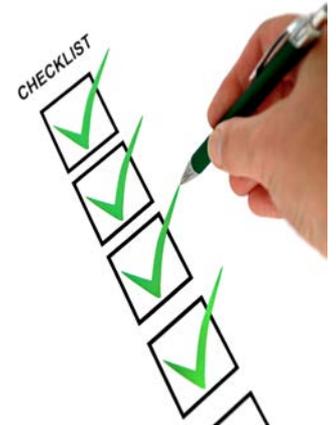
Monitor how well staff remove visible soil

How will you determine that?

– Visual inspections (YES)

- How will you do that?
- How often and under what circumstances?
- How will you document your assessment?

– Staff recall (NO)



PLAN: Step 4

When Will Monitoring Be Done?

When is monitoring to be done?

- Shift, weekend, holiday
- Unannounced

How will process monitoring be done?

- Verbalization
- Demonstration
- Observation in real time

How will outcome monitoring/evaluation be done?

- Will it provide information that can change practice?
- Technology (e.g., ATP)?
- With the individual being monitored/evaluated?



PLAN: Step 5

How Will You Use the Data?

How will outcome evaluation be done?

- It is best done when the individual being monitored/evaluated is present
 - Technology (e.g., ATP)

How will outcome evaluation be used?

- Will it provide information that can change practice?
- What will the monitoring tell us?
- Will we be able to use monitoring information as a means of evaluating practice (process)?



DO: Step 1 Implement

Implement the plan

Collect data so it can be analyzed

- Easiest are ‘yes/no’ evaluations
- Text comments are difficult to analyze

Build trust among participants to create buy-in

Use the opportunity to promote teamwork with other departments



DO: Step 2

Collect

Get assistance with analysis before you begin

- Easy to maintain in a spreadsheet
- Can perform simple analysis
 - Percent 'YES' or 'NO' for each item measured
 - Can compare across units
 - Can compare across supervisors
 - Can also use to compare workload and assignments (quick vs. quality)
 - Can identify problems that may be system or organizational and outside departmental control or influence



STUDY

Analyze data

Summarize what you have found

- Prepare written report
- Prepare visual report



Share with your department first, unless critical patient safety situation uncovered

Share with your executive level leader



What If There Are Unexpected Results?

Results may indicate that current environmental needs exceed capabilities

May be time to consider alternative technologies

They are an adjunct, not a replacement

- Look at strengths, weaknesses, capabilities, limitations and costs



ACT

Identify what is going right and what is not

Identify what changes need to be made

Establish a timeline

- What training is needed, what are barriers

Determine when a repeat evaluation is needed

Act on what you decide

- Corrective action is best done at the time the process deviation is identified



Summary

Simple approaches and real time feedback are ideal

Act on what you find or you lose credibility and you give the message that poor performance is excusable

Include frontline staff

Consider rewards for exceptional performance



References

Deming WE. *The New Economics for Industry, Government, and Education*. Cambridge, MA: The MIT Press; 2000.

PDSA Cycle (Part 1). Institute for Healthcare Improvement. Open School. <http://www.ihl.org/education/IHIOpenSchool/resources/Pages/AudioandVideo/Whiteboard5.aspx>. Accessed September 27, 2016.

PDSA Cycle (Part 2). Institute for Healthcare Improvement. Open School. <http://www.ihl.org/education/IHIOpenSchool/resources/Pages/AudioandVideo/Whiteboard6.aspx>. Accessed September 27, 2016.

Science of Improvement: How to Improve. Institute for Healthcare Improvement. <http://www.ihl.org/resources/Pages/HowtoImprove/ScienceofImprovementHowtoImprove.aspx>. Accessed September 27, 2016.



Speaker Notes



Speaker Notes: Slide 1

Hello and welcome to the third module of the Environmental Cleaning course. This module, entitled Using a Quality Improvement Approach to Improve Environmental Cleaning Practices will explore how you can use quality improvement strategies, like Plan-Do-Study-Act (PDSA) to monitor and guide enhancement of your environmental cleaning and disinfection program.



Speaker Notes: Slide 2

This module was developed by national infection prevention experts devoted to improving patient safety and infection prevention efforts.



Speaker Notes: Slide 3

This module will explore methods you can use to assess how well activities aimed at disinfection of the patient environment are being accomplished. An important aspect of measuring performance is having a defined process, providing feedback so work can be improved and ensuring ongoing quality that can be supported with tools and resources. It's important that these tools and resources can be used by both the individuals performing the work and those responsible for assessing performance and sharing results.



Speaker Notes: Slide 4

Before we begin any type of monitoring or improvement process, we have to make sure we fully understand the problem. To improve practices we first have to identify the problem by looking at WHAT has happened or is happening that resulted in the situation of concern. From there, you can begin to ask questions such as, “How did it happen? Where did it happen? Who was involved? What types of patients or staff were involved? When did it happen? And, why did it happen?” Let’s start by identifying the problem as it relates to environmental cleaning practices.



Speaker Notes: Slide 5

As you will recall from modules one and two of this course, pathogen transmission via the healthcare environment and the cleaning and disinfection practices used to prevent that transmission, are essential. We are concerned with the movement of infectious organisms among and between patients, staff and even the community. By understanding why transmission happens and focusing efforts on improving the processes involved in care and pathogen transmission, we can improve both patient and caregiver safety.



Speaker Notes: Slide 5 Continued

Let's use the example of improving environmental cleaning and disinfection practices to stop *Clostridioides difficile* transmission to prevent healthcare-associated *C. difficile* infection (CDI) and reduce hospital CDI rates as our problem to demonstrate how to use process improvement.



Speaker Notes: Slide 6

We should determine an organized method for process monitoring. In the past, we talked about “auditing” as a way of gathering information about a particular practice. In order to do our best work we have to know what we are and are not doing well. Our defects or failures define what needs to change so that we can target improvement efforts.



Speaker Notes: Slide 6 Continued

There are many methods used to guide performance improvement, and they go by many names and acronyms, but the one that seems to be used most frequently in healthcare is W. Edwards Deming's PDSA model. PDSA stands for Plan, Do, Study, Act. Although we sometimes think that this is new—or at least new to our patient care practices—remember that many of us learned about the scientific method when we assessed, planned what to do next, performed that intervention and then evaluated its impact. This is very similar to the PDSA model. So, don't be intimidated by the many methods for improving performance that involve assessment of care processes.



Speaker Notes: Slide 7

Before we can develop the plan and utilize PDSA for process improvement, we must make sure we have a clearly defined problem. In our example of preventing *C. difficile* transmission by improving cleaning and disinfection practices, the team must determine where the gaps in practice are occurring. One strategy to identify gaps is to round with environmental services staff to see what is really happening on the frontline. Consider asking staff “What is working? What isn’t working? What goals are we trying to achieve?” In our example, conducting environmental services rounds revealed that staff were using different strategies and processes to perform disinfection.



Speaker Notes: Slide 7 Continued

Additionally, several employees did not understand why certain steps were required or what the cleaning and disinfection was trying to prevent. These insights helped inform the team's specific problem: lack of a uniform process for hospital cleaning and disinfection and a lack of a common understanding about the important role environmental cleaning and disinfection plays to prevent pathogen transmission.

Now that we have our defined problem, we can develop a plan to use the PDSA cycle displayed on the slide to guide improvement and process monitoring.



Speaker Notes: Slide 7 Continued

Starting on the right and following the process clockwise, our “plan” begins with development of specific and measurable objectives. Development of those objectives may involve making predictions, such as what might be the outcome after implementation and what resources may be necessary. We then determine how we will implement that plan—the who, what, where and when—and then determine how we will collect data to help us know how well the intervention is working. Then, we “do” what we planned and gather the information so we can “study” and analyze our intervention. After studying and summarizing what we learned, we ask what additional changes need to be made and, if needed, and it usually is, we continue with another PDSA cycle.



Speaker Notes: Slide 8

Now, let's turn our attention back to our example of CDI transmission. Ultimately, we want to achieve a reduction in the hospital CDI rate by streamlining environmental cleaning and disinfection processes and improving environmental services staff's knowledge of how they are helping to prevent infections, but we need to be pragmatic about how this occurs. What changes should be implemented to achieve these improvements? What should we measure to determine how well we are implementing the changes? How will we know if these changes worked? These questions are the link between process monitoring and outcome monitoring.



Speaker Notes: Slide 8 Continued

We would look to outcome data –hospital/unit CDI rates– to measure if we met our goal of reducing CDIs, and process measurements, such as the proper use of a sporicidal disinfectant, to determine if our chosen intervention is being implemented.



Speaker Notes: Slide 9

To reach the outcome we want, which is elimination of *C. difficile* transmission, we must begin with an improvement in the processes of care. In today's example, that process of care is environmental cleaning and disinfection. Our goal is to improve our standard practices for environmental hygiene so higher levels of quality result and “backsliding” is reduced or eliminated. For this to be efficient, we must break down our problems into small “chunks” so we can develop interventions that can be tested, assessed and then either continued or revised.



Speaker Notes: Slide 9 Continued

While we are framing this example around reducing CDI by improving cleaning and disinfection practices, hopefully you can see how the PDSA model can be used to address any number of problems, or many aspects of a single problem.



Speaker Notes: Slide 10

Now, using our example, we'll quickly go through how we can perform process monitoring. First, what are we going to monitor? What is our first target? For example, let's look at how uniformly staff are able to perform environmental cleaning and disinfection. You might want to break this down even further and say that you want to evaluate the basic processes of cleaning or how well staff remove visible soil from the patient environment. For this to occur, process monitoring may be done on several levels because you want to be specific in your monitoring. Will you measure how well staff adhere to a written policy or how supplies and equipment are managed?



Speaker Notes: Slide 10 Continued

Start small so that you and your team can manage the process and learn from it rather than being overwhelmed. Small tests of change allow discovery of what works and what doesn't so the process steps that are not effective can be removed or revised, allowing the process to become more stable and easier to perform with each iteration.

Our CDI team has narrowed down the process to monitor and has determined they will measure how well staff remove visible soil during the discharge cleaning process. So, how can we do that in a practical manner?



Speaker Notes: Slide 11

Now that we've planned what we will measure, we need to address some of the logistical issues, such as what we will collect, how we will document the data, who will be collecting it and who or what groups are targets for monitoring. So, for example, if we are going to collect data about staff knowledge of when an alternative germicide should be used, a data collection form should be clear and match the question you are asking. Make responses, "Yes" or "No" as a means of keeping it simple. You should also take some time to pilot test your data collection process just to make sure you can actually accomplish what you want.



Speaker Notes: Slide 11 Continued

As you test your form, consider if responding staff are having trouble giving a Yes or No response. If staff feel like they need to offer additional information, then you might need to clarify your questions. In our CDI example, our team chose:

WHAT: Monitor how well staff remove visible soil during the discharge cleaning process using the CDC's Environmental Checklist for Monitoring Terminal Cleaning as the data collection tool. Both visual inspection and ATP technology will be used to assess effectiveness of this process. The CDC's Environmental Checklist for Monitoring Terminal Cleaning will be used; visual inspection of all surfaces listed will performed and documented; ATP will be used on three surfaces in each room, to be pre-determined by observers.



Speaker Notes: Slide 11 Continued

WHO performs monitoring: In collaboration, the environmental services (EVS) supervisor and the infection preventionist assigned (IP) to the unit will randomly perform the checks. They will be trained in ATP cleaning verification process by the ATP vendor and will need ATP swabs and a portable handheld luminometer to assess the surfaces after cleaning. (ATP technology is being used in the hospital's operating room already.)

WHO is being monitored: The assessments will be done initially on 5A, the unit with the highest incidence of CDI. The EVS technician assigned to the unit will perform discharge cleaning as assigned, unaware of which rooms will be assessed by the EVS manager and IP, when assessments will be done, or of which surfaces will be ATP-tested.



Speaker Notes: Slide 12

Choosing the appropriate audit method is important. If you are seeking to evaluate presence or absence of visible soil, you can probably rely on a visual inspection along with specific checklists outlining what to inspect and how to “grade” that inspection. If you are seeking to evaluate disinfection, then you will have to determine how you will measure whether or not disinfection has occurred. Clearly, this is more difficult and it underscores the need to make sure you understand which tools can help you answer the questions. The CDC website, “Options for Evaluating Environmental Cleaning” can help you sort out what your options are. For our CDI example, the team decided to use visual inspections by the environmental services (EVS) manager and the infection preventionist (IP) assigned to 5A, the unit with the highest CDI rate, for their pilot testing.



Speaker Notes: Slide 12 Continued

In addition, they decided to use ATP (adenosine triphosphate) technology, which means swabbing of specified high-touch surfaces in patients' rooms and then inserting the swab into a portable handheld luminometer to quantify how much ATP is on the surface, which is an indicator of live organisms present on a surface. This is a more quantifiable way to assess how staff are cleaning surfaces. (Refer to the CDC's "Options for Evaluating Environmental Cleaning".) The IP and EVS manager are to be trained by the vendor on how to use the ATP technology and pilot test it so they will be prepared to begin using it for the actual PDSA cycle being planned. The hospital already uses the technology in the operating room.



Speaker Notes: Slide 13

Your plan should include when monitoring will be done so your results are representative of the group you are evaluating. For example, if you are only interested in what happens during the day shift, then only evaluate that shift. If you want to know what happens throughout the entire day, then you will have to broaden the net. Similarly, if discussions regarding discharge cleaning are your area of interest, then monitoring should be done during the time discharges occur. This will help you understand obstacles to the process as well as gather information from those who are responsible for the work.



Speaker Notes: Slide 13 Continued

In our CDI scenario, once the pilot test for use of the ATP is done and the IP and EVS manager are comfortable moving forward, they will begin the first cycle PDSA on 5A, beginning with two discharge cleans on day shift: one done by the IP and one done by the EVS manager. The team has agreed to modify the CDC checklist to include a response to each high-touch item for visible removal of soil (direct observation) and the results from the ATP, if that surface is one selected for ATP testing. They will identify any kinks in the monitoring process, revise if needed, and then begin the formal process, performing a maximum of two reviews per 24 hours for three days for a total of six discharge cleans over a Thursday, Friday and Saturday. The IP and EVS manager negotiated coverage for the Saturday observations.



Speaker Notes: Slide 14

Think ahead and make some predictions regarding how you intend to use the results. Will they be helpful in changing processes and practices? If you do not use the data, you have wasted time. Likewise, if you collect poor data using a faulty method, the data may be unreliable. You can see that the planning step is the most difficult, time consuming, but probably the most important.



Speaker Notes: Slide 14 Continued

The CDI team decided that to consider a surface “clean”, both visual observations and ATP results need to be positive responses for those surfaces where both are performed. If responses differ for the same surface, the ATP result will rule. An overall percent clean score will be given for each discharge cleaning and then all scores will be aggregated by surface type. This information will be provided to both observers, the EVS technicians who cleaned the room and the team for review and discussion.



Speaker Notes: Slide 15

When you get started, make sure you are collecting the correct data and it is being gathered in a way that can be analyzed. Now, it's very hard to analyze text so try to gather data that can be objectively captured, such as YES or NO or assign numbers to activities that may occur so you can differentiate among them. For example, three may mean that all steps were verified, two means that some, but not all were verified, and one or zero means none of the steps were verified. Once you have planned sufficiently, you are ready to "DO." Improvement and monitoring can be hard on everybody's ego so make an effort to build trust among team members. Emphasize that you are looking "upstream" to identify elements of a process that can be changed in order to impact outcomes.



Speaker Notes: Slide 15 Continued

In our case scenario, the checklist helps to drive Yes/No responses. Piloting of the checklist to start off will help identify any issues with the tool and its ability to record what needs to be recorded. Revise the tool if indicated. In addition, the team determined that they needed to inform the 5A unit manager, Admissions, and Bed Control that this study was taking place to ensure they are aware in case of any delays in turning rooms around. From that discussion, the team decided to track bed turn-around times during the pilot time, comparing non-monitored rooms to monitored rooms. Bed Control tracks room turnaround times by room and that info is easy to capture.



Speaker Notes: Slide 16

Figure out how you will organize your data so it can easily be entered and maintained. If you know how to use a simple spreadsheet, that can be a real help. Programs used by biostatisticians can be powerful but are not routinely necessary. Evaluate your data collection method, the questions you intend to assess and draft a report template. This should be addressed in your PLAN phase, but make sure it is considered before data are collected. Even simple checklists with YES or NO responses can be used to pinpoint where excellent work is occurring and where work of a lesser quality is taking place. It can also help you identify where outcomes may be impacted by other departments or through influences that may be out of your control.



Speaker Notes: Slide 16 Continued

For our example the team has set up an Excel spreadsheet to capture the raw data so it can be filtered by room number, EVS technician, and surface being cleaned. Findings where both observation and ATP results show there is no soiling will be scored as a “1” and a poor result (both observation and ATP results show there is soil) will be scored as a “0”. If results disagree, for these surfaces that are tested by ATP as well as observation, the ATP result will be the deciding determinant. Meanwhile the EVS manager can begin talking with the ATP vendor about a system to automate the data collection and reporting to move this monitoring process to a larger scale include other areas of the hospital.



Speaker Notes: Slide 17

Once you have conducted the monitoring process and you have your data, make sure your summary answers your original questions and addresses your objectives. If you can provide a visual report, that goes a long way in making sure that many are able to read and understand your process monitoring story. Include photos of your monitoring methods if it brings clarity. And share the report broadly. Now, if the process uncovers a critical patient safety situation, then the study should become secondary at that point and correcting the problem should receive your immediate attention. Include members of the executive staff at that point and include them early in the sharing process of your final report.



Speaker Notes: Slide 17 Continued

Our CDI team reviews their reports. They are presented in graphic format, identifying insufficient cleaning of the beds and high-touch surfaces which patients interact with such as call buttons, TV controls, and side-rails. This provides focused information for EVS technicians on where to concentrate more effort and the team begins to discuss cleaning methods, disinfectants being used, and supplies/equipment that may impact EVS' ability to clean. The report is shared with the team's executive leader, the Chief Nursing Officer. Wider monitoring and reinforcement of cleaning processes for those high touch surfaces is done with EVS staff, including re-education on how to clean electrical equipment such as call-buttons, TV controls and phones.



Speaker Notes: Slide 18

It is important to consider what you will do if you get unexpected results. Sometimes, your process monitoring results a need for additional activities, e.g. addition of a new product or technology. Please remember that these are an adjunct to what you are currently doing and not a replacement or magical answer. You must be able to adequately evaluate any product before you bring it to the facility and you must have some measurements in place to let you know whether or not the product is helping you. Making a change does not equal making an improvement.



Speaker Notes: Slide 19

Whatever your intervention, you need to be able to identify what is working and what is not. This will guide change.

Approach all interventions with a timeline that allows you to implement appropriate training, identify barriers and implement repeat monitoring and evaluation. If you identify a problem in the process, implement corrective action when the process deviation is identified. The 'ACT' step can include using your findings to develop a new intervention, putting that intervention into play, or spreading the intervention to a different area or team.



Speaker Notes: Slide 19 Continued

In our CDI example, after sharing findings from the monitoring with EVS staff, re-educating and wider monitoring, 5A had a 15 percent decrease in CDI rates. 5A EVS staff now see themselves as vital members of the infection prevention efforts on 5A and the CDI team is working to spread 5A's results. Based on EVS input and formal monitoring, the team is now working to coordinate with the nursing staff to standardize cleaning and disinfection of equipment commonly used by nursing staff.



Speaker Notes: Slide 19 Continued

As the EVS monitoring process spreads to other units and broadens to include use of the sporicidal disinfectant, the EVS manager engages the 5A EVS staff as champions and has them instruct and train their colleagues on other units. They are recognized at the CDI team meeting and during the EVS staff meeting as CDI champions. Unit CDI infection rates are shared at monthly EVS staff meetings now by the IP Director and progress of the CDI is presented by EVS members.



Speaker Notes: Slide 20

In summary, key take-away points for this module are:

1. First start with simple (e.g. visual) assessments that allow immediate feedback.
2. Second, share what you learn and act on what you find. Be open with your approach and your findings.
3. Include frontline staff from all departments that can impact infection prevention. They have critical expertise and knowledge of how things really work.
4. Finally, recognize performance improvement activities as a win, but safe care is what is expected.



Speaker Notes: Slide 21

No notes.

