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Welcome to "What is Root Cause Analysis and Why Is It Valuable?"
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This transcript is the companion to the video located at: http://youtu.be/4IjJ2XWXURs

In this presentation we will review the value of Root Cause Analysis. We will discuss several of the key concepts that support Root Cause Analysis and end by highlighting some of the tools that are especially useful.

Root Cause Analysis or RCA is a structured process used to determine why an unexpected or unintended outcome occurred and what can be done to prevent it from happening again. The topic of an RCA is often referred to as an event – suggesting that it is something considered to be important. While the RCA process can be used on an event of any scale, it is typically a larger or more significant event that triggers a team-based investigation.

RCA can be considered as a tool for quality improvement as it is a method for learning from our past experience in order to change our systems and processes going forward. It's a team-based investigative approach that focuses on systems and processes and their impact on individual behavior rather than on the individual behavior. RCA is not something that is done by just one person working alone and should not be something that is done by leadership without the involvement of the staff who care about or are impacted by the process being analyzed.

RCA helps us break the habit or tendency to go for a quick fix. Sometimes we are so sure we know the problem and how to fix it only to find later that we did not really understand why something happened, and therefore the event is repeated.

The focus on understanding why something happens helps staff learn how to analyze problems rather than looking for the quick fix. The process of RCA also fosters a non-punitive culture as it helps us shift the focus from individual behavior (ex. "This would not have happened if he or she had done their job correctly!")

The RCA process also guides teams to measure the actual success of the process change (Did it happen as expected?) and the outcome or the impact on resident care. In all these ways, RCA is a tool to improve resident safety.

This slide contrasts approaches to addressing problems that are less effective and more effective. Successful RCA uses the approaches listed that are more effective.

The high level steps in the RCA process are listed here –

1. Identify the event
2. Select the team
3. Describe the event – where did the breakdowns occur

4. Identify all factors
5. Identify root causes and contributing factors
6. Create change by designing and implementing process and system changes to eliminate the root cause
7. Measure to determine results

Within each of these steps the team will use their basic QI tools such as:

- Creating a timeline
- Flowcharting the current process to identify where breakdowns occurred
- Creating a cause and effect diagram or fishbone to group potential root causes and contributing factors into categories
- Brainstorming corrective actions
- Using PDSA to test and implement changes
- Developing process and outcome measures to determine impact
- And identifying ongoing measurement to determine if the change is sustained over time rather than reverting to the old way to doing things

Because RCA requires us to think differently, it is helpful to review several key concepts:

The terms "process" and "system" get thrown out frequently in quality improvement and in RCA. Here is a way to define and differentiate the terms:

Process

- The steps to be followed
- Often guided by policies and procedures

System – the combination of

- Processes
- People/culture
- Environment/equipment

An example would be medication administration. This can be thought of as a system composed of many processes and impacted by the people involved, the environment, and equipment. If we make a change in one part of that system, it could have impact on other aspects as well.

Once we starting identifying our processes and systems, we are starting to perform systems thinking. In order to do this we need to believe that the parts of a system can be best understood through how they relate to each other, rather than in isolation. It requires critical thinking skills to analyze, synthesize and evaluate information. This does not come naturally but requires practice.

In addition to the concept of systems thinking, there are several theories that help us in performing effective RCA. Three of these theories are:

- Human factors
- Tunnel vision
- Swiss cheese

Human Factors are those elements that influence the performance of people operating equipment or systems, including behavioral, medical, operational, task-load, machine interface, and work environment factors. A simple way to think of human factors is that human factors are the things that differentiate us as humans. Human factors include our physical and cognitive abilities as well as our limitations. For example, as humans our performance is influenced by distraction, reliance on memory, emotion, and other things that do not affect other aspects of our environment. Whenever we are looking at an unintended outcome or event, we have to take into account what we know about our human factors and how effectively the systems and processes we have in place support us to do what we intend.

In human factors, the term error is used to identify a mistake or a deviation from what was intended or expected. In contrast to how we often think of error as something we did wrong, Human factors looks at errors as unintentional or intentional. The vast majority of errors we encounter are unintentional and the result of outside influences on our performance. Intentional error is very uncommon. This is one of the reasons that discipline is not an effective way to prevent most errors.

A very important concept in human factors is that human error is actually predictable and the expected rate of error can be measured. This table shows the probability of error in a few situations.

Reading labels is something we are generally good at and the probability of error is low but not zero. Three out of 1000 times we read a label we will make a mistake. While this sounds very low, it can actually represent a fair number of errors since this is a very common task.

The next one is a bit more common – 3 times out of 100 there will be an error when self-checking. So checking your work is good but far from fool-proof. The next is especially interesting as often we look to a second check as a way to prevent errors. However, this is not effective as we know that 1 out 10 errors will not be detected with a second check. That is why double checks are not considered to be a strong corrective action and likely waste staff time and energy with little benefit. The final example is the probability of error is situations where we are working quickly in a high stress situation. In this case, the probability of error is 25%. Therefore, even though this situations may not occur frequently, it is important that our systems and processes support us in preventing error

Human factors engineering is the practice of taking into account our unique human traits when designing the tools, devices or equipment which we will use. We want our tools to enhance our performance and help us prevent errors rather than confuse or mislead us into an unintentional error.

Many of us remember the old VCR players that had lots of buttons but none of them were easy to figure out and consequently many people paid for but never used most of the functions on the VCR. Contrast that with the newer smart phones that almost seem to anticipate what we need next. Successful designs do not force us to make an extra effort to interact successfully with an interface or device.

Human Factors are relevant to RCA because it teaches us to:

- Avoid reliance on memory and vigilance and instead make use of protocols and checklists
- Simplify processes by taking out extra steps and extra places where we could potentially make and error
- Standardize procedures to reduce unintended variation, and,
- Use constraints and forcing functions that force us to do certain steps (Example: the car is designed to not lock until the lights are turned off.)

Tunnel Vision is the next theory that relates to human factors.

In tunnel vision there are two ways to look at the path leading to an unintended outcome – from inside and outside the tunnel. When we are going through our day we are inside the tunnel, choosing our path based on based on the information we have at each juncture along the way. We only get outside the tunnel after something has occurred that causes us to say "Why did that happen?"

From outside the tunnel it is easy to look at the outcome and then say "Why did this happen, it should have been so obvious!" However, that is generally not true. When you are in the tunnel you do not have the benefit of seeing the end result of the path you have chosen, you can only make the best decision possible at each step along the way. When we are outside the tunnel, we cannot judge based on the outcome, we need to decide why decisions were made along the way and how to make different choices in the future.

The concept of Tunnel Vision is important to RCA because:

- The point of the RCA process is to understand why people did what they did – not to judge them for what they did not do
- And getting inside the tunnel allows us to fully understand why individual actions were felt to be reasonable at the time.

The final theory is the Swiss Cheese Model in which the barriers we have designed to prevent errors are thought of as multiple slices of Swiss cheese. They are Swiss cheese because no barrier is perfect, they all have holes and these holes can be thought of as continually varying in size and position. Unintended outcomes and errors occur when the holes in each of the slices align

Here is a graphic of how we can look at our typical environment. The slices on the left are what we would like to have because there are no holes and it would keep the potential hazards that are lurking in our environment from causing harm. Unfortunately, what we do have is on the right. We have barriers with holes of various shapes and sizes. And when these holes align we have an unintended outcome or error.

So what causes those holes?

We refer to the holes as Latent Conditions because they represent weaknesses in our processes or systems that can be present for long periods before they are recognized. They hang around undetected until there is an Active Failure or unintended outcome or error.

We tend to focus on the Active Failures because they are easily recognized and often have an immediate impact. We talk about Active Failures being on the sharp end of the system. When using a knife, the sharp end of the knife is the part that does the actual cutting. But it's the handle of the knife that directs the blade. The handle is like the Latent Failures. We need to understand what was behind the Active Failure in order to identify these holes in our barriers. Because only by identifying the holes can we work to eliminate them or make them as small as possible.

The Swiss Cheese Model is important to RCA because it reminds us to look beyond the Active Failures or the unintended outcomes and errors to find the Latent Conditions. It is the latent conditions that will most likely be the root cause, it will rarely be the Active Failure.

The root cause will typically be a process or system that can be redesigned in order to reduce the risk of error.

These theories all support the goal of RCA which is to determine why something happened and prevent it from happening again.

Before we end, I want to touch on what types of events can trigger an RCA. What is listed here are the most common:

- Unexpected events with serious outcomes
- Repeating incidents
- Near misses
- Good catches
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You may find yourself using the RCA process even on a small scale to determine why something happened. Any opportunity to practice RCA helps us build our system thinking skills.

There are a number of common quality improvement tools used in RCA. These include:

- Team work supports
- Brainstorming
- Affinity grouping
- Consensus building
- Flowcharting or process mapping
- Cause and Effect Diagrams or Fishbone
- A technique to identify and classify root causes and contributing factors
- Advantage are that it works for complex problems
- The drawback is that it takes practice to do well and gets messy very quickly
- The Plan Do Study Act or PDSA is a useful tool in RCA to test and implement process changes

And tools such as run charts and control charts can be useful to monitor success

Although common QI tools are helpful in RCA, the most important tools are listed here. These are:

- Critical thinking skills
- A non-judgmental attitude
- The desire to understand why
- A belief that we can always do better

Thank you for listening!

Produced under contract with the Minnesota Department of Health
Produced with the use of Civil Money Penalty Funds