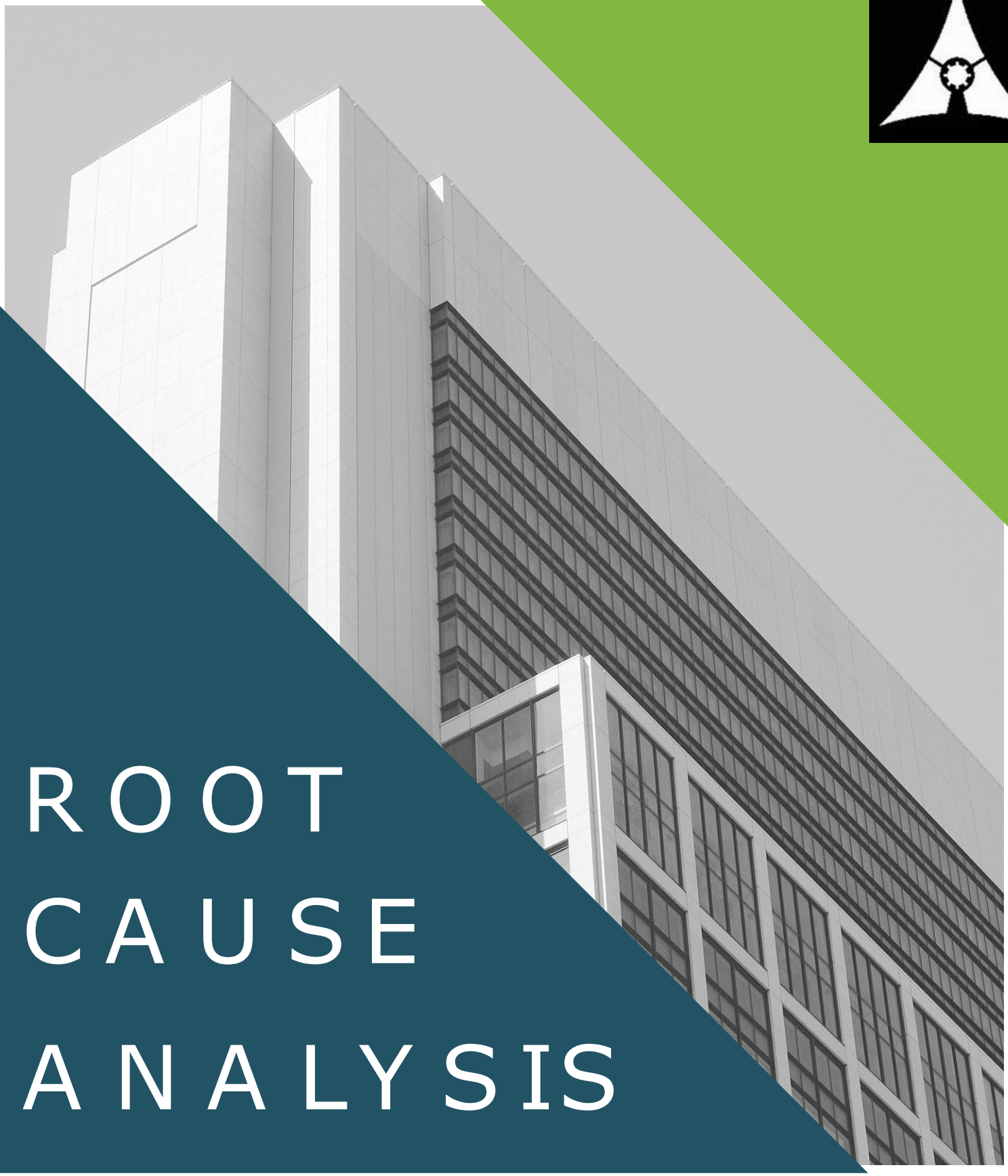

ROOT CAUSE ANALYSIS

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INSIGHTS

INTRODUCTION

Root Cause Analysis process is a way of learning from challenging rare events in public health and other emergencies. This part describes the peer assessment approach to root cause analysis and your role in that process. This insight focuses on how to conduct a root cause analysis using an actual incident involving a contaminated public water supply. And is designed for public health practitioners, emergency management, academic researchers, health care workers and anyone that may work on challenging public health events and wishes to learn from those events after participating in this module. You'll increase your awareness of the benefits of root cause analysis will be able to describe different root, cause analysis models and be able to conduct a root cause analysis on your own. Using root cause analysis to review. A critical incident can have multiple benefits. First, it can help stakeholders understand how an event unfolded and who will be the key participants. In that event, it's an important strategy to improve quality because it examines how and why events happened and it can improve after-action reports, a requirement following many exercises or incidents.

Let's look at the basics of root. Cause analysis root, cause analysis as why an outcome happened. We keep asking why digging deeper, uncovering more issues and finally arriving at the root of the problem. This visual map helps us to see the cause and effect we start with identifying a response challenge. There are intermediate causes and root, causes factors which may or may not be clear or easily identified. Let's apply root-cause analysis to public health. We use the same process but customize the steps to a public health problem or issue.We start with identifying a public health challenge the problem encountered during an emergency response

OVERVIEW

Our approach begins with the problem and then backs into the causes by asking why we then consider the public health objective or goal related to this problem. Looking at the bigger picture helps us decide what is the mission of a response or a process. We move on to identifying an intermediate cause. Why did this public health challenge happen? Finally, we dig deeper to find the root cause which ultimately impacted our ability to achieve our public health goal. Next, we'll walk through an example of a foodborne illness incident. Completing the visual map of the root cause analysis as we go start with identifying the public health response challenge. Local primary care, physicians and health clinics reported residents being sickened from eating at a local restaurant. The overall public health objective was to reduce the occurrences of this foodborne illness outbreak. Let's think what could be some of the intermediate causes of this foodborne illness outbreak.

In this example, the intermediate cause was traced back to a particular server who came into work, feeling sick, but wait what root cause might lead the sick individual to come to work and serve food.

In this case, the server had completed the restaurants required safe, serve training. However, interviews with the server revealed that English was not her first language, the root cause was that she did not fully understand that she could spread her illness through the food. Finally, the lesson learned is to offer safe, serve training in different languages.
Now that we understand the basics of root- cause analysis, let's look at using root cause analysis to solve more complex problems. Sometimes there may be two root causes that contribute to one intermediate cause which in turn leads to a particular public health challenge or one root cause could contribute to two different intermediate causes. It's important to remember that a public health challenge may result from multiple intermediate or root causes.

Our next example illustrates a single root cause where the objective is disease, surveillance for a West Nile virus outbreak. The public health challenge was tracking people who had become infected with the West Nile virus interviews and analysis showed the intermediate cause inconsistent, lab results, investigation revealed

the problems were occurring because of one particular root cause the various types of labs handling. These cases, state, local and private labs had different testing standards. The labs used different criteria for classifying a West Nile virus case. Therefore, the lesson learned was to develop clear, consistent, uniform data systems for West Nile virus lab testing, but wait.

Our investigation of the rules of labs during this West Nile virus also turned up another interesting fact. The various labs also reported that they had been overwhelmed by the number of samples they received during the virus outbreak. A second root cause was formulated with this new information, and another important lesson was learned. Labs need to identify backup, staffing resources to ensure they can correctly process the flood of incoming samples. During a severe disease outbreak, it can sometimes be difficult to distinguish between a root cause and an intermediate cause. Let' s look at a case from start to finish, to see how we can hone in on root causes we' ll examine Mennella outbreak in Alamosa Colorado on March 7th. Several cases of severe gastrointestinal illness presented at the local medical facility and by March 12th, these cases were confirmed as salmonella. On March 19th, the source of the salmonella infection was identified. The information is from an actual outbreak, but do your best to think through the facts with us.

What was the objective or mission of Public Health in this outbreak? It was to prevent residents from being infected with salmonella. Given we have our objective, what do we look at next? We identify what might be a public health challenge that prevented the responders from meeting this objective. Can you think of something that may have been an obstacle to meet that objective? What challenges or troubles might you confront in preventing residents from being infected with salmonella? One public health challenge encountered in this case was alerting the public to the salmonella contamination. We' ve decided not to use this as our objective, as there were other more severe challenges encountered during this incident. For example, interviews with the public health staff revealed trouble identifying the source of the salmonella outbreak, an important consideration when trying to prevent residents from getting sick. Our visual map now shows the public health challenge of identifying the source of the salmonella outbreak.

What' s our next step in the root cause analysis process, collecting and organizing information to find out why it was so hard to find the source of the outbreak? Let' s ask questions that take us backwards in time breaking down cause- and- effect relationships. In our example, there were a number of possible intermediate causes that impacted this challenge, we' ll take a look at three possible.

Remember we're trying to find any factors that directly influence the successful identification of the outbreak. The first intermediate caused consider is lab. Testing labs were responsible for analyzing the samples for the presence of Salmonella. In this case, however, the labs had adequate staffing and supplies and were able to efficiently process all the samples in a timely manner. We can discard this as an intermediate cause, as it did not influence the successful identification of the outbreak. The second possible intermediate cause was the process of determining exactly how people were infected by salmonella. Public health officials traced the majority of cases back to residents who had recently eaten at a local, fast food restaurant. However, one of the first cases was a baby who is too young to eat a McDonald's. The mother explained. The baby was still on infant formula that she bought in the form of a powder that she then mixed with tap water. Salmonella is rarely found in a public water supply, but it does occasionally happen.

This contributed to the delay in identifying the source of the salmonella. Finally, the third possible intermediate cause was systems issues over the public water supply who is in charge of the water supply. Our problems with a water supply identified and communicated while the Public Health Department was busy responding to the outbreak and trying to identify the source of the salmonella. The Public Works Department was in charge of the water supply. Public health wasn't aware of any new problems with the public water supply tanks, such as a hole in a pipe or a breach in the system that might result in the tank being vulnerable to salmonella contamination. We have now identified two intermediate causes: an unusual source of Salmonella, the public water supply and Public Health, not being aware of problems with the public water tanks. What's next, we now turn our attention to looking at the root cause of these two intermediate causes. As we continue breaking down our analysis into parts, we break intermediate causes down at a more granular detail. A number of root causes were suggested by incident respondents, but how do we know which of these were the real root causes?

Let's examine each suggestion to decide if it's a root cause, the first root cause under consideration was the communication problems between municipal departments. The Public Works Department was aware of a breach or hole in the water tanks that left the supply open and susceptible, but the Public Health Department was not alerted to this problem. This was confirmed as a root cause because it fundamentally impacted the level of situational awareness of Public Health. Had Public Health been alerted that the public water supply was compromised, they may have identified the source of salmonella more rapidly.

The second root cause considered was the role of the public health agency. During this incident, the local Public Health Department that responded to the salmonella outbreak was primarily a nursing services unit. It was not a full-service health department and didn't include environmental health. Consequently, Public Health was not involved in emergency management meetings conducted to find the source of the salmonella. This was confirmed as a root cause. Public Health's role was limited to clinical response. Instead of helping identify the source of the outbreak, do we suspect that public health didn't envision a role for themselves in this outbreak? No, the Public Health Department had an epidemiologists on staff who was actively tracking cases to identify the source. Perhaps Public Health wasn't available to work with Public Works to find the source of the outbreak. This too wasn't deemed a root cause because Public Health was well staffed and were accessible through many lines of communication throughout the incident.

The final root cause that was considered was that city and county departments do not have a history of working together. In our example, the city runs the Public Works Department, while the county runs the Public Health Department. This was a root cause. Why well, if the two organizations had a history of working together, they could have shared information about the water supply in the outbreak. This could have led to more rapidly identifying the source of the outbreak.

SUMMARY

Let' s summarize, the root causes that we' ve considered and discarded by asking more questions and digging deeper, we collected and organized more information and we' re able to find three root causes. Let' s take a look at how all these pieces fit together. We have our objective to prevent residents from being infected with salmonella. We also have our public health challenge to identify the source of the salmonella outbreak. Next, there are two intermediate causes: the unusual source of salmonella, the public water supply and that public health was not alerted to the breach in the public water supply. The three root causes to these issues are the different level of awareness of the water supply problem between Public Works and public health. The Public Health Department was seen solely as a nursing services department and as the third root cause, the city and county did not have a history of working together.

Given this analysis, what are the lessons learned? Improve communication, the city and county must communicate to successfully conduct disease outbreak. Investigations relating to improving communications is the importance of Public Works and public health developing an ongoing relationship so that when an emergency incident occurs, they understand each other' s roles and responsibilities. Our completed root- cause analysis diagram illustrates all the steps of our investigation as we break it down into its parts. First, we identified the objective. Next, we identified possible public health challenges and settled on the challenge that was actually related to our objective. Next, we examined possible intermediate causes and proceeded with the ones connected to our response challenge. Finally, we identified multiple root causes that can be addressed through lessons learned. We have gone through each step of the process. The process of root- cause analysis involves examining key factors and causes in each step and discarding those that don' t apply. The questions continue as we identify intermediate and root causes. Finally, ending in lessons learned as recommendations to ensure that the next incident response will go more smoothly with fewer problems. Let' s summarize, what we' ve learned you can now describe the benefits of root cause analysis, be able to describe different root, cause models and conduct a root cause analysis.

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