



F18 Root Cause Analysis for Attorneys: Why? Why? Why? Why? Why?

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After attending this presentation, attendees will understand the basics of root cause analysis as a tool for exploring potential failures of forensic service providers.

The presentation will impact the forensic science community by providing attorneys with a valid framework for inquiries directed at actual or perceived failures of forensic service providers. This framework will help the forensic science community respond to legal inquiries in a structured, focused manner.

Root Cause Analysis (RCA) is a method of problem-solving that tries to identify the necessary and sufficient reasons for an event, typically a fault, problem, or — in this case — a non-conformity in a quality system. Once a root cause is removed from the sequence, the non-conformity should be prevented from happening again.¹ RCA assumes that systems and events are related. An action in one area can create other actions or results in others, continuing on in what is known as the “causal chain.” RCA traces the remnants of the chain of events back to its source, the root cause.

RCA is an iterative process.² The process of RCA begins with the problem statement: What happened? Why is it a non-conformity? How is it outside the quality system requirements? This is done using a technique of continually asking “Why?” until the root cause is identified.³ Once identified, the chain of events leading to the root cause of the non-conformity is characterized as simple, complicated, or complex; a root cause may be characterized as chaotic, but this is rarely the case.⁴ The characterization will indicate the kinds of changes that need to be made to test if the identified root cause is the actual source of the non-conformity; additional observations may be needed to confirm this decision. The confirmed changes are then made to the root cause, taking the rest of the quality system into account, to see if the non-conformity is prevented from recurring. Periodic checks are made to provide feedback on the continual prevention of the non-conformity; that is, are the changes still preventing the non-conformity?

The RCA process is intended to be followed step by step; however, it may be necessary to revisit or repeat a step if something does not produce the expected results: (1) state the problem; (2) get to the root cause — the 5 “whys”; (3) the decision framework — simple, complicated, complex, or chaotic; (4) remediation; (5) feedback; (6) resume the process; and, (7) check for recurrence.

For example, if the problem statement is, “The analysis of a sample/specimen was not completed by the deadline,” then the root cause is determined by asking: (1) Why? The instrument failed to complete the run; (2) Why? The instrument ran out of carrier gas; (3) Why? The tank of carrier gas emptied mid-run; (4) Why? More gas was not ordered; and, (5) Why? An employee forgot to order more gas.

The “whys” provide a problem analysis (the problem has already been *stated*), a breakdown of effects and causes leading from the problem to the root cause. The remediation may be that a reminder is set in a calendar function to inform an employee when more gas needs to be ordered; the message is the feedback on the remediation. Testing can now resume with occasional checks for recurrence; that is, other samples not being completed by the deadline because of lack of carrier gases.

Thinking that only one cause exists is dangerous: *A cause never stands alone*. A good RCA will explore the causal chain thoroughly; other instances of the event may have occurred and the root cause may be more widespread and disruptive than initially assumed.

References:

1. Deming, W. *Out of the Crisis*. MIT Press: Cambridge, MA, 1986.
2. Shewhart, W. *Economic Control of Quality of Manufactured Product*. ASQ Press: Milwaukee, WI, 1980.
3. Ohno, T. *Workplace Management*. Translated by Jon Miller, Gemba Press, 2007.
4. Snowden, J. and Boone, M. “A leader’s framework for decision making”, *Harvard Business Review*, 2007: 85 (11): 68-76.

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