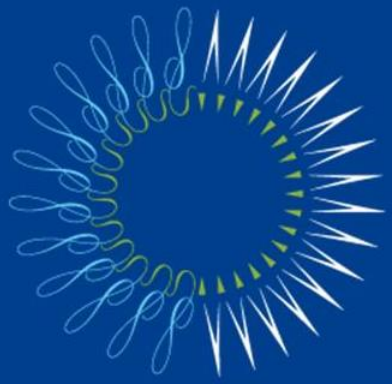

THE PEW CHARITABLE TRUSTS

Root Cause Analysis & Environmental Assessments

Karin Hoelzer, DVM, Ph.D.

November 9, 2017

Outline of today's presentation

- What is RCA & why is it needed?
- Pew's RCA initiative
- Some lessons learned about RCA

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- **What is RCA & why is it needed?**
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Why root cause analysis (RCA) is needed?

"It is our view that **complex systems** almost always fail in **complex ways**, and we believe it would be wrong to reduce the complexities and weaknesses associated with these systems to some simple explanation. Too often, accident investigations blame a failure only on the **last step in a complex process**, when a more comprehensive understanding of that process could reveal that **earlier steps might be equally or even more culpable**."

Columbia Space Shuttle Accident Investigation Board, 2003

RCA: explain why disaster strikes & how to prevent it

1986: Space Shuttle Challenger disaster Live on CNN

From *Challenger* to *Columbia*: root causes reoccur

- **Challenger investigation**
  - Root causes identified
    - Physical causes
    - NASA history
    - NASA culture
  - Corrective actions suggested
- **Seventeen years in-between**
  - System returned to *status quo*
- **Columbia investigation**
  - Root causes reoccurred

The goals of RCA: prevent disaster reoccurrence

Root causes are	RCA focus	RCA approach

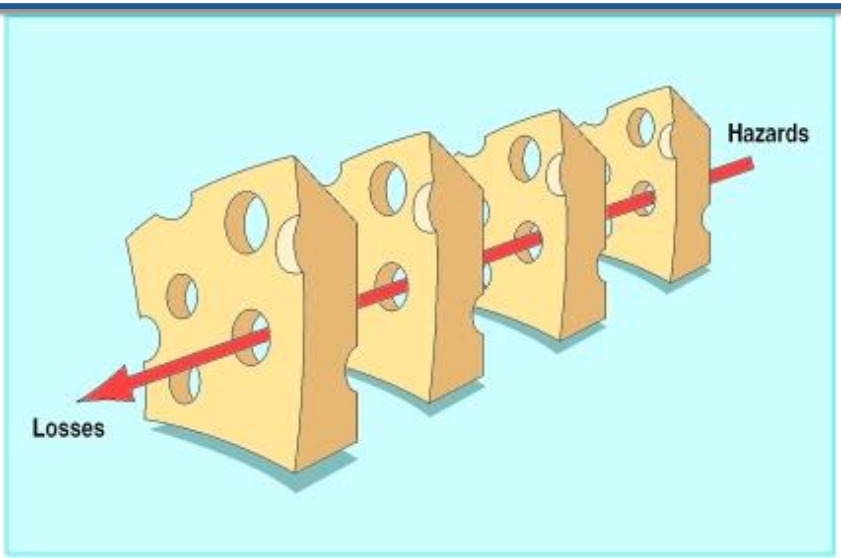
• Causal influences
  • Caused event or
  • Increased impact
• Controllable
  • Manageable
  • Within control
• Usually > 1 RC
	• Learn from past
	• *Why* system failed
	  • Events
	  • Interactions
	  • Root causes
	• Prevent repeat
		• Systematic
		• Comprehensive
		  • Physical factors
		  • Human factors
		  • Organization
		  • Other

Systems theory: attributes of complex systems

- consist of multiple interdependent parts
- have ‘set points’ shaped by these interactions
- changes require deep knowledge of interactions
- system is prone to return to ‘set points’

Understanding accidents: Swiss cheese model

- **Basic premises**
  - Humans are fallible
  - Errors happen
    - Understand why
    - Adapt conditions
  - Understanding is key to prevention



James Reason, 2000

- **Complex systems have many safety barriers**
  - Every safety barrier has weaknesses
  - Accidents happen when ‘holes’ align
  - Need to understand ‘near misses’

Outline of today's presentation

- What is RCA & why is it needed?
- **Pew's RCA initiative**
- Some lessons learned about RCA

Why is root cause analysis a priority for Pew?

- Foundation of a prevention-based food system
- Not always done; ineffectively shared; lost opportunities
- Improvements require collaborative approach
- Alignment among FDA, CDC, FSIS, state & local; industry

Root cause analysis project approach

Research

- Other models (e.g., NTSB, CSB, NuReg)
- RCA best practices

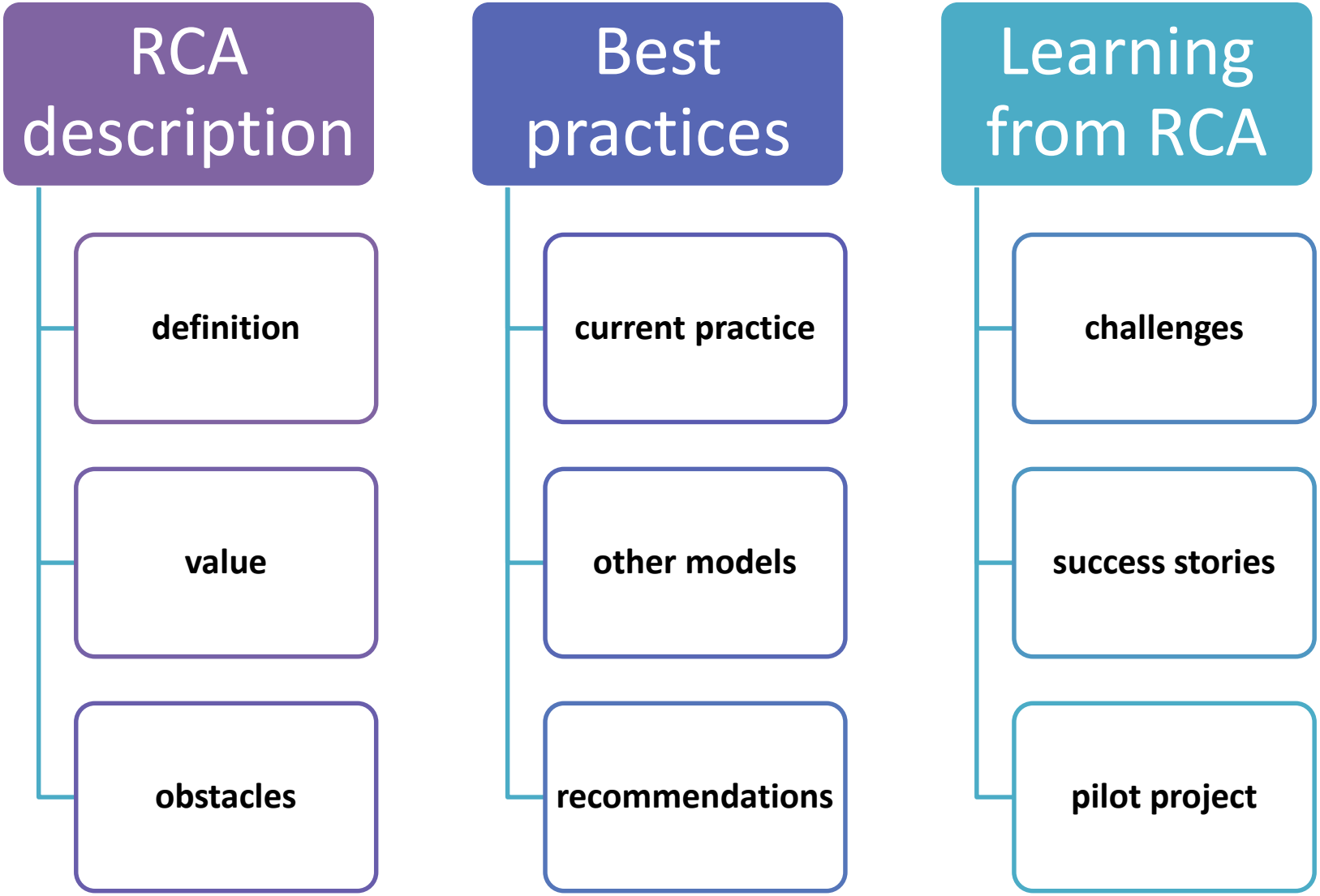
Convenings

- RCA value; obstacles; definitions
- Communicating RCA findings
- RCA best practices

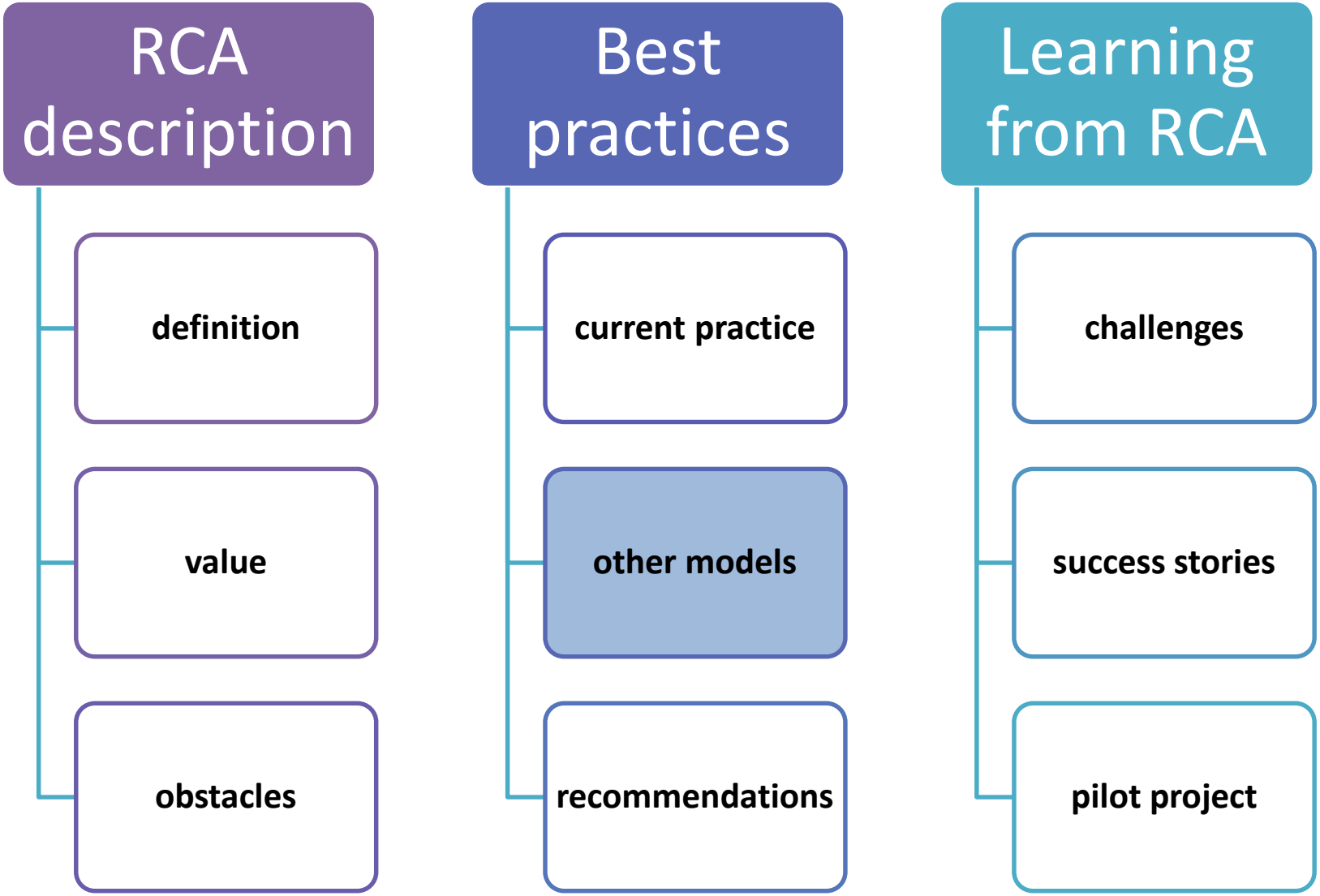
Outreach

- Conference presentations (IAFP, InFORM)
- Publication in trade magazine (upcoming)

Pew's work on RCA: Goals and objectives



Pew's work on RCA: Goals and objectives



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- What is RCA & why is it needed?
- Pew's RCA initiative
- **Some lessons learned about RCA**

Pew's work on RCA: Learning from other models

RCA in other high-risk industries

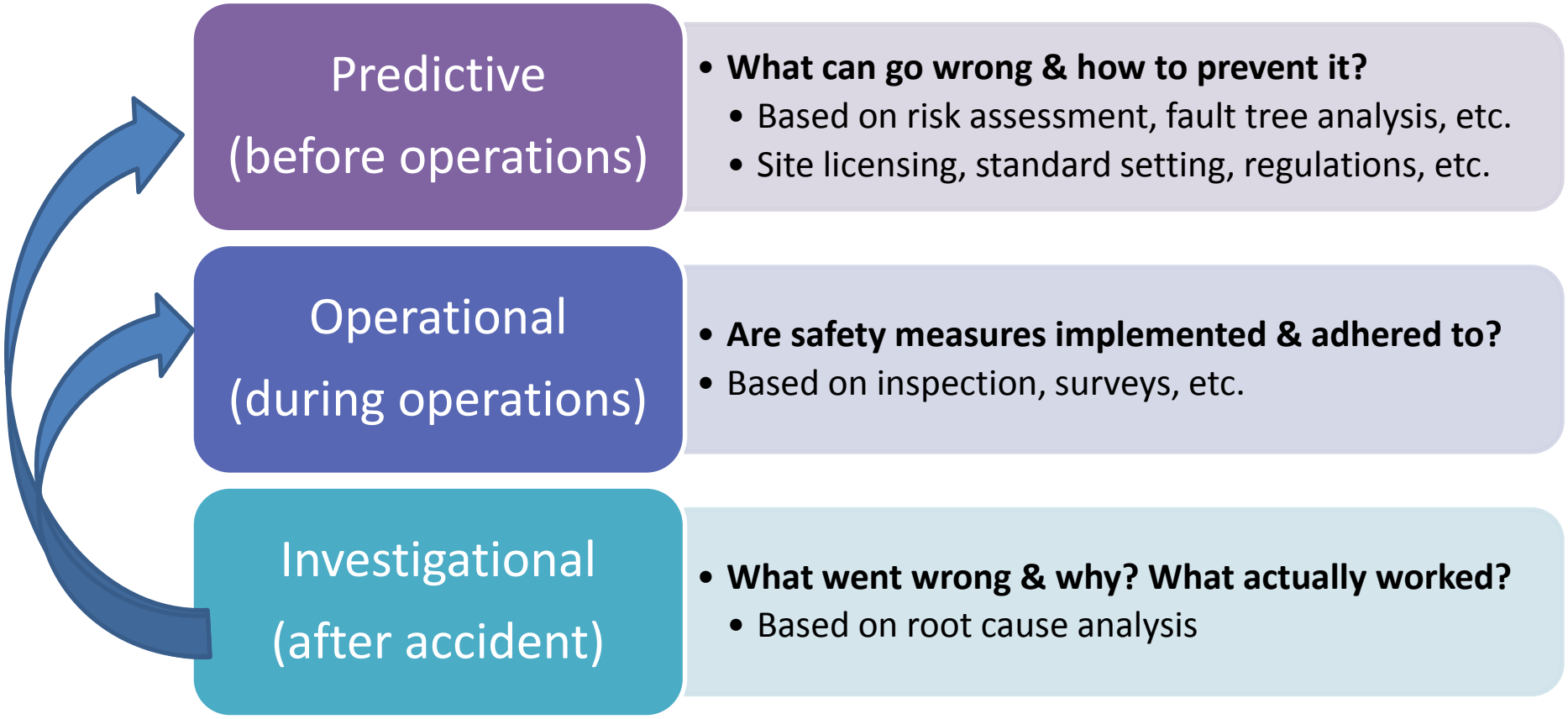
- Transportation, chemical, nuclear industries
- Occupational safety; consumer product safety
- Recreational scuba diving

3 Key research questions

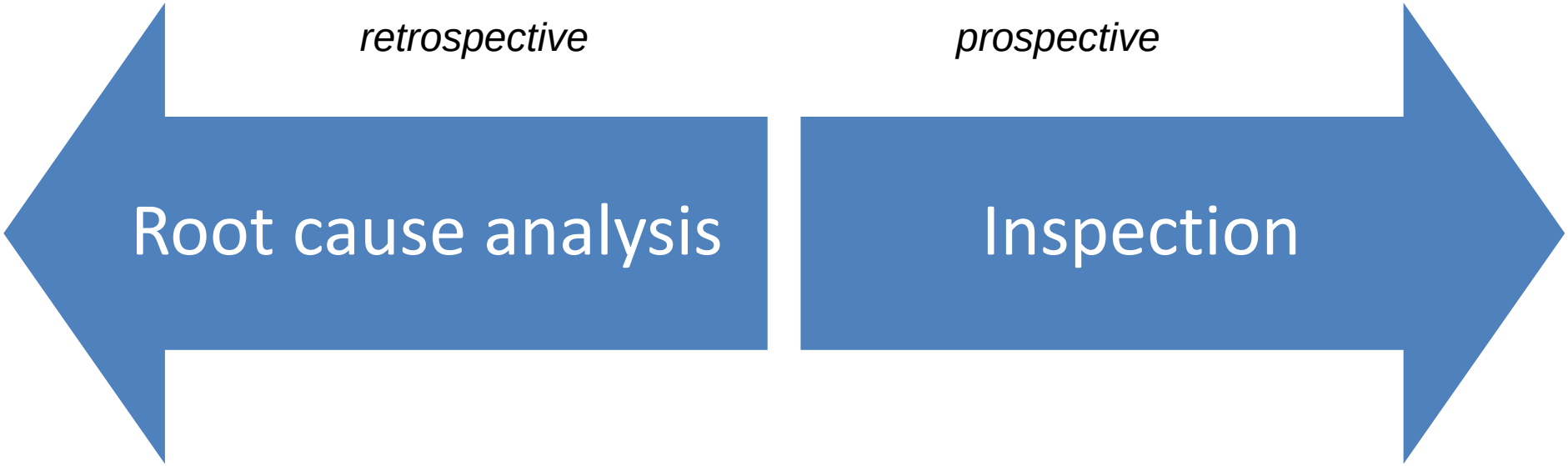
- How are RCAs conducted? (When, why & how)
- How are key findings disseminated & used?
- What is working & what is not?

Key finding: Not every investigation is a RCA

Three distinct but related types of investigations:



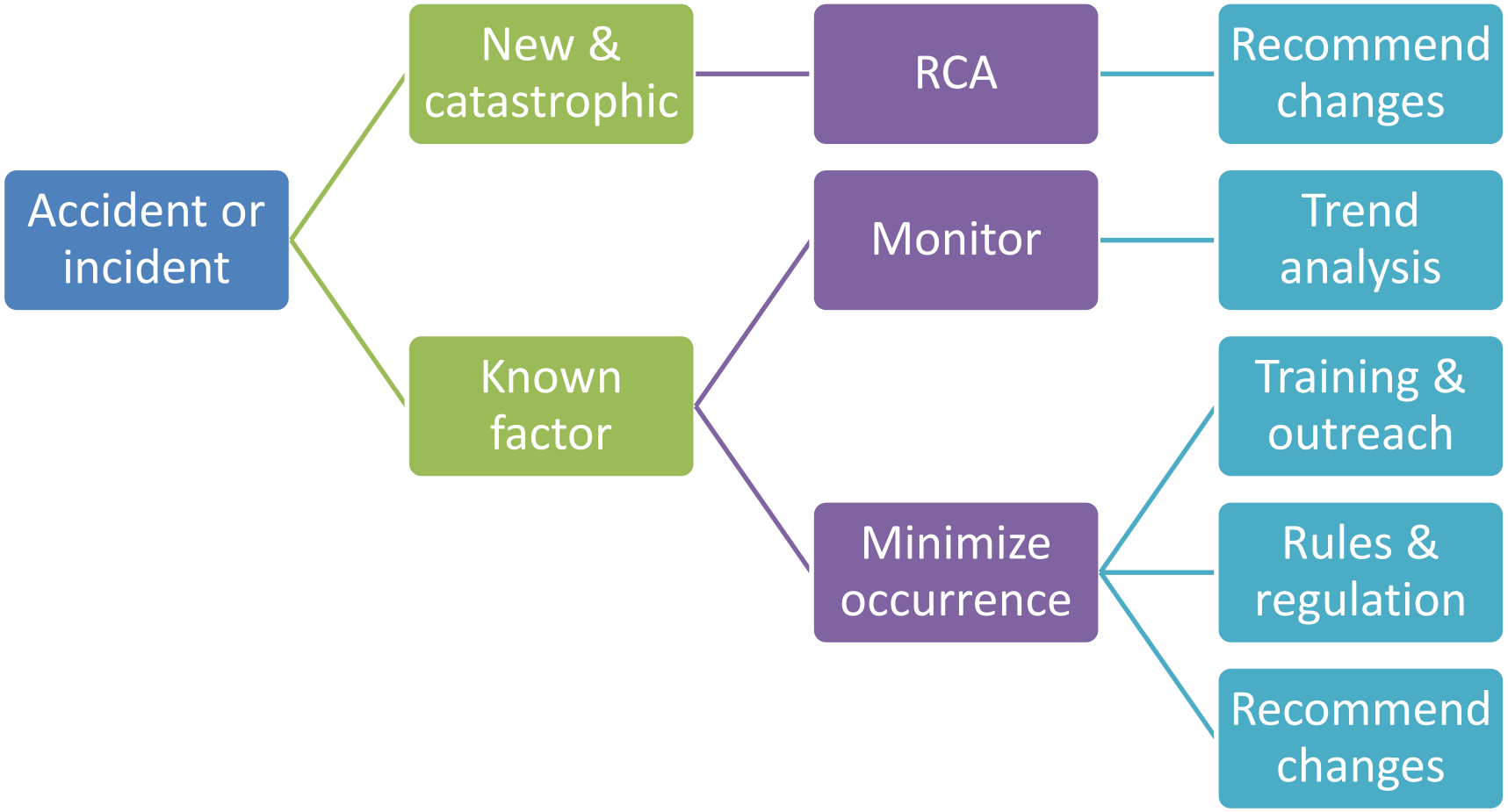
RCA: learning from past to prevent future



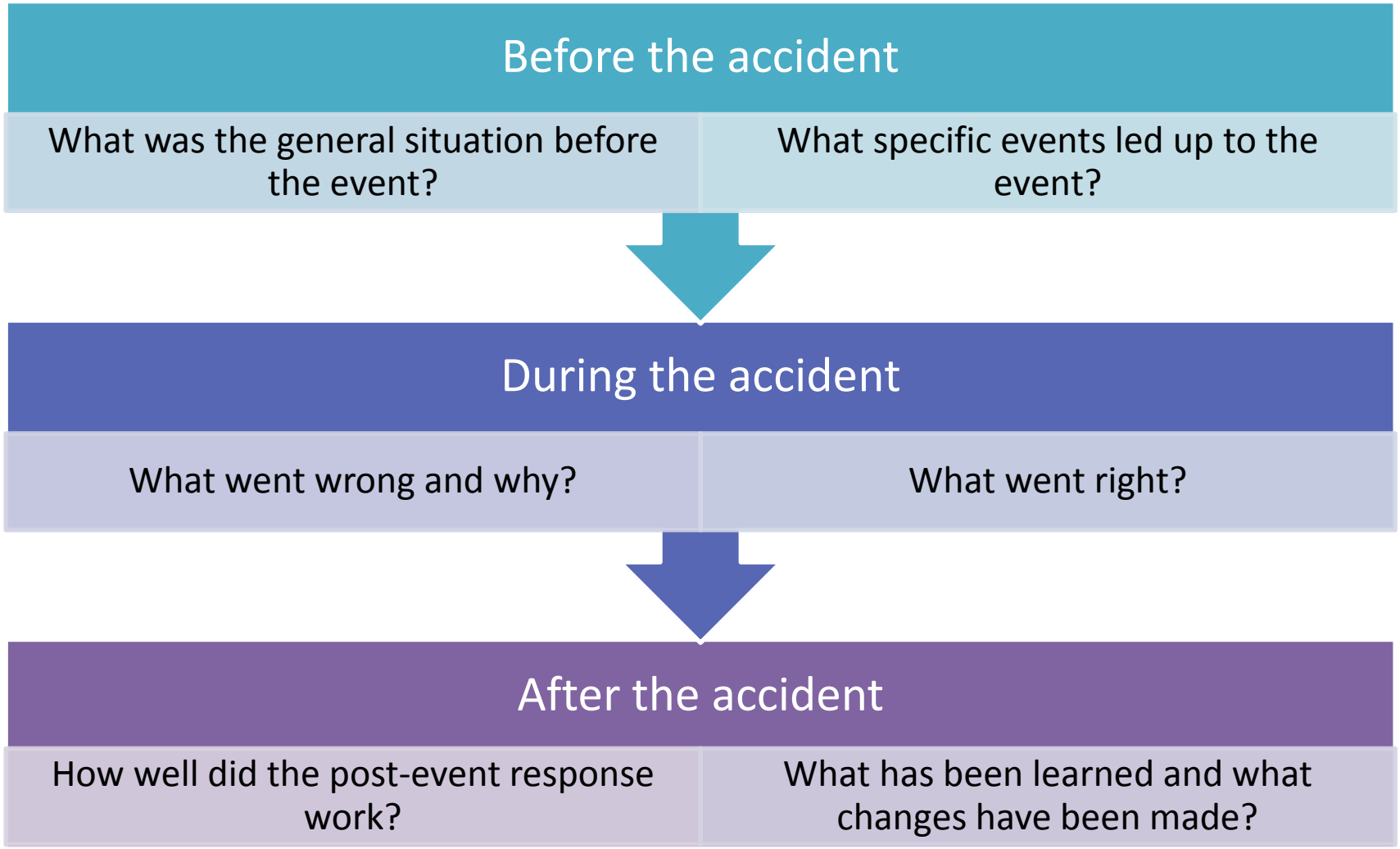
- What went wrong and why?
- How to prevent reoccurrence?
- What could create future problems?

- Is operation in compliance?
- How to restore compliance?
- How to prevent future issues?

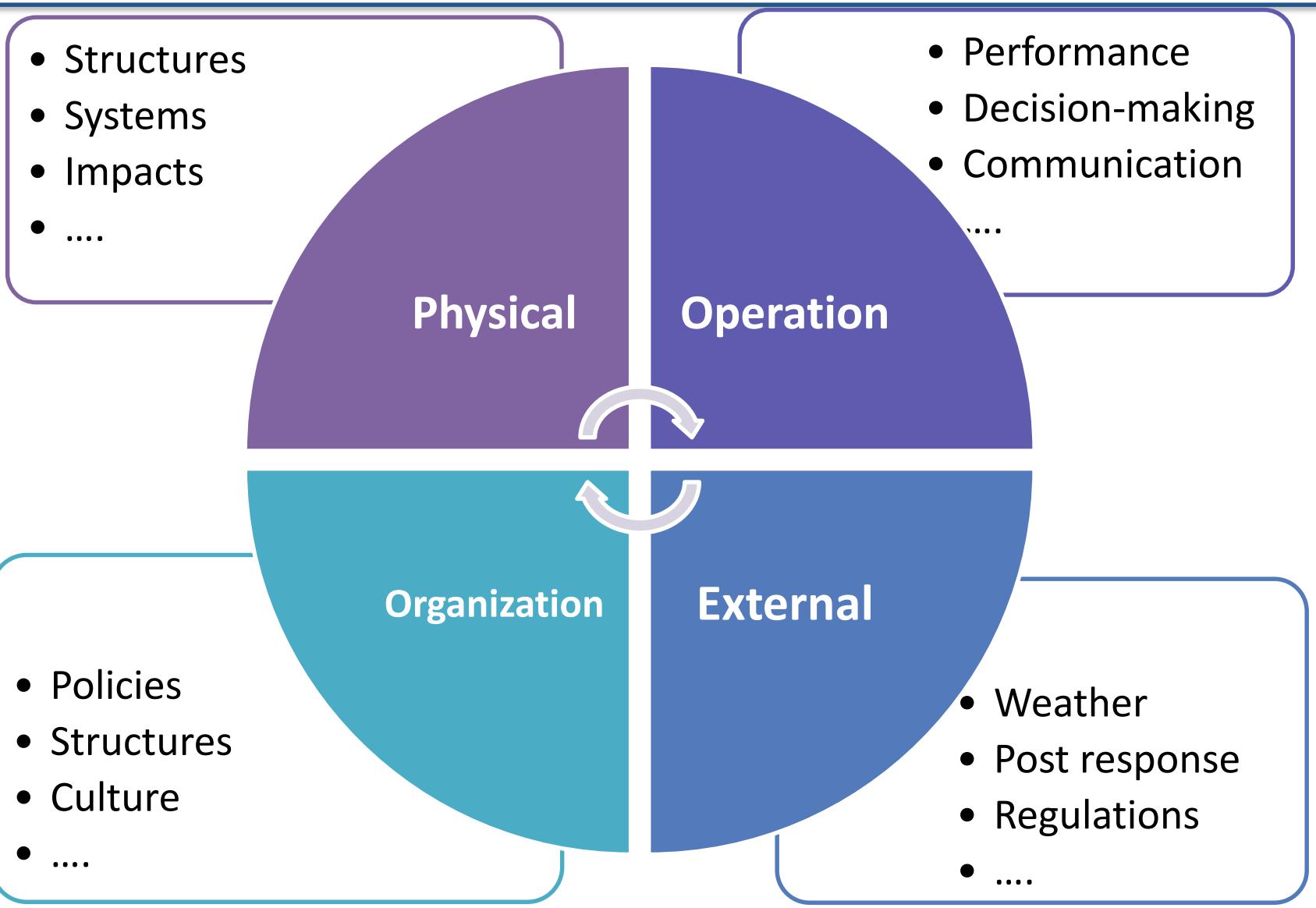
Key finding: Not every event requires a RCA



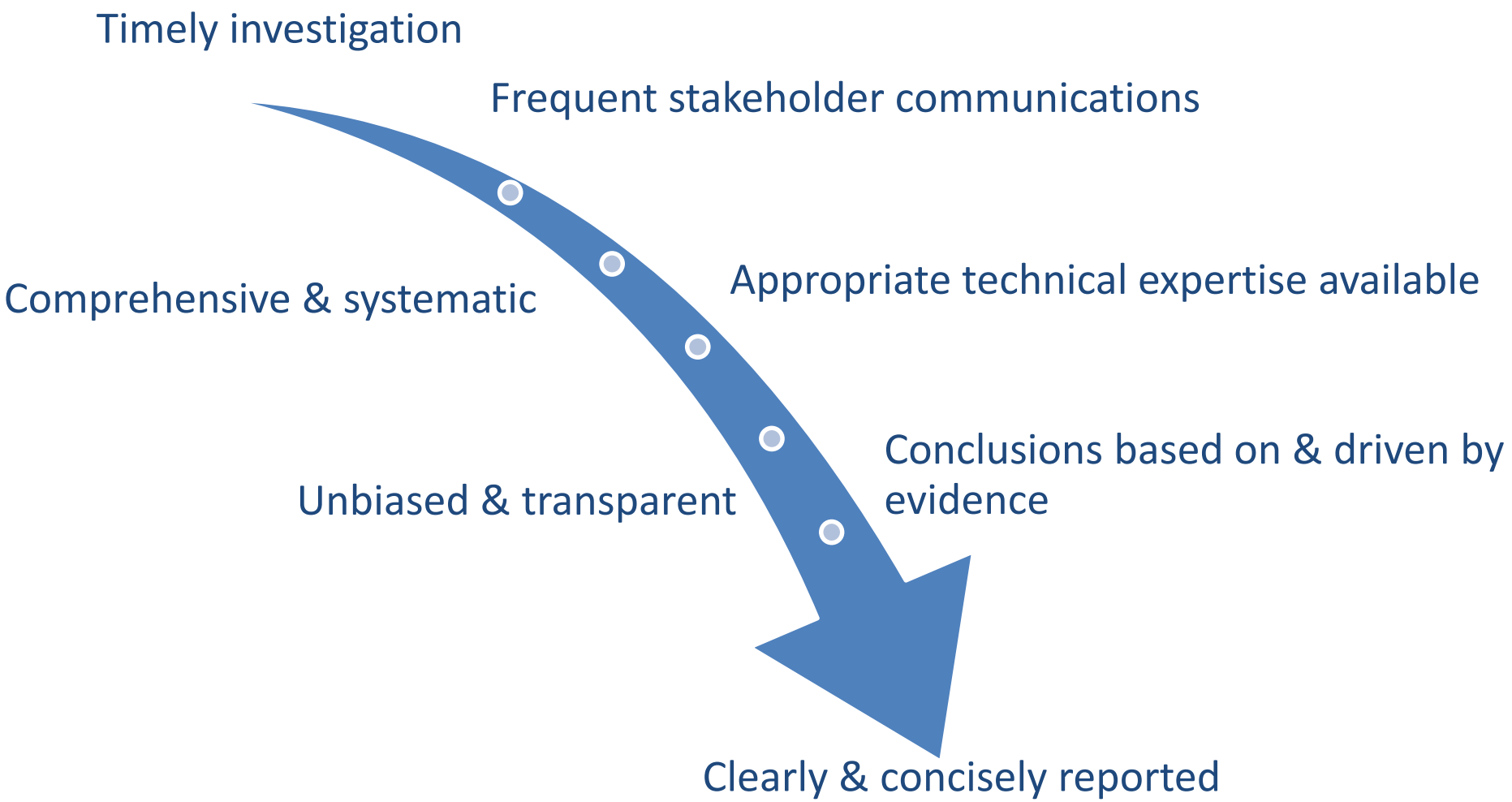
Key finding: Effective RCAs reconstruct events



Key finding: Effective RCAs consider 4 types of factors



Key finding: Properties of effective RCAs



Conclusion: RCA valuable for foodborne outbreaks

- **Systems-based approach for prevention**
- **Key in prevention-based food system**
  - Understand why outbreak happened
  - Find weaknesses in food system
  - Identify how to prevent reoccurrence
- **Other high-risk industries rely on RCA**
  - Opportunities to learn from them

Thank you for your time & attention

To continue the discussion beyond today please contact:

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"Is the asparagus farm-raised or wild-caught?"

Source: New Yorker, 12/06/2004