

Safety in Hospital Medication Administration Applying STAMP Processes

Elizabeth White Baker, PhD SDM '22
Associate Professor, Information Systems
Virginia Commonwealth University (USA)



Evidence:

- The in-hospital losses from incorrect medication administration are \$220M-\$300M per year from deaths alone, and over \$3.5B in serious harm done to patients (valuing 1 life year at \$75-100k)
- Studies have reported hospital in-patient medication error rates of 4.8% to 5.3%, with the Institute of Medicine estimating that in-hospital medication errors alone cause 1 of 854 in-patient deaths (Wittich et al., 2014).

Urgency:

- The case of RaDonda Vaught, a nurse convicted of criminally negligent homicide for a medication administration error that resulted in a patient's death.
- Tragically, this is not an uncommon event in hospitals.

Goal

To reduce hospital medication administration errors (medication adverse events) by developing insights into hazards and losses through a hospital medication administration control structure using STAMP methods.

- Secondary mission: To provide a starting point for hospitals to develop specific interventions (new/revised policies and procedures) to improve medication administration safety

Critical Issue of Medication Administration Safety

Why the time is now!

Coy, Peter. (2022, June 1). Stop pinning the blame on individuals when the whole system is at fault. *The New York Times*.
<https://www.nytimes.com/2022/06/01/opinion/patient-care-hospital-errors.html>

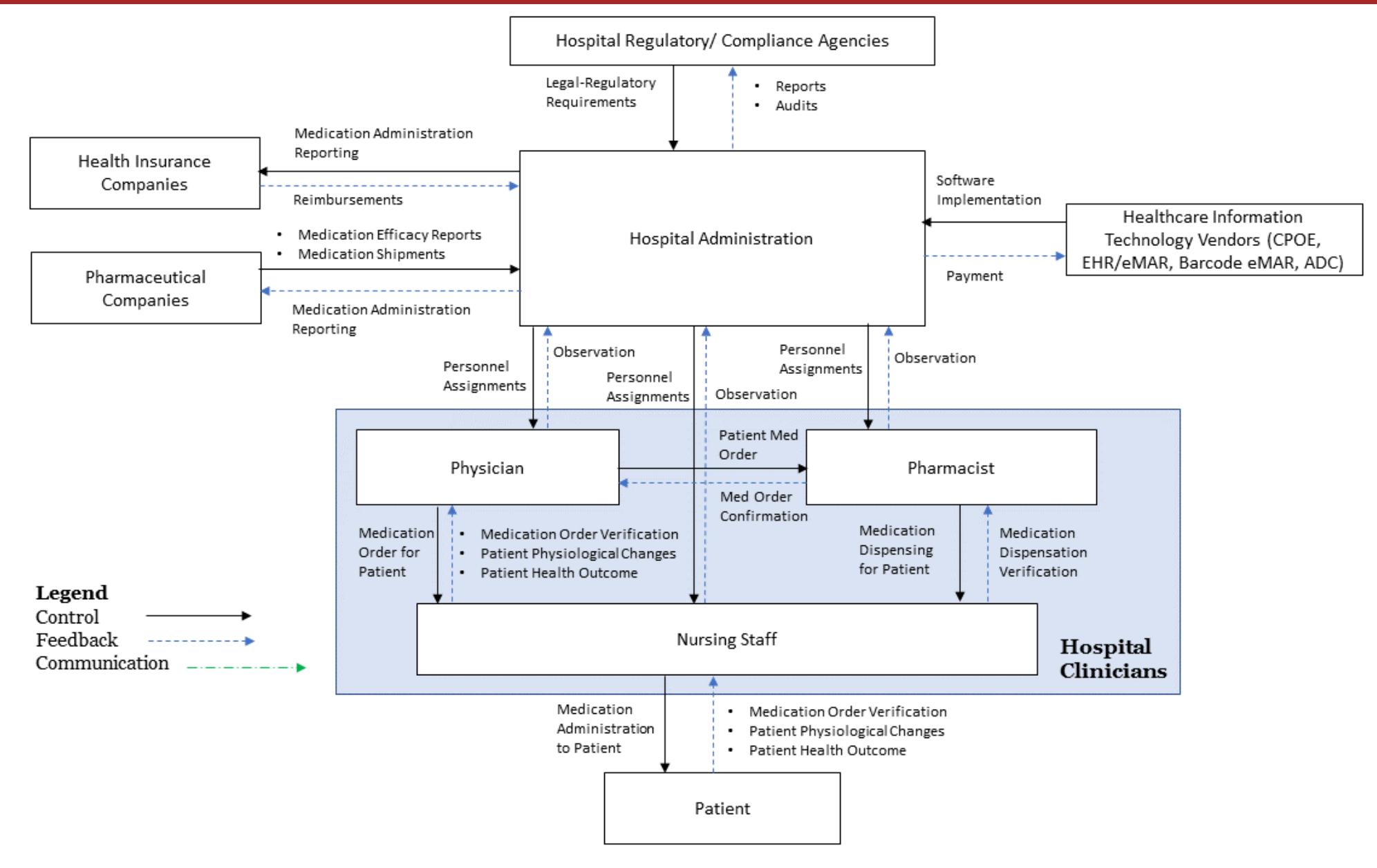
Focus on **STPA hazard analysis**: construct a systemic view of the interactions among healthcare workers, their patients, the enabling cyber-physical information systems, and the industry operations legally and commercially to elucidate hazards.

Outcomes:

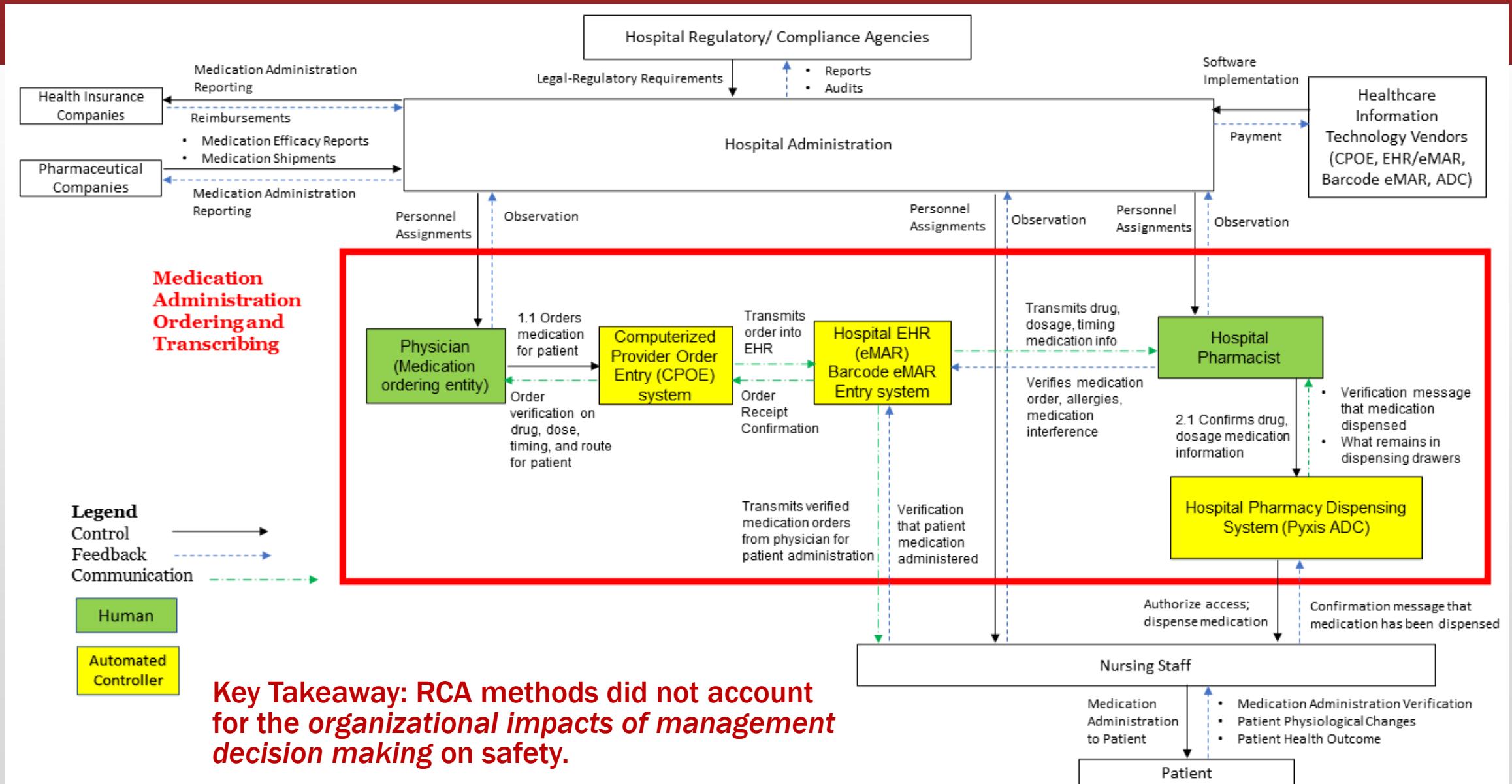
- Develop more effective safety interventions
 - The current FMEA and RCA techniques have led healthcare to the situation it is currently in
- Achieve higher patient quality of care metrics
- Repurpose resources from safety legal actions and accident investigations toward better patient outcomes

Tools for Reengineering the Hospital for Safer Hospital Medication Administration

Hospital Medication Administration High Level Control Structure



STPA: Hospital Medication Administration Control Structure for Med Ordering and Transcribing



STPA findings:

- 4 system-level losses, from which three system hazards were identified.
- 43 UCAs that lead to 99 different causal scenarios
- Identified 27 high-level requirements and 16 safety constraints

Control actions from the hospital administration to the medication administration process (providing personnel assignments and approved drug formularies) indicates *there are many ineffective or missing safety management mechanisms to the process.*

Safety Management System (SMS) analysis also completed

- In-depth look at control structures within hospital management and hospital safety culture
- Missing safety information systems to make data-driven decisions

It is easier to reengineer the environment and processes within which medication administration processes happen than to reengineer healthcare personnel.

Importance of Safety Management Systems (SMS) and Safety Information Systems (SIS) for Safe Practices

Baker, EW. (2022) “Safety in Hospital Medication Administration Applying STAMP Processes”, Master’s thesis, Massachusetts Institute of Technology.

Where to next for medication administration safety?

- Stop doing what is NOT working when it comes to safety analysis in hospitals
- Stop training healthcare quality and safety professionals on safety techniques that do NOT work
- Start using CAST for accident analysis to prevent repetitive accident occurrences.
- Start introducing safety management systems and effective safety information systems into your facility

Future Vision

Questions and Answers