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Conference & Exhibition | March 5–9, 2018

Las Vegas | Venetian – Palazzo – Sands Expo Center

Improving Febrile Infant Care Using Mobile Technology

Session #412, March 8, 2018

Sarah Fouquet, PhD, Human Factors Specialist

Russell J. McCulloh, MD, Associate Professor

Children's Mercy KANSAS CITY

ENGAGED

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Conflict of Interest

Sarah Fouquet, PhD

Russell McCulloh, MD

Have no real or apparent conflicts of interest to report.

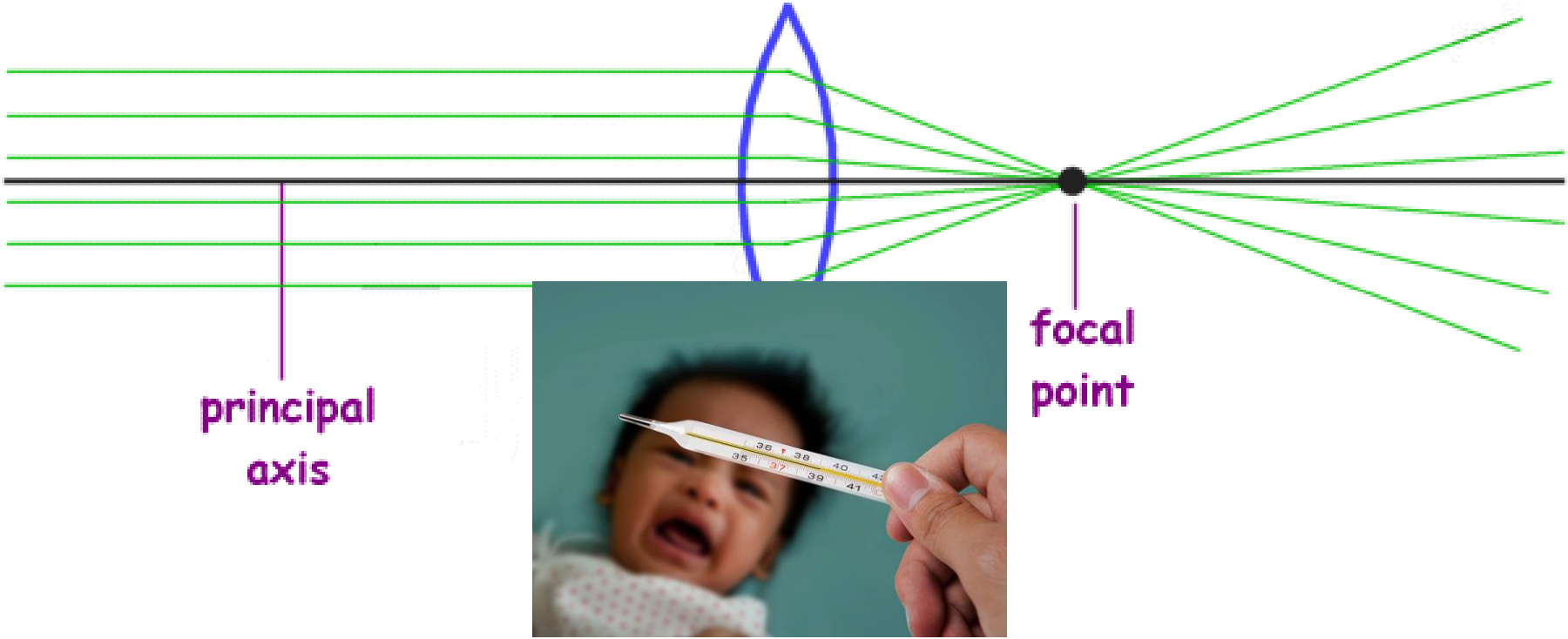
Agenda

- Describe our experience developing and deploying an electronic decision aid as part of a national practice improvement project
- Provide a brief overview of clinical decision-making in acute care medicine and the challenge of disseminating/implementing new knowledge on a national scale
- Interactive question and answer session to discuss challenges, lessons learned, future projects, and ways our experience can help others to deliver and implement new medical knowledge on a broad geographic scale

Learning Objectives

- Identify common processes clinicians use to make medical decisions
- Discuss strategies for enhancing medical decision-making and disseminating evidence-based practices in diverse settings using electronic decision support tools
- Recognize the importance of human factors principles to the design of a mobile electronic clinical decision support tool
- Develop a plan for creating a mobile electronic clinical decision support tool relevant to your own health system or patient population

View through the lens of . . .



Case

- 26 day old female brought to the emergency department for fever.
- Mom noticed baby felt warm before feeding; at 1:00 a.m. temp was 100.8F
- Called the nurse triage line → directed mom to take infant to ED

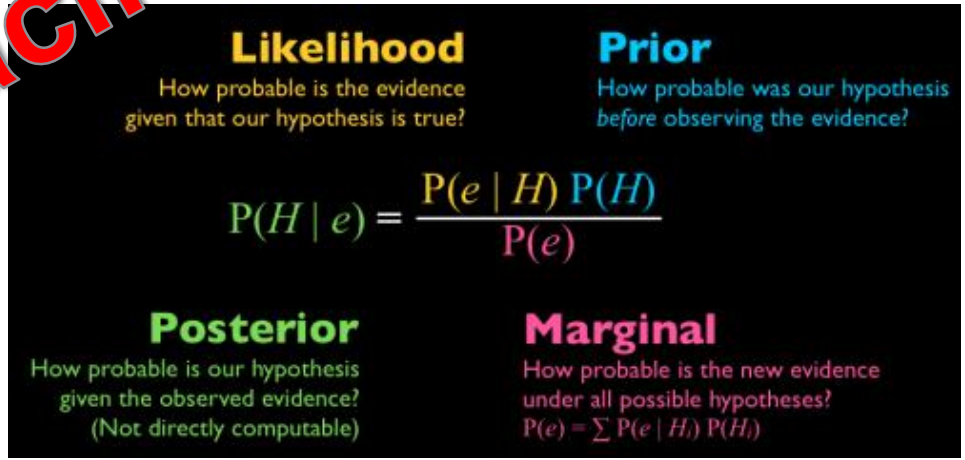
What do you think is going on?

- Does this infant have a serious bacterial infection?
- Does this infant have meningitis?
- Does this infant have a mild, self-limited infection?
- Where do you place your bet?

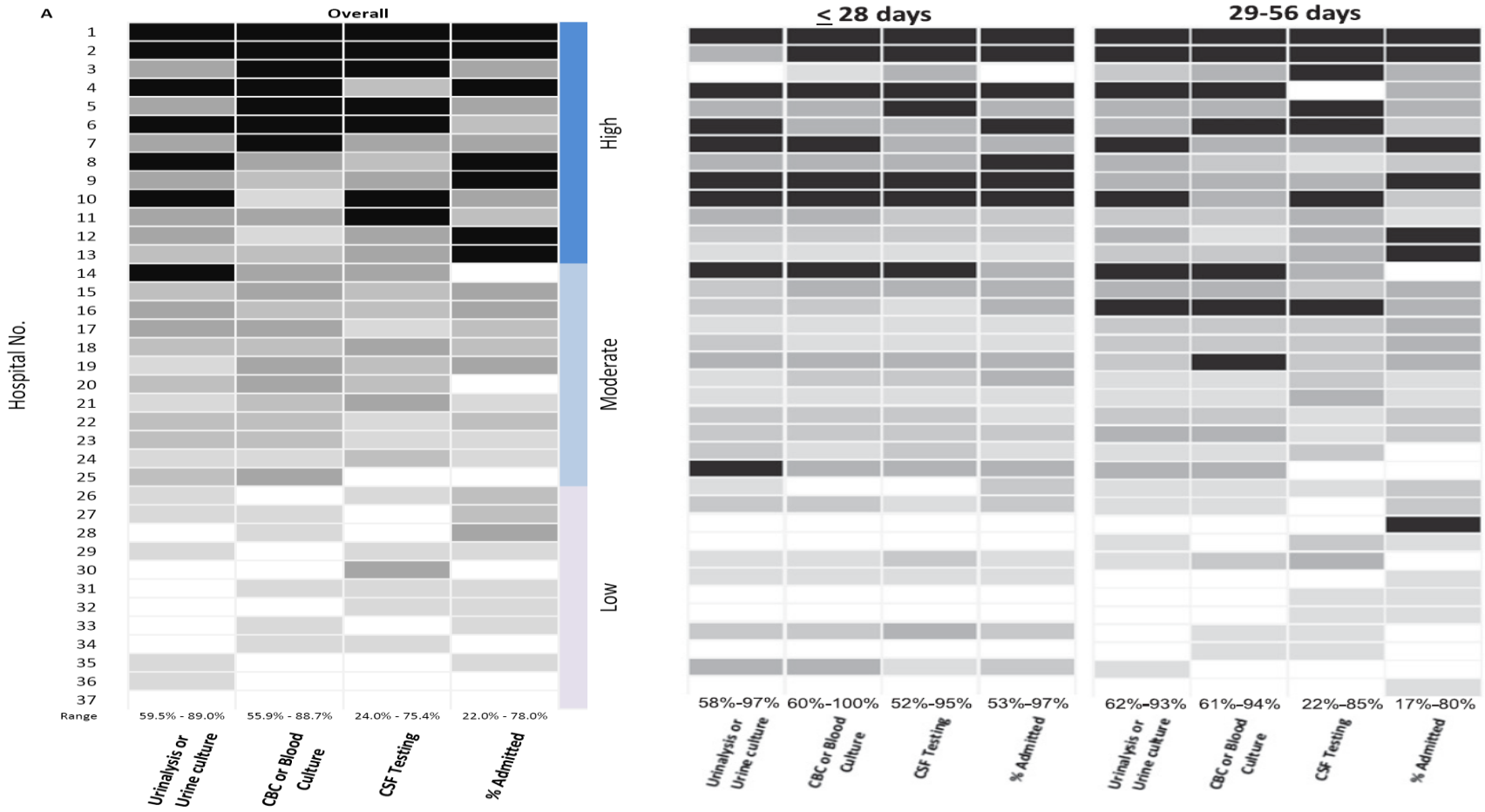
Decision Analysis

- Physician's usually employ Bayesian inference when making medical decisions/diagnoses
- Bayes' theorem in practice: the probability of an event based on:
  - Prior knowledge of the likelihood of an event, AND
  - Information available to you at the time you are determining the probability

$$p(B|A) = \frac{p(A|B)p(B)}{p(A)}$$



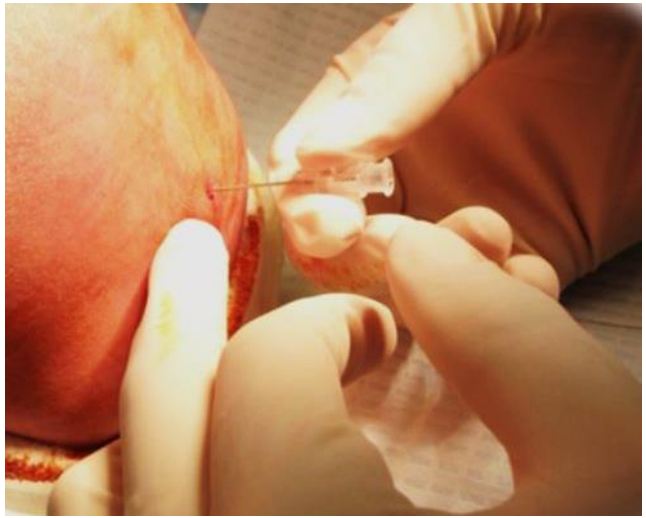
You are placing a bet!



Aronson, et. al., Pediatrics, 2014

The Problem: Variable Guidance

- Various clinical practice guidelines and expert panels recommend differing courses of action
- Leads to unnecessary variation in care
- Results in excessive/avoidable:
  - Hospital stays
  - Painful procedures
  - Unnecessary medications
  - Parent/caregiver fear/stress
  - Hospital charges



Challenge: How to standardize care?

- Standardize knowledge and approach
  - Take away conflicting recommendations
  - Provide consensus recommendations
  - Monitor for change

- How do you get this approach in clinician's hands?
- How do you know they are accessing new information?
- How do you know that it is impacting decision-making, clinical care, health outcomes?

Opportunity: REVISE

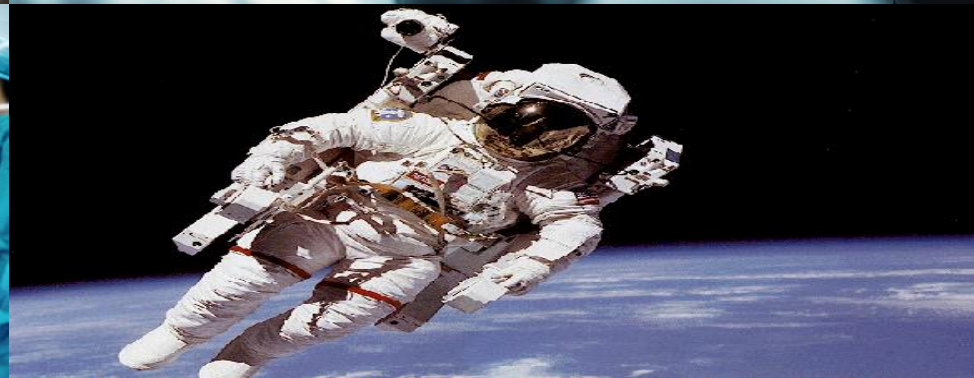
- Reducing Excessive Variation in the Infant Sepsis Evaluation
- Sponsored by the American Academy of Pediatrics (AAP)
- 132 Hospitals across the US
- >20,000 infants evaluated over 2 years
- >1,000 physician volunteers in the project

- Approach: disseminate a standardized clinical practice guideline and submit reports on how children were cared for pre-/post-intervention

Opportunity: PedsGuide

- Children's Mercy Kansas City developed a mobile electronic clinical decision support tool for managing common pediatric illnesses
  - Released 2010-2011
  - Freely available
  - Stepwise reference/guidance
- Obtained permission from AAP to update and deploy as part of the "change package" for REVISE

Human Factors



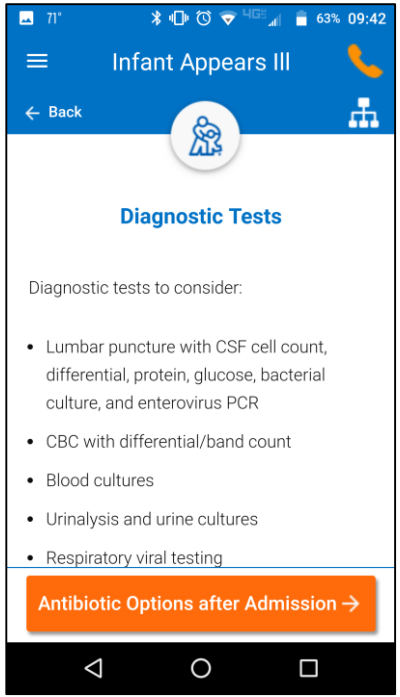
The goals of Human Factors

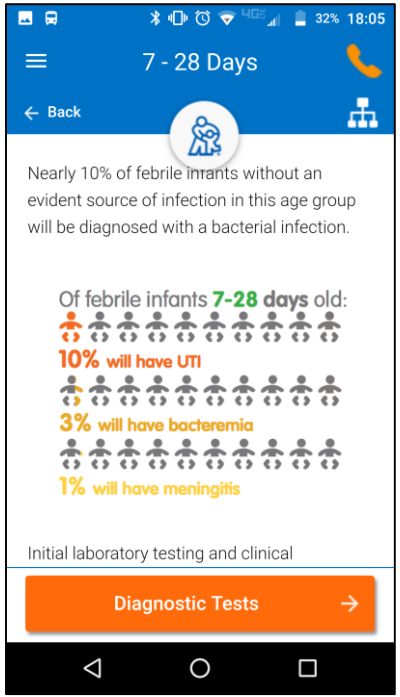
Understand human cognition, behaviors, and expectations

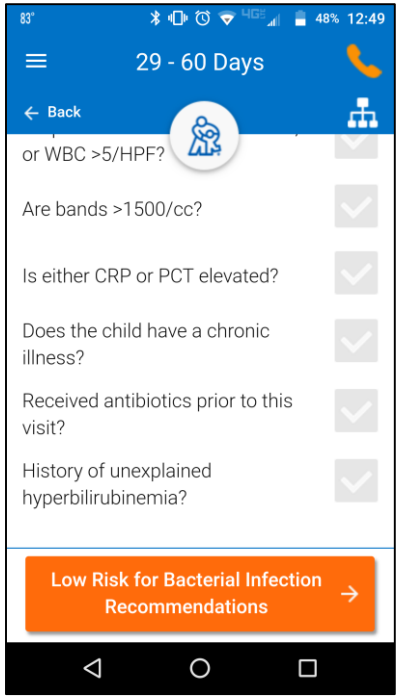
Study interactions with other people, technology, and tools in their environment

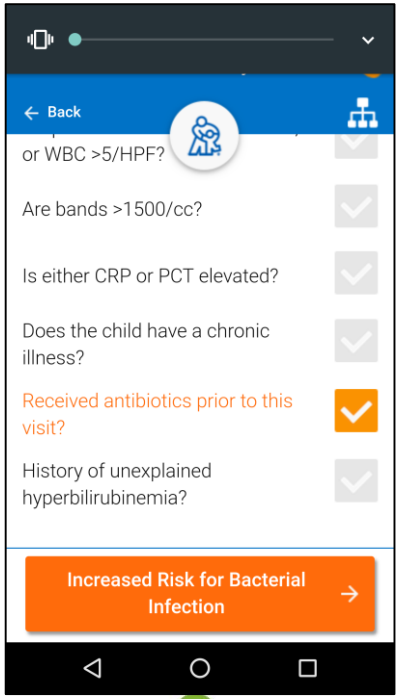
Create safe, effective, reliable systems

Design → Test → Test → Test

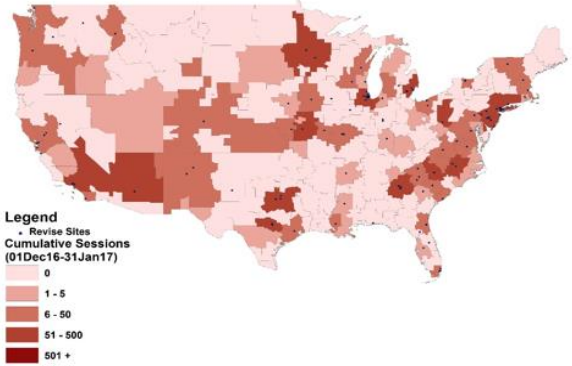


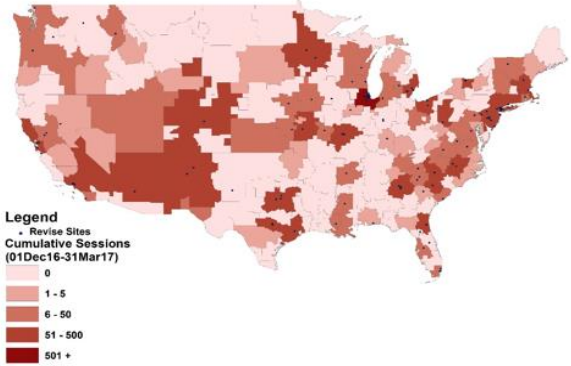


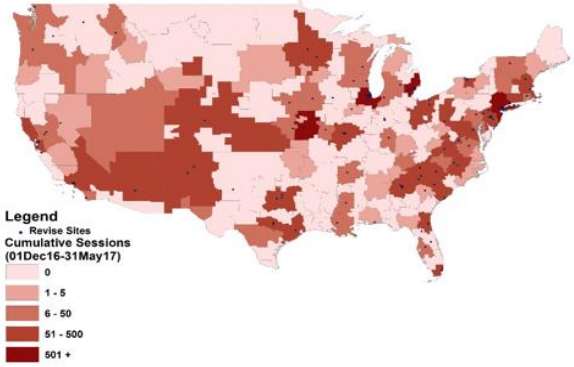


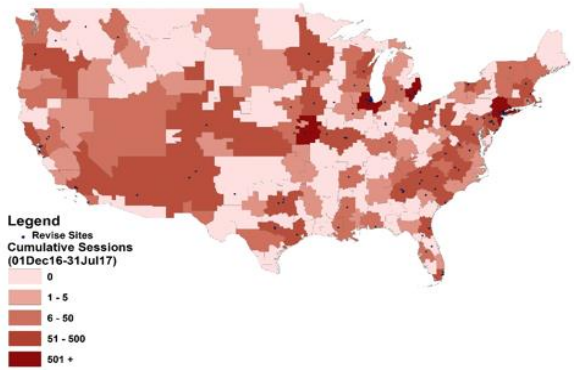


In 9 months - 12,823 downloads









What we learned… and you should consider

- The importance of a supportive framework (Cresswell & Sheikh, 2013)
- Sustainability should be considered before the project starts
- Do not underestimate resource requirements
- Build in analytics from the beginning
- (larger fonts to be

Questions

- Sarah Fouquet, sdfouquet@cmh.edu, https://www.linkedin.com/in/sdfouquet/
- Russell McCulloh, mccullohr@gmail.com, @RMcCulloh, www.linkedin.com/in/russellmcculloh
- Please complete the online session evaluation!

Children's Mercy KANSAS CITY