System PI Training
March 2015

Jose Cabanas, MD, MPH, FACEP

Louis Gonzales, LP

OFFICE OF THE MEDICAL DIRECTOR

CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Agenda

- ## Subcommittee & Document Updates
  All

- ## Patient Safety Review / Performance Improvement
  Dr. Cabanas

- ## Medication Cross-Check Improvement Process
  Dr. Cabanas

- ## Clinical Decision Making Error Types
  Louis Gonzales

- ## Case Examples in Error Identification
  Louis Gonzales

- ## Action Items, Future Topics & Discussion
  All

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Patient Safety Review / Performance Improvement

What is the relationship between Patient Safety and Clinical Performance Improvement?

First, what does the patient typically expect?

Patient Safety Review / Performance Improvement

Typical Patient Expectations

Treatment
- Clinically appropriate
- Safe treatment
- Clinically beneficial

Safety
- Avoid harm
- Reduce risk of harm / error
- Recognize adverse effects

Service
- Compassion and Concern
- Attempt to help / resolve issue
- Seek to improve

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Patient Safety Review / Performance Improvement

What is the relationship between Patient Safety and Clinical Performance Improvement?

Treatment
- Clinically appropriate
- Safe treatment
- Clinically beneficial

Safety
- Avoid harm
- Reduce risk of harm / error
- Recognize adverse effects

Service
- Compassion and Concern
- Attempt to help / resolve issue
- Seek to improve

Improvement

OFFICE OF THE MEDICAL DIRECTOR

CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM
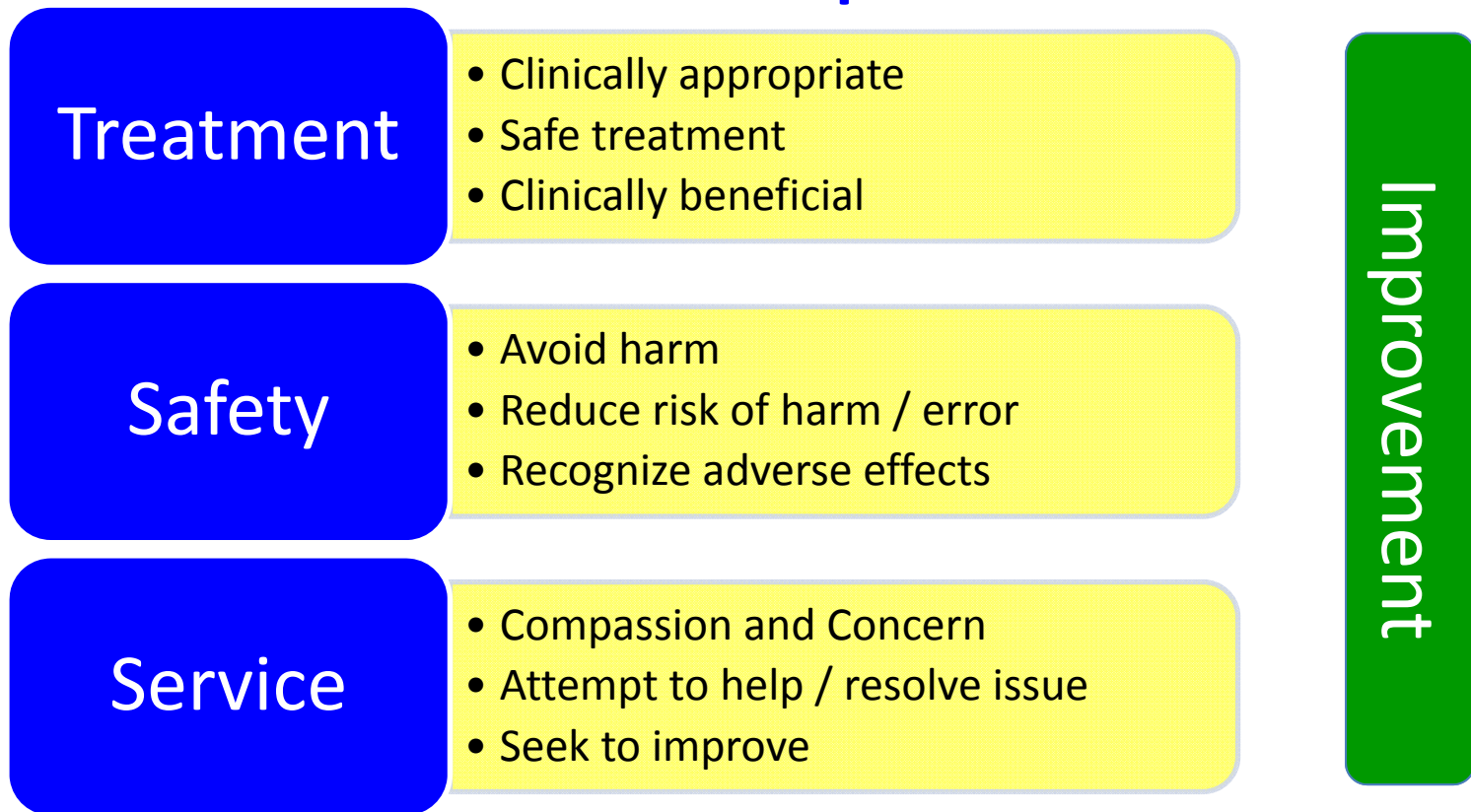
PATIENT SAFETY

Sometimes, things do not go as desired or as planned?

OFFICE OF THE MEDICAL DIRECTOR

CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Patient Safety Event

Serious Safety Event
Event that reaches the patient & results in (death, life-threatening consequences, or serious physical or psychological injury

Precursor Safety Event
Event that reaches the patient & results in minimal to no harm
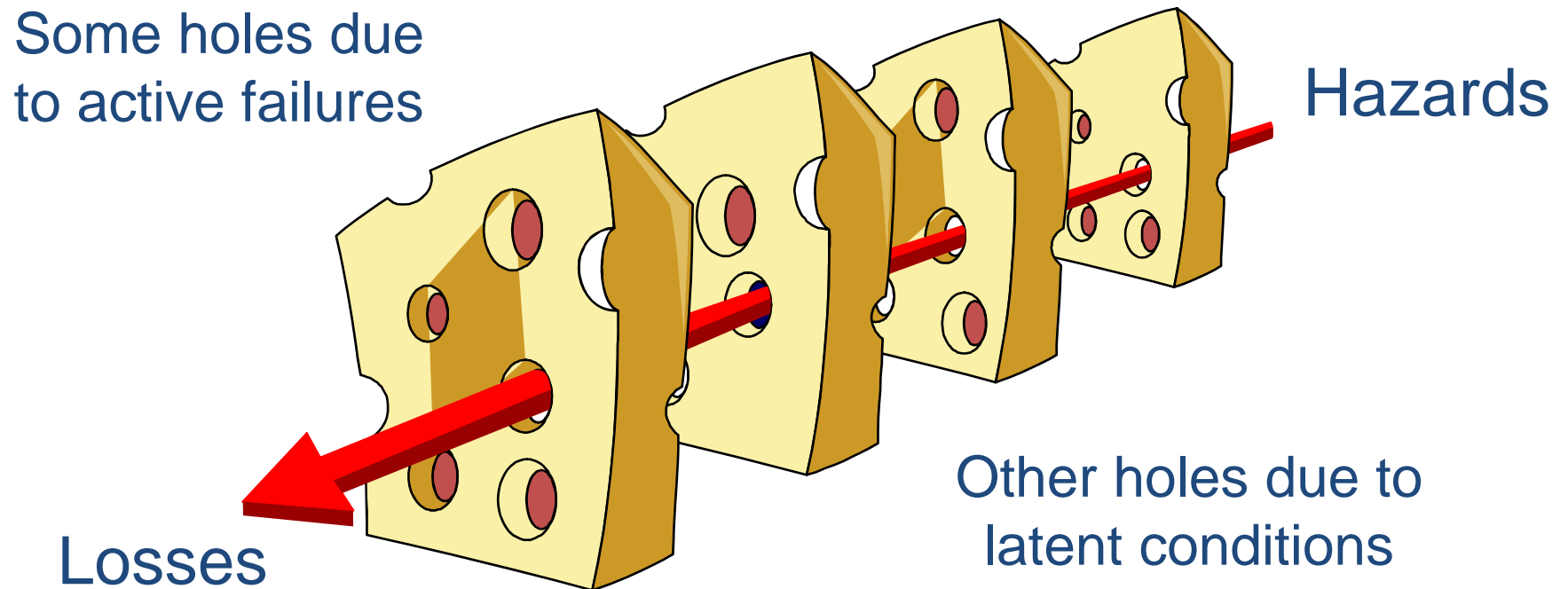
Near Miss *"Good Catch"*
An event that almost happened, but error caught by a detection barrier

Serious Safety Event

Precursor Safety Event

Near Miss Safety Event *"Good Catch"*

"Swiss cheese" model of accident causation

Some holes due to active failures

Hazards

Losses

Other holes due to latent conditions

Successive layers of defences, barriers and safeguards

System defences

Medical Error

- According to the IOM, it is "the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim"

http://refhub.elsevier.com/S1878-8750(14)00278-2/sref22

OFFICE OF THE MEDICAL DIRECTOR

CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Medical Errors

- 1999 Institute of Medicine (IOM) report:

- 3-4% of hospital patients are harmed by the health care system

- 7% of hospital patients are exposed to a serious medication error

- 50,000 – 100,000 deaths/ yr from medical mistakes

TO ERR IS HUMAN

BUILDING A SAFER HEALTH SYSTEM
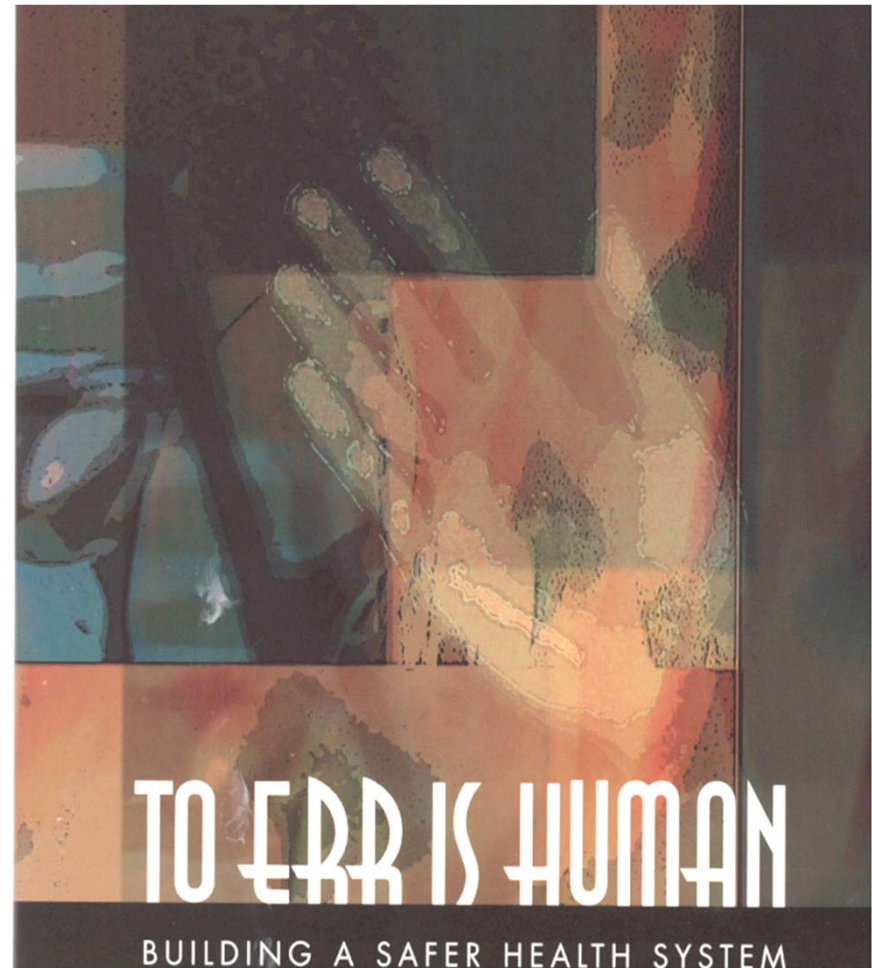
What Kinds of Errors do Human Make?

Knowledge-based
1. Figuring it Out

Rule-based
2. By the Rules

Skill-based
3. Auto-Pilot

30–60 errors/100 acts
**15% of
healthcare errors**

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

MORE ON KNOWLEDGE BASED ERRORS & CLINICAL DECISION MAKING ERRORS

. . . . in a few minutes

Can you think of a common & concerning patient safety event in healthcare?

One that is likely to cause an adverse effect on the patient in the prehospital setting

Medication Related Events . . .are common in prehospital care

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Medication Error

"Any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer"

OFFICE OF THE MEDICAL DIRECTOR

National Coordinating Committee-Medication Error Reporting and Prevention (NCC MERP); accessed at **http://www.nccmerp.org/aboutMedErrors.html**; Jan. 2012.

Can you think of specific examples of each of these?

- Wrong medication
- Wrong dose / route
- Unrecognized clinical deterioration
- Wrong/Inadequate/Absent procedure
- Tunnel vision / decision-making
- Treatment delay

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Root Causes of Errors in a Simulated Prehospital Pediatric Emergency

Richard Lammers, MD, Maria Byrwa, EMT-P, and William Fales, MD

- EMTPs completed pediatric patient simulation scenarios
- Failure to use Broselow tape: 50%
- Incorrect use of Broselow tape: 47%
- Incorrect dosing:
  - Epinephrine: 68-73%
  - Diazepam: 47%;
  - Midazolam 60%

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Root Causes of Errors in a Simulated Prehospital Pediatric Emergency

Richard Lammers, MD, Maria Byrwa, EMT-P, and William Fales, MD
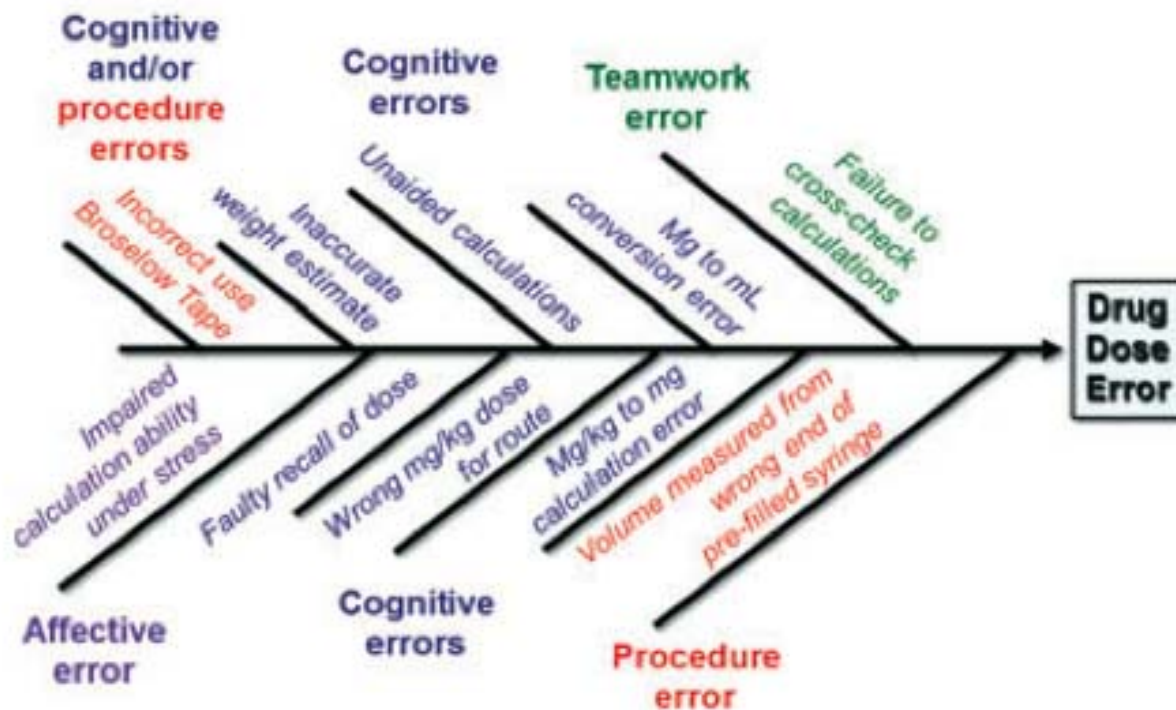
Figure 2. Drug administration errors. Fishbone diagram showing how a variety of factors, individually or combined, can result in a bad outcome.

Out-of-hospital environment

- Environment contributes to risk of error
  - Emergency situation
  - No written order
  - No external crosscheck
  - No electronic decision support
  - High-risk medications
  - Drug shortage issues and constant substitutions

Prevention of Medication Errors

- Most providers have memorized the five rights of med administration

- The 5 "Rights" focus mostly on individual performance

- System-wide issues may impact the ability for providers to perform the 5 "Rights"

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Medication Safety Strategies

- Standardization in medication administration procedure
- Use of memory aids and checklists
- Risk-reduction strategies to minimize opportunities for error
  – Medication storage and packaging
- Redundancies and independent backups
  – Team-work
  – Crosscheck

Reducing Medication Errors

- A more common error than perceived
  - *Lack of systems to detect errors*
  - *Reluctance to report errors*
  - Inadequate error reporting mechanisms
- A System improvement process was needed

Reducing Medication Errors

- Our available System data indicates med errors associated with:
  - *Calculating correct dose*
  - *Administering correct dose*
  - *Specific meds, frequently and infrequently used*
  - Choosing appropriate med (indicated, not contraindicated)
  - Complying with COGs

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Reducing Medication Errors

- Medication cross-check error reduction approaches:
  - Use a standardized med administration procedure
  - Use standardized memory aids and checklists
  - Use redundancies & independent checks
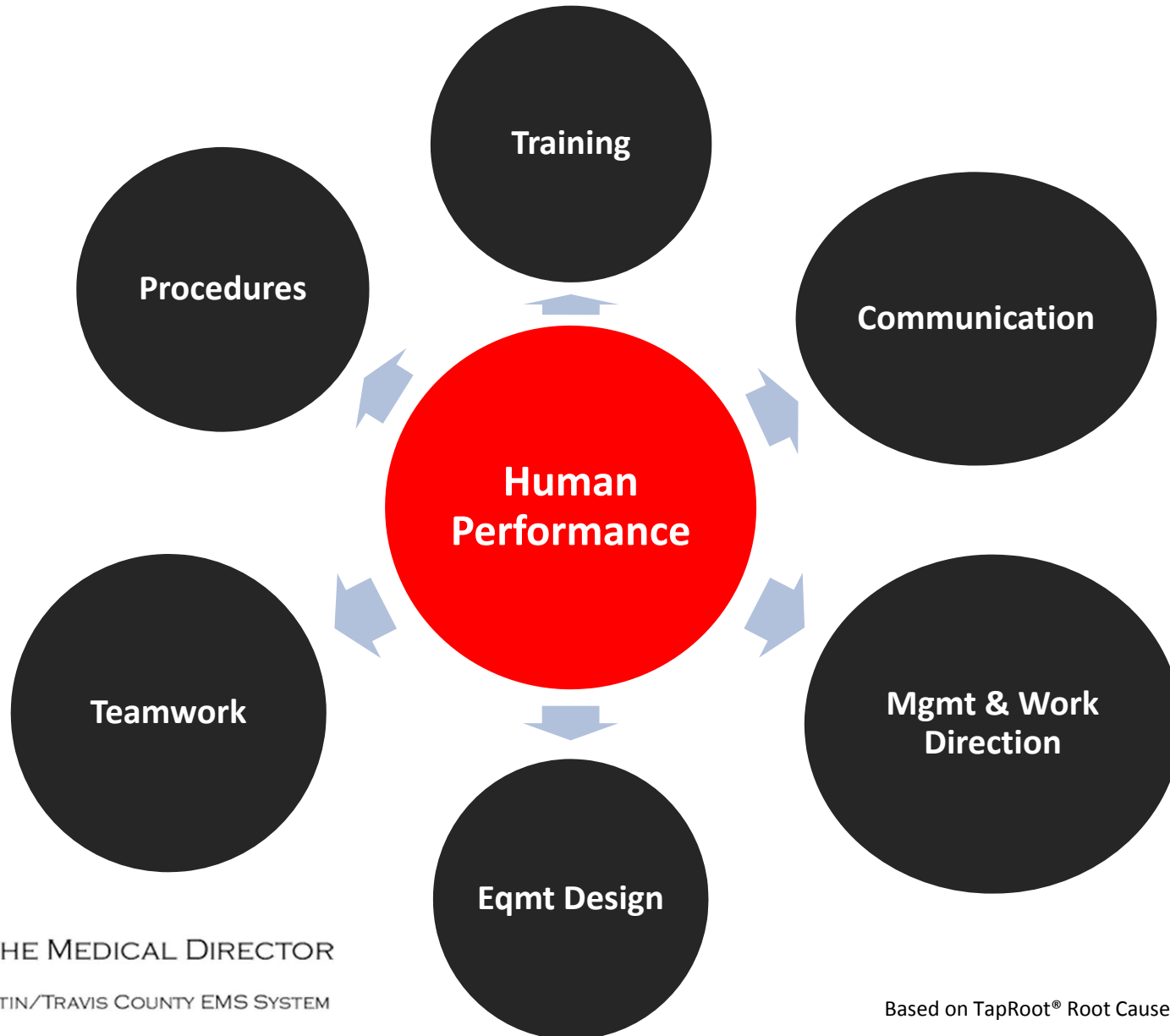   - **Required for med administration**

Reducing Medication Errors

How do each of these things prevent medication errors?
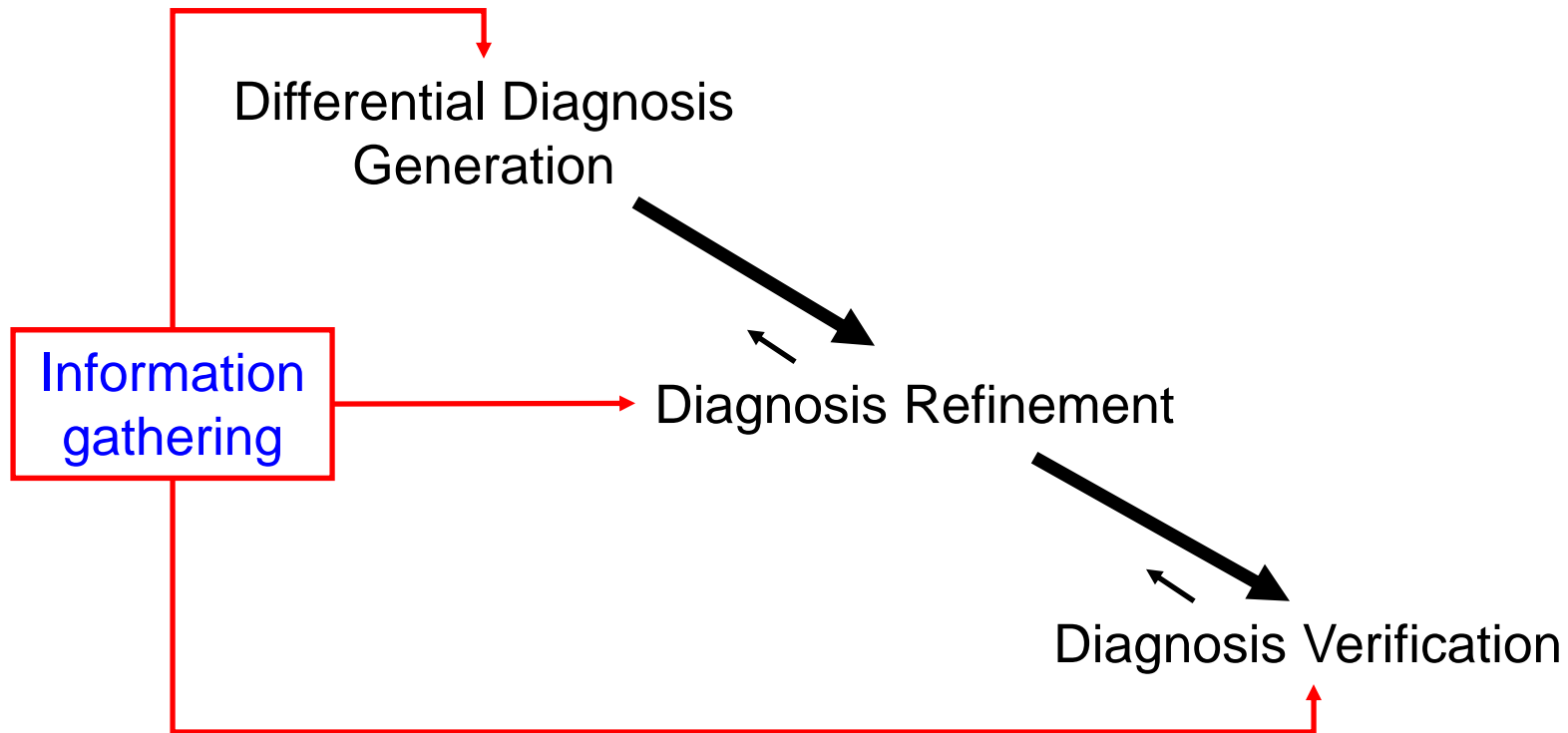
Cognitive Errors & Clinical Decision Making

OFFICE OF THE MEDICAL DIRECTOR

CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

System Approach to Identifying Causes

- Training
- Procedures
- Communication
- Human Performance
- Teamwork
- Mgmt & Work Direction
- Eqmt Design

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Based on TapRoot® Root Cause Tree®, 2007

Diagnostic process

Differential Diagnosis Generation

Information gathering

Diagnosis Refinement

Diagnosis Verification
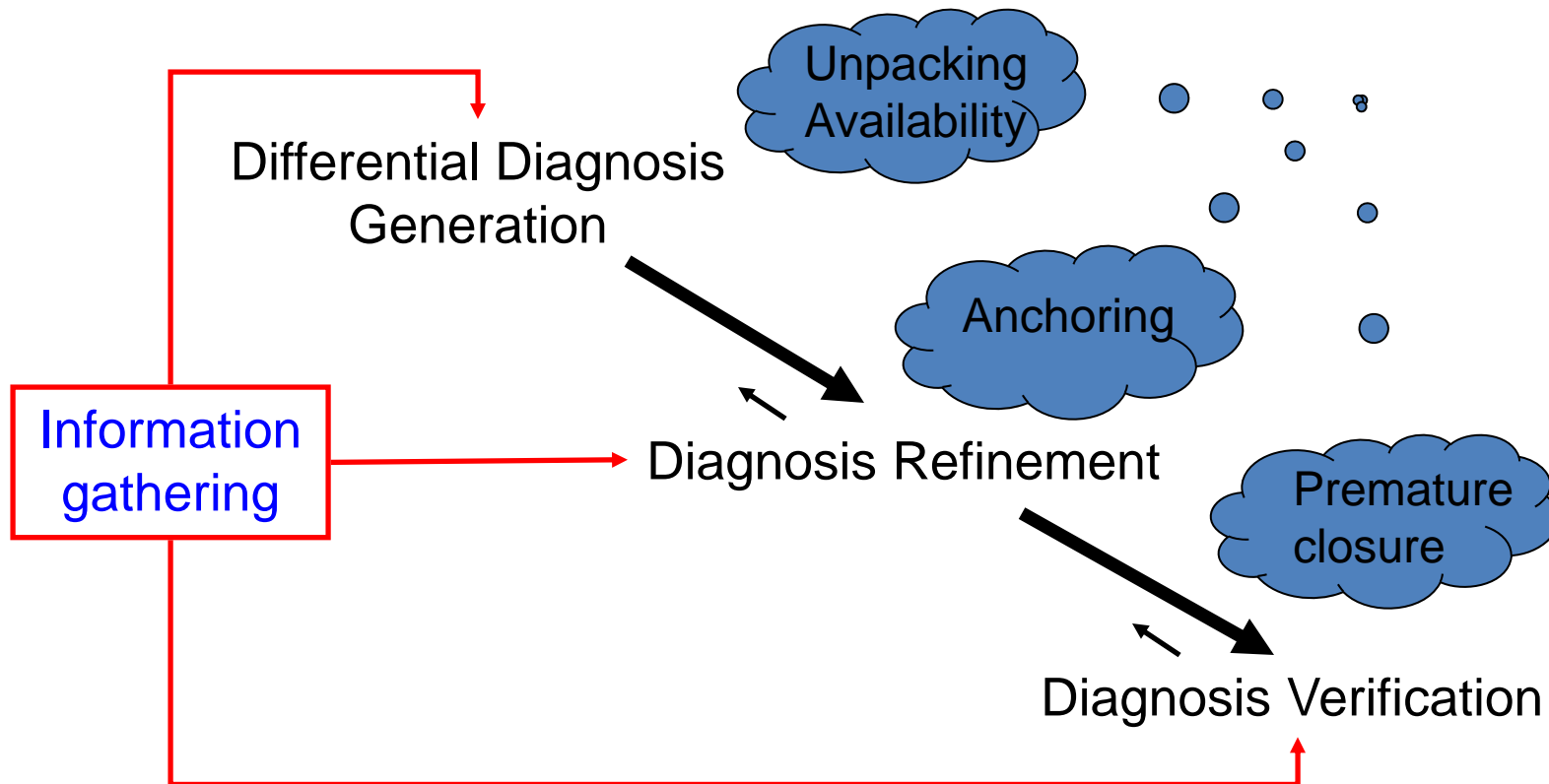
Diagnostic Errors

Human Cognitive Errors

- Diagnostic decision making is prone to error
  - Shortcuts & "rule of thumb" are common
  - HCPs often rely on pattern recognition
  - Desire to identify the specific problem and treat
  - Decision is only as good as the information

Types of cognitive errors

How does knowledge of error types help reduce the likelihood of errors?

Types of cognitive errors

- **Premature closure**
- **Anchoring error**
- **Confirmation bias**
- **Attribution error**
- Availability error
- Representation error
- Affective error
- Unpacking error

occur more often

Premature closure

- Common cause of clinical error
- Quick decision based on initial pattern recognition
- Stop considering realistic alternatives
- Jump to a conclusion without adequately
  - evaluating supporting evidence
  - considering likely possibilities

Anchoring error

- Overly rely on specific bit of info (often the 1st)
- Latch on to early conclusion even when not supported by new evidence
- Failure to adjust as new info is available

Confirmation error

- Search for or interpret info to confirm a belief or premise

  . . . instead of looking for info to prove wrong or prove an alternative premise

- Give more weight to info that supports preconceived conclusion

Attribution error

- Ignore or minimize possible clinical conditions because of negative stereotypes
  - Blame the patient
  - More likely with intoxicated or psychiatric patients

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Others

- Availability error
  - Under- or over-estimation of the likelihood of a disease/condition due to recent experience(s)
    - a reliance on readily available experience

- Representation error
  - likelihood of the disease based on how well the findings match the textbook presentation

Others

- Affective error
  - Avoid unpleasantness due to patient sympathy
- Diagnosis momentum
  - Diagnostic conclusions gain momentum as passed on
- Unpacking error
  - Failure to seek out the relevant and necessary information

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Avoiding Cognitive Errors

1st - recognize these errors are more common than we perceive

Avoiding Cognitive Errors

- Anchoring error
  - "If something doesn't fit, don't try to make it fit"
  - Revisit initial thought after gaining more info or as patient condition progresses

- Attribution error
  - Avoid stereotypes
  - Use a standard approach to assess each patient
  - Do the right thing for every patient

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Avoiding Cognitive Errors

- Premature closure
  - Keep differential broad especially early on
  - Think through entire differential diagnosis
  - Seek input from other providers
- Confirmation error
  - Seek information through assessment & history
  - Does the information make sense?

Avoiding Cognitive Errors

- Develop a *structured approach* and follow it
- Use checklists or *standard procedures*
- Force consideration of other *likely possibilities*
- Be cautious with *labels* passed on by others
- Consider *slowing down*
- Make good use of your *collective resources*

Avoiding Cognitive Errors

- What else might be going on?

- Is there any info that does not fit?

- Have I missed likely possibilities?

- How likely is there more than one problem?

- Have you pointed out any impending errors?

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

http://gme.wustl.edu/About_the_GME_Consortium/Educational%20Resources/2014-The%20Science%20of%20Medical%20Decision%20Making-%20Neurosurgery.%20Errors.Cognitive%20Strategies.pdf

Cases

Case 1

- 32 yo female c/o severe posterior left headache; off/on past month; no significant past med hx; P 80; BP 136/96; RR 20

- Conclusion: severe migraine

What types of error(s) might occur following this path?

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Case 1

- 32 yo female c/o severe posterior left headache; off/on past month; no significant past med hx; P 80; BP 136/96; RR 20
- Conclusion: severe migraine
  - **Premature closure**
  - **More info needed; stroke, meningitis, head trauma, others?**

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Case 2

- 38 yo female c/o "difficulty breathing"; per husband this is another "panic attack"; provider asks about onset - after argument, history - anxiety and med for same, similar episode - last month; states anxiety is causing her tachypnea and mild tachycardia; P 124, BP 106/72, RR 28, clear lungs

What types of error(s) may have already occurred?

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Case 2

- 38 yo female c/o "difficulty breathing"; per husband this is another "panic attack"; provider asks about onset - after argument, history - anxiety and med for same, similar episode - last month; states anxiety is causing her tachypnea and mild tachycardia; P 124, BP 106/72, RR 28, clear lungs

  – **Anchoring error**
  – **Rest of story = sudden onset, childbirth 4 days ago, worsening tachycardia & tachypnea**

Case 3

- 50 yo male found in alley; responds to pain w/movement & groaning; no obvious injury; odor of alcohol on breath; friend states hx of ETOH abuse & psych illness; P 110, BP 128/78, RR 20, Pupils mid, equal, rx, Ox Sat 98%

What types of error(s) may have already occurred? Why?

Case 3

- 50 yo male found in alley; responds to pain w/movement & groaning; no obvious injury; odor of alcohol on breath; friend states hx of ETOH abuse & psych illness; P 110, BP 128/78, RR 20, Pupils mid, equal, rx, Ox Sat 98%
  - **Attribution error (Anchoring, Contribution)**
  - **Was condition minimized due to "type" of pt?**
  - **Explore differential; assess BGL; look for other explanations for condition**

Case 4

- 62 yo male c/o SOB & CP; sudden onset, awakened 1 hr ago; NurseLine states may be a heart attack; P 68, BP 118/84, RR 16, Ox Sat 98%; Wife is gathering meds; No allergies; You continue to assess & get hx; Another provider gives ASA and another gives NTG

Were steps taken to avoid errors in this case? Any avoidance steps obviously absent?

Case 4

- 62 yo male c/o SOB & CP; sudden onset, awakened 1 hr ago; NurseLine states may be a heart attack; P 68, BP 118/84, RR 16, Ox Sat 98%; Wife is gathering meds; No allergies; You continue to assess & get hx; Another provider gives ASA and another gives NTG
    - Anchoring? Diagnosis momentum
    - Medication cross-check; contraindications for ASA and NTG

OFFICE OF THE MEDICAL DIRECTOR
CITY OF AUSTIN/TRAVIS COUNTY EMS SYSTEM

Discussion

- Questions?
- Action Items
  - Quarterly CPI Excel Spreadsheet Charts
  - Next meetings