The Ottawa M&M Model:

A Guide to Enhancing Morbidity and Mortality Rounds Quality

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Objective:

To assist with appropriate case selection, analysis and creation of "bottom lines" to enhance the quality of morbidity and mortality (M&M) Rounds

The goal of M&M rounds is to discuss cases of ***adverse outcomes*** which provide ***lessons*** in terms of ***cognitive errors*** made or identify ***system issues*** that need to be addressed. Rare diagnoses, "fascinomas" are reserved for other resident case-based rounds and while they provide stimulating discussion, they are not appropriate for M&M rounds. Ultimately, the aim is to prevent future adverse outcomes and improve quality of care.

The Ottawa Hospital prides itself on a "non-blame" culture where errors can be openly acknowledged. It is recognized that medicine is challenging and that errors and adverse events are inevitable. The goal is to improve care by sharing and examining our collective experiences.

Case Selection

It is ideal for presenters to select their ***own*** recent cases.

Case criteria – must have **all 3** of the following:

1. Adverse outcome
    a. death, disability, harm or injury
    b. near miss (potential harm avoided) e.g. patient given incorrect medication due to lack of appropriate labelling of syringe or method in which drugs are stored – potential for harm but patient ultimately had good outcome
2. Preventable
3. Lessons to be learned about cognitive or system issues

How can you find a good M&M case?

- Cases identified on the Patient Safety Learning System (PSLS)
- Cases which caused you to think about them long after they occurred
- Cases where you were provided follow-up from a colleague
- Cases which were highlighted to you by head of department or the coroner
- Cases which highlight a recurring system issue

Case Analysis

When analysing your M&M rounds case, consider the case from 2 perspectives (see Appendix A for further details):

1. Were there any *cognitive issues* on your part that contributed to the outcome?
2. Were there any *system issues* which contributed to the outcome?

Another approach to case analysis could be using the following checklist considering your actions and that of the whole team involved in patient care (see Appendix B for further details on each item):

Department Specific:

1. Were there any *patient factors* that increased this patient's risk for harm? Yes □ No □
2. Were there any issues with communication with outside facilities? Yes □ No □
3. Were there any *cognitive issues (see table 1)*? Yes □ No □
4. Were there any contributing *skill-set errors* (see Appendix 1)? Yes □ No □
5. Were there any *task-based errors*(see Appendix 1)? Yes □ No □
6. Were there any issues of *personal impairment*? Yes □ No □
7. Did *teamwork failure* (see Appendix 1) contribute to the outcome? Yes □ No □
8. Were there any *local environmental contributors*? Yes □ No □
9. Were there any *hospital-wide contributors*(see Appendix 1)? Yes □ No □
10. Were there any *hospital administration contributors*? Yes □ No □

(checklist based upon Cosby et al 2008, see Appendix 4)

If you answered yes to any of the above questions, describe what the issues were

M&M Bottom Line

We suggest that each case have concrete bottom lines created that summarize cognitive and system issues which are suitable for action by the department (see Appendix C for example). When drawing lessons from your M&M rounds case, consider concrete changes that could be made:

1. Any cognitive de-biasing strategies (see resources for details)
2. Education around evidence, practice guidelines, policies, procedures (use of simulation)
3. Changes to the system and how the department works*
4. Ways that the adverse outcome could have been mitigated or harm reduced

*these have the highest likelihood of preventing recurrence of an adverse outcome

Be wary of concluding "we should try harder next time". This is unlikely to bring about any changes.

In order to maximize the impact of M&M rounds, consider reviewing these bottom lines at your departmental quality and safety committee and prioritizing them for action.

Tips for your Presentation:

- Consider the following time outline:
  - 10 minutes for review of the case and state of evidence on current management
  - 10 minutes for case analysis in terms of cognitive and system issues
  - 10 minutes for discussion, identified issues and actions

Remember this is M&M rounds not Grand Rounds!

- Please remember these rounds are confidential and we need to endeavour to protect the privacy of patients. No patient initials, dates, times or names of staff involved should appear in your presentation.
- Think about whether you can make your rounds multi-disciplinary. Email the nurse manager and ask them to invite nurses involved in the case. Would it be helpful to have a pharmacist or social worker present? Are there consultants from other services you could invite? Other allied health members? Pathologist?
- Involving patients and/or their families can be powerful in M&M rounds. If this seems appropriate, speak to the Head of Department first to help you coordinate with Patient Care Relations and ensure it is done in a sensitive manner.
- Consider briefly discussing your selected case one week ahead of time with a colleague to confirm you have identified a clear cognitive or system issue.

M&M Rounds Process Improvement - Role of the Facilitator

1. Pre-M&M rounds: To touch base with presenters 1 week prior to offer feedback on case selection and slides
2. At M&M Rounds:
    a. Very brief intro mentioning the ongoing study and emphasizing confidentiality
    b. Maintain timeliness – reminder to presenters (ensure presentation starts at on time and ensure enough time for discussion)
    c. Facilitate discussion
        i. Highlight cognitive and system issues
        ii. Seek consensus on bottom line – identify 2-3 key points and emphasize
            1. Remember that these should be blame free
            2. Focus on recommendations that can be actioned
            3. Try and avoid "try harder" type of bottom lines or "more training" but seek out system changes
3. Post-M&M rounds:
    a. Create M&M rounds bottom line using template (remove presenters names) and disseminate to departmental members, RNs, allied health and senior management

Table 1. Classification Scheme for Cognitive Dispositions to Respond (CDRs)

Error of over-attachment to a particular diagnosis
• **Anchoring:** the tendency to perceptually lock on to salient features in the patient's initial presentation too early in the diagnostic process and failing to adjust this initial impression in the light of later information. This CDR might be severely compounded by the confirmation bias. • **Confirmation bias:** the tendency to look for confirming evidence to support a diagnosis rather than look for disconfirming evidence to refute it, despite the latter being more persuasive and definitive. • **Premature closure:** a powerful CDR accounting for a high proportion of missed diagnoses. It is the tendency to apply premature closure to the decision making process, accepting a diagnosis before it has been fully verified. The consequences of the bias are reflected in the maxim: ''When the diagnosis is made, the thinking stops.''
Error due to failure to consider alternative diagnoses
• **Multiple alternatives bias:** a multiplicity of options on a differential diagnosis might lead to significant conflict and uncertainty. The process might be simplified by reverting to a smaller subset with which the physician is familiar, but might result in inadequate consideration of other possibilities. One such strategy is the three diagnosis differential: "it is probably A, but it might be B, or I don't know (C)." Although this approach has some heuristic value, if the disease falls in the C category and is not pursued adequately, it minimizes the chance that serious diagnoses are made. • **Representativeness restraints:** drive the diagnostician toward looking for prototypical manifestations of disease: "if it looks like a duck, walks like a duck, quacks like a duck, then it is a duck." Yet, restraining decision making along these pattern recognition lines leads to atypical variants being missed. · **Search satisficing**: reflects the universal tendency to call off a search once something is found. Co-morbidities, second foreign bodies, other fractures, and co-ingestants in poisoning may all be missed.
Error due to inheriting someone else's thinking
• **Diagnosis momentum:** once diagnostic labels are attached to patients they tend to become stickier and stickier. Through intermediaries (patients, paramedics, nurses, physicians) what might have started as a possibility gathers increasing momentum until it becomes definite, and all other possibilities are excluded. • **Framing effect:** how diagnosticians see things might be strongly influenced by the way in which the problem is framed, **e.g.** physicians' perceptions of risk to the patient may be strongly influenced by whether the outcome is expressed in terms of the possibility that the patient might die or might live. In terms of diagnosis, physicians should be aware of how patients, nurses, and other physicians frame potential outcomes and contingencies to the clinical problem to them. • **Bandwagon effect:** the tendency for people to believe and do certain things because many others are doing so. Group-think is an example, and it can have a disastrous impact on team decision making and patient care.

Errors in prevalence perception or estimation

- **Availability bias:** the disposition to judge things as being more likely, or frequently occurring, if they readily come to mind. Thus, recent experience with a disease might inflate the likelihood of its being diagnosed. Conversely, if a disease has not been seen for a long time (is less available), it might be underdiagnosed.
- **Base-rate neglect:** the tendency to ignore the true prevalence of a disease, either inflating or reducing its base-rate, and distorting Bayesian reasoning. However, in some cases clinicians might (consciously or otherwise) deliberately inflate the likelihood of disease, such as in the strategy of "rule out worst-case scenario" to avoid missing a rare but significant diagnosis.
- **Hindsight bias:** knowing the outcome might profoundly influence perception of past events and prevent a realistic appraisal of what actually occurred. In the context of diagnostic error, it may compromise learning through either an underestimation (illusion of failure) or overestimation (illusion of control) of the decision maker's abilities.

Errors involving patient characteristics or presentation context

- **Fundamental attribution error**: the tendency to be judgmental and blame patients for their illnesses (dispositional causes) rather than examine the circumstances (situational factors) that might have been responsible. In particular, psychiatric patients, minorities**,** and other marginalized groups tend to suffer from this CDR. Cultural differences exist in terms of the respective weights attributed to dispositional and situational causes.
- **Triage cueing**: the triage process occurs throughout the health care system, from the self-triage of patients to the selection of a specialist by the referring physician. In the emergency department, triage is a formal process that results in patients being sent in particular directions, which cues their subsequent management. Many CDRs are initiated at triage, leading to the maxim: "Geography is destiny." Once a patient is referred to a specific discipline, the bias within that discipline to look at the patient only from their own perspective is referred to as "deformation professionnelle".
- **Yin-yang out:** when patients have been subjected to exhaustive and unavailing diagnostic investigations, they are said to have been worked up the yin-yang. The yin-yang out is the tendency to believe that nothing further can be done to throw light on the dark place where, and if, any definitive diagnosis resides for the patient, i.e., the physician is let out of further diagnostic effort. This might prove ultimately to be true, but to adopt the strategy at the outset is fraught with the chance of a variety of errors.

Errors associated with physician affect, personality, or decision style

- **Commission bias:** results from the obligation toward beneficence, in that harm to the patient can only be prevented by active intervention. It is the tendency toward action rather than inaction. It is more likely in over-confident physicians. Commission bias is less common than omission bias.
- **Omission bias:** the tendency toward inaction and rooted in the principle of non-maleficence. In hindsight, events that have occurred through the natural progression of a disease are more acceptable than those that may be attributed directly to the action of the physician. The bias might be sustained by the reinforcement often associated with not doing anything, but it may prove disastrous. Omission biases typically outnumber commission biases.
- **Outcome bias:** the tendency to opt for diagnostic decisions that will lead to good outcomes, rather than those associated with bad outcomes, thereby avoiding chagrin associated with the latter. It is a form of value bias in that physicians might express a stronger likelihood in their decision-making for what they hope will happen rather than for what they really believe might happen. This may result in serious diagnoses being minimized.
- **Overconfidence/underconfidence:** a universal tendency to believe we know more than we do. Overconfidence reflects a tendency to act on incomplete information, intuitions, or hunches. Too much faith is placed in opinion instead of carefully gathered evidence.
- **Zebra retreat:** occurs when a rare diagnosis (zebra) figures prominently on the differential diagnosis but the physician retreats from it for various reasons: perceived inertia in the system and barriers to obtaining special or costly tests; self-consciousness and underconfidence about entertaining a remote and unusual diagnosis and gaining a reputation for being esoteric; the fear of being seen as unrealistic and wasteful of resources; under- or overestimating the base-rate for the diagnosis; the ED might be very busy and the anticipated time and effort to pursue the diagnosis might dilute the physician's conviction; team members may exert coercive pressure to avoid wasting the team's time; inconvenience of the time of day or weekend and difficulty getting access to specialists; unfamiliarity with the diagnosis might make the physician less likely to go down an unfamiliar road; fatigue or other distractions may tip the physician toward retreat.

Adapted from: Campbell SG, Croskerry P, Bond WF. Profiles in patient safety: a "perfect storm" in the emergency department. AcadEmerg Med. 2007; 14:743-749.

Appendix A: Terminology

Cognitive issue: a specific pitfall in clinical decision making. Can refer to cognitive dispositions to respond (see table 1)

System issue: a problem beyond the individual clinician or team which pertains to how an emergency department operates

Examples of ED-based system issues:

- Prehospital care (coordination, protocol adherence, lack of needed protocols)
- Triage (accuracy of triage, impact of under-triage, protocol violations, insufficient triage rules)
- Wait times (impact of delays in offloading, triage, registration, awaiting investigations or consults)
- Investigations (availability of diagnostic imaging, timeliness and accuracy of results, follow-up of modified final reports, delay in laboratory testing results, availability of appropriate laboratory testing, followup of positive cultures)
- Therapy (availability of medications, medication errors, procedural errors or complications)
- Consultations (communication, delay in response, appropriateness of service, admission algorithm issues, impact of decisions on return ED visits)
- Discharge planning (lack of appropriate follow-up, delay in follow-up, communication issues around follow up or reasons to return)
- Shiftwork (impact of fatigue, timing of decisions relative to when you were on shift (i.e. beginning vs end of shift decisions)
- Crowding (impact of lack of beds, long wait times on decision making)
- Public/occupational health (people other than the patient, including health care workers are placed at risk)

Patient factors: any communication barrier (due to language, intoxication, obtunded, critically ill…), behaviour eliciting affective bias

Skill-set error: procedural complications or errors in interpretation of ECGs, laboratory or diagnostic imaging tests

Task-based error: failure of routine behaviours such as regular bedside care, attention to vital signs and appropriate monitoring – often reflects work overload

Personal impairment: personal factors that impact job performance e.g. fatigue, illness, emotional distress

Teamwork failure: breakdown in communication between team members, across shifts, between teams, and across specialty boundaries or due to inappropriate assignment of unqualified personnel to a given task – this includes resident and student supervision

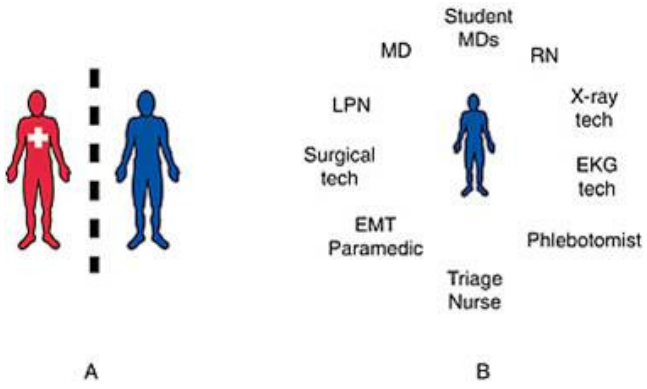
Local ED environmental contributors: e.g. appropriate staffing, stocking, functional equipment, sufficient policies & guidelines

Hospital-wide contributors: e.g. access to patient services, consultants, inpatient beds, specialty treatments

Hospital administration contributors: e.g. budgetary constraints, hospital policies & guidelines

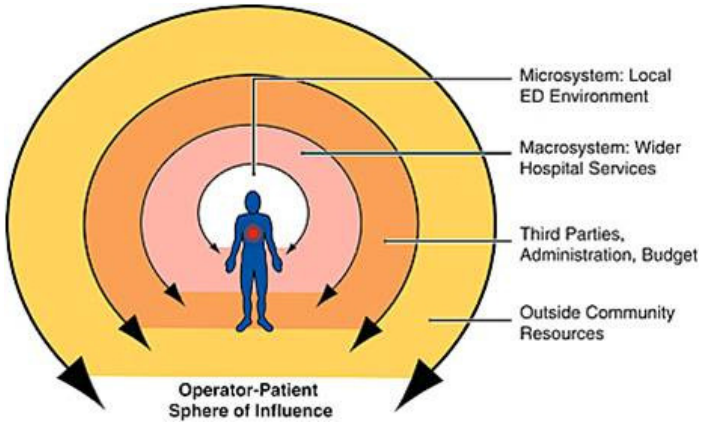
Appendix B: Analysis Tools

Perspectives of Patient Care



Patient: Doctor

Patient: Healthcare Team



Patient : System

Taken from: Cosby KS. Framework for classifying factors that contribute to error in the Emergency Department. Ann Emerg Med. 2003;42(6):815-823.

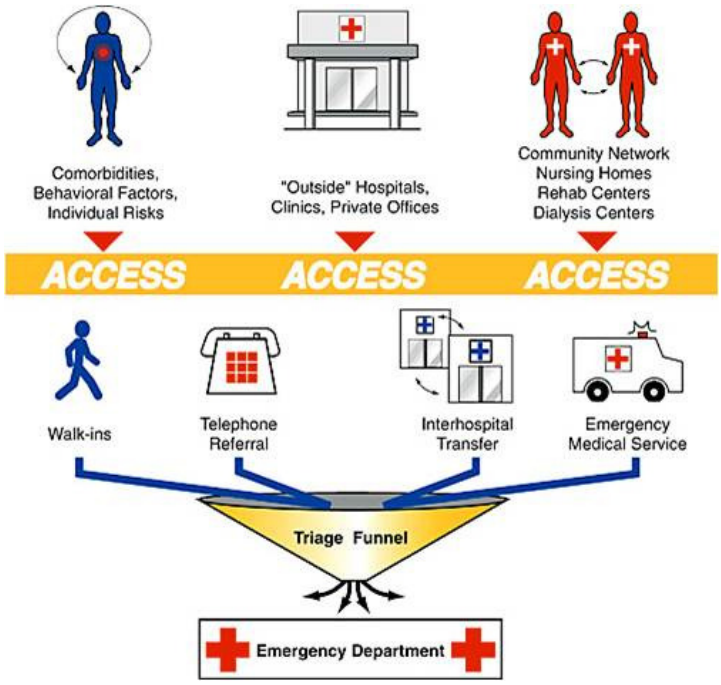
See also: Cosby KS, et al. Characteristics of patient care management problems identified in ED M&M during 15 years. Ann Emerg Med. 2008;51(3):251-61.

ACCIDENT MODEL

Pre-Event Event! Post-Event

ED EVENT MODEL

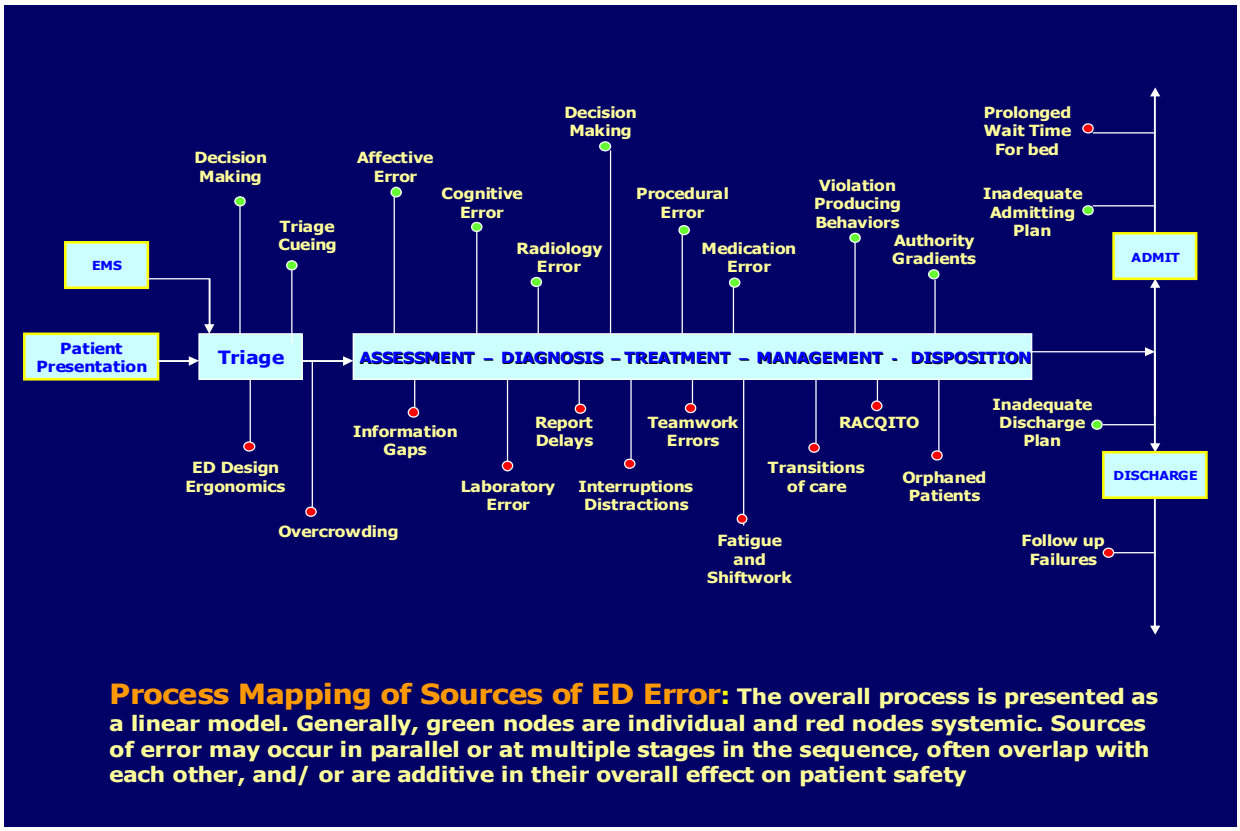
PreHospital – ED – Post ED Course (Both admissions and discharges)



Pre-ED Phase

Taken from: Cosby KS. Framework for classifying factors that contribute to error in the Emergency Department. Ann Emerg Med. 2003;42(6):815-823.

Process Mapping the ED



Reproduced from: Croskerry P, et al. Process Improvement and Patient Safety in the Emergency Department. In: Marx J, Hockberger R, Walls R. Rosen's Emergency Medicine: Concepts and Clinical Practice. 6th ed. Mosby;St Louis. 2006:3119-3127.

Process Mapping for Laboratory Testing:

Pre-Analytic (obtaining specimen, labeling, getting it to test site)

Analytic (performance of test)

Post-Analytic (reporting and interpreting result)

Process Mapping for Medication Ordering and Delivery:

Prescribing – Transcribing – Dispensing – Administering – Monitoring

Table 3. Taxonomy of where and what errors occurred

Where in Diagnostic Process *(~Anatomic localization)*	What Went Wrong *(~Lesion)*
1. Access/presentation	Denied care
	Delayed presentation
2. History	Failure/delay in eliciting critical piece of history data
	Inaccurate/misinterpretation "
	Suboptimal weighing "
	Failure/delay to followup "
3. Physical exam	Failure/delay in eliciting critical physical exam finding
	Inaccurate/misinterpreted "
	Suboptimal weighing "
	Failure/delay to followup "
4. Tests (lab/radiology)	***Ordering***
	Failure/delay in ordering needed test(s)
	Failure/delay in performing ordered test(s)
	Suboptimal test sequencing
	Ordering of wrong test(s)
	Performance
	Sample mix-up/mislabeled (e.g., wrong patient)
	Technical errors/poor processing of specimen/test
	Erroneous lab/radiol reading of test
	Failed/delayed transmission of result to clinician
	Clinician processing
	Failed/delayed followup action on test result
	Erroneous clinician interpretation of test
5. Assessment	***Hypothesis generation***
	Failure/delay in considering the correct diagnosis
	Suboptimal weighing/prioritizing
	Too much weight to low(er) probability/priority dx
	Too little consideration of high(er) probability/priority dx
	Too much weight on competing diagnosis
	Recognizing urgency/complications
	Failure to appreciate urgency/acuity of illness
	Failure/delay in recognizing complication(s)
6. Referral/consultation	Failure/delay in ordering needed referral
	Inappropriate/unneeded referral
	Suboptimal consultation diagnostic performance
	Failed/delayed communication/followup of consultation
7. Followup	Failure to refer to setting for close monitoring
	Failure/delay in timely followup/rechecking of patient

Taken from: Gordon D. Schiff, SeijeoungKim,Richard Abrams et al. Diagnosing Diagnosis Errors: Lessons from a Multi-institutional Collaborative Project. Advances in Patient Safety 2005; 2:255-278

Contributing Factors to Diagnostic Errors

Patient Factors (genotype, unable to comply, inadequate social support)

Disease Factors

Clinician Factors

Cognitive Factors

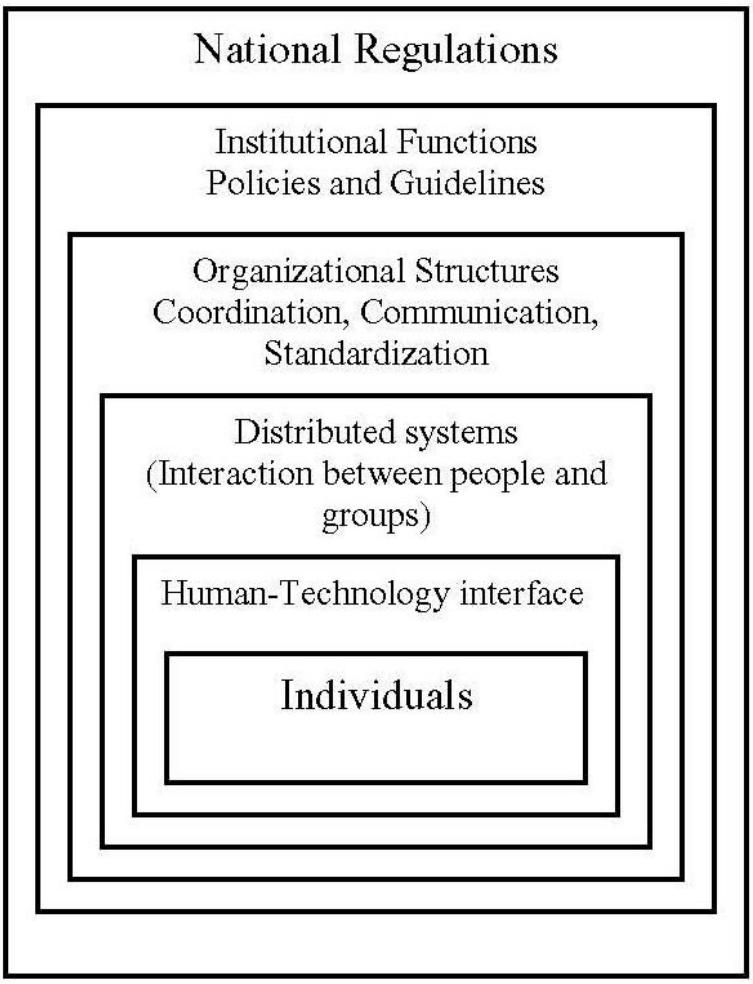
- Incomplete information
- Mis-information
- Perceptual errors
- Cognitive biases, heuristics, logical fallacies

Teamwork Failure

Communication

System or process failure

Wider community issues; regulatory issues; access to care.



Zhang and Patel's model focuses on systems and human factors.

From Zhang J, Patel VL, Johnson TR, Shortliffe EH.A cognitive taxonomy of medical errors.*J Biomed Inform*. 2004; 37(3): 193-204.

Appendix C: Examples of M&M bottom lines:

Massive Hemoptysis & DNR Status

- Actively seek resuscitation status of any arresting patient in the ED
- There is room for improvement in our current process of CPR designation
- Crash intubation in the setting of massive hemoptysis is best performed in the OR; a double lumen tube is a poor second.
- **Action items: 1.** DEM CPC Q&S to discuss the development of a guideline on the management of massive hemoptysis in the ED.
- **2.** DEM CPC Q&S and leadership (MDs & RNs) to discuss enhancing the identification and communication of DNR status of patients in the ED, including admitted patients boarded in the ED.

Rib Fractures

- Epidural use in patients with rib fractures can decrease mortality, especially in patients with > 5 fractured ribs who are > 65 years of age
- Positive Pressure Ventilation (not just invasive) can be an effective pain management strategy in patients with multiple rib fractures. The key is early initiation and strong RT support
- Be proactive in pain management of patients with rib fractures
- Potential regional partnership with trauma, ICU anaesthesia related to rib fractures