Human error – the flip side of the behaviour coin
Study of human error – historical note

1980 Columbia falls conference – John W Senders and Ann Crichton Harris

1983 Bellagio conference ‘Nature and Source of Human Error’ - Senders and Moray NATO sponsored, Rockefeller foundation provided conference venue in Villa Serbelloni

Ergonomic psychology/ human factors/ cognitive engineering – Rasmussen, Reason, Anderson, Kirwin, Swain etc.

High risk industries – HRA and ALARP region

2003 First conference of surgical errors (COSE) Washington USA
Diagram of Human Actualization – Maslo

Behaviourist Psychology

- Physiological needs: to satisfy hunger, thirst, and sex drives
- Safety needs: to feel secure, safe and out of danger
- Belongingness and love needs: to affiliate with others; to be accepted and belong
- Esteem needs: to achieve, be competent, gain approval and recognition
- The need to fulfill one's unique potential
Anderson’s Theory of Cognitive Architecture

- **Memory systems**
  - Working
  - Declarative
  - Production

- **Processes**
  - Encoding
  - Performance
  - Storage
  - Retrieval
  - Execution

- **Knowledge representation types**
  - Temporal strings
  - Spatial images
  - Abstract propositions (encode meaning)
COCOM Contextual Control Model

- Scrambled Control: Choice of the next action is unpredictable or random. The operator does not have a useful internal model of the world in which he operates.

- Opportunistic Control: corresponds to actions based on the current context as opposed to more fundamental constructs.

- Tactical Control: when operator performance is based on planning. Behavior that is consistent with the rule-based levels of control identified by Rasmussen.

- Strategic Control: operator has a sufficiently accurate model of the process and the environment to support planning and prediction of high level goals that can be managed across a system of interruption.

(Hollnagel, 1997)
The Internal Processing Classification

- **Input error**: the input data are incorrectly perceived (an incorrect intention is formed) hence the wrong action is performed.

- **Intention error**: the input data are correctly perceived but an incorrect intention is formed, and the wrong action is performed.

- **Execution error**: the input data are correctly perceived, the correct intention is formed, and the wrong action is performed; that is, an action not what was intended.

- James Reason
Error Modes (Embrey)

Mode is the particular appearance of an error when this results in an action

Error modes:
- **Omission** - leaving out of an appropriate step in a process
- **Insertion** - adding of an inappropriate step to a process
- **Repetition** - inappropriate adding of a step normally appropriate to a process
- **Substitution** - an inappropriate object, action, place or time instead of the appropriate object, action, place or time
The human perspective – blame, responsibility for error

- Blame implies a theory that errors can be perceived by the actor before they are executed, and voluntarily controlled to prevent their execution.
- Responsibility implies a theory that consequences arise because of flaws in behaviour.
- Errors, to the extent that we have data, are random; the moment when an error will occur cannot be predicted. There is no "aura" which signals to an actor that an error is about to occur.
- From the point of view of the actor, the error is unpremeditated - "Operation of uncontrollable natural forces" (Oxford Dictionary)
‘The actor is the victim of the error; the patient is the victim of the expression of the error in a medical setting which permits the error to be completed and produce an injury’
Human Errors in Medical Setting

- There are no medical errors
- There are many errors which occur in a medical setting
- Although we can predict error probabilities, we cannot predict when an error will occur
- Errors that are not prevented from running their course lead to accidents…but how?
‘The real problem isn’t how to stop bad doctors from harming, even killing their patients. It’s how to prevent good doctors from doing so.’

How Dangerous is Health Care

- Less than 1 death per 100,000 encounters
  - Nuclear power
  - European railways
  - Scheduled airlines

- One death in < 100,000 but > 1000 encounters
  - Driving
  - Chemical manufacturing

- More than 1 death per 1000 encounters
  - Bunjee jumping
  - Mountain climbing
  - Health care

J Smith BMJ
Some 'holes' due to active failures

Other 'holes' due to latent conditions

Defences in depth
Bristol babies
Factors Modulating Effect of Errors in Hospital Practice

- Prevailing external circumstances
- Interventional activity
- Efficiency of abortive active intervention
- Communication defects
- Poor team work/ skills
- Surgical approach
- Complexity of the intervention
Distal (Coalface) Errors in Surgical Practice

- Diagnostic and management errors
- Resuscitation errors
- Situation awareness errors
- Identification/ misappropriation errors
- Team work errors
- Prophylaxis errors
- Prescription/ parenteral administration errors
- Technical and operative errors
Surgical Settings

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<th>Setting</th>
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<tr>
<td>Operating room</td>
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<tr>
<td>Intensive care</td>
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<td>Ward</td>
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<tr>
<td>Ambulatory care</td>
<td>?</td>
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<tr>
<td>Outpatients/ consulting</td>
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Nature of errors likely to differ in these settings – importance of ‘intensivity’ factor
Error Averse Surgical Care

Neither system nor individual based – but holistic approach or paradigm

Interrelated components:
Risk avoidance
Coherence
Sound infrastructure
Culture
Quality assurance
Elimination of poor performance
Risk Avoidance

Well trained staff
Clear Procedures
Safe Environment
Coherence

- Goals of individual, team and organisation aligned
- Excellent communication systems
Culture

Open and participative

Good leadership

Education/ research valued

Patient partnership

Ethos of teamwork
Quality Assurance

Best practice spread
Evidence based clinical policies
Anonymous incident reporting systems
Improvement processes integrated
Poor Performance

- Early recognition
- Decisive intervention
- Effective self regulation!
- Feedback on performance
- Re-validation
Confusing Terminology

- Competency:
  Cognitive skills and knowledge to practice a profession

- Proficiency
  Ability to execute a task at a consistently optimum level and outcome

- Learning
  Acquisition of new knowledge
Surgical Proficiency - Control Modes

**Controlled Conscious Processing**
- Requires attention control
- Error probability high
- Slow deliberate execution
- Subject to fatigue

**Automatic Unconscious Processing**
- Effortless
- Intuitive and fast
- Reduced error probability
- Not mentally exhausting
Training/ Proficiency Zones

- Training zone

Number of cases performed
Proficiency-gain Curve Documented by HRA

Total number of errors per anastomosis

- Number of errors vs. Anastomosis
- Series 1
Proficiency Maintenance

Performance vs. Years of independent practice graph.
Surgical Competency and Proficiency

- Long-term process
- Selection of surgical trainees
- Training and assessment of trainees
- Anonymous incident reporting systems in surgical practice
- Assessment of established surgeons - revalidation/re-certification
There are some patients whom we cannot help.....

There are none whom we cannot harm
Failure to ensure that all of our colleagues are competent and safe is ethically indefensible.
ACS Code of Professional Conduct

- Maintain competence throughout our surgical careers
- Respect the knowledge, dignity, and perspective of other healthcare professionals
- Participate in self regulation by setting, maintaining, and enforcing practice standards
Types of Performance Problems

1. The Psychopathic physician
2. The impaired physician
   - Substance abuse - alcohol / drugs
   - Mental illness
   - Physical illness
3. Declining Competency
4. Behavioral Problems
   - Disruptive physician
     - Refuses to follow rules
     - Abusive behavior
   - Abusive with patients
Types of Performance Problems

1. The Psychopathic Physician 0.1%
2. The impaired physician
   - Substance abuse - alcohol / drugs 15%
   - Mental illness 15%
   - Physical illness 10%
3. Declining Competency
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Types of Performance Problems

1. The Psychopathic Physician  0.1%
2. The impaired physician
   - Substance abuse - alcohol / drugs  15%
   - Mental illness  15%
   - Physical illness  10%
3. Declining Competency  5-10%
4. Behavioral Problems
   - Disruptive physician
What do surveys reveal about disruptive behavior?

NURSES:
• Nurses witnessing or receiving it 95%
• Verbal abuse every 2-3 months 64%
• Believe it is a cause of nurses leaving 37%
• Percent of doctors exhibiting it 5.7%

HOSP EXECs: 1-5%
Types of Performance Problems

1. The Psychopathic Physician 0.1%
2. The impaired physician
   - Substance abuse - alcohol / drugs 15%
   - Mental illness 15%
   - Physical illness 10%
3. Declining Competency 5-10%
4. Behavioral Problems
   - Disruptive physician 5%
     - Refuses to follow rules
     - Abusive behavior
   - Abusive with patients 5%
All causes considered, 30-40% of all physicians will have a problem at some time in their career that will impair their ability to practice medicine safely.

For a hospital staff of 100, this means that at any one time 1 or 2 physicians need help.
Why are doctors reluctant to act?

• Distasteful to judge peers
• Emotionally difficult – “family”
• “Glass house” syndrome
• Fear of retribution
• No good mechanism
We have a “Non-System”

- Implicit
- Personal
- Punitive

It’s “all or nothing”
We define performance problems as disciplinary problems

- “Hung up” on punishing
  - Want to “weed them out”

- Safety objective: prevention
What would we like to do?

1. Identify doctors with problems early
2. Do something about it
3. Do it in a timely fashion

We need a system
What are the essential characteristics of an effective professional accountability system?

- **Objective** - based on data, not opinion
- **Fair** - applies to everyone
- **Responsive** – prompt and effective treatment

**GOAL:** to enable the physician to continue to practice medicine
What would an effective professional accountability system look like?

1. Adopt performance standards
2. Adherence is a condition of appointment to staff
3. Adherence is monitored (everyone)
4. Feedback of results and action as needed
5. Broad repertoire of methods for remediation
• Sub par performance can be objectively defined

• Routine monitoring of all members of the medical staff is necessary to detect problems fairly and early

• The response to deficiencies should be prompt, constructive, and sustained
What is needed?

• Standards
• Measures
• Assessment and remediation programs
ACGME / ABMS Competency Standards

- Compassionate, appropriate, and effective patient care
- Medical knowledge and its application to patient care
- Practice-based learning and improvement
- Interpersonal and communication skills
- Professionalism and ethical behavior
- Systems-based practice
Example of a Behavioral Standard

“Treat Co-workers with Respect”

• Hostile behavior is forbidden (raised voice, insults, public reprimands)
• No demeaning behavior or humiliation of residents and nurses
• No derogatory comments about colleagues – oral or written
• Work in meaningful teams
• Accept challenges to authority
What measures are available?

- ABMS competency measures are being developed
  - ABIM competency testing now
- Gerald Hickson’s analysis of patient complaints
- PAR “360” multitrait evaluations
What about:

- Annual physical exams
- Drug testing
- Cognitive testing
What is needed?

- Standards
- Measures
- Assessment and remediation programs
How will we develop programs for assessment and remediation?

Need a collaborative effort

ABMS
FSMB
JCAHO
Are we willing to support recovering doctors?

• Who pays for assessment and remediation?
• How is his/her income maintained?
• Are we willing to make refresher positions available in all of our residency programs?
• Are we willing to mentor and supervise retrained doctors?
• Will we let them care for our patients?