Preventing Clinical Errors: Part One

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Learning Objectives:

- Discuss the epidemiology and significance of medical errors.
- Distinguish among four categories of medical errors
- Explain the interaction of personal, systemic and patient factors in causing medical errors.
- Describe common types of errors that are specific to respiratory care.

Learning Objectives:

- Recognize the barriers to error prevention at all levels in the healthcare system.
- Describe the potential contributions of department managers, practitioners, educators, patients and their families in preventing medical errors.

Terminology

Definitions

- Error - the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim.
- Errors can include problems in practice, products, procedures and systems.

Definitions

- Adverse event - an injury that was caused by medical management and that resulted in measurable disability. These may be either:
  - unpreventable; e.g., due to patient characteristic, or
  - preventable - due to error

Click to see operating room adverse event (0.5 min)
http://www.youtube.com/watch?v=G8iT_PRjptg&NR=1

Definitions

- Sentinel event (Joint Commission)
  - an unexpected occurrence involving death or serious physical or psychological injury, or the risk thereof. Serious injury specifically includes loss of limb or function.

Definitions

- Sentinel event
  - These events are called "sentinel" because they indicate the need for immediate investigation and response.
  - The terms "sentinel event" and "medical error" are not identical; not all sentinel events occur because of an error and not all errors result in sentinel events.

Definitions

- Near misses - error recognized and action taken to prevent harm
- No harm errors - error does not result in adverse event

Epidemiology of Medical Errors

Occurrence

- Adverse events occur in 3 - 4% of hospital patients
- Average ICU patient experiences
  - 1.7 errors per day
  - 20% of ICU errors are potentially serious or fatal

Occurrence

- 19% of adverse events are drug complications - 45% of these are due to error
- Deaths from medical errors exceed deaths from motor vehicle accidents, breast cancer and AIDS, respectively
- More errors occur in healthcare than in other industries - complexity?

Cost of medical errors

- Medical errors kill 44,000 - 98,000 U.S. hospital patients/year
- Medical errors cost $17 - $29 billion/year
- Patients suffer physical and psychological discomfort
- Patients and families lose trust in healthcare
- Caregivers suffer from shame, frustration and loss of confidence

Positive effect of errors

- Under controlled conditions, errors are conducive to acquisition of skills
  - laboratory training
  - simulations
  - war stories
  - directly supervised clinical practice

Error Classifications

Broad categories of medical errors

- overuse - the service is unlikely to have net benefit; e.g., incentive spirometry, chest physiotherapy
- underuse - a potentially beneficial service is delayed or withheld (intubation)
- misuse - a service is inappropriately used (bronchodilators)

Types of errors

- Diagnostic
- Treatment
- Preventive
- Other

Types of errors

- Diagnostic
  - error or delay in diagnosis
  - failure to use indicated tests
  - failure in diagnostic testing or reporting
  - failure to act on test results

FYI - click to see video of talk-show discussion about surgical errors (6 min)
http://www.youtube.com/watch?v=9fCYYPCtHGs

Types of errors

- Treatment
  - error in operation or procedure
  - error in administering a treatment; e.g., wrong medication/dosage
  - delay in treatment
  - inappropriate treatment

Types of errors

- Preventive
  - failure to provide prophylaxis; e.g., TED stocking, anticoagulants
  - inadequate follow-up; e.g., coagulation profiles

Types of errors

- Other
  - technical failure; e.g, ventilators, monitors
  - other system failure; e.g, management mistakes
  - communication failure
    - many sources
    - enables many errors

Click to see results of communication failure (15 sec)
http://www.youtube.com/watch?v=SnO9Jyz82Ps

Causes of Errors

Multifactorial view

- Individual factors play causal role in injuries; but,
  - there usually are multiple contributing factors, that enable or perpetuate the original error and
  - a faulty system can set up people to make errors; e.g., understaffed ICU

Multifactorial view

- Factors
  - personal attributes of practitioner
  - attributes of the system; e.g, the hospital
  - patient attributes

Interplay of contributing factors

Personal Factors

- health
- state of mind
- competency
- professional commitment

Interplay of contributing factors

System Factor

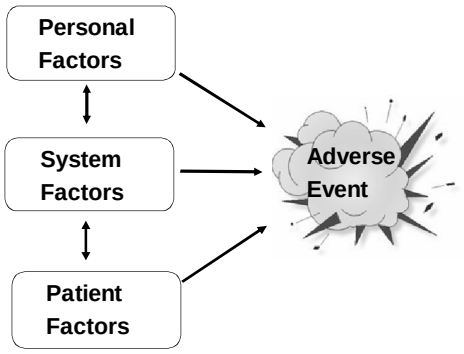
- physical facilities
- management & supervision
- organization culture
- communication
- commitment to safety

Interplay of contributing factors

Patient Factors

- physical constitution
- psychological constitution
- illness acuity
- comorbidities
- obscure morbidity

Interplay of contributing factors



Multifactorial view

- Swiss cheese construct - errors are perpetuated through holes in multiple layers of defenses
  - example: errors in mechanical ventilation perpetuated by therapists who copy settings from previous shifts

Multifactorial view

- Injuries were found to have more than three contributing factors
- Chain of errors found in 77% of errors - 66% of these were communications errors

Multifactorial view

- Injury - patient infected by RCP
  - RCP did not wash hands or glove for that patient.
  - they respond to an urgent call
  - handwashing sinks poorly accessible
  - hand sanitizing dispenser empty
  - gloves were not stocked
  - patient was immunosuppressed by steroids

Multifactorial view

- Injury - patient bleeds from heparin overdose
  - Physician orders wrong drug dosage
  - chart shows incorrect patient weight
  - laboratory report missing from chart ==> misdiagnosis
  - erroneous order is carried out, because ..... Swiss cheese

Personal factors

- Fatigue - excessive work hours
- Impairment
  - illness - physical or psychological
  - substance abuse
- Techno-sightedness - seeing the monitors and ignoring the patient

Personal factors

- Inattentiveness - diversion to personal matters
- Autopilot - act from habit, not intent
- Slips (brain cramps) - happens to all
- Deficient motivation - does not care
- Incompetency - management also responsible

Systemic factors

- Fatigue - excessive work hours
- Organizational culture*
  - language - negative connotations, implying blame
  - intimidation - impairs communication
  - tribalism - impairs communication

Systemic factors

- Excessive workload
- Extreme patient acuity (one-on-one)
- Task-focused care (numbers)

Systemic factors

- Training and education failure
  - orientation
  - new equipment
  - new procedures
- Insufficient standardization
  - procedures - unwritten, unclear or uncommunicated
  - equipment - different devices in different units

Medical records

- Multiple charts
  - paper
  - electronic
- Confusing abbreviations, acronyms
- Poor legibility - paper
- Poor spelling, grammar

Click to see medical chart bloopers (1 min)
http://www.youtube.com/watch?v=dsw7uNZiJcI&NR=1

Respiratory Care Specific Errors

Medication errors

- Common errors
  - missed treatments
  - wrong medications
- Error causes:
  - lack of physicians' knowledge of indications
  - excessive workload
  - failure to verify orders
  - slips

Medication errors

- Error enablers
  - overuse of medications
  - misuse of medications
  - absence of collegial relationships and/or protocols

Lung inflation techniques - errors

- Common errors
  - inappropriate treatment
  - missed treatments
  - incorrect administration technique
- Error causes
  - inappropriate order
  - perception that treatment is not important
  - inappropriate instruction by therapist

Lung inflation techniques - errors

- Error enablers
  - lack of physicians' knowledge of indications
  - inadequate procedure and/or communication of procedure
  - absence of collegial relationships and/or protocols

Oxygen therapy

- Common errors
  - inappropriate appliance
  - incorrect liter flow
- Error causes
  - inappropriate order
  - failure to verify orders
  - failure to check device/liter flow
  - readjustment of liter flow by others

Oxygen therapy

- Error enablers
  - physicians' lack of knowledge pertaining to device capabilities
  - excessive workload
  - difficulty seeing devices, especially in dark
  - perception that it is not important to verify orders or check adjustments
  - absence of collegial relationships and/or protocols

Mechanical ventilation

- Common errors
  - inappropriate ventilator settings
- Error causes
  - inappropriate orders
  - miscommunication; e.g., saying one thing, writing another
  - failure to verify orders
  - slips
  - knob twirling gremlins

Click to see result of knob twirling gremlins (1.75 min)
https://www.youtube.com/watch?v=hl3Y_MfDH3U

Mechanical ventilation

- Error enablers
  - physicians' lack of expertise pertaining to ventilation
  - respiratory therapists' lack of expertise pertaining to discretionary adjustments
  - excessive workload/patient acuity
  - absence of collegial relationships and/or protocols
  - inappropriate Christmas gifts; e.g., mogwai

Blood gas analysis

- Common errors
  - sampling errors:
    - sample obtained on incorrect FIO2
    - venous sample
  - analysis errors; e.g., air, clots in sample
  - reporting errors; e.g., reporting impossible results

Blood gas analysis

- Error causes
  - failure to verify order for FIO2
  - inappropriate sampling technique
  - failure to examine or mix sample
  - miscommunication of conditions for sampling; e.g., FIO2 or venous sample

Blood gas analysis

- Error enablers
  - excessive workload/patient acuity
  - difficult sampling conditions; e.g., shock, seizures
  - inadequate sampling supplies; e.g., syringes, needles
  - inadequate procedures, communication or adherence to procedures

Error Prevention

Barriers to prevention

- Failure to report errors, especially:
  - near misses
  - no harm done
- Error reporting enhances error prevention by:
  - identifying error enablers
  - discovering strategies for error prevention

Barriers to prevention

- Reasons for not reporting errors
  - question as to whether a reportable error has occurred
  - fear of punishment - dismissal
  - fear of reprisal - payback
  - too busy

Barriers to prevention

- Strategies to encourage error reporting
  - place positive spin on reporting
  - facilitated reporting; e.g., safety hotline
  - confidentiality - supervisor not informed
  - anonymity - avoidance of reprisal
  - investigation by fact-finding and not faultfinding

Barriers to prevention

- Tribal culture
  - impairs communication among tribes
  - impairs cooperation on error prevention
- Dysfunctional administration
  - culture of blame
  - reactive measures to adverse events - punish, not prevent

Agency level preventative measures

- Research on:
  - error frequencies
  - error causes
  - error enablers
  - error prevention
- Generation of practice guidelines aimed at error reduction at all levels

Institutional preventative measures

- Promote safety culture - starting with analysis of employee attitudes and perceptions about safety

Institutional preventative measures

- Safety culture characteristics
  - belief that harm is untenable
  - ability to speak up and raise concerns
  - obligation to listen to others' concerns
  - recognition of personal and organizational hazards
  - obligation to work as a team
  - use of systems approach to analyzing safety issues
  - organizational learning is valued

Institutional preventative measures

- Analysis of events
  - investigation should be fact-finding; not faultfinding
  - identify error enablers; e.g., glove unavailability
  - correct error enablers

Institutional preventative measures

- Education, not just training, about safety
  - general safety
  - specific areas; e.g., infection control

Institutional preventative measures

- Educate & recognize all contributors to safety:
  - clinical practitioners
  - clerical staff
  - housekeeping
  - central supply
  - physical plant maintenance

Unit preventative levels

- Leadership - intensivist for ICU
- Team work - plug holes in Swiss cheese
- Focused patient safety efforts
  - peer support, not peer pressure
  - safety conferences - all tribes represented
  - safety checklists for procedures

Departmental preventative measures

- Leadership - not autocracy (boss)
- Management by walking around
- Education and training
  - patient safety
  - competency assurance
  - policies and procedures
- Feedback (not threats) to employees about results of safety effort
- Assignments to safe conditions

Departmental preventative measures

- Equipment
  - safest, not cheapest
  - standardized - variety is not spice
  - maintenance

Individual preventative measures

- Identification as a professional, including accountability
- Self monitoring of:
  - state of alertness - autopilot off
  - awareness of our knowledge status (metacognition)
  - clinical skills
- Report errors and error enablers
- Decline assignment to unsafe conditions

Individual preventative measures

- Critical behavior checklist
  - Stop - before procedure and intend to focus
  - Think - identify steps in critical safe actions
  - Act - consciously implement steps
  - Review - revisit and evaluate completed procedure
  - Track - follow up outcomes - how is patient?

Patient level

- Engagement of patient and family - monitoring and reporting to prevent errors.

Respiratory care educators

- Contribute to safety and error prevention by teaching:
  - professional attitude
  - ethical basis for practice
  - knowledge base for practice
  - clinical skills - error-free procedures
  - error detection and correction in the laboratory and clinical setting
  - war stories - vivid details of misadventures

Summary & Review

- Terminology
  - errors
  - adverse events
  - sentinel events
- Epidemiology of errors
  - kill up to 98,000/year
  - cost up to $29 billion/year

Summary & Review

- Broad error categories
  - overuse
  - underuse
  - misuse
- Specific error categories
  - diagnostic
  - treatment
  - preventive
  - others

Summary & Review

- Error causes - interaction of:
  - personal factors
  - systemic factors - setups for mistakes
  - patient factors
- Respiratory care specific
  - medications
  - lung inflation treatments
  - oxygen therapy
  - mechanical ventilation
  - blood gas analysis

Summary & Review

- Error prevention
  - barriers to prevention - bosses and tribes
  - agency level prevention - research, guidelines
  - institutional level prevention - safety culture
  - unit level prevention - full-time intensivist

Summary & Review

- Error prevention
  - department level - walk-around leaders, education
  - individual level - professionalism, self-monitoring, reporting
  - patient & family prevention - monitoring and reporting
  - educators' contributions to prevention - safety indoctrination, knowledge, skills

END

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