

Preventing Clinical Errors: Part One

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<http://www.geocities.com/jonesapjr/index.html>

Learning Objectives:

- △ Describe errors that occur in respiratory care practice, their underlying causes and contributing factors.
- △ Explain mechanisms by which healthcare organizations and practitioners can minimize clinical 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
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.

FYI - click for more information on Sentinel events
http://www.premierinc.com/safety/topics/patient_safety/index_3.jsp

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.

FYI - click to subscribe to Joint Commission Sentinel Alert
http://www.jointcommission.org/Library/Newsletters/list_serve.htm

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)
<http://www.youtube.com/watch?v=9fCYYPctHG8>

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

<http://www.youtube.com/watch?v=AShBoF1FPSE&feature=related>

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
- ^ 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

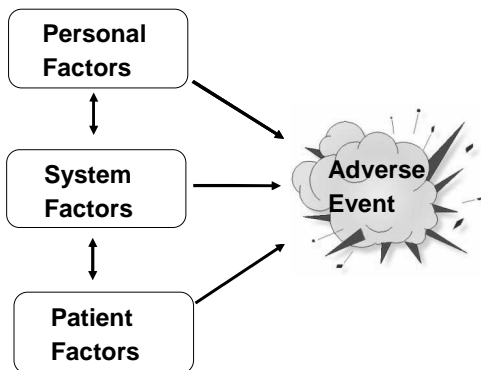
- ◆ health
- ◆ state of mind
- ◆ competency
- ◆ professional commitment

Interplay of contributing factors**System Factors**

- ◆ 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

FYI - click to download article on mistake cascade
<http://www.annfammed.org/cgi/reprint/2/4/317.pdf>

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

FYI - Click to download article on birth and death of a high-reliability healthcare organization
<http://qshc.bmj.com/cgi/content/abstract/14/3/216>

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**

FYI - click to see medical chart bloopers
<http://www.youtube.com/watch?v=dsw7uNZiJcl&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
<http://www.youtube.com/watch?v=c3cbrfpVmK8&NR=1>

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

Click for Joint Commission Sentinel Alert on preventing medical errors

http://www.jointcommission.org/SentinelEvents/SentinelEventAlert/sea_43.htm

Institutional preventative measures**^ Promote safety culture - starting with analysis of employee attitudes and perceptions about safety**

FYI - Click to download article on culture of safety

https://www.ecri.org/Documents/Patient_Safety_Center/HRC_CultureofSafety.pdf

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

Institutional preventative measures**^ Analysis of events**

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

^ 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 98,00/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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