Preventing Medical Errors Part One

Arthur Jones, EdD, RRT

This Presentation is Approved for
1 CRCE Credit Hour

Learning Objectives

- Describe errors that occur in respiratory care practice, their underlying causes, & contributing factors
- Explain mechanisms by which healthcare organizations & 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, & systems

Definitions

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

See links below to view operating room adverse event

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 see links below for more information on Sentinel events

Definitions

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

FYI see links below to subscribe to Joint Commission Sentinel Alerts

Definitions

- Near misses: error recognized & 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 & psychological discomfort
- Patients & families lose trust in healthcare
- Caregivers suffer from shame, frustration, & 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 a 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 see links below for video of talk-show discussion about surgical errors (6 min)

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

See links below to view results of communication failure
FYI see links below to view medical chart bloopers (humor)

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

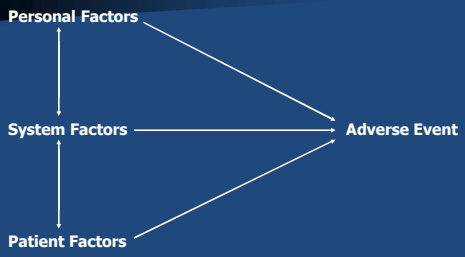
Interplay of Contributing Factors

- 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 see links below to download article on mistake cascade

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 see links below to download article on birth & death of a high-reliability healthcare organization

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 see links below to view medical chart bloopers

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 &/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 &/or communication of procedure
  - Absence of collegial relationships &/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 &/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

See links below to view result of knob twirling gremlins

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 &/or protocols
  - Inappropriate Christmas gifts, e.g. mogwai

Blood Gas Analysis

- Common errors
  - Sampling errors
    - Sample obtained on incorrect FiO_2
    - 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 FiO_2
  - Inappropriate sampling technique
  - Failure to examine or mix sample
  - Miscommunication of conditions for sampling, e.g. FiO_2 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 & 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 & perceptions about safety

Institutional Preventative Measures

- Safety culture characteristics
  - Belief that harm is untenable
  - Ability to speak up & raise concerns
  - Obligation to listen to others' concerns
  - Recognition of personal & 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
- 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 & 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 & intend to focus
  - Think - identify steps in critical safe actions
  - Act - consciously implement steps
  - Review - revisit & evaluate completed procedure
  - Track - follow up outcomes - how is patient?

Patient Level

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

Respiratory Care Educators

- Contribute to safety & error prevention by teaching
  - Professional attitude
  - Ethical basis for practice
  - Knowledge base for practice
  - Clinical skills - error-free procedures
  - Error detection & correction in the laboratory & 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 & 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 & reporting
  - Educators' contributions to prevention - safety indoctrination, knowledge, skills

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