Section A

Case
Case

- Infant born in Denver hospital to mother with past history of syphilis
- Incomplete information on past treatment and current serologic status
- Spanish speaking
- Decision made to treat infant for congenital syphilis
Case

- Phone consult with ID specialists and health department
- Benzathine penicillin G 150,000 units IM
Case

- Physicians, nurses and pharmacists unfamiliar with congenital syphilis and drug
- Physician consulted reference book
- Misread 50,000 units/kg as 500,000
- Pharmacist prepared 1,500,000 unit dose to be given as 2.5 mL IM
Case

- Nurse concerned that 0.5 mL/injection in infants = 5 injections!

- Investigated possibility of IV admin

- Reference book mentioned
  - Crystalline penicillin G slow IV push
  - Penicillin G procaine IM
  - No mention of Penicillin G benzathine
Hospital policy unclear on non-physicians changing Rx orders

Neonatal NP assumed this was okay

Decided to administer IV
Case

- Penicillin G benzathine is a milky white substance that is insoluble and obstructs blood flow in the lungs necessary for the transfer of oxygen from the airways
Case

- Syringe must be rotated 180 degrees away from name to see manufacturer’s warning
Nurses began to administer first syringe of Permapen slow IV push

After 1.8 mL administered, the infant became unresponsive

Resuscitation efforts were unsuccessful
Case

- What went wrong?
Medication Use Process

- Prescribing
- Ordering/transcription
- Dispensing
- Administration
- Monitoring
What Went Wrong

- Poor transcription of health department order
- Physician order writing
  - U for units
- Lack of double check of doses
- Confusing drug information
- Lack of communication
- Poor syringe labeling
What Should Be Done?

- Be more careful
- Better education
- Make a policy
Case

- The three nurses indicted by grand jury for negligent homicide
- Expert testimony gave evidence of more than 50 latent and active failures
- Advised against tendency to focus on the errors of individual providers
- Clear evidence that med errors are almost never caused by failure of single element or practitioner
- Jury acquitted nurse in the case that went to trial
Look Beyond Blaming Individuals

Section B

Understanding and Preventing Medication Errors
Systems of Medication Use

- Patient information
- Drug information
- Communication of drug information
- Labeling, packaging and nomenclature
- Drug storage, stock, standardization and distribution
- Device acquisition, use, and monitoring
- Environmental factors
- Staff competency and education
- Patient education
- Quality and risk management issues
Examples of Medication Errors/ADEs

- Medication error
  - Wrong dosage prescribed
  - Wrong dosage administered for a prescribed medication
  - Failure to give medication (by provider) or take (by the patient)

- Adverse drug event
  - Wrong dosage leading to injury (e.g., rash, confusion, loss of function)
  - An allergic reaction occurring in a patient not known to be allergic to the given medication
Frequency

- Frequency of medication errors and preventable adverse drug events
  - On average, a hospital patient is subject to at least one medication error per day
  - Substantial variations in error rates are found across facilities
At least 1.5 million preventable ADEs occur each year

- Hospital care
  - Classen et al., 1997, projected 380,000
  - Bates et al., 1995, projected 450,000

- Long-term care
  - Gurwitz et al., 2005, projected 800,000

- Among outpatient Medicare patients
  - Gurwitz et al., 2003, projected 530,000

This excludes errors of omission
Morbidity Due to Medication Errors Is Costly

- Our understanding of costs is incomplete
  - Hospital care: $3.5 billion (2006 dollars)
    - Bates et al., 1997
  - Long-term care: no cost estimate available
  - Among outpatient Medicare patients: $887 million (2000 dollars)
    - Field et al., 2005
Additional Costs

- Drug use without a medically valid indication
- Failure to receive drugs that should have been prescribed
- Failure of patients to comply with prescribed medication regimens
- Lost earnings, compensation for not being able to carry out household duties, and compensation for pain and suffering
- Errors that do not result in harm but create extra work
Preventing Medication Errors

- Preventing Medication Errors
  - IOM, 2006
Recommendations

- Improved provider-patient partnership actions for consumers and providers (rec. 1); improved consumer-oriented drug information (rec. 2)

- Electronic prescribing (by 2010) and monitoring for errors is essential (rec. 3)

- Enormous knowledge deficits must be addressed
  - Improved naming, labeling and packaging, and review of free sample use (rec. 4); standards for health IT (rec. 5); research agenda on safe medication use (rec. 6)

- Oversight, regulatory organizations, and payers should motivate error reduction and enhance professional competency (rec. 7)
Recommendation 1: Specific measures should be instituted to strengthen patients’ capacities for sound medication self-management

- Patients (or family) should maintain an active list of all medications
- Providers should take definitive action to educate patients (or family) about the safe and effective use of medications
- Consultation on their medications should be available to patients at key points along the medication use process
Consumers should be able to obtain quality information about medications not only from their provider, but also from the pharmacy, Internet resources, and community-based resources. However, current materials are inadequately designed for consumers to read, comprehend, and act on.
Improved Provider-Patient Partnership Is Vital

- **Recommendation 2:** Government agencies and consumer-oriented drug information and medication self-management support
  - Standardization of pharmacy medication information leaflets
  - Improvement of online medication resources
  - A national drug info telephone helpline
  - Personal health records
  - National medication safety plan
Electronic Prescribing and Monitoring for Errors Is Essential

- Impossible for prescribers to have current knowledge about every medication they prescribe
- Paper-based prescribing is associated with high medication error rates
- Patient handoffs between care sites and providers often lead to medication errors
- Medication error reduction is an ongoing activity
Electronic Prescribing and Monitoring for Errors Is Essential

**Recommendation 3:** Health care organizations should implement the appropriate systems to enable providers to ...

- Communicate patient-specific medication-related information in an interoperable format
- Assess the safety of medication use through regular monitoring
- Write prescriptions electronically by 2010
- Subject prescriptions to evidence-based, clinical decision support
Enormous Knowledge Deficits Must Be Addressed

- Better risk/benefit information is needed for prescription drugs, particularly, for specific populations—children, elderly, patients with renal dysfunction, patients with multiple comorbidities.

- Drug naming, labeling, and packaging problems lead to medication errors.
Enormous Knowledge Deficits Must Be Addressed

- Large gaps exist in our understanding of medication error incidence rates, costs, and prevention strategies
  - Primary focus of research should be prevention strategies and implementation
  - Priority areas for research on incidence rates are care transitions, specialty ambulatory clinics, psychiatric care, the administering of medications in schools
  - A better understanding of the costs/consequences of errors in all care settings is needed
Conclusions

- Medication errors are very common in every setting in which medications are used and present a risk to millions of Americans every day

- There are many proven approaches to make medication use safer

- Safe medication use will require actions at all levels of the health care system, including providers, patients, health care organizations, educator, regulators, payers, and legislators

- More information is needed so we can learn in the real world how to prevent medication errors