Medication Errors

Mistakes in the use of a medication are one of the best tracked types of medical error. Errors with medication can occur in hospitals, at the pharmacy, in the doctor's office, and even due to the patient. Problems can include adverse reactions and interactions with other medications, and also basic administrative errors such as patients being given the wrong medication or wrong dosage. A less studied aspect of mistakes involving medications is the misdiagnosis of a disease when the real cause is a side effect of medication; see medications underlying disease.

Medical errors: An Institute of Medical report [1] gives detailed information about deaths and adverse events due to errors in medication. The report estimates that 7,391 deaths resulted from medication errors in 1993. The IOM report cites one study finding that about 2% of hospital admissions experienced a preventable adverse drug event, although the majority are not fatal. Medication error was cited as the cause of death for 1 in 131 outpatient deaths and 1 in 854 inpatient deaths.

Children and infants are particularly at risk of medication errors mainly due to dosage, because of the need to modify dosages based on age and weight. The dosage modification may be either overlooked or miscalculated. Various studies have shown high error rates in doctors and nurses in calculating weight-dependent dosages in infants and especially neonates.

Prescription errors: The dispensing of prescription medications at the pharmacy can have various errors. The wrong medication can be given, particularly when medications are named or packaged similarly. There are particular drugs that are known to have problems because their names are very similar. The pharmacy can also give out the wrong dosage of the drug in some cases.

Most studies of medication errors only analyzed hospital medication usage, and there is a large volume of medications prescribed in doctor's offices and dispensed by pharmacies. There were nearly 2.5 billion prescriptions dispensed by pharmacies in 1998 in the USA compared to an estimated 3.75 billion drug administrations in hospitals. Error in prescription and dispensing are known but difficult to quantity. For example, the IOM report cites an Australian study for 1988-1996 finding that 2.4 to 3.6 percent of hospital admissions were due to medication events, of which 32 to 69% were preventable. The medications causing most problems were cytotoxics, cardiovascular drugs, antihypertensives, anticoagulants, and NSAIDs.

Causes of medication errors: People with kidney conditions, liver conditions, or known drug allergies were at the greatest risk. The IOM report cites the following factors as casual in medication errors:

failure to alter a medication or dosage due to patient's reduced kidney or liver function (13.9%),

known allergy to same medication class (12.1%);
using the wrong drug name, dosage form, or abbreviation (11.4%),
incorrect dosage calculations (11/1%); and
atypical or unusual and critical dosage frequency considerations (10.8%).

Data indicates the greater risk in prescription errors from the doctor rather than the pharmacist with estimates as follows:

prescribing errors (69%)
administration errors(25%) and
supply errors (7%)

Adverse drug reactions: An adverse drug reaction (ADR) is not necessarily a medical error although it can be. An adverse drug reaction occurs when a patient suffers a reaction, side effect, or other injury from a medication. This can occur without an error, such as when a patient has an **allergy** to a medicine, but has never shown any signs or risk factors for the allergy previously. On the other hand, an error would occur if a previous allergy was known but the medication was still given to the patient.

Adverse drug reactions are quite common. Lazarou et al. 1998 (JAMA) Lazarou [2] estimated that 6.7% of hospitalizations resulted in an adverse drug reaction, and 0.32% of cases were fatal. This extrapolates to about 2,216,000 cases annually in hospitalized patients and 106,000 deaths.

Holland et al 1997) [3] estimates as many as 1 million patients are injured while in the hospital and approximately 180,000 die as a result. This leads to a cost estimate of more than $136 billion a year. The article cites the list of medications most frequently causing adverse reactions in order of incidence:

antibiotics,
chemotherapy,
anticoagulants,
cardiovascular agents,
anticonvulsants,
antidiabetic agents,
antihypertensives,
analgesics,
antiasthma agents,
sedative-hypnotic agents,
antidepressants,
antipsychotic agents, and
antiulcer agents.

Footnotes:

1. Institute of Medicine (IOM), “To Err Is Human: Building of Safer Heath System”, 2000, online.
2. Lazarou J, Pomeranz BH, Corey PN. Incidence of adverse drug reactions in hospitalized patients: a mete-analysis of prospective studies. JAMA 1998 Apr 15;279(15):1200-5,html,PDF
3. EILEEN G. HOLLAND, PHARM.D., and FRANK V. DEGRUY, M.D. Drug-Induced Disorders, Volume 15, No. 7, November 1, 1997, html