

# Rachel's Environment & Health News

## #682 - Medical Mistakes

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During 1999 mainstream institutions revealed that one of the biggest killers in the U.S. is medical mistakes.

\*\* The NEW YORK TIMES reported that 5% of people admitted to hospitals, or about 1.8 million people per year, in the U.S. pick up an infection while there.[1] Such infections are called "iatrogenic" -- meaning "induced by a physician," or, more loosely, "caused by medical care." Iatrogenic infections are directly responsible for 20,000 deaths among hospital patients in the U.S. each year, and they contribute to an additional 70,000 deaths, according to the federal Centers for Disease Control (CDC). The dollar cost of iatrogenic infections is \$4.5 billion, according to the CDC.

The rate of iatrogenic infections has increased 36% in the past 20 years[1] partly because people entering hospitals now are sicker and more vulnerable than they were 20 years ago, and partly because excessive use of antibiotics has created antibiotic-resistant killer microbes.

\*\* A large part of the problem is health care workers who fail to wash their hands properly, the TIMES reported. "Hands are the most dangerous thing in the hospital," says Dr. Robert A. Weinstein, director of infectious diseases for the Cook County Bureau of Health Services in Chicago. A study conducted at the Duke University Medical Center found that only 17% of physicians treating patients in an intensive care unit washed their hands appropriately.[1]

An alternative to hand-washing would be use of latex gloves. Unfortunately, many health care workers view gloves as protecting themselves exclusively -- they put them on in the morning and wear them all day long, the equivalent of not washing their hands. A study of glove use at a long-term care center found that gloves were worn 82% of the time when their use was indicated, but changed appropriately only 16% of the time.

Hospitals have few incentives to monitor infection rates among their patients. "If you don't do good [infection] surveillance, you don't detect infections, which means they don't exist and you look great," says Dr. William Jarvis, chief of the Investigation and Prevention branch of the Hospital Infections Program at the CDC in Atlanta.[1]

Various remedies are being considered. One is to urge health care workers to wash their hands with waterless, alcohol-based antimicrobial hand rubs which are as effective as traditional hand-washing but faster to use and gentler than soap and water.

Another approach is to train patients to ask each health care worker who comes into their room, "Did you wash your hands?"

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The "big picture" of medical mistakes is even worse. A report entitled, TO ERR IS HUMAN, issued by the National Institute of Medicine (a division of the National Academy of Sciences) in November found that medical mistakes kill somewhere between 44,000 and 98,000 people (average: 71,000) in hospitals in the U.S. each year.[2]

There are about 33.6 million people admitted to hospitals each year in the U.S. Somewhere between 2.9% and 3.7% (average: 3.3%) of these suffer an "adverse event" while in the hospital.[2,pg.1] An "adverse event" is defined as an injury caused by medical management rather than by the underlying disease or condition of the patient.[2,pg.25] Of these adverse events, somewhere between 8.8% and 13.6% (average: 11.2%) are fatal.[2,pg.1] Of all adverse events, somewhere between 53% and 58% (average: 55.5%) are attributable to mistakes.[2,pg.22] Therefore we can calculate[3] that, on average, one out of every 500 people admitted to a hospital in the U.S. is killed by mistake. (For comparison, the chance of being killed in a commercial airline accident is one per 8 million flights.) Thus medical mistakes qualify as a major public health problem. Even the low estimate, 44,000 killed by medical mistakes each year,

exceeds the number of people killed in the U.S. by automobile accidents (43,458 in 1998).

For those who are accustomed to thinking in terms of 1-in-a-million as an "acceptable" death rate for technological errors, the 1-in-500 deaths by medical mistakes equates to 2000-in-a-million.

TO ERR IS HUMAN acknowledges that the 1-in-500 figure may underestimate the size of the death-by-medical-mistake problem because the 1-in-500 estimate is based on information found in patient records and many medical mistakes may not be acknowledged in patient records. TO ERR IS HUMAN says, "Most errors and safety issues go undetected and unreported, both externally and within health care organizations." [2,pg.37] "Silence surrounds this issue," the report says.[2,pg.2]

TO ERR IS HUMAN provides evidence that the 1-in-500 estimate may be low. The report describes two studies that found rates of death due to medical mistakes that far exceed 1 in 500. One study of 815 patients in a university hospital found that 36% had an iatrogenic illness, defined as "any illness that resulted from a diagnostic procedure, from any form of therapy, or from a harmful occurrence that was not a natural consequence of the patient's disease." Of these 815 patients, 9% had an iatrogenic illness that threatened life or produced considerable disability, and for another 2%, iatrogenic illness was believed to contribute to the patient's death.[2,pg.26] Thus this study found that 10-in-500, or 1-in-50, patients were killed by a medical mistake.

A second study looked at 1047 patients admitted to two intensive care units and one surgical unit in a large teaching hospital. Of the 1047 people studied, 480 (46%) had an "adverse event" where an adverse event was defined as "situations in which an inappropriate decision was made when, at the time, an appropriate alternative could have been chosen." [2,pg.26] For 185 patients (18%), the adverse event was serious, producing disability or death.

An important class of medical mistakes is medication errors --giving a patient the wrong medication, the wrong dose, or inappropriate combinations of medications. TO ERR IS HUMAN estimates that medication errors both inside and outside hospitals killed 7,391 people in the U.S. in 1993,[2,pg.27] but the report acknowledges that, "Current estimates of the incidence of medication errors are undoubtedly low because many errors go undocumented and unreported." [2,pg.29] The problem seems to be getting worse as doctors prescribe more drugs. Between 1983 and 1993, hospital patient deaths due to medication errors increased 2.4-fold while deaths from medication errors among outpatients increased an astonishing 8-fold.[2,pg.28]

TO ERR IS HUMAN reports that doctors often do not consider possible interactions among drugs that they prescribe to a patient. The report says, "Physicians do not routinely screen for potential drug interactions, even when medication history information is readily available." TO ERR IS HUMAN goes on to describe a study of 424 randomly-selected patients in a hospital emergency room. Nearly half of these patients (199, or 47%) received new medications as a result of their hospital visit and in 10% of those -- 19 individuals, or 4.7% of the study group -- received medications that added "potential adverse interactions." "In all cases," TO ERR IS HUMAN reports, "a medication history was recorded on the patients and available to the physicians." [2,pg.33]

Children and old people are particularly prone to medication errors, mainly related to incorrect doses. In one 4-year study of a pediatric intensive care unit, iatrogenic injury due to a medication error occurred among 3.1% of 2147 children -- a rate of one iatrogenic injury among every 33 intensive care admissions.[2,pg.29]

A 1987 study found that physicians prescribed inappropriate medications for nearly 25 percent of all older people.[2,pg.33]

And physicians are not the only part of this problem. A study of pharmacists in Massachusetts found that in a year's time 2.4 million prescriptions (4% of all prescriptions) were improperly filled at the drug store. Eighty-eight percent of these pharmacist errors involved giving patients the wrong drug or the wrong strength.[4]

Lastly, available data about medication errors probably underestimate the true size of the problem. To ERR IS HUMAN says, "Current estimates of the incidence [occurrence] of medication errors are undoubtedly low because many errors go undocumented and unreported." [2,pg.29]

TO ERR IS HUMAN acknowledges that the true death rate from medical mistakes may exceed 1-in-500 for other reasons. The 1-in-500 figure is the in-hospital death rate. "Although many of the available studies have focused on the hospital setting, medical errors present a problem in any setting, not just hospitals." [2,pg.2] And: "...[L]ittle if any research has focused on errors or adverse events occurring outside of hospital settings, for example, in ambulatory care clinics, surgicenters, office practices, home health, or care administered by patients, their family, and friends at home." [2,pg.25] The death rate from medical mistakes in nursing homes has not been reported. However, one study of medications in nursing homes estimated that, for every dollar spent on prescription drugs, \$1.33 is spent treating iatrogenic injuries and deaths caused by those drugs.

To ERR IS HUMAN presents a series of recommendations for improving medical safety. The stated goal is to reduce deaths from medical mistakes in hospitals to 1-in-1000 within 5 years. The recommended way to achieve the goal is to make medical errors expensive: "The combined goal of the recommendations is for the external environment to create sufficient pressure to make errors costly to health care organizations and providers, so they are compelled to take action to improve safety," the report says. [2,pg.3]

Thus the National Academy of Medicine acknowledges that laudable motives ("First do no harm"), good intentions, years of specialized training, and voluntary compliance cannot enforce safety protocols. What works is a hefty monetary penalty.

We should all remember this the next time Congress tries to limit the opportunity for citizens to sue corporations and individuals who sell unsafe products or services, dangerous chemicals, and other hazardous technologies. Tort litigation and stiff penalties provide our best hope of limiting harmful behavior.

--Peter Montague (National Writers Union, UAW Local 1981/AFL-CIO)

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[1] Emily Yoffe, "Doctors Are Reminded, 'Wash Up!'," NEW YORK TIMES November 9, 1999, pg. F-1.

[2] Linda T. Kohn, Janet M. Corrigan, and Molla S. Donaldson, editors, TO ERR IS HUMAN; BUILDING A SAFER HEALTH SYSTEM (Washington, D.C.: National Academy Press, 1999). ISBN 0-309-06837-1.

[3] Using data from TO ERR IS HUMAN (pgs. 1 and 22), the average probability of death by medical mistake after being admitted to a hospital is: the probability of an "adverse event" caused by medical management (0.033) multiplied by the probability that the adverse event will be fatal (0.112) multiplied by the probability that the adverse event was caused by human error (0.555); so  $0.033 * 0.112 * 0.555 = 0.002 = 1/500$ . The low death estimate for hospital deaths is  $33.6E6 * 0.029 * 0.088 * 0.53 = 43,700$ ; the high death estimate is  $33.6E6 * 0.037 * 0.136 * 0.58 = 98,000$ .

[4] We had to make some assumptions to derive the 4% figure. TO ERR IS HUMAN, pg. 33, says 2.4 million prescriptions were improperly filled in Massachusetts in a recent year. We do not know how many total prescriptions are filled in a year in Massachusetts, but we can estimate the number this way: TO ERR IS HUMAN, pg. 27, says 2.5 billion prescriptions were filled in the U.S. in 1998. In 1998, the U.S. population was about 270 million people, so each person had 9.2 prescriptions filled (average) in 1998. In 1997, the Massachusetts population was about 2.32% of the U.S. population, so in 1998 when the U.S. population was 270 million, the Massachusetts population was probably about 6.3 million people; if each person had 9.2 prescriptions filled in 1998 then the total filled in Massachusetts was about 58 million. Therefore 2.4 million errors represent an error rate of about 4%.

Descriptor terms: medical mistakes; mortality statistics; morbidity statistics; hospitals; infections;