IMPROVING THE SAFETY OF DRUG USE. TEN YEARS' EXPERIENCE.

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Background. We present ten years' experience in improving drug use through two methods of medication error detection applied in an acute-care private general hospital. This study may be useful to other hospitals in programs to improve drug use.

Methods. The study was done in a 357-bed acute-care hospital covering 36 medical specialties. The Pharmacy Service is open and has a pharmacist present 24 hours a day. Currently 70% of medical orders are prescribed electronically. In the decade from 1994 to 2004, 2,065,332 medical orders were validated and 19,382,965 units of medicine were dispensed. With support from Management, a multidisciplinary working group consisting of pharmacists, physicians and nurses was formed and met monthly. The methods of observation and communication were used to obtain two annual medication error rates. The communication method consisted in recording all medication errors communicated, analyzing them and implementing corrective measures. The errors were notified to all health-care personnel of the hospital. The error rate was calculated by dividing the total number communicated errors in a year by the total number administrations done at the same year in the hospital. The observation method was based on observations of drug administration in the hospital units by nurses and last-year pharmacy students in practicums. The error rate was calculated by dividing the total number of errors by the number of opportunities for error (doses administered plus doses omitted) and this figure was multiplied by 100 to give the value as a percentage.

Results.

Table 1. Voluntarily reported errors.

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
n errors	0	9	28	90	88	111	133	148	275	297	386
Errors severity > C	0	6	13	46	28	33	48	56	78	138	86
Error rate (%)	0	0.002	0.01	0.02	0.02	0.02	0.03	0.03	0.06	0.06	0.08

Table 2. Observer-reported errors.

Year	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
n observations	855	839	739	776	736	937	764	728	725	707	829
Error rate incl. time	6.8	3.5	7	7.7	5.6	4.7	7.9	4.6	5.2	4.2	4.6
Error rate (%) not incl. time	4.9	2.9	5.1	5.6	3.8	2.9	5.2	3.5	4.3	3.2	1.8

During the first two years of the study, the observations were done by supervisors of the floors where the drugs were administered, and during the third year, by supervisors from other floors, which led to an increased error rate as a result of greater objectivity. In the year 2000 pharmacy students joined the observer group, and they also detected more errors, thus increasing the error rate. Three errors with a level severity greater than C were detected in the first year. There were no errors of a severity level greater than C in the following years. The trend toward a lower error rate using the observation method is statistically significant. The errors that were communicated increased over the years as the culture of safety became more widespread in the hospital. The principal corrective measures applied were standardized dilution of intravenous drugs and standardization of the times of drug administration throughout the hospital, extension of electronic prescription methods (currently 70% of all medical orders), computerized control of allergies and the dissemination, analysis and corrective measures for the errors detected. Manual medical orders have a mean error rate that is double that of electronic prescriptions.

Conclusions. 1. The two methods applied have been effective in improving the safety of drug use in the hospital for the following reasons: the error rate for the observation method shows a tendency to decrease; starting in the second year there were no errors with a severity level greater than C; and electronic prescriptions present half the error rates of manual medical orders. 2. The number of communicated errors increased continuously and significantly throughout the 10 years of the study, undeniably the result of a positive attitude that excludes punitive measures or a culture of blame. 3. In comparison with rates obtained by other authors, the error rates for the observation method are lower and those for the communication method are similar.

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