

Simplified Model for Considering the Problem of Dispensing Errors: A Systems Perspective

T. Donald Rucker

The "Simplified Model for Considering the Problem of Dispensing Errors: A Systems Perspective" (Table 1) has served as a 1-page handout for over 1,500 first-year students enrolled in the introduction to pharmacy course at 2 major universities. Although the concept was originated by Bruce R. Siecker, Ph.D., elaboration and revision was carried out by the author sans feedback (positive or negative) from classroom experience. Thus the pedagogical value of this model has not been established. Readers with similar instructional responsibilities, therefore, are encouraged to conduct appropriate validation efforts so that further refinement may be considered.

The purposes of this model, which normally consumes some six to eight minutes of lecture time, are to dramatize that the practice of pharmacy involves a serious personal/professional responsibility, to challenge students to view their academic program from the perspective of solving problems rather than the more common one of just memorizing reading assignments and classroom notes, and to illustrate the power of macro analysis in confronting complex professional duties. Many faculty interested in using the kill-rate example will probably want to develop their own analytical comments. Those seeking guidance, however, may wish to consider the following points.

T. Donald Rucker, Ph.D., is Professor of Pharmacy Administration at the College of Pharmacy, University of Illinois at Chicago, M/C 871, Chicago, IL 60612.

TABLE 1. SIMPLIFIED MODEL FOR CONSIDERING THE PROBLEM OF DISPENSING ERRORS: A SYSTEMS PERSPECTIVE

Pharmacist Output (as dispenser or supervisor)

40 hours/week x avg. of 6 Rx/hour = 240 Rx/week
 50 weeks/year x 240 Rx = 12,000 Rx/year
 40 years professional employment x 12,000 = 480,000 Rx/lifetime

Pharmacist Proficiency		Persons Killed if Mortality Rate is:	
Accuracy Rate	Total Errors	1/4 of 1%	1/8 of 1%
95%	24,000	60	30
97%	14,400	36	18
99%	4,800	12	6
99.5%	2,400	6	3
99.8%	960	2+	1+

Selected Sources of Dispensing Errors

- Illegible handwriting on order form
- Verbal order misinterpreted (and not confirmed promptly in writing)
- Systematic dispensing procedures not followed
- Pharmacist lacks basic technical knowledge
- Interruptions during dispensing process

Illustrative Strategies for Preventing (Minimizing) Dispensing Errors

- Admit applicants who show promise of being competent practitioners
- Attend class regularly
- Achieve maximum performance in academic program
- Graduate only students who show promise of being competent practitioners
- Establish an optimal work environment, including systematic controls related to dispensing
- Modify incentives and/or regulatory approaches to ensure minimum levels of professional performance
- Develop effective CE programs and test results
- Reject any third-party administrative procedure that tends to raise probability of error

Total Deficiencies in Drug Use Process are Understated Because of Factors External to the Dispensing Model

- Prescriber error in diagnosis and/or selection of most appropriate therapeutic agent
- Drug product per se faulty and/or labeled incorrectly by the supplier
- Patient compliance problems excluded

The notion of aggregate output and related errors considers the daily duties of a pharmacist extrapolated to encompass some 40 years of employment. The lifetime estimate developed for this exercise might fall below 400,000 prescriptions under some assumptions, while it could exceed 650,000 under others. Further, patients usually receive prescribed medications under conditions where pharmacists hold sole responsibility for the dispensing function, regardless of practice setting.¹ The fact that some pharmacists may separately or jointly carry out managerial and/or clinical duties does not absolve the profession from any shortcomings in the dispensing obligation.

The literature describing practitioner errors, coupled with the continuing growth of the population, instructs us that most mistakes in the dispensing process do not lead to fatalities. On the other hand, no practitioner has been encountered who has never made an error. Hence the "Accuracy Rate" column reflects some best-case levels regarding pharmacist performance. Reality may be overstated here, though, because the literature fails to document that any pharmacist has operated above the threshold of 99% proficiency. More importantly, several investigations indicate that "serious errors" exceed more than 1% of the total. The accompanying model attempts to adjust for the lack of hard data by employing two conservative coefficients that fall well below this figure.

In summary, some dispensing errors lead to death, but society lacks a systematic methodology for measuring them and classifying their causal relationships. The handout suggests five possible sources where the implication is that neither academic inputs nor continuing professional education programs are likely to have much direct impact on reducing most of these impediments.

While some resources should be allocated to determining the frequency and severity of dispensing errors, the majority of our efforts should be devoted to minimizing them. The first four strategies illustrate methods that constitute the domain of colleges of pharmacy. But neither society nor the profession knows whether several of these strategies might be more or less cost-effective than the four managerial/system options enumerated below. Further, the most

¹The dispensing physician model, of course, precludes this responsibility.

cost-effective measure(s) may even have been omitted from the handout.

A simple model developed to help entering pharmacy students understand selected implications of their practice environment can also be expanded to suggest a research agenda for the question of how society might better control the frequency and consequences of dispensing errors. Indeed, some students (with prompting by their instructor) may perceive that graduate study represents the vehicle for pursuing this goal. In addition, some pharmacy administration faculty may consider that problems of this type represent their major *raison d'être*. Perhaps both faculty and students will be interested in examining the extent to which external procedures (e.g., those imposed by third-party drug programs) impede or facilitate such control. In any case, the profession, academe, and society share the responsibility when patients are killed rather than helped by prescription drug therapy.