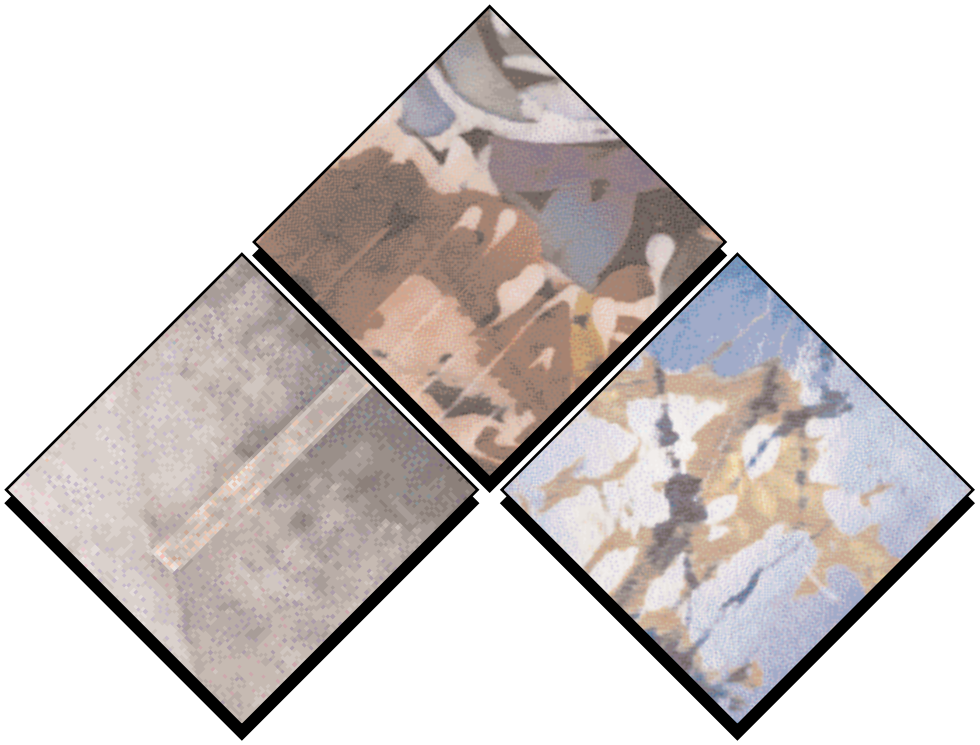
HEALTH NOTES



Quality Assurance

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HEALTH NOTES

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Quality Assurance

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Tools for the Reflective Practitioner:

Using Self-Monitoring, Personal Feedback and Goal Setting to Reduce Error

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In a recent letter that I received, a pharmacist remarked, "Part of the reason for errors is that filling prescriptions is like an assembly line operation. It seems like a never-ending task. We get so busy that we often don't have time to think. Pharmacists become like robots with our brains on the back burner!"

Pharmacists are not alone. Researchers estimate that 70-80 percent of our waking life uses the mental equivalent of an automatic pilot.[1,2] This is particularly true of familiar tasks such as driving cars, exercising, and performing the repetitive and routine parts of our jobs. Our conscious awareness drops and largely automatic modes of thinking and behaving take over. Harvard University psychologist, Ellen Langer, labels this mental state *mindless thinking* and contrasts it with what she calls *mindful* or conscious and reflective thinking.[3] Each mode of thinking has its advantages and disadvantages.

On the positive side, our ability to engage our "autopilots" saves time and energy for reflective thinking on interesting and challenging tasks. Thus, when asked whether a combination of three medications could have side effects, a pharmacist switches into a mindful mode of thinking. Since most of the dispensing process largely occurs automatically, additional time is available for a thoughtful answer. Reflective thinking and processing of information reduces accident and error rates, lessens anxiety and stress, and gives people a sense that they have more control in their lives.[4,5]

On the negative side, mindless thinking creates a mental fog with less conscious attention paid to the task at hand. Rules and procedures may not be used properly, and normal checkpoints may not be thoroughly conducted. In a pharmacy, these short cuts can translate into a variety of mistakes. Familiar examples include the misspelling of patient or physician names during data entry, placing incorrect directions on a label, selecting the wrong drug or strength, rushing the final verification of a prescription, or failing to counsel patients on new prescriptions.

Clearly, devoting additional conscious attention to tasks, especially during normal checkpoints, will be helpful. Also, periodic analysis of the strengths and weaknesses associated with how tasks are conducted and the outcomes of any changes can improve the safety and quality of work. The new quality assurance regulation to reduce medication errors (Title 16 CCR, Section 1711) encourages the analysis of mistakes and the development of remedies.[6] It is *reflective practitioner-friendly* legislation. It provides permission, protection, and an incentive for pharmacists to learn from their mistakes.

There are two sides to most things in life and the new quality assurance law in California is no exception. While it will undoubtedly yield dividends in improving patient safety, *it may inadvertently limit what can be learned and achieved*. The problem lies in how a medication error is defined in the new regulation. Specifically excluded from the definition of an error is "any variation that is corrected prior to furnishing the drug to the patient or patient's agent or any variation allowed by law."[6] This definition of a medication error is reasonable, but it may limit the focus of analysis to *those adverse outcomes that account for a minority of the mistakes that pharmacists make*.

In contrast, errors made and corrected in the process of achieving a correct outcome, or "near misses," provide extremely valuable information about conditions producing errors. I label such mistakes *process errors*. Analyzing process errors produces information about the causes of error and suggests how they might be managed. These lessons are less likely to emerge from a study of outright medication errors alone.

Important Characteristics of Process Errors

Process Errors Are "Real-Time" Errors

Currently, several strategies are used to analyze the cause of errors. But they are initiated either after an error has occurred (e.g., root cause analysis and pharmacy incident report analysis) or in advance of a potential problem. The latter strategy is used to assess potential risk in new procedures or changes in drug use and distribution systems (e.g., failure mode and effects analysis). A drawback of such techniques is that some dispensing errors are not easily reconstructed after the fact and conditions likely to produce errors that are not totally predictable beforehand. For example, consider what normally occurs when patients discover errors. Such mistakes are often called to the pharmacist's attention hours or even days after the event happened. Memories for events fade with time, facts are remembered and assembled selectively, and emotions associated with a medication error can interfere with an accurate reconstruction of what actually happened.[7,8] When asked about the causes of errors on incident reports or in focus groups, pharmacists typically respond with such statements as, "I was busy," "I was distracted by a customer's question," "It happened out of the blue like a bolt of lightning," or "Must have been a bad roll of the dice."[9] These and similar statements do not help to identify underlying causes.

In contrast, because process errors are monitored in *real time*, additional sensitivity to psychosocial factors and the nuances of environmental, workflow, and other factors can be obtained. Recent cases of serious errors suggest that mental distraction, following rigid rules, and emotional states affected the error, but were largely ignored in traditional analyses of the problems. The medication errors occurred when a pharmacist was preoccupied with the recent death of a spouse, when a nurse invoked a cultural injunction to "not challenge authority and thus I assumed the doctor knew what he was doing," and while a pharmacist was worried about her children on a camping trip as a severe storm approached.[9,10,11] Psychosocial factors can lead to specific interventions. In the cases mentioned here, a company bereavement leave policy should be in place; assertiveness training for employees in managing authority would teach valuable skills; and a culture

encouraging workers to ask colleagues to help check their work when emotional levels are high could have prevented the errors. Such lessons learned can be combined with traditional root cause and failure-mode analyses to provide a comprehensive picture of the causes of medication errors.

Increases in Process Errors are Precursors to Medication Errors

There are many more process errors than outright mistakes. As they increase, so do the chances of a mistake getting past normal verification checkpoints.[12] On average, for every six process errors, one mistake will find its way into the "will-call bins" waiting to be picked up or directly into the hands of patients. This ratio of process errors to mistakes that get past normal verification processes is remarkably stable and has been observed in retail pharmacy field-sites, an outpatient hospital pharmacy study,[13] and in a pharmacy simulation laboratory.[14]

Process Errors are Like a Double-Edged Sword

They are good, because a mistake was caught and corrected. Unfortunately, process errors are bad as well, because they signal that mental processes drifted into an error mode. Too many of them are a sign that the *fog of mindless thinking is emerging*. Pharmacy personnel should take precautions. *A rule of thumb is that six or more processes errors per hour should be treated as an alarm.*[i] This lesson is easily applied. One pharmacy manager told me that she watches herself and her staff carefully. "When I notice them fumbling about and making too many corrections, I require a break or a shift in their tasks and require additional checks of their work." A pharmacist remarked, "When they increase, I take a break or do a non-dispensing task for awhile." Such actions lessen the chances of patients receiving incorrect prescriptions.

Capturing Process Errors

Periodic Self-Monitoring of Performance

In a study of 84 pharmacists in 36 retail pharmacy field-sites, pharmacists monitored themselves for 9 hours a week over a 4-week period, equally dividing their time between early, middle, and late parts of their shifts.[12,16] The form used to document critical events is shown in Figure 1. It was part of a 4 x 6 inch booklet the pharmacists carried with them or kept close by in the workspace. Multiple copies of the form were available in the booklet to cover the periods of time on the shift they would spend monitoring performance. The pharmacists placed a hatch mark or check in the proper space on the form whenever a critical event occurred (e.g., a change in data entry or final verification). Everyone was instructed to make an entry only when it was safe to do so. The monitoring packet also included forms for recording emotional states and perceptions of subjective workload. The latter included ratings of perceptions of mental demand, time demand, physical demand, concern for doing well, effort required, and frustration with their work.[ii]

This form can be used as shown, or adapted to reflect aspects of particular pharmacy environments or any specific

SELF-MONITORING OF PROCESS ERRORS

Day ____ Part of Shift (Early) (Middle) (Late)

Time of day you began ____ ended ____

Scripts you helped to fill during this time ____

Correcting information to patient on telephone

Correcting script information when copying from a telephone call or FAX transmission

Date-entry changes

Product selection changes

Count & pour changes

Corrections during normal checkpoints

Counseling patient or answering patient questions

Correcting script after it was placed in "will-call"

Figure 1: Form used to monitor process errors

[i] *Author's opinion and not necessarily that of the California State Board of Pharmacy.*

[ii] *The National Aeronautical and Space Administration – Task Load Index was used. This tool allows people to judge the amount of subjective workload they are experiencing during different parts of a task or during various times of the day. Judgments are made of a scale that ranges from 1 – 100 where one indicates a low level of task tension and 100 a very high level of task tension. Scores on each of the subscales are also combined to yield an overall composite of subjective workload. It is one of the most highly reliable measures of subjective workload available.*

information needs the pharmacy might have. For example, the categories could be modified to include look-alike or sound-alike product confusion, number of times the work of a technician was corrected, process errors associated with working on third-party insurance requirements, specific data-entry mistakes made, or environmental or workflow conditions present. Also, the amount of time monitored could vary based upon individual circumstances (e.g., three times a week every month, one day a week, or for several hours after an increase in process or other errors are noticed). Finally, monitoring forms could be used to periodically check 10 percent of the prescriptions in will-call bins against the original prescription for mistakes. In the latter case, monitoring for a wrong prescription in the bag, incorrect directions and other label information, incorrect count/amount, wrong strength, and wrong drug could be examined.

Process error monitoring is best used for personal development. As such, individuals or teams might conduct such analyses. The goal is to provide information for personal use and professional development. There is no need to archive any records gathered since the objective is to use what is learned immediately.

Outcomes of Monitoring

Table 1. summarizes several patterns in process errors that were observed in the study of 84 pharmacists across 36 retail field sites.

Percentage of Process Errors **	Percentage of Process Errors **
Overall (8.4 percent)	Ratings of Pharmacy Lighting
	Rated Adequate (11.8 percent)
Scripts Worked on Per Shift	Rated Inadequate (8.5 percent)
Low [40-105] (11.2 percent)	
Medium [106-192] (7.9 percent)	Percent Reduction due to
High [193-327] (6.1 percent)	Eye-level script-holder (35 percent)
	Each independent check
Distribution in Monitoring Form	after final verification (95 percent)
Patient on Telephone (4.2 percent)	
Copying Information (8.6 percent)	Subjective Workload
Data Entry (41.3 percent)	Low Error- 6.6 percent- (60 of 100 pts)
Product Selection (12.5 percent)	High Error -10.2 percent- (40 of 100 pts)
Count & Pour (14.4 percent)	
Normal Checkpoints (14.2 percent)	Supervisory Effectiveness
Counseling Patients (2.6 percent)	Rated Effective (<4.8 percent)
After Prescription Placed in Will-Call (2.2percent)	Rated Ineffective (>11.6 percent)
High to Low Vol (7.1 percent to 10.2 percent)	
	Workload **&** Error Change***
	High to Low Vol (7.1 percent to 10.2 percent)

*Table 1. Summary of Findings from Monitoring Process Errors. **

* *Adapted from references 16 – 18*

** *All percentages based upon the number of process errors observed divided by the number of prescriptions filled.*

*** *Low workload was (< 15 prescriptions per hour). High was (> 25 prescriptions per hour).*

Learning from Process Errors

Using Patterns in Process Errors to Design Interventions

While interesting in their own right, analysis of the outcomes shown in Table 1. led to development of the following strategies to improve patient safety. [12,16-18]

Data entry: Use scanning technology. Keep information at eye level when typing it into a computer data base. Use copy or monitor-stands to hold a prescription at a comfortable visual angle to decrease errors.

Verification: Use independent double checks of work completed. Control interruptions of people when verifying work. Use adjustable task lights and magnification devices to increase visual acuity during verification.

Patient Counseling: Take more time to counsel patients and use a "show and tell" technique when dispensing new prescriptions, as follows. Open the vial of medication when counseling the patient, shake one tablet or capsule of the medication into the cap of the vial, and tell patients the name of the drug and the directions for its use. For refills, ask "is this what you expected to get?" This forces the patient or caregiver to consciously reflect on what was received, to ask questions, or to find out what was received the last time.

Negative perceptions of lighting: Take complaints about light levels or equipment seriously and take immediate steps to improve them. Perceptions that pharmacy lighting was adequate were associated with fewer process errors. This mirrors what happens when illumination levels were actually increased in research studies.

Workload Shifts: Work on non-dispensing tasks or review work completed in order to "get back into the task" or warm-up after a break or lull in workflow. Shifts from conditions of high to low workload and working under conditions of low workload led to more process errors. One reason is that low workload leads to boredom and people begin to think about non-task related items. Also, dramatic shifts from high to low workload disrupt normal work-rhythms. In both cases, engagement with the task drops.

Active attempts to regulate workload should be initiated. Consider prioritizing work to be completed by using different colored baskets and computer guided work priority systems to separate prescriptions needing immediate attention from those that can be filled later. Or, if possible, have some filled centrally when overloads occur, and always ask patients in outpatient and community pharmacy settings to state when they need to have their prescription ready.

Supervision: Use effective supervision skills. Ineffective supervision was seen as overly controlling, which did not allow people appropriate autonomy on the job. It led to job dissatisfaction, stress, and mental distractions that interfered with accurate and productive performance.[20] Similar finding have also been observed among nurse-pharmacist-physician teams.[21] Under such conditions people intercept and report fewer errors.

The most helpful supervisors have the following attributes:

- Set clear goals and directions for the work that people do;
- Help establish a climate for excellence and professionalism;
- Provide clear expectations;
- Delegate appropriately the freedom to do a job;
- Seek the opinions of those affected before making decisions;
- Insure that the reasons why something is done are clearly stated;
- Provide sufficient answers to questions;
- Adjust supervisory style to accommodate differences among people; and
- Make people feel involved and important.

Use Feedback from Self-Monitoring to Set Performance Goals

After the first two weeks of the project, pharmacists working in 12 of the field-sites were asked to calculate the percentage of process errors they observed before sending their booklets to the research team. Based upon a chart showing them the average percentage of process errors that all pharmacists in the study made, they set a performance goal for the following two weeks. Their choices were:

- "I am satisfied and will maintain my current level of work performance."
- "I am dissatisfied and want to improve my ability to detect mistakes."

The outcomes of this intervention are shown in Figure 2.

The data clearly show that attending to feedback and setting goals were helpful. Compared to a control group of participants working in 12 stores where no feedback was provided, those who set a goal to maintain their performance detected 22 percent more process errors. On the other hand, those who set a personal goal to improve what they did increased their detection of process errors by 103 percent. *They became more mindful of their actions on the job and were better able to notice problems*. While comparing one's performance to others is useful, establishing personal improvement goals based on monitoring behavior also should have beneficial effects.

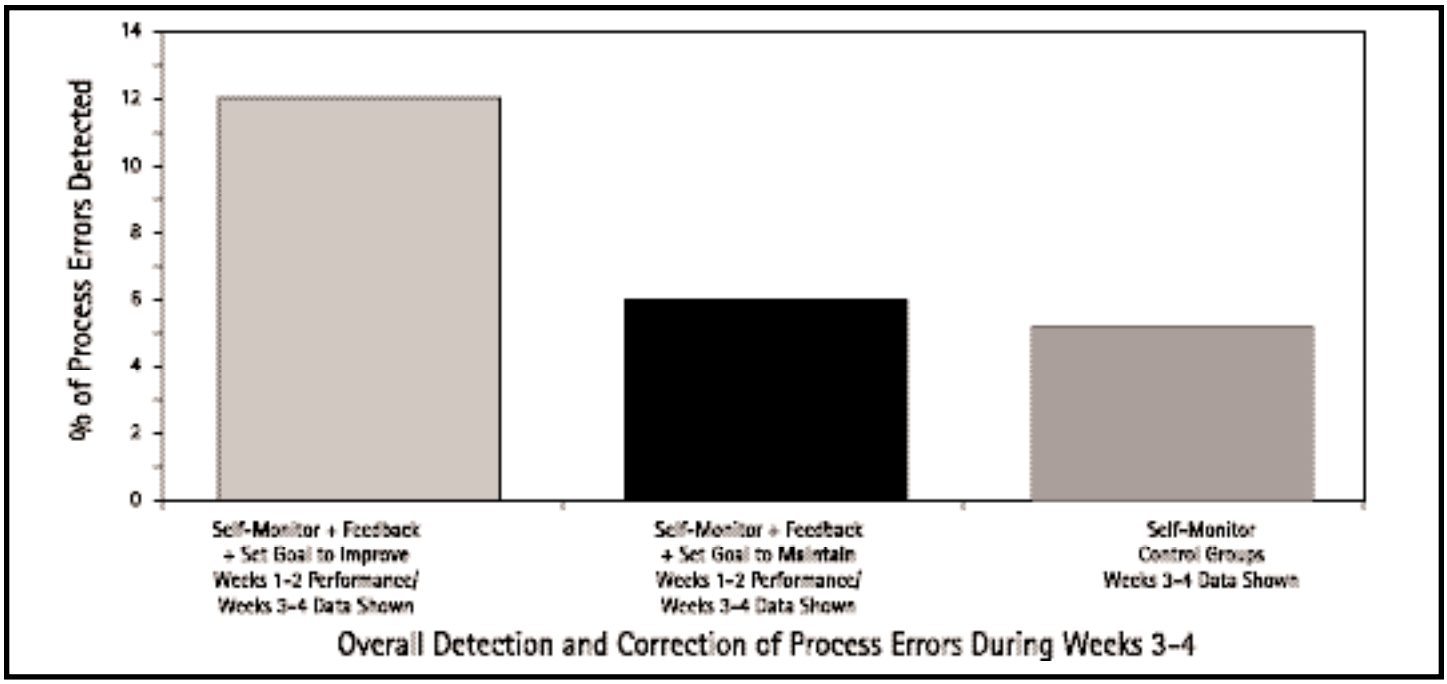

Figure 2: Effects of performance feedback provided after self-monitoring process errors during the weeks 1-2 of the protocol. Participants were asked to set a goal of either maintaining or improving process error detection during weeks 3-4. Chart shows performance improvement during weeks 3-4 compared to a control group than did not receive feedback or set goals.

Conclusion

Taking more time to become mindful or to consciously focus on work in process or completed benefits patient safety. This entails increasing the time spent as a reflective practitioner and using processes that actively facilitate such thinking. A general sensitivity to the interplay between cognitive and other psychosocial factors and pharmacy practices should be a part of such analyses.

More detailed information on how to accomplish such goals is available in several recent publications for pharmacy personnel.[iii]

[iii]*There are innovative self-study materials that cover the practical applications of the interplay between cognitive, psychosocial factors and traditional pharmacy practices in reducing error, risk management, and promoting patient safety. Ten self-study modules on the latter topics were supported from an unrestricted educational grant from the McKesson Foundation and will be available to pharmacy personnel worldwide beginning in July 2002. Interested readers should view the non-commercial website (www.pharmsafety.net) where the modules can be downloaded free of charge. CE credit is available for US and Canadian Pharmacists. The development team included Anthony Grasha, Ph.D., David Brushwood, R.Ph., J.D., Michael O'Neill, R.Ph., and Kraig Schell, Ph.D.*

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