Improving Pharmacy Practice by Learning from Errors

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A Story about Error...

Rob couldn’t believe it when he read the memo. He had filled scripts for that drug hundreds of times. Sure, sometimes he had made mistakes when he filled them, almost selecting a similar drug and dispensing it incorrectly, but he had figured that there were other reasons for that. Maybe he just wasn’t paying enough attention, maybe someone distracted him, maybe there were irate customers at the time, or maybe he had a lot on his mind that day. After all, he had been taught throughout his career that mistakes were rare events caused by unpredictable, “one-time” circumstances. Whatever the reason, he never thought that other people were having the same trouble with that drug as he was. In fact, so many pharmacists had reported errors with this drug that management was now taking steps to prevent them from occurring. Rob wondered if any of these mistakes had hurt anyone – what if he had paid more attention to the number of times that he had made that mistake and told someone? Now that he was thinking about it, he could have figured out that the mistakes weren’t just random, but had a definite pattern to them. If he had only taken the time to learn about his mistakes, maybe the company would have taken these corrective actions sooner...
Coming to Grips with Errors

In most medical settings, we can define errors as events that should be avoided at all costs. So it is not unexpected that we tend to treat errors as “the enemy” and instruct practitioners to avoid making them at all costs. Although this sounds good in principle, it is an impossible standard to uphold. Interviews with pharmacists about the causes of pharmacy error, for instance, suggested that they tend to see errors as uncontrollable events, blaming them on external forces. It follows that errors in pharmacy are considered unnecessary events that impede performance. By treating errors as “work garbage”, we are missing out on valuable lessons about our work that could be used to reduce future error events.

This purpose of this article is to discuss “error management training.” This approach changes perceptions of errors from useless trash to informational events. We believe the potential of error management training for the pharmacy is vast. As you read, we will address the current state of error management in pharmacy, both in pharmacy training and practice, and how error management training can improve those processes. Also, we will discuss roadblocks to the use of error management training in pharmacy, such as pharmacist perceptions and performance goals. After this, we will present the idea of error management training, defining its premises, describing different applications, and providing examples of situations where it worked in other circumstances. Building on this, we will provide a checklist of ideas for error management in pharmacy training, both in pharmacy schools and in the workplace.

The reader should know that error management training is still a new idea, and there is much yet to learn about how it works best. Nevertheless, the concept has enough merit even now to warrant serious consideration for use in pharmacy.

What Do Errors Mean to You?

No one likes to make an error. They make us feel badly, and they can lead to negative personal and social outcomes. So, it might seem strange that we are asking you to consider an error to be something useful instead of something horrible. It is not our intention to suggest that errors are less negative or less painful than they feel. Instead, we
are suggesting that errors are useful signals to be processed and understood.

A natural reaction is to try to forget about the error as soon as possible so we don’t have to experience its negative effects. We don’t like how errors make us feel, so we move into “damage control” mode, focusing all our energy on fixing what we broke, so to speak. Errors are quickly forgotten, chalked up to “bad luck” or “circumstances”, and left in the day’s “garbage pile.”

There are several explanations why errors can produce such strong reactions from pharmacists:

1. **Errors imply carelessness or apathy, qualities of which no one wants to be accused.** The literature suggests that carelessness and apathy are not primary causes of pharmacy errors, but we still want to assume that others will see us in a poorer light.

2. **A medication error could trigger a serious emergency for a patient.** This places even more importance on being as accurate as possible.

3. **The error may evoke some sort of punishment from management,** especially if it creates bad publicity or affects business operations.

4. **The way your co-workers see you professionally could change** if you make mistakes, which may put your credibility and professional reputation at risk.

It is important to note that these perceptions are quite natural, a function of our desire to accept responsibility for good outcomes and deflect it for bad outcomes. While you may insist that the error was not your fault, others are likely to blame the error on your “carelessness” or “inattention.” In light of this, it is not hard to understand why pharmacists and technicians are trained that all errors are preventable, and why some researchers have portrayed pharmacy management as a “culture of punishment.”

Whatever the punishment might be, the intent is to “browbeat” the pharmacist into being more careful. Since most pharmacy mistakes are not attributable to careless behavior, this approach assumes the opposite. This disagreement in perception “declaws” the punishment almost completely, and instead just produces anger and feelings of unfairness.
Misconceptions about Errors at Work

Historical analysis of prior work on medication error tends to suffer from three problematic themes. These themes are important because they can obstruct realistic attempts to deal with errors in the pharmacy. In this section, we will address each of these themes and suggest some ways to change our thinking about them to “set the stage” for new ideas like error management training.

The first misconception is that errors can be completely avoided. Errors are naturally occurring byproducts of human performance from which we can learn something about how to do our jobs better. When errors are portrayed as “taboo”, the implications are that their consequences are always negative and that the person committing them is somehow inadequate. So, to avoid error is to avoid negative feelings about oneself. This mindset is so pervasive in some contexts that errors are not even allowed in training exercises; when a trainer sees that an error has been or is about to be committed, she will correct the trainee before the “damage” is done (i.e., the trainee either learns the task incorrectly, suffers a loss of self-esteem, etc.). Error management training cannot co-exist with this mindset. Errors must be seen instead as events that will inevitably occur (some errors more than others), that carry useful information about how we are doing our jobs, and that cannot be entirely prevented regardless of the amount of effort expended.

A second misconception is that pharmacy errors are largely beyond the control of anyone in the pharmacy system. This is belief that errors come out of nowhere, without warning or expectation. While in some cases, there is some validity to this perspective, it is a two-edged sword. On one hand, it is useful because blaming the error on something out of anyone’s control helps to “soften the blow”. On the other hand, it is problematic for learning because of the lessened motivation to understand the error. The reliance on fate or luck as explanatory is an example of what psychologists call a “self-fulfilling prophecy.” After all, how can a technique like error management training do any good when the errors we are trying to prevent are not in our control in the first place? Thus, we are suggesting that our attitudes about errors and their causes should be more “middle ground,” realizing the contribution of both internal and external forces. Though we may not have complete control over the mistakes we make, we probably have more control...
in many cases that we want to admit.

**The third misconception is that the only viable method of handling errors in the pharmacy is system improvement** (i.e., changing workflows, reorganizing will-call bins, adding automation, etc.). Of course, automation in pharmacy has been successful in a number of ways. However, the system is not always the problem, and a belief that it is rests on some insidious assumptions.

*First, blaming the system implies that the pharmacist or technician in the system is never at fault.* For example, in the case of the USS Vincennes, a battleship shot down an Iranian passenger aircraft by mistake, killing over 200 people. A thorough investigation of the event revealed that the appropriate systems worked as intended (i.e., the radars, the plane identifiers, etc.). The “fault” for the tragedy rested on over 20 mistakes that the crew of the Vincennes made, mistakes that were later linked to psychological biases and poor information processing interfacing with the systems.

*The second assumption is that the person in the system and the system itself are separable.* It is difficult in any job to clearly define where the system ends and the humans begin. During the tragedy of Three Mile Island, the reactor meltdown worsened when a frantic employee used the wrong controls in response to a warning signal. Was that error solely the fault of a poorly-designed control panel, or did the persons running the panel bear some blame as well? It is impossible to determine this for sure, though the answer is probably both, to some degree.

*The third assumption is that a perfectly reliable system is possible to construct.* Even the most expensive pharmacy automation available, such as the massive machines that run some hospital pharmacies in the U.S., still has a demonstrable error rate. Thus, we must recognize the weaknesses of whatever work system we use and train our employees to understand those weaknesses. This is the core philosophy of error management training. So, in order to even consider using error management training as an error-reduction technique in your pharmacies, these attitudes and beliefs must be met head on. We must admit that errors are inevitable and are useful sources of information rather than just garbage; that errors are controllable to some degree; and that the system within which we work is not broken if an error happens to be produced within it.
What Is Error Management Training?

Rule #1: Error management training is a carefully guided process, not a random trial and error session. It is important that the reader understands this point clearly. Though it is entirely possible to learn from a random situation, this sort of learning is slow and costly. Instead, error management training provides freedom for trainees to “explore” the task(s) and enough information to avoid problematic side effects like frustration and boredom. Said another way, error management training works best when the trainee must solve a problem that she knows is solvable, but is not given complete and detailed instructions on how to do so.

Let’s use computer software as an example. Microsoft Word has a detailed help system built into it. If I were to need assistance with a task, I would simply click “Help”, type my question, and step-by-step instructions would appear. All I would have to do is follow them. This clearly minimizes the chance that I will make a mistake. In addition, even if I were to do something wrong as I followed the steps, Word (and other software packages) is “user-friendly” in that the program would likely stop me from going any further once it detected a deviation (for example, I can't save a document to my flash drive if it isn’t plugged in). Human factors psychologists call this a “forcing function.” As efficient as it sounds, error management theorists would call this product “error-avoidant”, meaning that errors are not only discouraged but every attempt is made to “program them out” of the system (for example, the “plug and play” technology in Windows has reduced the number of errors made when installing new components onto computer systems).

Error management training is not like this. If the Word software was built with error management training in mind, a click on the Help menu would produce a brief set of statements about what to do, leaving me to figure out how to do it. Notice that I would still have a target goal in mind and I would have enough guidance to get started, but any solution would now depend on my understanding of the software. In essence, error management training teaches the trainee to think about the underlying principles that lead to the task solution rather than focusing on the individual steps in the process. Error management training fosters task learning at a deeper level, whereas error-avoidant training fosters task learning as only a series of connected steps.
As medication therapy management (MTM) and associated changes in the role of the pharmacists continue to grow in popularity, it is an opportunity to bring error management training into the pharmacy more prominently, especially at the pharmacy school level. Pharmacists are being asked to think more about how the medicine, the disease and the individual characteristics of the patient fit together, rather than just putting the right pills in the right bottle for the right customer. Error management training could be an extremely useful approach as this role shift continues to proliferate.

**Rule #2: The focus of error management training is on error management, not error prevention.** Psychology has studied human error for some time and argues that many errors are preventable ideally. But an inordinate focus on error prevention minimizes the importance of what we need to know after an error has occurred:

- What is learned from the error?
- How is the error perceived and handled?
- What impact does the error have on the individual who committed it?
- How can the negative consequences of the error be managed in an educational way?

**Error management is the idea that performance can be enhanced if we accept that mistakes are going to happen and focus our energy instead on learning from them in a positive way.** Error management training is not designed to stop you from making all mistakes. Instead, error management training can work as a preventive measure against errors over time as more and more mistakes are captured, studied and analyzed. A famous quotation from a great historian comes to mind here: “Those who do not learn from the past are condemned to repeat it.”

It should be re-emphasized that learning from errors is only accomplished when error management instructions are given. In other words, simply deciding to learn from your mistakes is not enough; instead, in order to learn from our errors, we must have an instructional template in place, a “guidebook” to lead us through the important information that errors can provide. Think of it this way: a teacher in a college classroom can simply assign several chapters of text to students and say, “Learn it any way you want to.” On the
other hand, a better strategy would be for the teacher to give the students ways of thinking about the material, context for the material, etc., so that it is easier for the students to integrate. Error management instructions are like this: they guide us through the process of learning from our mistakes.

**Rule #3: The way in which the error management training program is designed is very important.** It is not enough to pay “lip service” to the importance of errors and to be forgiving when they occur. Effective error management training also must include the proper instructions to the trainees. The instructions given to trainees can change how error management training works. *Specifically, instructions must encourage what psychologists call “metacognition”; that is, trainees must be encouraged to understand the process underlying the work that they are doing, or in other words, to learn about their tasks at a deeper level.* Instructions like “What did you learn about your job from that event” or “How did this event enhance your understanding of your work” are examples of metacognitive questions. Notice how they force the trainee to think about the task broadly and systemically rather than just as a series of steps or behaviors. Further, error management training instructions must be encouraging and optimistic. The effectiveness of error management training in the long term can be enhanced using instructional statements that remind the trainee of ways to handle errors positively and that errors are part of the learning process. These sentiments keep the beneficial effects of errors in the forefront of the trainee’s experience.

**Error Management Training Ideas for Pharmacy**

What follows are only two examples of what error management training might look like in the pharmacy. Pharmacies would do well to build on and adapt these examples to their own experiences. We will focus here on the training of new technicians in a pharmacy school setting, and secondly on the use of “monitoring booklets.”

**Example 1: Technician and Pharmacy School Training**

The error management training regimen could be part of a course requirement or even a course by itself. Students would be exposed to difficult tasks that tend to produce errors. The students would also be given certain goals to achieve during their training.
However, they are not given step-by-step guidance. After making an error, the student must figure out why that error occurred and take steps to correct it. The trainer's job is to continually remind the student that the task can be completed and that they are to focus on understanding why they took the steps they took rather than just what steps were taken. A similar approach would be to create tasks that are likely to produce particular errors, or to go a step further and plant errors in the task that must be captured. Whichever approach is adopted, the rules of error management training still would apply and the way in which it would be done would not vary considerably. The key to this technique would be the creative development of error scenarios that trainees could solve.

Error management training may be best used during the orientation and training of a new technician by existing pharmacy staff and supervisors. Since this person is a new hire, they will need to learn as much as they can about their new employer, and part of that learning is the general attitude and culture about errors and how they should be handled by staff and management. By putting the new technician through a supervised on-the-job (OJT) training sequence where they can safely learn their new role and make mistakes along the way, the expectations of the pharmacy about error handling can be clearly and experientially learned. This approach rests completely on explicit and frequent feedback. Although it is easy to place someone in an on-the-job trainee's role and just let them “fend for themselves,” this does not foster error management training and in fact may open the door for improper or incorrect lessons to be learned about how to perform job tasks effectively.

**Example 2: Consistent Self-Monitoring and Error Feedback**

Our second example describes a “monitoring booklet” and how it can be used to implement error management training in the pharmacy. On the next page, we have included a page out of a similar booklet used in a series of studies and published in a technical report. The concept behind the booklet is very simple. As the employee works, he carries the booklet with him through the course of the day. When an error occurs (whether it actually happens or is caught before it occurs completely), the employee records information about the error event in the booklet.

For example, the page pictured was used in a pharmacy study about 15 years ago to
determine whether the booklets were helpful in increasing awareness of targeted drugs; that is, drugs that were on the Top 25 most error-vulnerable list for that store, based on historical data. When an error event occurred, the pharmacist recorded the specifics of the event, such as what drug was involved and what time of day, in the booklet when he had the opportunity. Results showed that this simple activity was related to an increase in captured errors (over a baseline estimate by the pharmacists) of more than 40%; in other words, pharmacists were actually making more mistakes and “almost-mistakes” than they thought, and several reported that they had gained some insight about particular scripts that were causing them trouble. The booklets helped pharmacists learn about their own error tendencies, and also gave the store information about which drugs were prone to error events and should be emphasized in their shelf design.

To use the booklets in an error management training session, the employees might bring their booklets to a store meeting, the purpose of which is to tell the team about errors that they encountered and accept feedback about those errors. The facilitator, which would likely be either a manager or a senior pharmacy staff member, would organize the meeting and guide the employees through the error events. For example, one pharmacist might report a problem that occurred with a particular customer’s script that had to do with a potential allergic reaction. The facilitator would help the employee explore this mistake by asking some of the following questions:

- “Why do you think this error was made?”
- “Where could this error have been captured?”
- “What aspects of our system here encouraged this error?”
➢ “What outside factors might have contributed?”
➢ “What can be done to improve our process so that similar errors do not occur?”

Notice that none of these questions are accusatory but merely seek information. In answering these questions, the employee should emerge from the meeting with a deeper understanding of the potential pitfalls surrounding that particular drug and allergic reactions in patients. Finally, we have included a checklist with some recommendations for how to successfully design and construct an error management training regimen in the pharmacy.

The Role of the Organization

In this section, we will list and discuss some factors that will play a role in the success (or failure) of error management training in a given pharmacy. While these issues have been previously mentioned, this section will examine them in more detail.

_The culture of the organization must emphasize learning from errors rather than merely punishing error events._ This is an ideal that must be approached persistently. Culture is usually difficult to change because it remains hidden from view until it is violated in some way. History shows that the traditional culture surrounding error in pharmacies is one of punishment: don’t make any mistakes, and if you do, tell your manager so you can be sanctioned (this is stated rather harshly in order to make the point). This encourages cultural side effects that were clearly unintended but influential nonetheless. First, honesty in self-reporting can be compromised, since few will be motivated to invite punishment. Second, the tendency to “blame the other” will be amplified as well; errors will more likely be seen as caused by any factor other than one’s own behavior. Third, errors may be perceived by pharmacy staff as evidence of their competency, which may then have an impact on the pharmacist’s beliefs about their professionalism and abilities. In short, just as children tend to become stifled in their development by punishing environments, we can expect the same from employees.
Second, there must be a change in attitudes about what errors mean and why they occur. As we have already discussed, it will be difficult to learn anything from an error if prevailing attitudes still define them negatively and blame them on uncontrollable factors. Instead, encourage an attitude of “error tolerance,” so that when mistakes happen, we can accept the error as a teaching tool, open to whatever lessons can be learned. Consider this idea: the fastest, most accurate pharmacists got that way because they were tolerant of error and realistic about their performance. Their error rates are lower because they fine-tuned their skill, making lots of mistakes along the way.

Third, we must redefine errors as useful sources of information, not as useless wastes of time and resources. This means that we have to change our perspective of an error event. We have to see the occurrence as a clue that can lead us toward a better understanding of why the accident happened. This is even more important in pharmacy, where the majority of employees are expert performers. Errors by experts are often baffling, and may even involve a particular drug or dosage that she has filled correctly numerous times in the past. In such a situation, the error can provide information about specific conditions or variables that can increase error risks that may not have been considered before. In fact, errors may be our only viable source of information to help identify particular problematic workplace factors.

Concluding Thoughts

It is easy to blame medication error on computers or packaging or circumstances, or even the patient themselves. This attitude has led to large-scale efforts to produce and distribute automated solutions and new packaging protocols. However, in an attempt to engineer errors out of the pharmacy, we are limiting the natural process of learning from errors that is important for the development of expertise. Thus, this article outlines techniques that can be used to make errors educational events and to keep the minds of pharmacy staff sharp and focused. We encourage pharmacies and hospitals to use the principles discussed in this article to create their own procedures for using error events as training material. Be creative and innovative in how you develop your staff using the
incidents that happen every day in your facility. By doing so, you will be creating “error experts” on your staff, and we can’t have too many of those.