Preventing Medication Errors:
The Role of the Hospital Pharmacist
An Interview with Steven Meisel, PharmD

Wong:
Welcome to the health and safety podcast. My name is Michael Wong. I'm the founder and executive director of the Physician-Patient Alliance for Health & Safety. Almost every day on the news, we read reports of opioid-related deaths due to opioid abuse and overdose. However, less attention is given to opioid-related adverse events and patient deaths that may happen in-hospital. These opioid administrations are given under the advice and supervision of clinicians, not because of an individual's actions that may have resulted in an over use or abuse.

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In previous podcasts, we have spoken with doctors about opioid-induced respiratory depression, including Dr. Jeffrey Vender about respiratory compromise; Drs. Matt Kurrek and Richard Merchant about procedural sedation; as well as nurses like Barbara MacArthur about monitoring patients during conscious sedation.

So, today, we're talking about hospital pharmacists, about what hospital pharmacists can do to prevent opioid-related adverse events and patient deaths. Hospital pharmacists receive orders to fill prescriptions for opioids from units and doctors throughout the hospital, so pharmacists are in a unique position to prevent potential adverse events from occurring throughout the facility. So we're very pleased to have as our guest Steven Meisel, PharmMD, who is a patient safety expert at the IHI Institute for Health Care Improvement. Steven is also Director of Medication Safety at Fairview Health Services in Minneapolis. Steve, could you please give us a brief background about yourself?

Meisel:
Thanks Michael. Again, my name is Steve Meisel. I'm a pharmacist by background. I've been focusing on patient safety for the past 20, 25 years of my career at an organization called Fairview. Fairview is an integrated health system with 11 hospitals, 50 clinics, a large retail pharmacy division, home care hospice [delete] and [delete] and urgent care and retail clinic, and basically the whole nine yards. We're a fully integrated health system based in Minneapolis and I've been the medication safety director for last 15 years or so.

Wong:
Thank you so much, Steve. So, IV medications are associated with the highest risk of harm to patients and opioids are typically considered among the highest risk injectable medications. As the Joint Commission in Sentinel Event Alert #49 cautioned "while opioid use is generally safe for most patients, opioid analgesics may be associated with adverse effects, the most serious effect being respiratory depression, which is generally preceded by sedation."

In your article, "Increasing the safety of analgesia use in a community hospital," you discuss medication errors. What key standards should be implemented to reduce medication errors?

Meisel:
Well, let me first point out that most of the over sedation events that we see and, probably most organizations see, have nothing to do with overt error. So, if you look at the universe of medication errors, most medication errors are relatively minor. Somebody might get two Tums instead of one for a given dose, that sort of thing. Occasionally, you have a large overdose of say a morphine to give somebody ten milligrams instead of one milligram, and that's obviously a problem, but most of the adverse events that we see have nothing to do with an overdose like that. They have to do with dose selection in general. It has to do with patient monitoring, it has to do with the unique characteristics of the patient and the current medical conditions.

And, so, when we look at medication safety, we try to look at opportunities to reduce harm, whether it was caused by error or whether it was not caused by error because the experience from the patient's point of view was the same. If they have an over sedation event, it's not a good thing.

Now, when we look at medication errors, I think it's very important to think about it in three terms. One is to prevent everything you know how to prevent, and knowing that you can't prevent everything, make sure that whatever does happen becomes visible, so it's easily detectable. So, if there is a medication error or there is an over-sedation event, that there are alarms, there is a good monitoring system, there are good cues, so the staff can identify that very quickly. And then the third element of this is to mitigate, so that at that point they can intervene and make sure that the medication error doesn't go on and cause an adverse event or the minor adverse event doesn't go on to cause a serious adverse event.

Wong:
Great advice, Steve. And obviously implementing those standards, make sure that medication errors aren't made or medication errors are caught at the appropriate time so that an appropriate intervention can be made. What have you done to ensure that these standards are maintained from patient to patient, so that every single patient is getting the same high standards of care?

Meisel:
Well that's a very important question. Across a broad health system such as ours with hospitals and clinics, retail pharmacies and nursing homes and all the rest, I think it first of all starts with strong leadership and strong culture. From the top of the organization right through the all the rungs of the organization, there has to be a belief that safety is important value, that it is as important as quality and finance and all the rest, that there's got to be good training, good recognition, good rewards and good expectation setting. It needs to be a part of the report and discussions at every level from the board all the way on down, that's very important.

Second is we have to make sure that we implement every known best practice that is out there, and there are lots of them, as you know. From the Institute for Safe Medication Practices or from the IHI or from other professional organizations. There are lots and lots and lots of best practices and, unfortunately, way too many of them are just not deployed to the extent that they should be. And so I think it's very important that we deploy all those best practices and we deploy them in ways that can assure that they're actually operationalized throughout the organization. So you build them into order sets in your electronic health records, you build them into your pharmacy computer system, you build in forcing functions such as IV tubing that can't be connected inappropriately to an intraveneous line or vice versa, you have pumps that are different for epidural versus IV and those sorts of things. Those sorts of forcing functions I think are very important, but even with all that leadership and culture and those technical processes, that's not enough.

I think you've got to innovate, you've got to invent new best practices. What we have learned is that you could deploy everything that's out there, but gosh you will still suffer adverse events and your patients will suffer adverse events. So you've got to dream up new ways of doing business, new approaches to the care of the patients that you're seeing whatever the condition may be and identify new ways of doing business. So for example, in the narcotic world, you want to prevent over sedation events and one of the risk factors might of the risk factors might be that hydromorphone comes in one milligram and two milligram prefilled syringes, but the normal dose is about zero point two or zero point four milligrams. Well, why would you buy two milligram syringes for most parts of your hospital? That's a risk and so one of the solutions that Fairview deployed for a good decade was to repackage every hydromorphone syringe into zero point four milligram sizes and we did that for a decade until a zero point five milligram size became commercially available. That was innovation, it was inventing a new best practice to try to eliminate the risk of that 10-fold over dose that, albeit rare, was always there.

And, then lastly, we've got to build in adaptive change. Organizations with resilience, good teamwork and communication so that it doesn't rely upon any one individual person coming to work that day, that there is resilience so that when somebody doesn't show up or it gets very busy or there's a supply shortage or something that you build in mechanisms that you can adapt in real time to those circumstances.

Wong:
So, it sounds like you've built in human standards as well as maybe what I'd call technological standards, for example those prefilled syringes, so that less medication errors can occur. Obviously something may occur, but it sounds like you guys have minimized that.

Meisel:
We have tried very hard to. Yes.

Wong:
Now I've often spoken with hospital executives who tell me they don't have an opioid related problem at their hospital and yet these same executives will admit to me that naloxone is administered at their health care facilities. What has [delete] does [delete] naloxone use experience told you at Fairview Health Services?

Meisel:
Well it's very interesting, we started our journey on on this back about 15 years or so ago. One of the things that we learned in talking to physicians, anesthesiologists, surgeons, even our vice president for medical affairs at the time was the same story that you just mentioned, that we don't have a problem here with narcotics over sedation. And, then we looked at the naloxone administration and said, " well, gee, we're using an awful lot of this." And the response was "Well, of course, we are because that's what naloxone on is on the market for. People aren't suffering because we have this antidote."

And so it is important to change the mindset that the use of naloxone is not a cost of doing business. That it's not a choice of good pain control versus somebody being over sedated or stopping breathing. You can have both, you can have good respiratory function and good pain control, but the use of naloxone is not a cost of doing business. And I think when people say they don't have a problem, it may be because people are not dying or not becoming comatose with long term central nervous system problems or whatever, but gosh if they stop breathing and they got given naloxone, that is something you'd not want for yourself or your spouse or your parents and therefore it is not the cost of doing business.

Wong:
So, it sounds like naloxone really is an indicator that a last solution resort was given and that is a problem. You should have been able to do something to intervene prior to that administration.

Meisel:
Absolutely.

Wong:
So, the FDA issued its strongest warning about combined use of opioids and benzodiazepines. What can the pharmacist do to prevent the risks associated with the concomitant use of such medications like that?

Meisel:
Well, first of all, keep in mind that, if a patient is undergoing endoscopy procedure, for example, or colonoscopy or something along those lines, it is perfectly appropriate and perfectly safe to be administering, say, fentanyl along with midazolam, as a cocktail for sedation for moderate sedation in that setting. So, I think we have to be cognizant of the fact that when used thoughtfully and judiciously, with good intent and with good monitoring, that that's a perfectly legitimate thing to do. Where we get into trouble, however, is where you have somebody who is on say post-op narcotic therapy, whether it's a PCA or IV push therapy or whatever it may be. And, then, they are given a benzodiazepine, perhaps celebrazione for anxiety. Some orthopedic surgeons like to prescribe benzodiazepine as a muscle relaxant after certain types of hip procedures and then they get given Ambien or something like that at bedtime for sleep. If the nurses isn't really careful and diligent and knowledgeable about what's going on, there's a huge risk of those decking, where they get the hydromorphone dose at the two o'clock, they get the diazepam dose at two thirty, they get both of those at nine o'clock at night, and at nine thirty at night, they get a dose of Ambien, and before you know it, the patient stops breathing.

So, I think it's very important to be really careful about the doses that are selected, the times that are used in these sorts of things, and what we've done in our electronic health record is to build in alerts, so that if two or more of the similar type of drug is given or is attempted to be given too close to each other, the nurse gets a pop up warning that says think twice before you give this.

Wong:
Obviously, as the hospital pharmacist, you're seeing all these orders coming in and as you say, you can see when dose stacking is occurring. You've also mentioned monitoring and does Fairview Health Services continuously monitor its patients receiving opioids or other sedatives?

Meisel:
Well, certainly in the post-op setting, if a patient is in for pneumonia and happen to have a sprained ankle and have a PRN dose of Percocet, we're certainly not going to do any special monitoring in that setting. But, in the acute post-op setting, we require that any adult inpatient who has an order for narcotics undergoes a continuous capnography monitoring for the first 24 hours after the surgery and then longer depending upon if the patient is doing well or poorly or whatever, and then we also apply continuous pulse oximetry in that setting as well. So, they have both continuous pulse oximetry plus capnography for the first 24 hours after surgery for all of our adult inpatient patients.

Wong:
So, who can make those requests? Is this a physician order or is it something that an RT or a nurse or you as a pharmacist can do?

Meisel:
Go back to the forcing function idea, we have built that into our order set so - no, a nurse can't just order one of these, there needs to be a doctor's order - but, we have built that into our order set so that all of our post-op pain orders have pre-checked boxes for that level of monitoring. So, the doctor doesn't have to do anything, in fact he doesn't even see the orders. He could, but he generally doesn't see the order and if it goes through as soon as he signs it and then the patient is on that type of monitoring for the timeframe that I mentioned. So, no, a nurse can't order that monitoring, only doctor could, but we force that as part of our post-op order set.

Wong:
That sounds like a great thing to have these order sets in place so that people just don't forget what needs to be done or has to be done to make sure that the patients are safely taken care of.

Meisel:
Absolutely.

Wong:
So, any last words of advice you would give to clinicians and hospital executives wanting to improve opioid safety in their hospitals?

Meisel:
Well, I think the first piece of advice is to recognize that there is a problem. Just like the alcoholic can't change his ways and get better before he admits he is an alcoholic. The hospital can't reduce its risk for narcotic over sedation until it believes that there is a risk for narcotics over sedation. So, that's the first piece there is to recognize that there is a problem or at least there's a risk. So that's the first thing to do. The second is to make sure that there is somebody who is in charge of this, somebody is appointed to be the point person to look at the data, to review whatever naloxone administrations are given, identify the risk factors and the commonalities and all of that and to begin to identify what changes ought to happen whether it's in monitoring or prescribing or dispensing or whatever it may be that would help improve the situation. Third is to measure. You can't improve what you can't measure, at least not very well. So, what we have for the last ten years or more, we have a run chart to every quarter, where we have the number of narcotic related adverse drug events plotted over time, by hospital and as an aggregate, and we post that regularly to be reviewed by our pain committee, reviewed by our pharmacy therapeutics committee and others. And, so we have that measure, we know whether we're getting better, staying the same, or in some cases at times getting worse, if that's the case. So, you got to measure, I think that's very important.

Wong:
So, in your measurements, have you seen, since putting in place these standards and other practices, a decrease in the number of adverse events or unfortunate tragic and patient deaths that may have been occurring?

Meisel:
We have not, thankfully, had any patient deaths, at least not in a recent time. But I can tell you that, yes, we have seen an impact on narcotic related adverse events. In fact, at our university hospital alone, from 2008 through 2016, we had an 82% reduction in our narcotic related adverse events.

Wong:
Wow, that's amazing!

Meisel:
But, that's an 82% reduction over an eight or nine year period. So I think that's very, very telling. And it shows that this is something that you've got to be at for the long haul, but you can make a difference.

Wong:
Absolutely. So thank you so much for joining me on this podcast and, hopefully, clinicians and hospital executives out there will listen to this and particularly your advice to be aware of the problem and then to construct systems around solving that problem. So thank you so much for joining me in this podcast, Steve.

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