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Hospital pharmacies need to improve metrics as budget realities evolve

Now is the time to start

There is no reason for hospital pharmacies to wait for national health care reform to force major data collection changes. The right time to improve the pharmacy's metrics, data collection, and analysis is now, experts say.

"We need systems that accurately measure the current performance and that provide a breakdown of opportunities," says **James A. Jorgenson**, MS, RPh, executive director of pharmacy at Clarian Health Partners in Indianapolis, IN.

Hospital pharmacy directors need to know what resources they need to meet target goals and how they can do better with existing resources, Jorgenson says.

"We need all of the metrics that go into this, including data about changes in service intensity, length of stay, clinical services, etc.," he adds. "We need a way to measure the impact of those variables."

Pharmacy directors should think in terms of metrics, particularly as their departments' role evolves.

For instance, pharmacy directors might need to take the lead on understanding and developing metrics that will provide an accurate picture of the pharmacy department's expenditures, benchmarks, and resources.

"Metrics are data that could be used as a benchmark to compare yourself to someone else or to monitor your progress," says **Philip E. Johnson**, MS, RPh, FASHP, director of pharmacy at H. Lee Moffitt Cancer Center in Tampa, FL.

Pharmacy departments should use metrics to measure productivity,

Summary points

- Good metrics are needed to better focus pharmacy resources.
- Large pharmacies could hire trained analysts.
- Hospital pharmacies need to know their true costs for certain patient diagnoses.

financial performance, progress, and other purposes, Johnson says.

However, this is not happening as consistently as is needed, he notes.

"A lot of pharmacy directors are not that familiar with working with metrics, or they only use the numbers their institution provides them," he says. "That was fine for the last probably 35 years."

But now things have changed, and hospital pharmacy departments also will need to evolve or be left behind.

"Before, it was okay to look at the cost per patient day and cost per admission," Johnson says. "But now everything is getting crazy in the health care network with the way costs are today."

Data, trending of data, and setting thresholds for performance increasingly are important for hospital pharmacies, says **David Kvancz**, RPh, MS, FASHP, chief pharmacy officer at the Cleveland Clinic in Cleveland, OH.

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Whether it's efficiency data, productivity data, or quality data, these measures are important to show hospital leaders that the pharmacy department has met its targets or benchmarks, Kvancz says.

"There's no question that we have to spend more and more time looking at data and employing more resources to extract and extend the data for analysis," he adds.

For instance, when Kvancz first arrived at the Cleveland Clinic in 1997, one of the first things he did was to develop a proposal for hiring a drug utilization analyst whose job would be to support initiatives by the hospital system's pharmaceutical therapy committee.

That one analyst position led to more, including an operations analyst and quality analyst, he says.

"We probably have five analysts, and our pharmacy staff is around 400 FTEs [full-time equivalents]," Kvancz adds. "We're increasingly employing BSPS [bachelor's science in pharmaceutical sciences] graduates for analysis positions."

Also, people with a financial analyst background or experience in creating databases also can make good analysts, depending on a hospital's interests and desired expertise, Kvancz says.

Hospital leaders and physicians make their decisions largely based on data, he notes.

"To the extent you can provide data with a logical, philosophical argument of what you're trying to accomplish, whether it's in patient safety, quality issues, or system design, the data ultimately are the card that will enable you to seal the deal to support your initiative," Kvancz explains. "So it's critically important to be able to use data."

Along with data, provide context

One problem might be with interpreting pharmacy data since hospital leaders typically do not fully understand the business of pharmacy, Jorgenson says.

"They don't understand what metrics mean; they don't understand what's behind the numbers," Jorgenson explains. "They can see our drug spend and head count, but they have no idea how those two things are related."

Every other hospital department spends more on personnel than anything else, so cutting jobs is a way to cut expenses. With pharmacy, job cutting can have the opposite effect, Jorgenson says.

"Our big expense is drugs, and if we don't have the right numbers and kinds of personnel, then we can't control that 80% that is the drug expense," he adds.

"Having more pharmacists and the right kind of pharmacists can save you money, and we need metrics to show that to hospital leadership," he says.

"Drugs are one of the fastest growing expense lines, and they're one of the top three revenue sources," Jorgenson says. "So why isn't pharmacy at the top of the C-Suite radar?"

Pharmacy directors who collect accurate and useful metrics will help make their pharmacy departments a top priority in the hospital.

Also, metrics can be used to highlight quality improvements and accurate comparisons to peers.

At cancer hospitals like H. Lee Moffitt, 70% of therapies occur in outpatient settings, Johnson notes.

So the patients who are hospitalized are very sick and their care is labor-intensive, he adds.

"If you compare my 200-bed hospital to a general 200-bed hospital, I look like I'm doing a terrible job with six times the staff and an $82 million drug budget," Johnson says.

Obviously, this type of comparison which often occurs with national databases is misleading, he says.

"Specialty hospitals like a cancer hospital or pediatric hospital don't match up," Johnson explains. "So what we need are numbers that allow for comparison with a similar institution."

Such data are hard to come by, but there is a group of pharmacy directors from across North America who will be meeting in December, 2009, to analyze a national database for information that could be useful to specialty hospitals, Johnson says.

"What we need to do is some research ourselves," he adds. "We really need to figure out what our true costs are for a certain patient diagnosis, for example."

Also, metrics could show the cost to a hospital pharmacy department for following national guidelines pertaining to particular diseases and treatments.

"So if we follow NCCN [National Comprehensive Cancer Network] guidelines, we'll know what the cost is for doing that," Johnson says. "And then we can measure outcomes and know patients' stage of disease and we'll scientifically put an acuity level on that patient."

The entire discussion about pharmacy costs will change as these data become available.

For example, when pharmacy directors discuss leukemia patients and medication costs, they won't speak in global terms of all leukemia patients, but will be able to identify costs particular to leukemia patients with a certain stage of disease, Johnson explains.

"If one patient is at stage 3 and another patient is at stage 2, then there should be a difference in cost, and it's accounted for in the metrics," he adds. **(See story on improving metrics, p. 136.)**

Metrics that account for acuity levels would help explain the situation when drug costs escalate due to increases in patients with particularly complicated and expensive conditions.

For instance, the Cleveland Clinic's drug costs per case on an adjusted case-mix basis was above budget in the most recent year, Kvancz says.

"When we looked back at detailed analysis data, we found that the number of transplants we were doing this year versus last year were far greater than was budgeted," Kvancz explains. "We were able to explain that the variance was due to a higher level of drug costs for patients with transplants, and the transplants had increased."

In a similar example, Jorgenson used data showing how the Clarian Health Partners hospital's transplant patient population had changed to explain a higher medication cost.

"This year we had the same gross numbers of transplants from FY08 to FY09, but drug spending is up by 1.2 million," Jorgenson says. "So [hospital leaders] said, 'What's wrong? You're not doing a good job of controlling your drug spending.'"

The patient metrics painted a different picture: The hospital's multivisceral transplant patients had increased by 35%, and these patients with two organ transplants required more expensive medication treatment, Jorgenson explains.

In another example, Jorgenson looked at total adjusted patient days and saw that one recombinant factor seven [recombinant human factor VII] patient needed $1.4 million in factor seven in one week.

"It was appropriate because the patient was a hemophiliac, and the factor seven was the only way to stop his bleeding, and it worked," Jorgenson says. "But that was in just one week, and our numbers looked horrible." ■

Hospital pharmacies need pharmacy-specific numbers to improve metrics

Some national effort is needed

Work needs to be done at both the national level and the hospital level to improve hospital pharmacy metrics, experts say.

Medication therapies are more expensive and complicated now than a decade ago, and patient acuity levels are higher, so there is a definite need to find better ways to collect pharmacy data and to develop national standards for analyzing metrics, says **Philip E. Johnson**, MS, RPh, FASHP, director of pharmacy at H. Lee Moffitt Cancer Center in Tampa, FL.

"Most metrics show cost per patient day or cost per 100 beds," Johnson says. "But you need to know what kind of beds those are."

Developing such metrics will be challenging, says **James A. Jorgenson**, MS, RPh, executive director of pharmacy at Clarian Health Partners in Indianapolis, IN.

"It can be quite daunting," Jorgenson says. "If I focus on financial metrics, the first thing I'd look at are some of the basics, like total pharmacy expenditures, what percentage is personnel, drugs, and everything else."

For instance, if the beds are intensive care beds or orthopedic or long-term care beds, the metrics will have different meaning with regard to acuity, staffing needs, and costs.

When a hospital's metrics show the number of staff per 100 beds, there needs to be a modifier that shows what might be expected in staffing for a particular type of bed and its patients' typical acuity levels.

"One thing I'd suggest is that pharmacy directors take a hard look at what kind of metrics package their current C-Suite is looking at," Jorgenson says. "What are they looking at in terms of internal flex numbers, and what are they looking at in terms of benchmarking?"

Also, there might be national numbers that can be used, such as pharmacy supply expense as a percentage of net revenue. But organization leaders have to make sure they fully understand the impact of both the numerator and denominator in these types of comparative statistics, he adds.

Without good numbers, it will be difficult to provide hospital leadership with an accurate picture of a hospital's performance.

"You need to have more specific numbers in your database, so your metrics are more specific," Johnson says. "We have to start creating these numbers."

The numbers could be based on metrics already devised for nursing, he suggests.

"Nursing has a patient acuity level scale of 1 to 4, and it's based on how much nursing manpower it takes to take care of these patients," Johnson explains. "Can patients feed themselves, ambulate, wash themselves?"

The case mix index is of mixed value to hospital pharmacies, says **David Kvancz**, RPh, MS, FASHP, chief pharmacy officer at the Cleveland Clinic in Cleveland, OH.

"The pharmacy workload really is the admission and discharge and transfer processes that occur and the rapidity with which drug orders are changed during a hospital stay," Kvancz says. "A patient might have a very high acuity level because they had a surgical operation that was very complex and post-surgery care is very complex," Kvancz explains. "But they may be relatively limited or simplistic when it comes to drug therapy, and we can have the converse of that."

Unfortunately, there are no acuity level indexes for pharmacy, Kvancz and Johnson say.

"We have case-mix index, which looks at the average cost of one hospital for a given diagnostic code, but it doesn't break it down to what the cost is," Johnson says. "So we need to develop a better way and set some examples of how to come up with numbers that can specifically identify the kind of patient and institution we have."

Then hospitals with similar pharmacy acuity levels can be compared and benchmarked more accurately than can be done now.

For this to happen, pharmacy departments need specific numbers in their metrics, numbers based on the amount of pharmacy staffing, medication costs, and other particulars, he adds.

"We've started doing this in our infusion center," Johnson says. "We rank patients as high, low, or medium intensity for both pharmacy and

Summary points

- National and site-level work are needed to improve hospital pharmacy metrics.
- Pharmacy needs its own case-mix acuity levels.
- Data analyses now are done largely on organizational basis.

nursing."

For example, a simple drug might require blood pressure testing every 15 minutes, which is high labor intensity for the nurse, but low intensity for pharmacy, he says.

"Or a more complex drug where we have to recalculate the dose and check labs might be simpler for nurses," Johnson adds. "We have to know if it will be difficult for the pharmacist or nurse or neither or some combination."

Once these different acuity levels are known and quantified, then pharmacists can measure the acuity and use those numbers to measure how many patients can be treated with existing resources, he says.

"Then we can track that and measure our average patient acuity and compare ourselves to other institutions," Johnson says.

"This is what we're trying to do," he adds. "We want to get the whole concept started through a grassroots effort where hospitals start measuring what they're doing, what acuity level their patients are, and this gives us better data."

There will need to be a national standard for these numbers before true benchmarking can take place, Johnson says.

"That's what I'm hoping that cancer hospitals can do because we're a small enough group and we communicate very well," he says. "Our diseases already are rated by stage of disease, and that could be related to patient acuity, so the cancer world has some advantages in developing this sort of patient acuity system."

Until national metrics are available for pharmacy departments, data analyses will be largely done on an organizational basis, and they'll continue to be somewhat labor intensive, the experts say.

"We extract data mostly by using data analysts located in the department of pharmacy, taking downloads of data from legacy systems, manipulating those in database software and maybe spreadsheet software, and working with managers of each area to make sure data are clean and exceptions are identified," Kvancz says. "We have monthly business reporting and a monthly quality report card we produce for our department."

It takes a considerable amount of work to collect data, especially since some information is pulled from paper sources, such as patient charts, or visual observation, he adds.

For example, the Cleveland Clinic benchmarks its medication order turnaround time by both physically and electronically obtaining the medication order entry time, collecting the time it takes to deliver medication to the floor, and the time it takes to get to pharmacy, Kvancz explains.

"You need a pharmacy technician who observes when the orders leave the pharmacy and tracks them, and you have to take data from legacy systems, download data, and spread them to spreadsheet software, manipulating them, and analyzing them, before reporting to a manager," he adds. "You use electronic data combined with manual observation to provide a complete picture." ■

MUE program works well, following these principles

Key is using descriptive research

Hospital pharmacists and pharmacy directors are not always comfortable conducting medication use evaluations, although they recognize the need for these.

"The level of expertise and comfort with doing it is all over the board," says **Geoffrey C. Wall**, PharmD, FCCP, BCPS, CGP, an associate professor of pharmacy practice at Drake University in Des Moines, IA, and an internal medicine clinical pharmacist at Iowa Methodist Medical Center, also in Des Moines.

"Brand new pharmacists, fresh out of their residency, may have participated in a medication evaluation program, but they're sketchy on doing it, and there are other hospital pharmacists who are experienced with doing four or five of these per year," Wall says.

One strategy is to create a suitable medication use evaluation (MUE) instrument and to establish a process for conducting MUEs. **(See story on establishing MUE process, p. 138.)**

Whether pharmacists have little or a lot of experience, Wall suggests they could improve their medication

Summary points

- Review ASHP and other guidelines for medication use evaluation.
- Target drugs with high costs and high safety concerns.
- Design a MUE data collection instrument.

use evaluation process by following these tips:

• **Carefully review available guidelines:** The American Society of Health-System Pharmacists (ASHP) has very good guidelines for conducting these evaluations, Wall says.

The "ASHP Guidelines on Medication-Use Evaluation," published on-line at www.ashp.org, suggest MUEs follow 14 steps, including the following:

- Establish organizational authority for the MUE process;
- Develop screening mechanisms (indicators) for comprehensive surveillance;
- Set priorities for in-depth analysis of important aspects;
- Inform health care professionals in the practice setting about objectives and expected benefits;
- Establish criteria, guidelines, treatment protocols, and standards of care for specific medications and processes;
- Educate health care professionals to promote use of these criteria, guidelines, etc.;
- Establish mechanisms for timely communication;
- Initiate the use of MUE criteria, guidelines, etc.;
- Collect data and evaluate care;
- Develop and implement plans for improvement of the medication use process;
- Assess the effectiveness of actions taken and document what's done;
- Incorporate improvements into criteria, guidelines, etc.;
- Repeat cycle of planning, evaluating, and taking action for ongoing improvement;
- Regularly assess effectiveness of MUE process and improve as needed.

• **Target drugs with high cost, high safety concerns:** Pharmacy directors should have certain drugs on their radar because of their high costs and safety issues, Wall suggests.

For instance, when drotrecogin (Xygris®) first was marketed about 7 years ago, it was a breakthrough therapy for reducing mortality from severe sepsis. It's cost was high, reaching more than $10,000 per course of treatment, Wall notes.

"Right away, that cost raises it on the radar," he explains. "Because it's a really expensive drug, we need to make sure it's used right."

Plus there were concerns about safety because the drug has anticoagulant affects, he adds.

"People in intensive care units were saying, 'We need some sort of way of making sure we're monitoring [drotrecogin] patients and making sure only the right patients receive these drugs, and to make sure we don't see too many serious adverse events,'" Wall says.

It should be a simple process for pharmacy directors to identify these types of drugs for MUEs, Wall says.

"It's easy to say we'll evaluate the drugs that are expensive, that have safety concerns, and that have efficacy issues, where existing medications might be more efficacious," Wall says. "Those are hot-ticket drugs."

If a new drug is expensive, but not a safety concern, then it's important to ask if this fourth or fifth drug in a class has any benefits beyond what existing, lower-cost drugs in its class have, he adds.

• **Report outcomes to appropriate authorities:** "The Joint Commission [of Oakbrook Terrace, IL] requires that we report this information to a pharmacy and therapeutics committee," Wall says. "We say, 'We've performed an MUE on this drug, and this is what we found, and based on what we found we think it might be a good idea to put restrictions on the use of the drug.'"

Restrictions could include taking the drug off of the formulary or to restrict the drug's use to certain physician specialists, he adds.

"Then in 6 months or 1 year later, we need to see if they made the changes or if the changes had the effect we desired," Wall says. "The most important piece is collecting the data." ■

Establishing MUE process requires sound goals and data collection tool

Select criteria for comparing drugs

Pharmacy leaders need to take charge of the medication use evaluation (MUE) process by identifying a lead person, establishing a process for regular evaluations, and then creating an appropriate tool.

"It's reasonable for mid-sized community hospitals to shoot for quarterly medication use evaluations," **Geoffrey C. Wall**, PharmD, FCCP, BCPS, CGP, an associate professor of pharmacy practice at Drake University in Des Moines, IA, and an internal medicine clinical pharmacist at Iowa Methodist Medical Center, also in Des Moines.

Summary points

- Identify a leader in the medication use evaluation process.
- Set up a process for conducting consistent, regular MUEs.
- Create a tool to assist with data collection.

"We've managed to get two per year done and sometimes three at a community hospital," Wall says.

Also, someone must be identified as the point person for the MUE process.

"Whether it's the director of pharmacy or the clinical coordinator or the floor pharmacist who does a lot of expensive work, someone should be in charge," Wall suggests.

Pharmacy leaders should establish criteria for measuring new medications against existing drugs, he says.

"There should be several outcomes you'll look at with this medication, and you should compare the use of this drug to the baseline, which sometimes is very easy," Wall says.

Use available resources

If the type of medication already has guidelines available, then these are good references, he notes.

For example, if the MUE will compare IV proton pump inhibitors, there already are guidelines for the use of these, Wall says.

"So I take out those guidelines and say, 'How are we doing against these,'" Wall says. "Is my hospital doing what the guidelines say you should do?"

When there are no established or published guidelines, pharmacy directors should conduct an in-depth literature search and develop criteria based on best evidence or compare the hospital's outcomes to published outcomes, he adds.

"There are more and more published clinical guidelines out there, and more professional medical bodies are doing a good job of that," Wall says.

Sometimes there might be very little to go on. When drotrecogin was approved, there was only one study with which an MUE program could compare the hospital's outcomes with published outcomes, he says.

It's important to design a practical data collection instrument.

This could be a piece of paper or an electronic database, Wall says.

Data collection instruments should give the basic patient demographics, including age, gender, and also include what the patient was admitted for, and the patient's outcomes, Wall says.

"That means you have to go back to the chart and medical records and research it like a retrospective study," Wall explains. "If the computer database shows 50 patients who received drotrecogin last year, then I will compare their charts with the current patients' charts."

The data collection instrument should collect information about rehospitalizations, mortality, and as many hard outcomes as the system will allow, he says.

"With electronic medical records much of that stuff is on-line, and it makes collection of data much easier if you don't have to slog through paper charts," Wall says.

If pharmacy directors have an effective data collection instrument and clear objectives, then it will work.

"The key piece is to sit down with your outcomes and ask yourself, 'What is the minimum amount of information I need to figure out this outcome?'" Wall suggests.

With electronic medical records, pharmacists potentially could access a variety of details, including many that are unnecessary for the MUE task, he says.

"I only need the patient's age, weight, and creatine to figure out if the right dose was given to the patient, so I don't need to know the liver function test or anything else about the patient," Wall says. "So there's no need to collect additional data."

Another factor that could impact outcomes is cohort selection.

"Make sure the cohort you're looking at will be representative of what you'll get," Wall says. "You might pull charts from the types of patients who are not representative of what you're trying to figure out."

The key is to pull enough charts to get a good feel for the situation, but not so many charts that the pharmacy director will not have the time or resources to review each, Wall adds.

These could be selected through a randomized number generator, Wall says.

"I think people think it's rocket science, and it's not," he adds. "Once you get a couple of MUEs under your belt, they're pretty simple to do." ■

Collaborative care works well with pharmacist care patient services

Model could be employed by hospitals

The California Chronic Care Coalition brings together a patient community, pharmacy, practitioners, researchers, payers, and pharmaceutical companies with the goal of providing better care through collaboration.

"Our approach is a collaborative that brings value to all the partners," says **Eleanor Vogt**, PhD, RPh, a clinical professor in the department of clinical pharmacy at the University of California-San Francisco in San Francisco, CA.

The coalition's purpose is to provide a strategy for bringing all of the players together with the overall goal of improving the quality of care and reducing major medical care costs, Vogt says.

"In this regard, patients are receiving quality care and hopefully improving outcomes; the payer is seeing a major shift and reduction in major medical care costs, including inpatient stays and emergency room visits," Vogt explains. "Then the practitioner gets reimbursed for providing quality care, and the pharmaceutical company gets to see their product used appropriately and safely."

Also, researchers benefit from having data to publish about best practices, and clinical pharmacists are able to be integral to providing better quality and safety in care.

"As a side effect, we as pharmacists and practitioners get reimbursed for providing primary care," Vogt says. "It's a win for academia also because we're in the business of teaching."

The intervention works up front through medication monitoring, Vogt says.

"We recommend adjustments in medication and lifestyle and are able to reduce the major medical costs," she adds.

Research has shown that pharmacy counseling in medication management provides a huge return on investment, Vogt says.

Nearly $5 are saved for every dollar invested, she adds.

The first step in medication management is to identify patients. The California coalition focused on community pharmacy employees and members of a local union.

The union was a good fit since their members typically are members for life, and they have an incentive to encourage preventive care and medication management, Vogt notes.

Unfortunately, insurance companies lack that incentive because a person might have one insurer one month and another a different month, she adds.

"There's no business incentive for them, and it's something we're all struggling with," Vogt says.

The model could work for hospitals, and it's been used by health systems, most notably the Mission Health System in Asheville, NC, which developed an innovative program that has been duplicated across the country, Vogt says.

Basically, the intervention involves having community pharmacists counsel patients who have diabetes about managing their disease, Vogt says.

This model could be studied as part of comparative effectiveness research (CER) since it appears to be an ideal model to be evaluated against the traditional way of providing care to populations with chronic diseases, Vogt says.

The staffing resources for providing care exist within the pharmacy profession.

"We're graduating students who have the skills to help patients with lifestyle management," Vogt says. "We have 15 years of research showing how it's clinically effective and cost-effective."

The project, which is about three years old, has shown a positive impact on improving patients' outcomes, but the results have not yet been published, she adds.

"It's really exciting work, and we're hearing from patients some wonderful feedback," Vogt says. ■

Summary points

- The California Chronic Care Coalition brings together a combination of patients, pharmacists, physicians, researchers, and others to improve patient care.
- Pharmacists help monitor patients' medications and counsel them on medication and health management.
- Model could be used by health systems.

Pharmacists can assist in fall prevention programs

Medications among most common causes

When St. John Medical Center of Tulsa, OK, started a fall prevention program in 2006, the group included a pharmacist.

"We wanted anyone on the group who could possibly prevent a patient from falling," says **Polly Robinson**, PharmD, clinical pharmacist with St. John Medical Center.

Robinson, as the pharmacy representative on the committee, assessed safety by reviewing and assessing each patient's risk for falling, including patients' potential risk from their medication regimen.

"The group wanted a pharmacist to assess each patient's medication as they entered the hospital," Robinson recalls. "That would be nice, but we didn't have the money to hire 10 more pharmacists to do that."

So Robinson researched the issue and found that one of the most preventable and reversible causes of falls is patient medications and that patients who've already fallen are most likely to fall again.

"So we chose to focus on those patients who've already fallen," she explains. "We review their medication and identify common causes of falls."

Each time a patient falls, a nurse enters data into a hospital computer system, and that information is reviewed regularly.

A pharmacist reviews the charts of patients who've had a fall and sees which of their medications could be changed, such as lowering the drug dosage, Robinson says.

When a change is made and approved by a physician, the pharmacist documents the change and labels it in the "falls" category, she adds.

This information is stored electronically and can be used to chart trends and for quality improvement initiatives. **(See sample information from Falls Review Sheet, p. 142.)**

For example, the hospital has made some changes in standard prescription dosages to prevent falls, including changing temazepam (Restoril®) 30 mg orders to 15 mg dosages for patients who are 65 years or older. Or these patients are changed to a more selective GABA agonist, such as zolpidem (Ambien®), with 10 mg prescribed for patients who are younger than age 65 or 5 mg prescribed for patients who are 65 years or older, Robinson says.

> ***Summary points***
>
> - Fall prevention program needs to include pharmacist.
> - Suggest dosing and medication changes to physicians.
> - Create list of drugs placing patients at risk of falls.

"We noticed Restoril often was the culprit in falls," Robinson notes. "So we focused on that medication and reviewed a lot of preprinted order forms."

With physicians' approval the dosage was lowered and changed.

Now that zolpidem is available in a generic form, it can be used as a safer drug that is not more expensive for the hospital, Robinson says.

"Before zolpidem was a more expensive drug and it was prescribed in 10 mg for everyone," she adds. "So we added age-dosing."

Also, physicians previously would select a pain medication from 4 or 5 different opioid choices. Now they're steered to one opioid that has a lower risk of causing falls, Robinson says.

"As another example of changes made to decrease fall risk, we have simplified the choices of pain medications on our preprinted order forms," she adds. "And we've enacted a policy limiting the use of meperidine (Demerol®), an inferior pain medication with increased risk for CNS side effects."

A medication review for falls turned up another trend: "We noticed a lot of patients were taking diuretics right before bedtime," Robinson says.

"The peak of action of those diuretics was right when they were sleeping, so they'd wake up and need to go to the bathroom, and then they'd fall in the bathroom," she explains. "So we changed the automatic times of those diuretics to be given no later than 5 pm, and with the change we saw a trend of decreased falls at night."

The number of falls decreased from 1.4 falls per night per 1,000 bed days of care down to 1.1 falls per night in a very short timeframe, Robinson adds.

The falls sheet used by pharmacists includes one side with medications that are known to increase the risk of falls, based on a recent literature review. The list includes psychotropics,

cardiovascular medications, and others, including anticholinergics, anticonvulsants, post-anesthesia, and opioid analgesics.

This educational piece also includes details about why the listed medications have the potential to increase risk of falling, including this information:

• **Selective serotonin reuptake inhibitors (SSRIs):**

- New use of SSRIs is associated with a greater risk for falls. Recommend starting with a low dose for the first week, then slowly increasing to therapeutic levels.

- Doses ≥ the equivalent of 20 mg of fluoxetine have a higher risk for falls.

- May induce hypnoatremia, which can lead to delirium; recommend monitoring electrolytes.

• **Antihypertensives:**

- Antihypertensives have been proposed to contribute to fall risk via postural hypotension (drop in SBP of ≥ 20 mm Hg, in DBP of ≥ 10 mm Hg, or to a pressure of < 90 mm Hg when standing).

- Diuretics have been significantly associated with falls (vertigo, orthostatic hypotension, frequent urination). Most studies have found a non-significant relationship between antihypertensives and falls.

- Inadequate treatment of a cardiovascular disease may also be a factor in increasing fall risk.

• **Post-anesthesia:**

- Risk for falling is greatest within 48 hours post-anesthesia.

Pharmacists also make suggestions to physicians when they note a prescription that might entail a fall risk.

For instance, a pharmacist might say, "This patient is elderly and taking temazepam and on 30 mg every night at bedtime for sleep, and that's a very high dose for an elderly patient," Robinson says.

This approach is short and to-the-point, she says.

Then the pharmacist would recommend to reduce the temazepam prescription to 15 mg or to try some other sleep regimen, such as seeing if there were other medications that were keeping the patient awake and which could be adjusted, Robinson explains.

"We look at the medication profile to reduce the medicines that cause falls risk," she adds. "The goal is to review the patient's medication and back-up your suggestion with detailed information about risks for falls." ■

St. John Medical Center's medication review for falls

St. John Medical Center in Tulsa, OK, has developed a medication review for falls sheet that includes a one-page documentation chart of patients' potential medication risks for falls.

Here are some items included in the chart:

• Patient name

• Date of birth

• Room

• Number of routine medications

• Psychotropics
  - Sedative-hypnotics, especially benzodiazepines (BSDs)
  - Neuroleptics (antipsychotics)
  - Tricyclic antidepressants (TCAs)
  - Selective serotonin reuptake inhibitors (SSRIs)

• Cardiovascular medications
  - Digoxin
  - Antihypertensives, especially diuretics
  - Class 1A antiarrhythmics

• Other medications
  - Anticholinergics — sedating antihistamines, TCAs, antipsychotics, and some antiemetics
  - Anticonvulsants
  - Opioid analgesics (within first 48 hours of initiation or dosage increase)

• Other risk factors to consider
  - Elderly patients who are 65 years or older have altered pharmacokinetics and may be more sensitive to medications
  - Renal function impairment may result in medication accumulation and increased risk of adverse reactions
  - Patients taking 4 or more prescription drugs, regardless of pharmacologic classification, are at an increased risk for falls
  - Anticoagulants/antiplatelets may directly increase the risk of injury from falls due to an increased bleeding risk
  - Patients with untreated osteoporosis, urinary incontinence, delirium, and/or pain have an increased risk of injury from falls.

The form is signed and dated by the pharmacist.

Source: Polly Robinson, PharmD, CGP, FASCP, Clinical Pharmacist, St. John Medical Center, Tulsa, OK.

Two children died after surgery and IV solution problems

ISMP warns hospitals to educate staff

Two young children recently died from severe postoperative hyponatremia, says the Institute for Safe Medication Practices (ISMP) in a health care warning to providers in August, 2009.

The tragedies underline the need for greater education about the causes, signs, and symptoms of low sodium levels, ISMP says in the *ISMP Medication Safety Alert!* newsletter, which is available on-line at: www.ismp.org/Newsletters/acutecare/articles/20090813.asp.

In one case the child had an outpatient tonsillectomy and received an IV infusion of plain dextrose in water at a rate that was too high. The child vomited and had seizures that were assumed to be a reaction to an anti-nausea drug, ISMP reports.

The child's lab levels showed critically low sodium levels, but by the time treatment was administered, the child had cerebral edema and eventually died, ISMP says.

In another case, a child had vascular surgery and didn't receive enough sodium in IV fluids postoperatively. When the child became hard to awaken and exhibited seizures, the symptoms were attributed to sleepiness and fidgeting from pain, ISMP reports.

A critical care intensivist recognized the problem, but despite treatment, the child died the next day, the institute adds.

ISMP's recommendations are as follows:

- Hospitals should establish standards of practice for postoperative IV solutions used to hydrate patients, especially children.
- Standards should state that administration of saline in maintenance parenteral fluids is the most important preventive measure to prevent hyponatremia.
- Criteria should include when lab studies need to be drawn to determine electrolyte levels in patients receiving post-op IV fluids over an extended period of time.
- Protocols should be established to identify, treat, and monitor patients with hyponatremia and related conditions.
- Hyponatremia should be included in differential diagnoses for patients presenting with early symptoms.
- All physicians, nurses, and pharmacists need to be educated on fluid and electrolyte balance and the pathophysiology of hyponatremia.
- All hospitals should consider establishing a rapid response team that allows anyone to summon an interdisciplinary team to patient's bedside for full evaluation when they fear something is seriously wrong with the patient. ■

Flu patient died after treatment with zanamivir inhalation powder

GlaxoSmithKline of Philadelphia, PA, issued a "Dear Healthcare Provider" letter on Oct. 8, 2009, reporting the death of an influenza patient who had received zanamivir (Relenza®) inhalation powder that was solubilized and administered by mechanical ventilation.

GSK advised that health care providers do not reconstitute zanamivir in any liquid formulation or use it in any nebulizer or mechanical ventilator. Zanamivir for nebulization has not been approved by the FDA, and a safety and effectiveness profile for its use by nebulization has not been established, the letter says.

When used incorrectly, there is a risk the lactose sugar in the medication's formulation will obstruct proper functioning of mechanical ventilator equipment, the letter says. ■

COMING IN FUTURE MONTHS

- ■ Pharmacy leaders need financial management skills
- ■ Learn to do revenue budgeting
- ■ Indigent clinic needs pharmacy support
- ■ Implementing carousel/packager technology
- ■ Optimizing safe and effective sedation

FDA approves pazopanib for treating kidney cancer

The FDA approved pazopanib (Votrient®) for treatment of kidney cancer in October, 2009.

The sixth drug approved for treating kidney cancer since 2005, pazopanib is intended for treatment of advanced renal cell carcinoma. It is an oral medication that interferes with angiogenesis, the FDA reports.

Adverse reactions to pazopanib include heart rhythm irregularities, diarrhea, high blood pressure, hair color changes, nausea, loss of appetite, vomiting, fatigue, abdominal pain, headache, and weakness. The drug also can cause severe and fatal liver toxicity, according to the FDA.

Patients taking pazopanib should be monitored with blood tests to check liver function before and during treatment. Also, patients receiving the drug need to be monitored with periodic electrocardiograms and blood tests to monitor electrolytes, the FDA advises. ■

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Ketorolac tromethamine injection recalled

On Oct. 16, 2009, American Regent of Shirley, NY, voluntarily recalled the 30 mg/mL Ketorolac Tromethamine Injection® due to a potential for particulate matter in conjunction with crystallization causing obstruction of blood vessels and leading to pulmonary emboli or thrombosis.

The medication also might activate platelets and/or neutrophilis to induce anaphylactic reactions, the FDA and American Regent news release report.

The product was distributed nationwide. All hospitals, surgical centers, clinics, and other facilities that have the USP Injection 30 mg/mL in stock should immediately quarantine the product and return it to American Regent, the company says.

The recall does not affect any other strength of Ketorolac Tromethamine Injection.

Questions about the recall are directed to American Regent at (800) 645-1706 or (631) 924-4000. ■

DRUG FORMULARY REVIEW™
Utilization, Criteria and Outcomes

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