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Hospital pharmacy's future: More EMRs and CPOEs, fewer centralized pharmacies

Future looks like more of current trends

New hospital technology is helping to move health care systems away from the centralized dispensing pharmacy model to a more integrated pharmacy practice model, according to results from the 2009 American Society of Health-System Pharmacists (ASHP) National Survey.

Automated dispensing cabinets (ADCs) which are fairly ubiquitous among hospitals, as well as barcode technology, smart infusion pumps, electronic medical records (EMRs), and computerized provider order entry (CPOE) systems, are accelerating this evolutionary change.

"They're moving toward decentralized drug distribution systems, using automated dispensing cabinets, and that has continued to increase," says **Philip Schneider**, MS, FASHP, an associate dean for academic and professional affairs in the College of Pharmacy at Phoenix Biomedical Campus in Phoenix, AZ. Schneider spoke about the 2009 survey results at the 44th ASHP Midyear Clinical Meeting & Exhibition, held Dec. 6-10, 2009, in Las Vegas, NV.

ADCs bring medications closer to patients, which helps to cut down on delays and waiting periods, he adds.

"Nurses like this because they no longer have to call the pharmacy and wait for the pneumatic tube to arrive," Schneider says.

One major reason why the adoption of new technology in hospital pharmacies has exploded is because of safety issues, says **Lynnae M. Mahaney**, MBA, RPh, FASHP, president of ASHP and chief of pharmacy

Summary points

- Hospitals increasingly are moving toward decentralized drug distribution systems.
- Electronic medical record systems are being implemented more slowly than some other technology.
- Workflow issues sometimes serve as barrier to successful implementation of new technology.

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at William S. Middleton Memorial Veterans Hospital in Madison, WI.

"Technology is helping us do the right thing, so that's the other big reason we're implementing it everywhere," Mahaney adds. "The drug handling process has so many points at which human errors can occur."

The pharmacist's role in hospitals will continue to expand and advance in terms of their involvement with patient care, predicts **Douglas Scheckelhoff, MS, FASHP**, vice president of professional development for ASHP in Bethesda, MD. Scheckelhoff also spoke about the ASHP national survey at the recent ASHP meeting in Las Vegas.

"One thing we've focused on is a look at a pharmacist practice model," he says.

ASHP will have a summit this year with a focus on this topic, Scheckelhoff adds. (See story on ASHP's 2015 goals for hospital pharmacy practice, p. 18.)

"The reason for attention to this is we have an

evolving pharmacist workforce with the doctor of pharmacy degree and residency training, and we also have drug therapy and patient management needs that are becoming more complex with more high risk," he explains.

New technology contributes to this changing need, as well.

"We have a growing amount of technology that's available with barcode dispensing and robotics, so the pharmacist is less tied to dispensing functions," Scheckelhoff says.

So the focus is more on a practice model tied to how pharmacists spend their time and how technology and technicians are used in medication preparation and the distribution process, he adds.

This year's survey described the three most common models and asked survey respondents to say which of these best described their hospital. The models are as follows:

- **Drug distribution-centered model:** About 25% identified with this model, which is where most pharmacy time is focused on managing the drug distribution process;

- **Patient-centered integrated model:** This describes hospitals where the pharmacist spends some time interacting with patients, but also does drug distribution. About 65% of hospitals have this integrated, 50-50 role for pharmacists; (See story on the increase in pharmacy medication monitoring, p. 16.)

- **Clinical specialist model:** Only about 10% of hospitals have pharmacists who are strictly divided between those who work only with distribution and those who work only in clinical activities, Scheckelhoff says.

"When we ask directors about their vision of the future model, 4% say it will be a drug distribution model, 84% say it will be an integrated model, and 12% say it's a clinical specialist model," Scheckelhoff says.

"We asked pharmacy directors what their barriers were to changing their practice model, and the No. 1 barrier was the lack of pharmacist staff resources," he adds. "The second most common barrier was the lack of pharmacist staff with the needed training to take on some of these expanded roles, and the third most common barrier was resistance to training from existing staff."

Hospital pharmacies will continue to incorporate new technology in their facilities, the survey also suggests.

"We also see continual adoption of technology, which will support the pharmacist's role," Scheckelhoff adds.

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Editorial Questions

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For instance, hospitals increasingly are implementing CPOE systems, Scheckelhoff says.

Only about 2.7% of hospitals used these in 2003 and 3.6% in 2005. But now 15.9% of hospitals have switched to CPOE systems, the survey shows.¹

The implementation of CPOE systems increases each year despite the obstacles, including a high cost and obtaining buy-in from medical staff, Scheckelhoff notes.

"Hospitals need to have software systems in place, and the workflow changes, so it's quite an involved process," he adds.

Electronic medical records have had a slower, phased-in adoption rate, the survey's results show.

For example, only 8.8% of hospitals reported a complete EMR in 2009, which is up from the 3.8% who had complete EMRs in 2007. However, there now are more hospitals with partial EMRs, meaning some documentation still is on paper, than there are hospitals that have all-paper medical records, the survey shows. About 47% of hospitals reported partial EMR implementation in the 2009 survey, compared with about 37% in 2007.¹

"I think the federal government's emphasis on building an electronic highway for medical and health information has contributed to this trend," Schneider says. "We're seeing [electronic technology] really improving the efficiency of care and the ability of everyone, including pharmacists, to have access to the information they need to do their jobs."

For instance, 93% of hospitals have pharmacists with access to ready data, he adds.

In the case of barcode technology, there has been a rapid improvement in its adoption.

"That's a technology that went from being adopted in 1.5% of hospitals in 2002 to almost 28% in 2009," Scheckelhoff says.

"The ASHP has pushed for that for a number of years, and the FDA back in 2004 required manufacturers to add a barcode to their medication packaging," he says. "There still are issues where barcodes aren't readable, but it has improved significantly over the last five years."

Another trend noted in the ASHP survey is that small hospitals are starting to catch up in their use of barcode technology, he adds.

"In the early years of barcode administration, it was almost always the large hospitals who were adopting this technology, but now there's very little difference from small to medium to large hospitals," Scheckelhoff says.

Smart infusion pumps also are becoming more popular among hospitals, with 56% reporting their use, up from 32% in 2005.¹

The 2009 ASHP survey did not collect data on the adoption of automated dispensing cabinets because these already are used in 90% of hospitals, Scheckelhoff says.

The decentralization of hospital pharmacies has led to both more efficiency and some drawbacks.

The chief barriers to adopting new technology are the high capital expenditures and the often complex logistics work that needs to be done, Scheckelhoff says.

Schneider has found in his experience that new technologies often create new problems in workflow, as well.

"So it's really important for people to not just acquire technology, but to also understand why they're in place and how to use them properly," he says. "Hospitals will buy barcode systems, Smart Pumps, and not explain why the technology has been acquired and why employees need to change the way they work."

This leads staff to find creative ways to defeat the technology, Schneider adds.

"The difference between the potential for pharmacy with new technology and the actual effectiveness is a gap that pharmacists need to be mindful of and help with," he says.

"One issue is the nurse may get the medication from the ADC before the pharmacist has an opportunity to review the order," Schneider explains. "A review of the order could reveal problems before the drug is administered to a patient."

This problem has led the Joint Commission of Oakbrook Terrace, IL, to require that pharmacists review all medication orders before they're administered to a patient, he adds.

Another issue is that some new technology, such as barcoded medication administration, actually are more time-consuming for nurses.

"Many times it may take nurses longer to administer medications when new technology is implemented, but it is a safer system," Scheckelhoff says. "So it can take time to align what's needed, including equipment costs and software costs and having support and buy-in from nursing."

Reference

1. Scheckelhoff DJ, Schneider PJ, Pedersen CA. 2009

ASHP's annual survey shows increases in pharmacy medication monitoring

Hospital pharmacies are at a tipping point

The 2009 American Society of Health-System Pharmacists (ASHP) National Survey highlights the escalating trend of hospital pharmacists becoming more involved in clinical care.

The future of pharmacy likely will see the continuation of a trend of health systems moving away from the centralized dispensing pharmacy and the continued integration of new technology that makes this process easier to accomplish, according to experts and the survey's results.

"We're in a good place, but we have a long way to go," says **Lynnae M. Mahaney**, MBA, RPh, FASHP, president of ASHP and chief of pharmacy at William S. Middleton Memorial Veterans Hospital in Madison, WI.

"Some hospital practices are much further ahead of the curve than others," Mahaney adds.

"But the idea is that we're at a turning point, or maybe even a tipping point, in hospital pharmacy practice," Mahaney says. "The pharmacy roles have changed a great deal, and they'll continue to change and evolve into direct patient care roles."

The 2009 survey found that the proportion of patients monitored by a pharmacist has increased dramatically, says **Douglas Scheckelhoff**, MS, FASHP, vice president of professional development for ASHP in Bethesda, MD.

In this survey, the percentage of hospitals who said more than 75% of patients are monitored by pharmacists was 43%, up from 24% in 2006, he says.

The number of hospitals that reported having at least half of their patients monitored by pharmacists increased from 43% in 2006 to 62% in 2009, he adds.

"We're really excited about this trend because historically the profession of pharmacy has been charged with dispensing medicines," says **Philip**

Summary points

- Increasing numbers of hospitals are reporting having pharmacists monitor patients.
- Easier access to clinical laboratory data has helped improve pharmacy medication management.
- Shifts in pharmacy education and training have also contributed to this trend.

Schneider, MS, FASHP, an associate dean for academic and professional affairs in the College of Pharmacy at Phoenix Biomedical Campus in Phoenix, AZ.

"We think everyone needs to be involved in monitoring patients' response to therapy," Schneider adds. "We need to make sure everyone is benefiting from therapy; we need to detect adverse events, and the outcomes noted from the monitoring process are an important determinant of quality."

So why has medication therapy monitoring increased so significantly?

"This is due to a combination of things," Scheckelhoff says. "Partly, it's a recognition that drug therapies continue to be more complex, and hospitals recognize that pharmacists are able to improve the safety of medication use."

The 2009 survey found many improvements, but one area seemed to lag behind, and that involved having pharmacy play a role in discharge planning. **(See story on 2015 goals, p. 18.)**

"There are certain areas where we have a long way to go, like the whole discharge counseling area, and that's because the attention is being paid on the front-end," Mahaney says.

ASHP has pushed for this trend of having pharmacists more involved in direct patient care for a number of years, Scheckelhoff notes.

"One of the things that has helped improve drug therapy monitoring is improved access to clinical laboratory data," Scheckelhoff says. "In the year 2000, about 73% of pharmacists had access to lab data; in 2009, that was up to 93%."

Electronic medical systems are better interfaced now than they had been, he adds.

The improvement in access to electronic medical data has made it possible for pharmacists to look at clinical information and monitor medication therapy no matter where they are located, Schneider explains.

Also, the education and training of pharmacists have advanced over the past decade to accommodate this expanded role, he adds.

The Accreditation Counsel for Pharmaceutical

Education (ACPE) in 2000 changed their standards to accredit only colleges that offer a doctorate of pharmacy degree as an entry-level degree, Schneider says.

"The aim was to prepare pharmacists for the future," he says. "So students are graduating with more qualifications and confidence and interest in being involved in medication use than they were before."

This led to a trend of increased numbers of internships and residencies, which gave hospitals the opportunity to involve pharmacy students in drug therapy monitoring, he adds.

"We think this is one of the reasons why more patients can be monitored through pharmacy services," Schneider says.

The 2009 ASHP survey found the percentage of hospitals that have students involved in monitoring medication therapy has increased from 25% to 38% between 2000 and 2009.¹

Since 2000, there has been significant growth in new graduates who pursue residency training, Scheckelhoff says.

"So the typical new pharmacist hired within a hospital setting has far advanced clinical training compared with 10-15 years ago," he says.

ASHP has surveyed hospital pharmacy directors for nearly 50 years, Scheckelhoff says.

"For the last 10 years we've looked at the medication use process, dividing it into three components and surveying each of these every three years," he explains. "This year we focused on patient monitoring and education."

The survey also looked at medication reconciliation programs, finding a variety of barriers to their implementation, including a lack of staff resources, which was cited by 37.4% of hospitals; staff resistance, listed by 11.8% of hospitals; and lack of commitment by institutional leadership, cited by 9.3% of hospitals.¹

Also, the survey's results seem to confirm anecdotal evidence that the current economic crisis has had an impact on inpatient pharmacy staff turnover rates.

"We always ask about staffing levels for pharmacists and technicians, and we do continue to see an increase in staffing for pharmacists and technicians," Scheckelhoff says. "It continues to grow year after year."

The total pharmacy full-time equivalent positions (FTEs) per 100 occupied beds has continued to rise, the survey found. There are 18.4 FTEs per 100 occupied beds among total pharmacist positions in 2009, vs 13.1 FTEs in 2005. Total techni-

cian FTEs per 100 occupied beds also has increased from 12.3 in 2005 to 16.9 in 2009.

"One element that was a little different this year was we saw the vacancy rate drop," Scheckelhoff says. "We anticipated this with the economy being what it is, and we've heard that a lot of people delayed their retirement or went from part-time to full time."

The 2009 ASHP survey found that the pharmacist staff turnover rate for all hospitals was 6.6% in 2009, compared with 8.6% in 2008 and 7.7% in 2007. The rate for vacant pharmacist FTEs went from 6.4% in 2007 to 3.7% in 2009.¹

"Of that 3.7%, about one-fourth of those positions in the survey, which took place in July, 2009, had been frozen," Scheckelhoff notes. "They were not allowed to hire because of the current economic situation and the financial situation within their hospital."

The 2009 survey's take-home message is that hospital pharmacies are evolving at a fairly brisk pace, and this will continue as they increasingly adopt new technology and embrace a more integrated pharmacy practice model.

"We definitely continue to see significant expansion in the pharmacist's role and advancement in what pharmacists are doing in terms of their involvement in impacting patient care," Scheckelhoff says. "We also see continual adoption of technology that will support the pharmacist's role," he adds.

Reference

1. Scheckelhoff DJ, Schneider PJ, Pedersen CA. 2009 ASHP National Survey Results: Implications and Trends for Today's Practice. Presentation at the 44th ASHP Midyear Clinical Meeting & Exhibition in Las Vegas, NV; Dec. 9, 2009. ■

Revenue budgeting is challenge for hospital pharmacy directors

Pay attention to reimbursement systems

Expense-based budgeting is traditional; it's comfortable, and it's no longer top of the evolving hospital pharmacy's radar screen.

Hospital pharmacy directors who want to

Hospital pharmacies nationwide are moving toward ASHP's 2015 initiative's goals

Some improvements are going faster

Hospital pharmacies nationwide have five years remaining to collectively meet the 2015 initiative goals of the American Society of Health-System Pharmacists (ASHP) of Bethesda, MD, and so far there are mixed results.

With some of the initiative's goals there is steady and encouraging progress; with others the goal seems remote, according to results of the 2009 ASHP National Survey.¹

U.S. hospitals have made significant improvements on the objectives involving implementation of technology and those that overlap with Joint Commission standards, but have some ways to go on objectives focusing on evidence-based medication use, disease-specific quality indicators, and public health, the survey found.¹

"The 2015 agenda of ASHP has six goals and 3-5 objectives in each goal, and they reflect questions historically asked in the national survey," says Philip Schneider, MS, FASHP, an associate dean for academic and professional affairs in the College of Pharmacy at Phoenix Biomedical Campus in Phoenix, AZ.

The survey's results show how much progress the nation's hospitals have made toward these goals since they were launched in 2003.

Here are some examples of the ASHP 2015 initiative goals and any progress noted in the national survey toward reaching these goals:

• **Goal 1:** Increase the extent to which pharmacists help individual hospital inpatients achieve the best use of medications.¹

Among ASHP's objectives are these: having 100% of hospitals with pharmacists who monitor inpatients with complex and high-risk medication regimens, and that 75% of hospitals have inpatients who are discharged with complex and high-risk medication regimens receive discharge medication counseling managed by a pharmacist.¹

The 2009 survey found that 56.1% of hospitals have pharmacists monitoring inpatients with complex and high-risk medication regimens, and 17.4% of hospitals have a pharmacist managing discharge medication counseling.¹

• **Goal 2:** Increase the extent to which health system pharmacists help individual non-hospitalized patients achieve the best use of medications.¹

Summary points

- The ASHP 2015 initiative goals have six goals with multiple objectives that are measured in the national survey.
- One objective has already been met: 70% of health systems have pharmacists who can access important patient information.
- One objective remains elusive: 75% of hospitals to include pharmacists in discharge medication counseling of high-risk patients; only 17.4% of hospitals currently do so.

• Goal 3:

Increase the extent to which health system pharmacists actively apply evidence-based methods to the improvement of medication therapy.¹

• Goal 4:

Increase the extent to which pharmacy departments in health systems have a significant

role in improving the safety of medication use.¹

One objective is for 90% of health systems to establish an organizational program that has pharmacy involvement, with the goal of achieving significant annual, documented improvement in medication use safety. The 2009 survey shows that 64.2% of all hospitals have achieved this objective.¹

• **Goal 5:** Increase the extent to which health systems apply technology effectively to improve the safety of medication.¹

One of these objectives involves the adoption of barcoded medication administration, which has steadily climbed in the past decade, reaching 27.9% of hospitals having implemented the system.¹

A second objective is that to have pharmacists use medication-relevant portions of patients' electronic medical records for managing patients' medication therapy in 65% of health systems. The 2009 survey shows that 49.9% of hospitals have achieved this objective, nearly double the number that had reached this goal in 2003.¹

U.S. hospitals have met and exceeded the third objective, which is that in 70% of health systems pharmacists will access pertinent patient information and communicate across settings of care to ensure continuity of pharmaceutical care for patients with complex and high risk medication regimens. The 2009 survey found that 72.3% of hospitals had achieved this objective.¹

• **Goal 6:** Increase the extent to which pharmacy departments in health systems engage in public

remain vital to their health system's future should now meet the challenge of revenue budgeting and establish strong financial system checks and balances, an expert says.

"We have to pay attention to reimbursement systems and opportunities that might provide us with both expense reductions, as well as revenue opportunities," says **Patrick E. Parker**, RPh, MS, director of pharmacy and IV therapy for Lawrence Memorial Hospital in Lawrence, KS.

"Some programs have looked at outpatient functions and the potential to do outpatient-based pharmacies, including medication management programming as part of their tactic," Parker says.

This has been a very successful venue for some big organizations because it enables them to reduce health care costs, so their expenses are down, and they've been able to improve quality of care, he explains.

"Both of these pieces reduce expenses, but provide high-quality programming, as well as revenues for a particular side of the program, and that's been a win-win piece," Parker says.

On the expense side, pharmacies have done the basics, such as cutting travel and training costs, he notes.

But these might be shortsighted measures when small investments in travel and training for pharmacy staff could lead to big revenue boosts when staff return with fresh revenue-based ideas or better cost-cutting strategies, Parker suggests.

"One thing we lose sight of is what we are throwing away and why we're doing it," he says. "What is expiring and going out of date? What is our waste stream and the cost in relation to that?"

Pharmacy directors and staff traditionally are hired based on their clinical acumen and experience, but the evolving hospital pharmacy requires much more than these attributes, he adds.

"Everyone I know is having discussions with their finance departments and engendering relationships with them to better understand financing in the organiza-

tion," Parker says.

For example, Lawrence Memorial Hospital's pharmacy recently had difficulty with how its billing structure maintained a Healthcare Common Procedure Coding System (HCPCS) code set, Parker says.

"Basic information for the chargemaster needed to be updated and reviewed, and we pay more attention to that now," he explains. "It's inherently dangerous to let that be handled by someone else."

If the HCPCS quantities are incorrect then a hospital could be charging more or less than it should, and those mistakes could have huge dollar impacts, he adds.

"We've built-in checkpoints in our pharmacy to reduce that risk," Parker says. "We've worked hard to build selective checkpoints, and the intent is that the bills we send out are much cleaner."

Without checkpoints, a pharmacy director won't know if the systems are working correctly, he says.

"The systems we're working in now are significantly more complex than they were 10 years ago," Parker explains.

Parker offers these suggestions for improving your pharmacy's financial management:

- **Establish tight documentation requirements:**

It's very important to have strict documentation requirements at the front end, Parker says.

"You have these systems built around a clinical information system, and within that framework, you have a formulary of medications associated with it," he explains. "So you need to generate a charge with those, and the documentation of all that is a very important issue."

Pharmacy directors need to outline how they will document and what they'll administer to the patient.

"People want to know why this is on their bill, and they want proof that they were given this medication," Parker says. "Errors are inherent, although barcoding has helped with that."

But barcoding systems need to be maintained because the codes change, and if a barcode is not charging correctly, or if it's connected to the wrong product, then there's a system error, he adds.

"It's not at all uncommon for a health system to have a clinical system and different financial system, and they interface but may not match up correctly," Parker says. "If those financials don't match up correctly, and they're not maintained correctly with proper codes, then you can lose a

Summary points

- Pharmacy goal is to provide high-quality programming, as well as revenues.
- Tight documentation measures make tracking trends, issues more feasible.
- Internal checkpoints can identify a problem before it results in a costly error.

lot of money.”

It’s easier and less costly to fix a problem that’s quickly discovered than to do a six-month, retrospective review, seeking every incidence of error, he adds.

• **Institute internal checkpoints:** “You can have Chargemaster do an internal review and have the pharmacy assess the quality of those chargemasters,” Parker says.

“Ten to 15 years ago, that wasn’t true,” he notes. “Financial folks operated independently of the pharmacy.”

Now it’s possible for trained pharmacy and technical staff to conduct checkpoints.

The pharmacy can run a series of daily reports that are screened as far as dollar charges and quantity charges, Parker says.

The pharmacy recently was updating the computer system with the assistance of a staff pharmacist who also is an expert in information technology. Through the pharmacist’s work the department discovered a million dollar mistake, Parker says.

“It was a huge mistake simply because a factor was put in incorrectly, and it multiplied every dose by 3,500,” Parker explains. “Our screening tool picked it up, by showing us how yesterday we charged X amount for this drug, but today it was charging a million dollars.”

Checkpoints also provide some reassurance to health care payers.

Third-party vendors and insurance companies continually are questioning the pharmacy department to make certain products and services were appropriate, Parker says.

“If you’re making changes in your electronic system right now, which everyone is, then you need to have an ongoing checkpoint,” Parker says.

“The revenue cycle is a piece that is relatively new to pharmacy directors, yet it needs their attention,” he says. ■

Ensure effective use of technology in improving medication management

Workflow changes dramatically

As hospital systems add new technology to improve and change pharmacy department

workflow, medication management also evolves and changes. This requires pharmacy leaders to anticipate new safety concerns and develop new practice models.

Continuum Health Partners of New York, NY, has been involved in this evolution for the past six years, starting first with the implementation of automated dispensing machines (ADM), and more recently the health system installed a new computerized provider order entry (CPOE) system which is interfaced with the ADMs.

“We completely changed our workflow,” says **Deborah A. Wible**, PharmD, chief pharmacy officer for Continuum Health Partners, which is comprised of Beth Israel Medical Center in New York, NY; St. Luke’s Roosevelt Hospital Center in New York, NY, and Long Island College Hospital in Brooklyn, NY.

“We used to have a physician order system which made its way to pharmacy, and we had to have someone double-enter it into the pharmacy system,” Wible explains. “We had to process the order and get the medication back up to the unit, and then the nurse would administer it, and record it on the medication administration record (MAR).”

The new system has the provider entering the order into the CPOE system. The information immediately populates the MAR and the pharmacy verification queue, Wible says.

“So there is not anybody double-handling information,” she adds.

Also, now the hospital bills only for the medication that’s administered, and there are no credits for returned medications.

Here are some of the other ways the new technology has improved and changed pharmacy workflow and processes:

• **Safety enhancements:** “When providers put in orders they can get alerts as to whether the

Summary points

- Total workflow changes often necessary with new technology implementation.
- Electronic medication management helps eliminate the drug crediting process.
- Electronic systems can help meet compliance standards by . . . eliminating handwriting issues and abbreviations.

patient has allergies or contraindications,” Wible says. “You can make this as robust as possible in terms of decision support.”

The system also provides notices when a medication

decision requires lab results or approval from another department, such as infectious diseases, she adds.

Since all order entries are electronic there are no more errors due to handwriting interpretation, prohibited abbreviations, or transcription, Wible says.

"We don't have in place barcode bedside verification, which will be a further enhancement," she says.

However, the new system directs nurses to the correct drawer where medication can be removed.

- **Regulatory compliance:** Electronic systems eliminate abbreviations and handwriting issues, thus meeting compliance standards set by the Joint Commission of Oakbrook Terrace, IL.

Hospital staff are not permitted to access medications until after the pharmacist has reviewed the order, and this helps to prevent regulatory noncompliance issues.

"You can have some exceptions with an override process," Wible notes. "But you can obtain all kinds of useful information out of these systems, and these help you monitor the process and look for medication diversions."

The electronic system also has the ability to set up order sets or treatment protocols that would help a health system comply with the Joint Commission's national patient safety goals for anticoagulants, she adds.

- **Financial improvements:** Electronic medication management makes it possible to charge for medications based on administration, thus eliminating the drug crediting process.

"When you first set up the machines you might have an increase in inventory," Wible says. "But over time you lower your inventory because you do not have to do returns, you're only putting in the stock you're using, and you can adjust your par levels based on usage."

The electronic dispensing and CPOE system give pharmacists a better idea about medication usage and prescription patterns, she says.

"We have used the system to improve usage," Wible says.

"There is the potential to put up messages associated with prescribing," she adds. "It can have a message that's tied to a particular drug, providing restrictions or warnings."

Also, providers who view the electronic information could see a drug tip of the day on the computer screen when the computer goes into its sleep mode. These items might pertain to the

Joint Commission's standards, infection control, and hand-washing, she says.

Another area of financial improvement involves changing a hospital's staff mix: "There's a possibility you could massage your professional and technical staffing mix," Wible says.

"When you have the dispensing cabinets you have the ability to more fully utilize technicians for the drug distribution process, assuring adequate oversight by pharmacists," she explains. "You don't have to have a pharmacist spend hours reviewing carts and instead move them to verification and review."

Since pharmacists no longer need to be stationed in a central pharmacy, they can review orders and interact with medical teams at the various hospital units, she adds.

"So maybe they're not doing the traditional rounding, but they are unit-based," Wible says. "So I think that's another kind of interesting practice model, and because of the computerization, you have the ability to utilize that kind of staffing model."

- **Implementation process:** Implementation of new technology impacts workflow during the process, as well as after the system is fully integrated into the hospital.

Continuum Health Partners implemented new technology for five hospitals with each hospital going up one at a time, Wible says.

"We did the big bang approach, and there was a lot to manage," she adds. "We had a multidisciplinary team spend time planning for the change."

Also, hospital leaders assessed the implementation process and post-implementation period.

"Twice a day we would have calls to troubleshoot what would come up and how people were monitoring the system," Wible says.

"We had people on the units that were knowledgeable of the system's functionality to help field questions," she says. "These people were not clinicians, but they knew how to get in touch with clinicians when necessary."

It helped that the organization's administration gave full support to the project, Wible notes.

"We also had all the senior administrative and physician leadership support the concept that this was the way we were going to move forward, and that this would be our new practice model," she adds. "We did not allow exceptions: Everyone had to use the provider order entry system." ■

Delirium is common among ICU patients; here's how to treat them

Cause might be related to medications

Research shows that 60% to 80% of intensive care unit (ICU) patients experience delirium, making this a significant diagnosis in this population.

"In general, most of our ICU populations will have delirium at some point in their stay," says **Jeffrey P. Gonzales**, PharmD, BCPS, an assistant professor in critical care at the University of Maryland School of Pharmacy in Baltimore, MD.

"It's a multifactorial issue and probably related to whatever brought them into the hospital," Gonzales says. "If you don't use a delirium assessment toolkit, health care providers are very poor at identifying whether or not a patient has delirium."

One study showed that a little more than one-third of nurses and even fewer physicians correctly identified delirium in their patient populations, he adds.

"That's why the Society of Critical Care Medicine's sedation guidelines recommend that providers use a delirium assessment tool," Gonzales says.

The reason so many patients with delirium are missed is because the condition can manifest itself in one of three different ways, including the following:

1. Hyperactive delirium: These are patients who are combative, agitated, and who often can be identified by a clinical exam, Gonzales says.

2. Hypoactive delirium: "This is the patient who is lying in bed with a decreased level of consciousness and awareness," he explains. "It's easier to miss diagnoses of delirium in these patients."

3. Mixed hyper/hypoactive delirium: Some patients alternate between the two, and this actually is the most common form of delirium in the ICU, Gonzales adds.

Most patients who experience delirium in the ICU develop it while in the hospital, he notes.

The key is to quickly identify delirium and then to look for reversible causes, such as environmental and medication side effects, and to begin treatment, he says.

Summary points

- Delirium is a common experience among intensive care unit patients, but hospitals do a poor job of identifying it.
- Hospitals could improve its diagnosis by using delirium screening tools.
- Drug therapy can be used to treat delirium when it cannot be eliminated through medication changes or environmental manipulation.

"We have two very good delirium assessment tools we can use," Gonzales says. "One is the Intensive Care Delirium Screening Checklist (ICDSC), and the other is called the Confusion

Assessment Method for the ICU (CAM-ICU)."

Both of these tools have been validated for use in the ICU setting. The screening checklist is better at assessing the type of delirium that fluctuates over a 24-hour period since it uses the previous shift's numbers, as well, Gonzales says.

The confusion assessment method is a more objective screening test than the checklist tool, he adds.

"Usually nurses will give the screening test since they're at the bedside more often than a physician or pharmacist," Gonzales says. "Both tools are easy to administer and have a high sensitivity."

Once patients are diagnosed with having delirium, then it's time to figure out what caused the problem, and hospital pharmacists can be very helpful in this investigation.

"We're looking for reversible causes of delirium, such as medications that cause it, such as benzodiazepines, which are used to treat agitation and anxiety," Gonzales says. "Benzodiazepines are used for sedation of ICU patients, but they also can create delirium."

Opioids also can cause delirium.

The key is to eliminate or reduce the use of these medications when delirium is diagnosed, Gonzales says.

Environmental issues also can cause delirium. For example, patients might be sleep deprived.

"So you should make sure the patient has a good sleep-wake cycle and is sleeping through the night and awake for most of the day," Gonzales says. "You can make sure the lights are on during the day and that the patient has a window that allows light to come through."

Other measures that have been shown to decrease delirium are re-orienting patients, early

mobilization, removal of restraints and catheters, and using eye glasses and hearing aids when appropriate, he says.

These types of measures have been shown to decrease the risk of delirium in hospitalized patients, although there are no data in the ICU population, he adds.

Another common cause of delirium is infection, such as sepsis.

When delirium cannot be eliminated through medication changes or environmental manipulation, providers can treat it with drug therapy.

"Drug therapy will help treat delirium, and, currently, the most common drug to treat it is haloperidol," Gonzales says. "It's an antipsychotic that's also effective for treatment of delirium, although there's not a lot of evidence for its use in treating ICU delirium."

The field needs more evidence about drug therapy to treat delirium, and hopefully there will be more information available in the literature within the next five years, Gonzales notes.

"It's a hot topic and a hot research interest, and it's an area where we need more studies — both prevention studies as well as treatment studies," Gonzales says.

The key is to pursue environmental and reversible causes of delirium before moving to drug therapy.

"What you don't want to do is what we've done in the past and that is to oversedate these patients when they have delirium," Gonzales says. "Five, 10 years ago we sedated patients to high levels of sedation so they're in a drug-induced coma state, and we're rethinking that whole practice."

Now the standard is to have ICU patients be more awake and to use antidelirium medications like haloperidol, while minimizing the medications that cause delirium, Gonzales says.

Another step hospital pharmacists should take is to assist in educating staff about how to use the delirium assessment tools.

"We've implemented this past summer a delirium assessment tool, and we've done massive amounts of education for nursing staff and physi-

cians through one-on-one inservices to formal inservices," Gonzales says. "We've put up a poster in the ICU and have used numerous educational techniques to drive home the importance of identifying delirium, and the next stage will be educating on how we treat these patients."

Reference

1. Scheckelhoff DJ, Schneider PJ, Pedersen CA. 2009 ASHP National Survey Results: Implications and Trends for Today's Practice. Presentation at the 44th ASHP Midyear Clinical Meeting & Exhibition in Las Vegas, NV; Dec. 9, 2009. ■

Drug News

ASHP and ISMP launch new national alert network for serious drug errors

The American Society of Health-System Pharmacists (ASHP) of Bethesda, MD, and the Institute for Safe Medication Practices (ISMP) of Horsham, PA, launched in mid-December, 2009, a new national alert system to prevent medication errors. It's called the National Alert Network for Serious Medication Errors (NAN).

ISMP will disseminate the alerts through its usual communication avenues, and ASHP will send information to its network of health care practitioners.

Each alert will provide a description of the error, along with recommendations for preventing the same error. Organizations or individuals who are involved with the error will not be named, according to an ASHP media announcement.

The goal is that health care providers nationwide will use the alert's recommendations to

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ensure the medication error is avoided at their facilities, according to an ISMP news announcement.

ASHP officials predict there will be 2-4 alerts per year since only medication errors of the most serious nature will be communicated through NAN.

The IV Safety Summit brought ASHP and ISMP, along with national experts, together to discuss ways to improve medication safety, and NAN is a result of that meeting, according to ASHP's media release. ■

Hospitals serving the indigent will receive relief from a reporting rule

Change depends on each state's Medicaid

The Center for Medicare & Medicaid Services (CMS) has issued a directive that eliminates the need of a controversial reporting policy, potentially saving hospitals millions of dollars in

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implementation costs.

CMS has notified state Medicaid programs that states may exempt hospitals from a federal mandate to collect national drug codes (NDCs) on physician-administered drugs if such drugs are billed at what the state's Medicaid plan defines as their purchasing cost, according to a news statement by the Safety Net Hospitals for Pharmaceutical Access (SNHPA) of Washington, DC. SNHPA represents about 500 safety-net hospitals.

SNHPA had sued CMS in 2008 to reverse the implementation of the 2007 CMS Medicaid regulation that mandated NDC reporting by hospitals.

CMS's clarification sent in October, 2009, to state Medicaid directors, states, in part, "States must collect National Drug Codes (NDCs) on claims submitted for physician-administered drugs in order for the states to bill manufacturers for rebates. Section 1927(j)(2) of the Social Security Act exempts certain hospitals from the rebate requirement as long as the hospitals bill Medicaid for covered outpatient drugs at no more than the 'hospital's purchasing costs for covered outpatient drugs (as determined under the State plan).' ■