

The Abell Report

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ABELL SALUTES:

Jhpiego: For Helping Developing Countries Develop First-Class Health Care

Before Najini Khan lay down to give birth, the 25-year-old Nepalese woman cleaned the house, fed the goat and cow, bathed her five-year-old daughter, and made dinner. Najini's labor was long, strenuous, and life-threatening. After giving birth to her daughter, the new mother began to bleed heavily. Postpartum hemorrhage is the leading cause of maternal deaths, the majority of which occur in the developing world. But a community health worker had prepared Najini for just such an emergency.

During prenatal visits to Najini's village in western Nepal, community health worker Chandrakali Kurmi explained what to do if Najini began to hemorrhage. She outlined the steps of a community-based intervention developed by Jhpiego, a Johns Hopkins affiliate, to help save the lives of the majority of women in the developing world who give birth at home.

Kurmi counseled Najini, her husband, and other family members on the use of misoprostol, a lifesaving drug that helps stop bleeding, and the need to go to the local health facility if the bleeding persisted. That was exactly what happened to Najini after giving birth to a lively baby girl. As instructed, Najini took the three white

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Battling deadly infections in Maryland hospitals:

Maryland Hospital Infection Rates at Bottom of National Rankings; State's Hospitals Launch Initiative to Bring Them Down to Zero

Hopkins' patient safety expert leads fight to change hospital culture

By M. William Salganik

Maryland's rates for hospital-acquired infections are public for the first time, and they are troubling.

Of 17 states that reported data, Maryland ranked worst when the federal Centers for Disease Control and Prevention (CDC) published the first-ever comparison of state infection rates¹ in 2010.

Responding to a legislative mandate, the Maryland Health Care Commission (MHCC) disclosed hospital-by-hospital rates² for the first time in October 2010 as well, comparing each hospital to national benchmarks. Of 45 hospitals included in the MHCC report, only the Johns Hopkins Hospital newborn intensive care unit was better than the national benchmarks by a statistically significant degree. Eight of the 45 hospitals—including three Baltimore hospitals: University of Maryland Medical Center, Sinai Hospital and Johns Hopkins Bayview—had pediatric and adult rates that were significantly worse than national peers.

Maryland's Health Services Cost Review Commission (HSCRC) has begun quantifying the financial impact

of hospital-acquired infections. The HSCRC reported 14,206 avoidable hospital-acquired infections in the year ended June 30, 2010, costing \$175 million to treat.³

The CDC and MHCC data track only one type of infection, those traced to catheters inserted in or near the heart of patients and known as central line-associated bloodstream infections, or CLABSI. And with 33 states not reporting—states can decide whether to participate—it's impossible to know precisely where Maryland stands even on that one type of infection. Moreover, Maryland is one of only five of the 17 reporting states that audits its data, and those five show the highest reported rates, an indication that the unverified data from other states is underreporting the problem.

The HSCRC reports on a full range of hospital-associated infections, but doesn't have comparable data from other states. The CDC report covers the first half of 2009, while both state datasets include the second half of 2009 and the first half of 2010, so they're not directly comparable.

Despite measurement limitations, however, Maryland's hospitals admit they have a problem—and say they are

Data discussed in this report can be found in tables on pages 8 through 11.

determined to fix it.

“I’m not explaining it away. We own it,” said Barbara Epke, vice president of LifeBridge Health, parent of Sinai and Northwest hospitals, and chair of the Maryland Hospital Association’s Council on Clinical and Quality Issues. “We look terrible. It’s out there. What can I say?”

“Maryland came out at the bottom of the heap,” said Dr. C. Patrick Chaulk, executive director of the Maryland Patient Safety Center, an independent non-profit that the hospital association helped launch several years ago. “There’s a real commitment to seeing if it can be fixed.” The safety center and Maryland Hospital Association (MHA) are spearheading a statewide initiative to reduce CLABSI, with the MHA setting a goal of eliminating CLABSI completely.

Dr. Peter Pronovost, a Hopkins physician and national expert on hospital-acquired infections, brought home the stakes to more than 300 people—doctors, nurses, infection control specialists—representing nearly every Maryland hospital at a December meeting to launch the initiative. He showed a photo of a cute 18-month-old.

“My hospital killed this little girl,” he said. “She died of what started as a central line infection.”

Prompted at least in part by public exposure of the infection rates, nearly all of Maryland’s hospitals are signed up for the Pronovost-led CLABSI initiative. Although they’ve all had CLABSI-reduction efforts in the past, they’re now agreeing to implement in full Dr. Pronovost’s infection-fighting protocol, which has been shown in several studies to significantly reduce rates of CLABSI. They’re also agreeing to confer regularly with each other and

the Pronovost team and to publish data for accountability.

Some hospitals are already reporting progress; University of Maryland, which posts its infection data on the internet, has shown a sharp drop since the state numbers were compiled.⁴

CLABSI is only one type of hospital-acquired infection. Some medical professionals also use the term “health care-acquired infections” to encompass infections picked up in doctors’ offices, ambulatory surgical centers, and other nonhospital settings. According to estimates by the CDC, health care-acquired infections occur 1.7 million times a year in the United States, resulting in nearly 100,000 deaths annually.⁵

Most of the data collection so far, however, has occurred in hospitals, and that’s why many patient-safety efforts—and this report—concentrate on hospitals rather than other health settings.

In 2007, an Abell Foundation report⁶ provided a national overview of the problem of hospital-acquired infections. At that time, the Foundation planned to follow up with a report on Maryland once data became public. What follows is that report.

CLABSI: An expensive—and deadly—hospital-acquired infection

The costs of CLABSI are substantial.

“Each year in the United States, central venous catheters may cause an estimated 80,000 catheter-related bloodstream infections, and as a result, up to 28,000 deaths among patients in intensive care units (ICUs),” Dr. Pronovost and colleagues wrote in an often-cited *New England Journal of Medicine* article.⁷ “Given that the average cost of care for a patient with this infection is \$45,000, such infections could cost up to \$2.3 billion annually.”

In the CDC report covering the first six months of 2009, Maryland had

a “standardized infection rate” (SIR) for CLABSI of 1.30—meaning its rate is 30 percent higher than a multi-state sample from 2006-2008. Massachusetts, a comparable state, had SIR of 0.59—half of Maryland’s rate. Overall, the rate for the 17 reporting states was 0.82.

In Maryland, there were 601 CLABSI cases in the fiscal year that ended June 30, 2010, with a treatment tab of about \$16 million, according to the HSCRC. Of those 601 patients, 77 died in the hospital, a lower death rate than the national estimates. The data don’t show whether those deaths were the result of CLABSI or of the condition, such as cancer or trauma, that put the patient in the hospital in the first place. And, that CLABSI infection rate actually represents improvement, with a CLABSI rate 20.9 percent lower for fiscal 2010 than 2009, as the impending public data release pushed hospitals to focus on central line infections.

“Almost as many people die of bloodstream infections as die of breast cancer,” Dr. Pronovost said in an interview. “But unlike breast cancer, we have a cure. And it’s cheap.”

Central line-associated bloodstream infections are often the first focus of efforts to reduce hospital-acquired infections because CLABSI is common, expensive to treat, deadly, and relatively easy to recognize and measure. Also, there is a substantial body of research—much of it conducted by Dr. Pronovost and his colleagues—that shows CLABSI can be reduced dramatically, quickly, and at a low cost.

“We have one goal, and that goal is very simple: zero. Zero central line-associated blood stream infections,” Carmela Coyle, president and CEO of the Maryland Hospital Association, said at the kickoff for the CLABSI

The Abell Report is published quarterly by The Abell Foundation

111 S. Calvert Street, 23rd Floor, Baltimore, Maryland 21202-6174 • (410) 547-1300 • Fax (410) 539-6579

The Abell Reports on the Web: www.abell.org

effort. “It’s hard to do, but it can be done, and it has been done. We have the tools and the strategies, and they’ve been proven.”

Pronovost: A pioneer in reducing CLABSI

Although it didn’t have to go out of state to find him, in Dr. Pronovost Maryland has a national leader in infection prevention coordinating the state’s current CLABSI initiative.

“Peter Pronovost is a critical care physician who devises life-saving clinical practices that are dramatically improving patient safety in hospitals across the United States,” the MacArthur Foundation said⁸ in awarding him one of its “genius” fellowships in 2008.

“His work has already saved more lives than that of any laboratory scientist in the past decade,” Dr. Atul Gawande, a Harvard Medical School professor and patient safety expert, wrote in *The New Yorker*.⁹

“If the infection fight has a national hero, that would be Dr. Peter Pronovost,” said the Center for Health Reporting of the California Health Care Foundation.¹⁰

More than 40 states are enrolled in the American Hospital Association’s Pronovost-led effort to reduce CLABSI. And under the auspices of the World Health Organization, Dr. Pronovost has taken his work international as well, with projects in Spain, the United Kingdom, and Chile.

Dr. Pronovost became interested in medical errors when he was a first-year medical student at Johns Hopkins in 1987-88; he learned that his father’s cancer had been misdiagnosed and had become inoperable.

“When my father finally passed away, I returned to medical school to finish my studies,” he wrote. “The experience had changed the way I viewed health care. My dad had suf-

fered and died needlessly at the premature age of 50 thanks to medical errors and poor quality of care.”¹¹

Eventually, he turned his attention to CLABSI, driven by the death of an 18-month-old girl, which triggered a self-examination at Johns Hopkins Hospital.

“Johns Hopkins Hospital rates were 11 to 15 per 1,000 catheter days,” he said, meaning that the hospital had 11 to 15 infections for every 1,000 days patients were on catheters. “A hospital with a rate that high should be sanctioned.” Dr. Pronovost says any rate above 3 is clearly too high, and that hospitals should be able to attain rates of 1 or fewer.

With an intervention designed by Dr. Pronovost and his colleagues, Hopkins brought its rates down. According to the Maryland Health Care Commission audited data for the year that ended June 30, 2010, Hopkins had a rate of 1.95 per 1,000 catheter days for adult and pediatric ICUs, slightly better than projected from national data and based on its mix of patients. For its newborn intensive care unit, Hopkins had a rate of 0.55—the only rate in the state that beat national benchmarks by a statistically significant degree.

In 2003, after Hopkins dramatically reduced its own rates, Dr. Pronovost began a project at 100 intensive care units across the state of Michigan. The average rate of infections for each 1,000 days that patients were on central lines dropped from 7.7 to 1.4 in an 18-month period, a reduction of more than 70 percent.¹²

The researchers estimate that over that 18-month period, the effort saved 1,500 lives and \$200 million. A new analysis in *British Medical Journal*, based on Medicare data, and thus covering only patients 65 or older, confirmed that the mortality rate in Michigan ICUs dropped significantly after the program—a reduction that was statistically significant compared to trends in 11 other Midwestern states. Length

of stay dropped about two-thirds of a day in Michigan, compared to half a day in the other states; this difference was not statistically significant.¹³

Showing the Michigan results were not a fluke, Dr. Pronovost replicated the effort in Rhode Island, reporting a 74 percent reduction in CLABSI infections, from 3.73 to 0.97 infections per 1,000 catheter days.¹⁴

At the heart of the Pronovost method is a simple checklist for health care providers. For CLABSI, the checklist recommends¹⁵:

1. Wash hands before inserting the catheter.
2. Wear sterile gloves, hat, mask, and gown, and place a sterile drape over the entire patient.
3. Clean the patient’s skin with a particular type of antiseptic, chlorhexidine.
4. Insert the catheter near the shoulder if possible, avoiding the alternative insertion site, the femoral vein in the groin area, which is more prone to infection.
5. Remove the catheter as soon as possible; check each patient daily to see if the catheter is still needed.

How could this list have mattered? Didn’t doctors and nurses know to wash their hands and use an antiseptic to clean the patient? Weren’t there already simple guidelines in place for clinicians to follow?

There were, of course, guidelines for clinicians, but they were far from simple.

The Centers for Disease Control and Prevention has published 13 guidelines on infection control and prevention, containing nearly 1,200 recommended practices, the Government Accountability Office found.¹⁶ That’s clearly more than even the most dedicated clinicians can track. For CLABSI alone, CDC offers 120 pages of guidelines.

So, Dr. Pronovost decided to boil

them down to a small number of steps that were most important and had the strongest research base.

Once he had his distilled checklist, Dr. Pronovost started by monitoring how often the steps were followed at Hopkins and found they were observed only 38 percent of the time.

He spoke to a group of intensive-care doctors and nurses, urging them to follow all the steps. “Peter, in a perfect world, that would be fine,” one doctor replied, “but it takes time to find all the things I need to perform those steps. And I don’t have the time to run around the hospital looking for them.”¹⁷

Dr. Pronovost tried the process himself and found he needed to go to eight different places to gather up the items. Caps, gowns, and masks were stored in three different places. And some of the items were missing altogether. Time spent rounding up the needed items meant time spent away from critically ill patients.

The solution was another seemingly simple step—create a “central line cart” and assign someone to make sure supplies were always stocked. Compliance jumped to 70 percent—nearly double the previous rate, but still not good enough.

Clear, simple checklists and keeping needed supplies handy aren’t sufficient to stop infections, Dr. Pronovost concluded. What’s needed is to change the hospital culture.

The death of 18-month-old Josie King—the little girl whose picture Dr. Pronovost shows at most of his safety lectures—“had a huge impact on the institution and in some ways it allowed for a change of culture to occur,” said Dr. Edward D. Miller, chief executive officer of Johns Hopkins Medicine.¹⁸ “There is a lot of arrogance in the institution; we believe we can do no wrong, we are the world’s greatest institution and so we don’t make mistakes.”

So, along with the checklist, Dr. Pronovost’s program includes culture-changing activities: Hospital executives commit to improvement, doctors and nurses review safety data, and junior staff and nurses are empowered to speak up when they see deviations from the checklist. Moreover, staff is encouraged to treat infections and other complications as avoidable, to investigate them when they occur, and to make system corrections to prevent recurrence.

Part of the culture change taught by Dr. Pronovost is to post infection data in each unit, so staff can see how they are doing relative to their peers. The result can be a relentless pressure for improvement.

“One of the nurses said, ‘We’ve gone 25 weeks without an infection. Do you think I would want to be the nurse whose patient breaks that?’ ” recounted Dr. Jonathan E. Gottlieb, senior vice president and chief medical officer at University of Maryland Medical Center.

“What we’ve seen, and it’s a really important finding, is that for decades we’ve labeled these infections as inevitable,” Dr. Pronovost said. “When you change your mind-set to believe that these infections are preventable, it’s a self-fulfilling prophecy.”

Dr. Chaulk, of the Maryland Patient Safety Center, said that checklists alone—which have been used in Maryland for the past five years—are not sufficient without the rest of the program. “It’s not the checklist; it’s the culture change,” he said.

Overall progress on patient safety has been slight

A process similar to the one Dr. Pronovost used for CLABSI—developing a simple checklist, gathering data, working to change culture—has been used by Dr. Gawande and his colleagues from Harvard in a different area, to improve surgical safety.

Despite those promising results on patient safety for nearly a decade from

Dr. Pronovost and Dr. Gawande among others, overall progress has been slow and spotty.

In a recent national survey, half of infection prevention specialists said CLABSI continues to be a problem in their hospitals, and many said they lack the time, resources, and support of administration that they need.¹⁹ Only three in ten said their hospitals were willing to spend what is necessary.

A recent study in the *Journal of the American Medical Association*²⁰ found troubling variation among hospitals in the measurement of CLABSI—indicating we’re not even getting accurate information on the extent of the problem. (This is consistent with the CDC data showing higher rates for the states, including Maryland, that verify their data before publishing them.)

While the CDC found that CLABSI declined 21 percent in reporting states from the 2006-2008 baseline period to 2009,²¹ other federal data show increasing rates of postoperative bloodstream infections (up 8 percent from 2008 to 2009), catheter-associated urinary tract infections (up 3.6 percent), and other healthcare-associated infections (1.6 percent).²²

The larger patient safety picture is even more disturbing.

Looking beyond infections to the full range of hospital dangers, in 1999, the Institute of Medicine produced a landmark report²³ sounding an alarm with the estimate that 44,000 to 98,000 patients a year in the United States die from medical errors. Since then, progress has been uneven at best.

A study last year in the *New England Journal of Medicine*²⁴ reviewed medical records at hospitals in North Carolina—a state the authors said had “shown a high level of engagement in efforts to improve patient safety”—and found “harms” (including medication errors and procedures gone bad as well as infections) in 25.1 percent of inpatient visits.

“Our findings validate concern

raised by patient-safety experts in the United States and Europe that harm resulting from medical care remains very common,” the authors concluded. “Despite substantial resource allocation and efforts to draw attention to the patient-safety epidemic on the part of government agencies, health care regulators, and private organizations, the penetration of evidence-based safety practices has been quite modest.”²⁵

And a federal report reviewing nearly one million Medicare records²⁶ from a single month found a similar percentage of problem cases—27 percent of those hospitalized had “adverse events” that resulted in permanent or temporary harm. Of those, half involved “prolonged hospital stay, permanent harm, life-sustaining intervention, or death.”

Over the course of a month, according to the report, 134,000 Medicare beneficiaries experienced serious harm in a hospital, contributing to 15,000 deaths and costing an additional \$324 million, or 3.5 percent of Medicare spending for inpatient hospital treatment during the month. That projects to added costs of \$4.4 billion annually.

“Because many adverse events we identified were preventable,” the report admonished, “our study confirms the need and opportunity for hospitals to significantly reduce the incidence of events.”

A national survey of hospital board chairs published last year “found less-than-optimal focus on clinical quality.”²⁷ Of those who were surveyed from hospitals performing in the bottom 10 percent on quality measures based on federal data, none perceived their hospital to be worse than average, while 58 percent said their hospital was better or much better than average.

In Maryland, HSCRC measures about 50 hospital-acquired conditions, including, in addition to infections, such problems as post-operating hemorrhaging and inflammation caused by

devices. Overall, HSCRC says there were 59,881 potentially preventable complications in Maryland hospitals for the year that ended June 30, 2010—adding \$566 million to the collective hospital bill in the state.

Although these numbers are staggering, they actually mark some improvement in patient safety. HSCRC says complications dropped 11.9 percent from fiscal 2009 to fiscal 2010—saving \$62.5 million in costs. It isn’t clear what caused the drop, but fiscal 2010 was the first year for which hospitals faced financial penalties and rewards for their performance.

Quality efforts going forward

The incentive for hospitals to improve in Maryland comes not just from a commitment to quality or from the knowledge that the data would be made public. The HSCRC, which sets the reimbursement rates for each hospital, imposes penalties on hospitals with more avoidable complications than the state average, and rewards those with better-than-average records.

For the fiscal year that ended June 30, 2010—the first in which penalties and rewards were meted out—the largest penalties were assessed to Prince George’s Hospital Center in Cheverly, \$890,955; University of Maryland Medical Center in Baltimore, \$678,169; Doctors Community Hospital in Lanham, \$145,925; and Shady Grove Adventist Hospital in Rockville, \$108,901.

The largest bonuses for avoiding complications went to eight hospitals, which collected between \$100,000 and \$200,000: Peninsula Regional in Salisbury; Mercy Medical Center, Union Memorial, Johns Hopkins, St. Agnes, and Maryland General, all in Baltimore; Holy Cross in Silver Spring; and Greater Baltimore Medical Center in Towson. In all, the system, which places up to one-half of 1 percent of hospital revenue at risk based on performance, shifted \$2.1 million from low-perform-

ing hospitals to high-performing ones.

Although there’s been no lack of effort on patient safety in the past decade, the problem, Dr. Pronovost said, has been satisfaction when hospitals are trying to improve rather than a focus on quantifiable outcomes. “The field has focused too much on efforts rather than results,” he said.

Maryland provides an example of this. There was a CLABSI initiative five years ago, also promoted by the Maryland Hospital Association and Maryland Patient Safety Center, the groups sponsoring the new effort. Surprisingly, neither the Patient Safety Center nor the hospital association have data on CLABSI rates during or since the earlier project. But it’s clear that Maryland hasn’t eliminated CLABSI.

“It was the first collaborative the center launched,” said Dr. Chaulk, who didn’t join the patient safety center until February 2010. Such efforts, he continued, “are much trickier than they look. There are a lot of politics.” Ultimately, he said, the effort didn’t provide enough feedback to the hospitals and wasn’t sustained. “We need to have buy-in from the CEOs,” he added, and he believes the current program does have that support.

The safety center and MHA tried to recruit Dr. Pronovost to work on the earlier effort.

“What bothered me most was they did not want to put resources toward supporting valid centralized data collection,”²⁸ Dr. Pronovost wrote. “So I contacted the head of the center and politely announced that we could not participate in the project. This was especially disappointing for me because Maryland is my home state and I care deeply about improving patient safety there.”

“The collaborative five or six years ago didn’t have consistent, standardized data collection,” concedes Beverly Miller, senior vice president of the Maryland Hospital Association, who oversees the association’s patient safety programs. “Now, robust data collection

is a piece of every single one of our initiatives.” Satisfied with the data plans this time, Dr. Pronovost agreed to coordinate the new initiative.

Dr. Pronovost, state officials, and hospital executives agree that the renewed effort, with a commitment to rigorous examination of data, has been spurred by the public airing of the infection data.

“I have no doubt,” Dr. Pronovost wrote, “that if all hospitals were required to have a sign in front of the entrance that accurately reported their central line infection rates, hospitals would rapidly adopt the program and dramatically reduce these infections.”²⁹

Public reporting, providing feedback to hospitals and doctors, is even more likely to improve safety than financial incentives or regulatory pressures, argues Dr. Lucian L. Leape, a safety crusader based at the Harvard School of Public Health.

“From the standpoint of improving patient safety,” Dr. Leape wrote, “transparency is crucial. It is the cornerstone of the cultural transformation that our health care organizations need to undergo to become safe.”³⁰

That seems to be happening in Maryland, according to early data since the infection numbers were reported.

“We’ve seen a definite improvement as a result of putting this out there,” reported Theresa Lee, chief of hospital quality initiatives for the Maryland Health Care Commission. “Some of the facilities perhaps didn’t realize they had a problem.”

Before the data were public, MHCC collected a year’s worth of “trial run” data that were available to the hospitals. The public data, for the fiscal year that ended June 30, 2010, represent a 20.9 percent reduction from the previous year, according to HSCRC data—indicating that hospitals began to focus and make improvements during the “trial run” period.

Both University and Sinai, which showed up as worse than average on the posted data and have reported improvements since the data period, say they have been working on reducing CLABSI for several years. While they’ve used elements of the Pronovost program over that time, including checklists, they’re now signed on for the full range of checklists, training, and culture-change exercises.

“These data troubled all of us,” said Dr. Gottlieb of University. “This was our number one area of focus for the last two years. We were not happy with our results, and we think our patients deserve better.”

At the same time it was fighting those troubling infection rates, University was winning patient safety awards. As a sign in the lobby proudly proclaims, it is one of two hospitals in the country to be honored as “hospital of the decade” by the Leapfrog Group, an organization of employers pressing for better and more cost-effective care. The group measures “mortality for common high-risk surgeries and procedures; resources used to care for patients measured by length of stay and readmission rates; and management practices that promote safety and quality such as the adoption of computerized physician order entry to reduce medication errors and properly staffing intensive care units with specially trained doctors and nurses.”³¹

While University earned top scores in most of those areas, Dr. Gottlieb said, the hospital was worried that it could lose its top ranking because of its CLABSI rate, which Leapfrog also monitors.

That and the impending public release of the Maryland data, he said, led to a push over the past two years that included some elements of the Pronovost program along with some others, such as the adoption of antibiotic-coated catheters. One addition is “just-in-time medical education,” a cart that rolls through the hos-

pital, working with nurses on demonstrating their catheter-insertion techniques on a dummy.

As the efforts continued, the infection rate “inexorably moved down, quarter by quarter,” Dr. Gottlieb said. And providing public accountability, University publishes that rate on its website.³² That audited data showed 42 CLABSI infections in July through September 2009—about as many as Johns Hopkins Hospital had for the whole year—but a steady drop since.

“It was almost cinematic, the engagement of the frontline staff,” Dr. Gottlieb said. “As more units began to experience [months-long periods with no infections], we couldn’t stop it. Everybody wants to be the best.”

For the third quarter of 2010, there were only 13 infections—down 70 percent from a year earlier. There was an uptick in the fourth quarter, to 26 infections, but that’s still 28 percent lower than the fourth quarter of 2009.

Similarly, Sinai has been working to bring down infections, and accelerated its efforts as the data were about to be released, according to Epke. “We’ve all been working on it, but we need to do better.”

Sinai purchased ultrasound equipment to better guide the placement of the central lines. It has put flipcharts at each intensive care bedside, showing how long the central line has been in—a reminder to clinical staff to check each day to see if the line is still needed. The chief of medicine uses a computerized tool to monitor progress.

Although Sinai doesn’t post its infection rate publicly, the way University does, Epke also reports progress. In November, the most recent month for which verified data were available, the hospital had an infection-free month.

“I think you’ll see dramatic improvement because of all the things we’re doing at once,” Epke said. “In the end, we have to be at zero, and we intend to be.”

State and federal regulators are con-

tinuing to press hospitals to improve.

Under the terms of the new health reform law, Medicare will begin imposing financial penalties on hospitals with high readmission rates, and is developing a “value-based purchasing program”, which will impose rewards and penalties based on a number of areas measuring clinical process (were heart attack patients given an aspirin on arrival?), outcomes (mortality rate for pneumonia), and patient survey scores. Bonuses of up to 1 percent will be based on high absolute scores or on improvement in scores.

The initial value purchasing rules—at publication time, Medicare had issued draft regulations for comment—do not include infections or other measures of hospital safety. The draft regulations say, however, “This new program will necessarily be a fluid model, subject to change as knowledge, measures, and tools evolve.”³³

Medicare also plans to add infection data to its “Hospital Compare” website, www.hospitalcompare.hhs.gov.

The Maryland Health Care Commission, after publishing CLABSI rates for the first time in October 2010, plans to add other types of infections to future reports. Next up is surgical site infections (SSI), although working out the technical issues could mean the SSI report isn’t public until 2012.

The state’s Health Services Cost Review Commission is considering expanding its financial rewards and penalties for hospital-acquired conditions. The commission at some point might double the amount of hospital revenue at risk to one percent, according to Robert Murray, the commission’s executive director.

The HSCRC is also beginning a new reimbursement system for hospitals—voluntary, so far—that will pay a bundled rate for hospitals covering an admission and any readmissions. Since the hospitals won’t collect any more if

the patient comes back, the system creates an incentive to eliminate unnecessary return trips to the hospital. Murray said he expected a majority of the state’s hospitals to sign up.

“The general idea,” Murray said, “is to strengthen our quality metrics, linked to financial incentives.”

Beyond the CLABSI initiative and the regulatory push on complications, the hospitals hope that the culture change and the discipline of checklists will have spillover effects that will help with other patient safety efforts.

“This offers the stimulation to say we can do things right,” said Dr. Chaulk of the patient safety center. “I think you’ll see it expand.”

MHA has also set targets for eliminating infections related to urinary catheters and pneumonia that comes from infected ventilators, according to Miller, although it has not yet announced programs to accomplish those goals. Catheter-associated urinary tract infections (CAUTI) are the most common type of hospital-associated infection, according to the CDC, accounting for some 450,000 of the 1.7 million infections picked up in hospitals annually.³⁴

MHA is also working on eliminating unnecessary readmissions to the hospital—expensive additional treatment that results from a patient being sent home too soon, or from unclear instructions or poor planning for follow-up care.

Individual hospitals have their own safety initiatives as well. University, for example, has teams working on falls, medication errors, pressure ulcers, procedure errors (such as wrong-sided surgery), and delays in diagnosis and treatment, in addition to CLABSI and two other types of infections, ventilator-associated pneumonia and surgical site infections.

“We have to do it all,” said Epke of Sinai.

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M. William Salganik was a reporter and editor at The Baltimore Sun for 30 years. For 12 years, he covered health, including hospital and HMO quality reporting, hospital rate-setting, and other regulatory issues.

Endnotes

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EDITOR'S NOTE: A copy of the report, *Battling deadly infections in Maryland hospitals: Maryland Hospital Infection Rates at Bottom of National Rankings; State's Hospitals Launch Initiative to Bring Them Down to Zero*, is available in "Publications" on the Abell website, www.abell.org.

State Rates for Central Line-Associated Bloodstream Infections (CLABSI)

| State | Number of Infections | Predicted | Ratio of Actual to Predicted Infections (SIR) |
|------------------|----------------------|-----------------|---|
| Vermont | 3 | 10.99 | 0.27 |
| Oklahoma | 59 | 118.95 | 0.50 |
| New Hampshire | 13 | 22.93 | 0.57 |
| Washington | 86 | 148.07 | 0.58 |
| Delaware | 20 | 33.84 | 0.59 |
| Massachusetts | 124 | 211.44 | 0.59 |
| Oregon | 50 | 82.21 | 0.61 |
| Colorado | 64 | 94.25 | 0.68 |
| Pennsylvania | 818 | 1,176.83 | 0.70 |
| New Jersey | 183 | 222.97 | 0.82 |
| Virginia | 161 | 193.81 | 0.83 |
| Illinois | 301 | 333.46 | 0.90 |
| Connecticut § | 65 | 69.46 | 0.94 |
| New York § | 604 | 610.22 | 0.99 |
| Tennessee § | 282 | 245.99 | 1.15 |
| South Carolina § | 183 | 158.11 | 1.16 |
| Maryland § | 234 | 179.95 | 1.30 |
| US-All | 4,615 | 5,618.75 | 0.82 |

§ State health department self-reported the completion of any validation study of NHSN data (studies conducted on 2008 data).
 Source: Centers for Disease Control and Prevention, based on data from January - June, 2009

Inside the numbers

What is a “standardized infection ratio”? How can a hospital with no infections at all be rated only “average”?

The seemingly mysterious statistics behind the reported rates of central line-associated blood stream infections (CLABSI) are based on two simple points:

Some patients are more susceptible to infection than other patients.

Patients in a burn unit, for example, are about three times as likely to get CLABSI as patients in a general medical-surgical intensive care unit, according to data from the Centers for Disease Control and Prevention (CDC).

Thus, to compare states or compare hospitals, statistics are usually based on the actual infection rate compared to the rate projected based on the type of patients, or what statisticians call “case mix.” Let’s say that given its case mix, a hospital is projected (statisticians say “expected”) to have 20 infections—that is, hospitals with similar populations are producing about 20 infections a year.

The standardized infection ratio (SIR)—used by the CDC in comparing states and by the Maryland Health Care Commission in comparing hospitals—is simply the actual rate divided by the expected rate. So, in the case of the hospital expected to have 20 infections, if it actually has 10, it will have an SIR of .5. If it actually has 40 infections, it will have an SIR of 2.

So, an SIR of 1 indicates that a hospital is doing as well, on average, as its peers, given its population. The hospital with a ratio of .5 has a rate that is half that of its peers; the hospital with an SIR of 2 has a rate that is double that of its peers.

Small samples are less precise than large samples.

We all know that a poll with a sample of 400 has a larger

margin of sampling error (plus or minus six percentage points) than a poll with a sample of 1,000 (plus or minus three percentage points).

There’s a comparable phenomenon in comparing infection rates. Statisticians can calculate a confidence interval—similar to the margin of sampling error—based on the number of cases in a hospital or in a state. Statisticians are sure that the true score will be within the confidence interval 95 percent of the time. For example, in the CDC rankings, Maryland’s SIR is 1.3, with a confidence interval ranging from 1.14 to 1.48. Because the low range of the confidence interval (1.14) is higher than 1 (a score of 1 means equal to national peers), analysts are quite confident that Maryland is worse than average.

So, while Maryland’s confidence interval, from 1.14 to 1.48, shows a spread of .34, smaller states have larger spreads—Delaware’s is .55 and larger states have smaller spreads—New York’s is .16.

It’s the same when comparing hospitals. Smaller hospitals have a large confidence interval, so it’s hard to be sure they’re different from average. That leads to the seeming anomaly in the Maryland Health Care Commission’s hospital comparisons—about half a dozen hospitals had no CLABSI infections during the reporting period, but were still rated as “average.” Of those with zero infections (Howard County, Carroll, Calvert Memorial, Fort Washington, Chester River, Garrett County, Kernan), most have fewer than 500 days a year in which a patient has a central line. There’s a wide confidence interval around their scores. In contrast, medium-sized hospitals (such as St. Joseph, Union Memorial, and Anne Arundel) have about 5,000 central-line days a year, and the largest hospitals with the most intensive-care patients, Johns Hopkins and University, have more than 20,000 central-line days a year.

Infection Rates in Maryland Hospitals, Newborn ICUs

| Hospital | Number of Infections | Number of Infections Predicted by National Experience | Ratio of Actual to Predicted Infections (SIR) | Difference From National Peers |
|---------------------------------------|----------------------|---|---|--------------------------------|
| Johns Hopkins Hospital | 4 | 20.17 | 0.20 | Better |
| Sinai Hospital | 0 | 2.50 | 0.00 | Average |
| Mercy Medical Center | 0 | 1.10 | 0.00 | Average |
| St. Joseph Medical Center | 0 | 0.55 | 0.00 | Average |
| Anne Arundel Medical Center | 0 | 0.24 | 0.00 | Average |
| Frederick Memorial Hospital | 0 | 0.11 | 0.00 | Average |
| Greater Baltimore Medical Center | 1 | 3.64 | 0.27 | Average |
| Johns Hopkins Bayview Medical Center | 2 | 3.76 | 0.53 | Average |
| Howard County General Hospital | 1 | 1.50 | 0.67 | Average |
| St. Agnes Hospital | 1 | 1.32 | 0.76 | Average |
| Holy Cross Hospital | 4 | 4.72 | 0.85 | Average |
| Shady Grove Adventist Hospital | 3 | 3.20 | 0.94 | Average |
| Prince George’s Hospital Center | 2 | 1.99 | 1.01 | Average |
| University Of Maryland Medical Center | 10 | 9.68 | 1.03 | Average |
| Franklin Square Hospital Center | 1 | 0.78 | 1.28 | Average |

Source: Maryland Health Care Commission, based on data from fiscal year ended June 30, 2010

Infection Rates in Maryland Hospitals, Adult and Pediatric ICUs

| Hospital | Number of Infections | Number of Infections Predicted by National Experience | Ratio of Actual to Predicted Infections (SIR) | Difference From National Peers |
|--|-----------------------------|--|--|---------------------------------------|
| Howard County General Hospital | 0 | 3.24 | 0.00 | Average |
| Carroll Hospital Center | 0 | 1.90 | 0.00 | Average |
| Calvert Memorial Hospital | 0 | 0.67 | 0.00 | Average |
| Fort Washington Hospital | 0 | 0.50 | 0.00 | Average |
| Chester River Hospital Center | 0 | 0.42 | 0.00 | Average |
| Garrett County Memorial Hospital | 0 | 0.17 | 0.00 | Average |
| James Lawrence Kernan Hospital | 0 | 0.12 | 0.00 | Average |
| Good Samaritan Hospital | 1 | 4.57 | 0.22 | Average |
| Mercy Medical Center | 2 | 4.69 | 0.43 | Average |
| St. Joseph Medical Center | 4 | 8.73 | 0.46 | Average |
| Maryland General Hospital | 1 | 2.08 | 0.48 | Average |
| Western Maryland Regional Medical Center | 2 | 4.16 | 0.48 | Average |
| Union Memorial Hospital | 4 | 8.20 | 0.49 | Average |
| Montgomery General Hospital | 1 | 1.67 | 0.60 | Average |
| Franklin Square Hospital Center | 4 | 6.24 | 0.64 | Average |
| Washington Adventist Hospital | 7 | 9.97 | 0.70 | Average |
| Anne Arundel Medical Center | 6 | 7.73 | 0.78 | Average |
| Frederick Memorial Hospital | 2 | 2.48 | 0.81 | Average |
| Johns Hopkins Hospital | 44 | 49.63 | 0.89 | Average |
| Suburban Hospital | 6 | 6.59 | 0.91 | Average |
| Meritus Medical Center | 4 | 4.39 | 0.91 | Average |
| Upper Chesapeake Medical Center | 3 | 3.28 | 0.91 | Average |
| Greater Baltimore Medical Center | 4 | 4.23 | 0.95 | Average |
| St. Agnes Hospital | 6 | 6.26 | 0.96 | Average |
| St. Mary's Hospital | 1 | 0.91 | 1.10 | Average |
| Baltimore Washington Medical Center | 6 | 5.39 | 1.11 | Average |
| Holy Cross Hospital | 16 | 13.27 | 1.21 | Average |
| Dorchester General Hospital | 1 | 0.70 | 1.43 | Average |
| Southern Maryland Hospital Center | 4 | 2.68 | 1.49 | Average |
| Civista Medical Center | 5 | 2.81 | 1.78 | Average |
| Harford Memorial Hospital | 3 | 1.59 | 1.89 | Average |
| Harbor Hospital Center | 6 | 3.00 | 2.00 | Average |
| Northwest Hospital Center | 6 | 2.99 | 2.01 | Average |
| Laurel Regional Hospital | 3 | 1.42 | 2.11 | Average |
| Bon Secours Hospital | 5 | 2.22 | 2.25 | Average |
| Atlantic General Hospital | 3 | 1.29 | 2.33 | Average |
| Union Hospital Of Cecil County | 4 | 1.46 | 2.74 | Average |
| Johns Hopkins Bayview Medical Center | 30 | 17.58 | 1.71 | Worse |
| University Of Maryland Medical Center | 119 | 68.50 | 1.74 | Worse |
| Prince George's Hospital Center | 21 | 11.42 | 1.84 | Worse |
| Peninsula Regional Medical Center | 15 | 7.40 | 2.03 | Worse |
| Shady Grove Adventist Hospital | 10 | 4.62 | 2.16 | Worse |
| Doctors Community Hospital | 16 | 7.08 | 2.26 | Worse |
| Sinai Hospital | 44 | 14.83 | 2.97 | Worse |
| Memorial Hospital At Easton | 5 | 1.06 | 4.73 | Worse |

Source: Maryland Health Care Commission, based on data from fiscal year ended June 30, 2010

Potentially Preventable Complications in Maryland Hospitals

| Hospital | Observed Number of Complications | Predicted Number of Complications Based on State Average | Difference From The State Average | Complication Rate per 1,000 Cases Adjusted for Severity of Patients | Total Cost (+)/ Savings (-) of Excess Complications |
|--------------------------------------|----------------------------------|--|-----------------------------------|---|---|
| Maryland General Hospital | 398 | 722 | Better | 1.34 | -\$3,535,709 |
| St. Mary's Hospital | 235 | 401 | Average | 1.43 | -\$1,522,272 |
| Bon Secours Hospital | 304 | 508 | Better | 1.46 | -\$1,825,650 |
| Mercy Medical Center | 803 | 1283 | Better | 1.53 | -\$5,306,405 |
| Southern Maryland Hospital | 771 | 1115 | Better | 1.68 | -\$2,916,078 |
| Calvert Memorial Hospital | 306 | 442 | Average | 1.69 | -\$1,368,142 |
| Howard County General Hospital | 709 | 987 | Better | 1.75 | -\$2,475,869 |
| Holy Cross Hospital of Silver Spring | 1160 | 1585 | Better | 1.78 | -\$3,899,581 |
| James Lawrence Kernan Hospital | 253 | 344 | Better | 1.79 | -\$710,985 |
| Baltimore Washington Med. Center | 1314 | 1758 | Better | 1.82 | -\$4,043,886 |
| Peninsula Regional Medical Center | 1866 | 2473 | Better | 1.84 | -\$6,789,929 |
| Carroll County General Hospital | 772 | 1023 | Average | 1.84 | -\$2,521,905 |
| St. Agnes Hospital | 1287 | 1667 | Better | 1.88 | -\$3,981,598 |
| Greater Baltimore Medical Center | 1219 | 1574 | Better | 1.89 | -\$3,931,988 |
| Dorchester General Hospital | 181 | 231 | Average | 1.91 | -\$541,330 |
| Union Memorial Hospital | 2052 | 2613 | Better | 1.91 | -\$4,724,454 |
| Northwest Hospital Center | 790 | 1006 | Better | 1.91 | -\$2,504,387 |
| Upper Chesapeake Medical Center | 849 | 1067 | Better | 1.94 | -\$1,908,259 |
| Harford Memorial Hospital | 329 | 413 | Average | 1.94 | -\$961,856 |
| Memorial Hospital at Easton | 659 | 801 | Average | 2.01 | -\$1,600,610 |
| Meritus Medical Center | 1057 | 1269 | Better | 2.03 | -\$2,352,735 |
| Good Samaritan Hospital | 1396 | 1653 | Average | 2.06 | -\$2,855,007 |
| Johns Hopkins Bayview Med. Center | 1233 | 1455 | Better | 2.07 | -\$2,113,203 |
| Sacred Heart Hospital | 988 | 1157 | Better | 2.08 | -\$1,089,767 |
| Atlantic General Hospital | 303 | 352 | Better | 2.1 | -\$726,475 |
| Suburban Hospital | 1162 | 1350 | Better | 2.1 | -\$1,604,115 |
| Johns Hopkins Hospital | 3782 | 4332 | Better | 2.13 | -\$5,255,133 |
| Anne Arundel General Hospital | 1567 | 1794 | Better | 2.13 | -\$1,657,915 |
| McCready Memorial Hospital | 28 | 32 | NA | 2.14 | -\$45,890 |
| Frederick Memorial Hospital | 1248 | 1397 | Average | 2.18 | -\$1,969,832 |
| Garrett County Memorial Hospital | 147 | 159 | Better | 2.26 | -\$106,658 |
| Franklin Square Hospital | 1848 | 1960 | Average | 2.3 | -\$1,793,184 |
| Harbor Hospital Center | 841 | 857 | Average | 2.39 | -\$146,534 |
| Sinai Hospital | 2680 | 2685 | Better | 2.43 | -\$539,716 |
| St. Joseph Medical Center | 2391 | 2364 | Worse | 2.47 | -\$1,863,911 |
| Chester River Hospital Center | 237 | 231 | Average | 2.5 | -\$141,996 |
| Washington Adventist Hospital | 1680 | 1629 | Worse | 2.51 | \$507,085 |
| Doctors Community Hospital | 956 | 920 | Worse | 2.53 | \$1,327,591 |
| Laurel Regional Hospital | 441 | 417 | Average | 2.57 | \$492,416 |
| Civista Medical Center | 557 | 526 | Worse | 2.58 | \$383,608 |
| Univ. of Maryland Medical Center | 4019 | 3668 | Worse | 2.67 | \$7,696,350 |
| Union Hospital of Cecil County | 586 | 532 | Average | 2.68 | \$511,638 |
| Montgomery General Hospital | 757 | 686 | Worse | 2.69 | \$741,128 |
| Shady Grove Adventist Hospital | 1553 | 1402 | Worse | 2.7 | \$974,636 |
| The Memorial Hospital | 252 | 200 | Worse | 3.06 | \$517,200 |
| Prince George's Hospital | 1255 | 749 | Worse | 4.08 | \$6,766,528 |

Source: Maryland Health Services Cost Review Commission, based on data from fiscal year ended June 30, 2010

ABELL SALUTES

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pills—known in Nepalese as maatri surakchya chakki. The bleeding slowed, but continued. Her husband, Isharat, called health worker Kurmi and together they loaded Najini in a buffalo cart for the hour-long ride to the hospital, where the staff was prepared to respond to an obstetric emergency as part of a Nepal government initiative implemented by Jhpiego. Staff there removed a piece of placenta that remained in Najini's uterus and stopped the bleeding.

Without the Jhpiego-supported prenatal care and emergency obstetric preparedness, Najini would likely have bled to death, as is the case for an estimated 100,000 women annually.

"I was able to survive because of this maatri surakchya chakki," Najini said, referring to the misoprostol and the advice of the Jhpiego-trained community health worker. "I would never have known when to come to the hospital if the information had not come with these pills. I might have died, leaving my two girls to struggle alone."

From the mountains of Nepal and the villages of Malawi to the crowded capitals of Afghanistan and Rwanda, Jhpiego has worked for nearly 40 years to prevent the needless deaths of women and their families. Jhpiego, an international health non-profit with headquarters in Fells Point, shares the health expertise and scientific knowledge associated with Hopkins, and collaborates with governments and health professionals so they can provide skilled, competent health care to their people. The organization employs 800—200 in the United States and 600 overseas. Its budget is \$110 million.

Through partnerships with businesses, foundations, corporations, and other NGOs, Jhpiego develops low-cost solutions to today's health care

problems. Its mission is to strengthen health systems and build the capacity of skilled health care providers so countries can improve health care services and reduce maternal deaths. Jhpiego's experts in maternal and child health, HIV/AIDS, infection prevention, malaria, tuberculosis, and workforce education are working today in more than 50 countries around the world.

In Guyana, for example, Jhpiego has assisted the government in establishing a cervical cancer prevention program, which has resulted in the screening of more than 10,000 women for the leading cancer killer of women in the developing world.

In Indonesia, Dr. Mohammad Baharuddin, the Director of Budi Kemuliaan Hospital and Midwifery Academy, the largest and oldest maternity hospital in this nation of islands, adapted Jhpiego's pioneering quality assurance program to improve care. As a result of Baharuddin's leadership, more women are choosing to give birth in the hospital, with deliveries increasing from 3,000 in 2001 to nearly 8,000 now.

And in Afghanistan, Jhpiego helped the government establish a national midwifery education program. Since 2002, the number of skilled, competent Afghan midwives has increased from 467 to more than 2,000, and they are saving lives in a country with the second highest maternal mortality rate in the world.

"People in these rural communities prefer to deliver at home... but I try and explain that the facilities in the health center are much better for them and they can get more comprehensive care there," said Sadiqa Husseini, a 24-year-old mother of two and 2009 graduate of a Jhpiego-supported midwifery school.

In 2011, Jhpiego will continue to assist Afghanistan in expanding its midwifery network; help develop a cervical cancer prevention program

focused on mothers and daughters in Asia; and bring its expertise to neglected areas of West Africa.

"In the coming year, Jhpiego looks forward to working with countries and sharing innovations as they build successful independent health care systems," said Jhpiego President and CEO Leslie Mancuso.

The Abell Foundation salutes Jhpiego's worldwide staff and its President, Dr. Leslie Mancuso, for helping countries care for their own with competent, skilled providers and build stronger health systems because when you save the life of a mother, you help ensure her children will survive and her family will thrive.

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