

How a Maryland lab met fixed-budget test

Anne Ford

March 2014—Maryland may be one of the smallest states in the nation, but its new effort to reduce spending on hospital services could have a big impact on patient care and health care costs. In January, after a three-year, 10-site pilot program, most of the state's hospitals decided to move to a system under which "the hospitals are given a fixed budget and asked to manage the care of the patients they serve within that budget," says Maryland Hospital Association president and CEO Carmela Coyle.

Thanks to a longstanding waiver from the federal Medicare program, Maryland, unlike every other state in the country, ensures that all hospital patients (insured or uninsured) pay the same price for the same service at the same hospital. Under the new fixed-budget system, hospitals are incentivized to reduce hospital admissions—not by keeping people out of the hospital who need to be there, Coyle says, but by eliminating duplication of tests and services and by helping the local community stay healthy. Authors of a perspective piece in the Feb. 6 *New England Journal of Medicine* write, "The resulting changes [of this fixed-budget approach] should be visible at hospitals throughout Maryland in the form of more coordinated care, a greater emphasis on care transitions, and a renewed focus on prevention" (Rajkumar R, et al. Maryland's all-payer approach to delivery-system reform. *N Engl J Med*. 2014;370:493-495).

"If you're given a fixed budget, you really do begin to think about the health of the population outside the hospital," Coyle agrees. "What we're trying to say is: Our job is bigger than the three to four days that somebody may be hospitalized. It's our job to coordinate their care as they leave the hospital, make sure somebody's got a physician to turn to, make certain they understand their medications, and create a clear care path for them. Without unnecessary admissions, hospitals have more room to spend their limited dollars on those patients who truly need acute-care services. It's the right way to care for patients, and we believe we have an opportunity to be a national policy leader in this. All eyes are on Maryland."

That's big talk for a small state. But the experience of at least one of the hospitals in the fixed-budget pilot program, Western Maryland Health System of Cumberland, Md., backs it up. With help from several large-scale laboratory initiatives, the health system has achieved big gains.

During the pilot, Western Maryland Health System reduced its inpatient admissions from 17,449 in fiscal year 2011 to 14,033 in fiscal 2013, while readmissions fell from 16 percent to nine percent. And in fiscal 2013, the system made an operating profit of \$15 million on about \$370 million in revenue, CEO Barry P. Ronan told the *New York Times* last August.



Jo Wilson

Impressive numbers to be sure, but when the pilot program began in 2010, Western Maryland vice president of operations Jo M. Wilson found it rough going at first. "We had a very tough year that year, because we were beginning to start up programs that were strengthening our out-of-hospital services for patients, but we weren't seeing the reduction in admissions yet," she explains. "So we actually had a terrible year that cost us money. It was after that that we realized we couldn't just sort of drift along to make these changes happen. We had to become change agents—actually take a role in making things happen, as opposed to just sort of letting them

happen.”

In the laboratory, “making things happen” took the form of initiatives around automation, staffing, point-of-care testing, and test utilization, as well as additional measures in areas such as microbiology, blood bank, and chemistry. These efforts are impressive examples of how a laboratory—any laboratory, in any state—can help achieve cost savings and improve efficiency.

One of the Western Maryland laboratory’s largest initiatives, automation, was made a bit less daunting by the fact that some of its departments, such as chemistry, were already automated. The blood bank, too, had begun the automation process in 2009 by introducing Ortho Clinical Diagnostics’ ID-Micro Typing System Gel test, which offers functions such as antibody screening and identification, ABO blood grouping and Rh phenotyping, compatibility testing, reverse serum grouping, and antigen typing. Initially, the medical technologists performed the test on manual workstations “to get everybody comfortable,” says blood bank supervisor and business manager Kim Smith. After the fixed-budget pilot program began, she brought in the fully automated Ortho ProVue instrument.



Smith

The ProVue not only reduced steps and simplified testing, Smith says, but also allowed the blood bank to qualify for a higher tier of discount pricing for supply reagents and to use its personnel more effectively. “It allowed them to walk away and perform other tasks,” Smith says. “And it reduced our turnaround time on cross-matched samples by about 25 minutes.”



Sweitzer

As for hematology, it, too, had started the automation process before the fixed-budget pilot program began. But plenty of automation remained to be implemented, such as middleware. Elizabeth Sweitzer, hematology supervisor, brought in Beckman Coulter’s Remisol Advance data manager. “It helps with autoverification of our CBCs, and that’s really where we started to bring our numbers down,” she says. Sweitzer hopes to soon start using Remisol for coagulation as well.

Even more helpful was the implementation of a CellaVision DM analyzer for blood film analysis. “This is the instrument that is able to pull out bone marrow cells or a peripheral blood smear, white blood cells, body fluid cells, into view on a monitor, so it’s less stressful to the tech, and the turnaround time is quicker,” says laboratory operation manager Darlene Westrom. “The pathologist can look on their monitor or come to the department. There’s no need to mark a slide manually.”



Westrom

"We really do enjoy that CellaVision," Sweitzer says with enthusiasm. "We can get a body fluid done in 20 minutes now. It's been a real driving force for hematology."

Hematology has also brought in Instrumentation Laboratory's ACL Top 500 mid-volume hemostasis testing system. "We went for that because we can add multiple bottles of thromboplastin, whereas before we were continually having to stop our process, add another bottle, run the QC, and go on," Sweitzer says. "We know now, for our entire day, what we will be utilizing, so that's a continual flow process. We've also brought homocysteines onto that analyzer, and we're going to bring in protein C, protein S, lupus anticoagulant. Again, because of its fast processing, it's not going to hinder our routine testing. The output has just been fantastic for us."



Rosato

Among the new instruments in microbiology are the BD EpiCenter microbiology data management system and the BD Phoenix automated microbiology system. "One of the reasons I went to the Phoenix was that the system we used before does a lot of interpolation to get susceptibility results, whereas the Phoenix does a direct measurement of MIC values," says microbiology supervisor Al Rosato. "To me, it's a more honest answer for the physician.

"We are working to train our second shift to release susceptibilities on the same day," he continues, "so the clinicians can modify administration of antimicrobials to go from a general empirical treatment to a more specific and more cost-effective treatment." He also brought in an automated Gram stainer, which, he says, has reduced errors on Gram stain interpretations by 95 percent.



Miller

How was all this automation justified to Western Maryland administration? Largely by return on investment. "Most of the time it was in the form of a body, an FTE or so," says Bonnie Miller, director of laboratory services. "We used to have almost 120 FTEs, and right now we're sitting at about 105.7." Most of that shrinkage is due to retirements. The FTEs who remain are being used more efficiently, she says, thanks to staffing-on-demand and cross-training.

Widespread changes came, too, to Western Maryland's point-of-care testing program, not the least of which was the reworking of the stat POC lab to meet the emergency department turnaround times required by the health

system's status as a designated trauma, stroke, and interventional cardiac center. "Point-of-care testing in the ED is huge in how it helped shorten the time for patients to get through the ED process and determine whether they can be discharged or whether they're going to be admitted," says operations VP Wilson.



**Laurie
Wilson**

For example, at the request of the ED, the stat POC lab began running lactate on its Nova Biomedical Critical Care Xpress stat analyzer. "What's beneficial about that is, we can improve our turnaround times for the lactates, and they're measuring that for the sepsis protocol now," POC supervisor Laurie Wilson says. "So for any lactates that are above a 4.0, we notify the doctor, and they're able to start treatment for possible sepsis much earlier."

In addition, she says, "we're also doing urine hCG in the stat lab, so we can get the patient to x-ray much faster. And we do troponins, CK-MBs, and BNP's. We have a very, very fast turnaround time on those. Usually we can keep them at under 30 minutes, from order to verify. That has helped tremendously with our stroke and our ST segment elevation myocardial infarction patients, so they can get them where they need to be—the cath lab, whatever—much quicker."

Of stroke and STEMI patients, she says, "We were looking for a way to improve the turnaround times for those patients with the bloodwork we send from the main lab to the ED." They were seeing a delay because the processing area receives the blood and multiple stats simultaneously. "And then sometimes those really important bloods would not make it to the departments in a timely manner."

The solution: Changing the color of the biohazard bags that are used to send blood specimens through the health system's pneumatic tube system. "We use red bags for general stats, clear bags for routine specimens, and yellow bags for stroke and STEMI patients," Laurie Wilson explains. "So when our processors see a yellow bag through the tube, they know that's top priority. And the techs can also see they're in a yellow bag, so they realize it's top priority. And we've done so well with meeting our turnaround times for strokes and STEMIs. Even in our main lab, which is on a totally different floor, we meet about a 45-minute or less turnaround time for that bloodwork also."

The stat POC lab has also worked to reduce duplicate testing. "We recently implemented a reflex for urine culture and a microscopic," Wilson says, describing one such instance. "Before, it seemed we were having a lot of redundant tests ordered, and now we run a urinalysis in the stat lab, and if it reflexes a culture or a microscopic, it's sent to the main lab for that. Our criteria for the reflex is positive nitrates or leukocytes."

The stat POC lab is staffed by phlebotomists who are trained to perform waived and moderate-complexity testing. "It results in a bit more cost savings than if we had a technologist run the stat lab, and they do all our blood collections in the ED as well," Wilson says.

Meanwhile, as part of its POC-related efforts to reduce admissions, Western Maryland Health System has established the Center for Clinical Resources, which is designed to help outpatients manage chronic health conditions such as diabetes, congestive heart failure, and chronic obstructive pulmonary disease. There "we can do point-of-care testing, and it keeps outpatients from being admitted to the hospital," Wilson says. "We perform PT INRs, we have a pharmacist on site to manage Coumadin, we do A1C testing, we have a diabetic counselor, we do glucoses."

In addition, blood draws are now being done on site in nursing facilities, assisted living sites, and even private

homes. In the case of the latter, lab services director Miller explains, “predominantly those are protimes for anticoagulant therapies, so those would be patients who can’t come to the hospital without their families taking off work or an ambulance of some sort.”

With all this point-of-care testing going on, how does Wilson keep track of it all? “We have a software program called RALS-Plus that helps me combine all my instrumentation,” she says. “Everything downloads to RALS, and then I’m able to review QC and patient testing, and I can keep track of competency dates for the more than 1,000 point-of-care testers we have in the health system. It works really well for me.”

A different piece of equipment, Iatric Systems’ MobiLab computerized positive patient identification system, earns similar raves from Miller. “Not only has it saved on staff and improved turnaround time, but since we’ve been using MobiLab, we have not had one misidentified specimen,” she says. Implemented first for inpatients and in the ED, then brought to one outpatient site, MobiLab—a wireless device that displays collection lists on its screen and alerts phlebotomists to stat collections—is now being implemented in all outpatient sites and in the nursing service. So far, “it’s improved our turnaround times by at least seven minutes on average,” Miller says.

In initiative to examine test utilization saw the laboratory staff working with physicians to identify duplicate testing and excess ordering. “Probably the No. 1 issue there was blood cultures,” Miller says. “We realized that probably 25 percent of them were done in duplicate.” That was in large part because there was no mechanism in place to prevent hospitalists from accidentally ordering blood cultures that had already been ordered. The solution was simple. “We were able to make a computer rule that when the inpatient doctor would order that set of blood cultures, it would look to see if any blood cultures had been done within the previous 24-hour period, and it would stop them from ordering if that were the case,” she says. “I know we saved probably at least \$60,000 in supplies and tech and phlebotomist time, just by doing that.”

Another contributing factor to the duplicate-testing problem: After patients were admitted through the emergency department, the hospitalists assigned to them were unable to see the tests that the ED physicians had ordered for them. As a separate issue, some ED physicians were simply unknowingly ordering duplicate tests or excessively ordering particular tests. For that reason, says lab operation manager Westrom, “with the permission of the doctor in charge of the ED, we set up report cards on the physicians working there, so we can see their ordering patterns, and then we work with the head of the department, not to ostracize any physician but to help him educate the physicians there.”



**Dr.
Thompson**

Then, too, the laboratory moved to curb not only duplicate testing but also inpatient testing that was not necessary for diagnosis or immediate treatment and that could be performed on an outpatient basis. As pathologist and laboratory medical director Noel Thompson, MD, explains, “Under the total patient revenue system, the hospital is unable to get any revenue from any additional testing that’s done on an inpatient basis. So reference labs on inpatients, when possible, need to be delayed until after they’re discharged, if the testing isn’t needed for immediate patient care.” And how do ordering physicians feel about this?

“It depends on the time of day sometimes,” Dr. Thompson laughs. “Basically, they have to call the laboratory, and usually the pathologist on call will be involved. So sometimes in the middle of the night, there’s some colorful language exchanged. We rarely refuse the order; it’s just another step. In general, if a physician knows they have

to check with the lab or the pathologist before they order a certain test, it makes them think twice whether they really need the test in the first place, and whether they need it immediately or it can wait. And often they'll decide just on their own to order it as an outpatient."

That said, the policy has undergone a few tweaks. "For instance, the pulmonary doctors will sometimes order antinuclear antibodies and rheumatoid factor on patients who have interstitial lung disease," says Dr. Thompson, "and we always approved that when they called us, but we're starting now to develop panels that are specific for certain specialties, where they'll be able to order it without checking first with the lab."

Reducing the number of tests sent to reference laboratories helped curb costs as well. Some tests, such as vitamin D and buprenorphine, were brought in-house. Others required further intervention. "There were a couple of tests in particular for irritable bowel and celiac disease that a specific laboratory was marketing directly to the physicians," Miller recalls. "Of course, the physicians wanted those tests, because they were made by a pharmaceutical company that developed laboratory tests to go with their drugs."

"But we found out that the literature did not support these tests," she continues. "They were not FDA approved, and they were very high cost, and when we looked at what was recommended by other facilities such as ARUP Laboratories or Mayo, we realized there were other, very simple tests we could do first. We worked with the physicians to substitute the lower-cost, FDA-approved tests, and we saved well over \$150,000 to \$200,000 a year."

In addition to these larger automation, staffing, point-of-care testing, and test utilization initiatives, the laboratory undertook measures in areas such as microbiology, blood bank, and chemistry. In microbiology, for example, Rosato has made a big push to reduce *C. difficile* infections. "The paradigm for identifying *C. diff* toxin has changed about 10 times in the last five years, and there's a lot of argument as to what paradigm to follow," he notes. "So we've adopted PCR testing, because it's definitive. It's a little costly, but we feel it has benefited us in terms of keeping a rein on *C. diff* within the health system. In fact, we've been singled out by an organization called the Delmarva Foundation for Medical Care out of Baltimore because of the procedures we put in place in the laboratory to rein in *C. diff* infections."

Preventing patients from becoming infected with *C. diff* helps reduce length of stay, of course. The health system has taken an additional step to reduce LOS by having the pharmacist who serves on the health system's antibiotic stewardship committee check antimicrobial sensitivity patterns in real time. "He has the authority to make changes in administration of antimicrobials if he thinks that a doctor is using one that might be too toxic or too broad a spectrum," Rosato says. "Physicians typically change their antimicrobials in the morning, so with this pharmacist being able to do this in real time, he can change from a broad-spectrum antibiotic to a better antibiotic, probably 12, 14 hours ahead of the physician. That's decreasing patient length of stay considerably. And we're hoping it will decrease resistance build-up, too."

Among blood bank supervisor Kim Smith's cost-saving steps was a collaboration with other hospitals to renegotiate the blood supply contract. "That saved us over \$200,000 in fiscal year 2013," she says. In addition, she learned that compared with other hospitals that were providing the same services, Western Maryland was using more platelets. Hence "we decided to establish criteria for multiple platelet products," she says. "That helped us decrease those by 16.8 percent in fiscal year 2013, and in the first quarter of fiscal year 2014, we were down 13 percent, so that seems to have helped a lot."

She's also worked to implement a new process that requires physicians who order irradiated products to document their reasons for doing so. Finally, "we've implemented electronic transfusion administration records in our inpatient areas," she says. "This entails bedside scanning of the patient and the product. It ensures that the right patient gets the right product, but it also allows electronic documentation of the transfusion rather than having the nurses manually do that and then scan those pages into the medical record. This is real-time documentation that's easily accepted into the information system."



Dreyer

Though chemistry was already largely automated before the fixed-budget system came along, the department has continued to bring in automation as needed to improve processes. For example, says chemistry supervisor Jennifer Dreyer, “we recently went live with a new automated electrophoresis analyzer that helps us run more samples. We used to batch them and run certain gel types only maybe once a week, and now we’re able to do them more frequently.”

Dreyer has also implemented reflex testing. “We tried, for instance, to take away the CK-MB test in general,” she says. “Now, when a troponin is positive, it reflexes so that we’re not doing unnecessary tests on the patient, since the focus nowadays for cardiac patients is the troponin—not, as it used to be, the CK-MB. We’re trying to stay on top of what’s out there.” Another reflex ensures that the microscopic portion of a urinalysis is done only when indicated.

If all of this soundslike a huge amount of effort, it is—and the Western Maryland Health System laboratory has no intention of easing up. Says hematology supervisor Sweitzer: “I can never let the standard stand. I look to see where my peers are and what they’re moving toward, and if I see a shift, I’ll start to investigate it. You can never overlook anything. It’s like there’s no stone too small.”

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