

How to spot the savings from a diagnostic team

Amy Carpenter Aquino

October 2017—Few pathologists and laboratory professionals would argue with the potential clinical benefit of a diagnostic management team, a group that meets often and provides timely patient-specific reports that synthesize all test results. But getting C-suite executives on board may mean uncovering whether such a team can save the hospital money.

That's what a health economist set out to find out and reported on at the first Diagnostic Management Team Conference earlier this year.

Several presenters at the conference in Galveston, Tex., in February spoke of the clinical need for and impact of diagnostic management teams, or DMTs. (See CAP TODAY: "Primary aldosteronism: diagnostic team lifts clinical practice," April 2017; "Family physician makes the case for CP consults," June 2017; "Integrative consults remove referral inefficiencies," July 2017.) R. Lawrence Van Horn, PhD, MPH, MBA, executive director for health affairs and associate professor of economics and management, of health policy, and of law at Vanderbilt University, painted a picture of the economic impact and advised others on how they can do the same.

"How can you assign the [financial] impact to the efforts of the DMT specifically and not believe it's due to X, Y, or Z outside the scope of what you're looking at?" Dr. Van Horn asked, illustrating the chief challenge.



Dr. Laposata

In 2009, when conference chair Michael Laposata, MD, PhD, was implementing multiple DMT pilots as chief of pathology at Vanderbilt University, Vanderbilt's associate vice chancellor charged Dr. Van Horn, who had no involvement with DMTs, with proving that DMTs save money.

"It's very difficult to show that we actually improve care because lots of things happen at the same time, and somebody will say, 'Oh, patients did better because we implemented our new service,'" Dr. Laposata, now chair of the Department of Pathology, University of Texas Medical Branch at Galveston, said in introducing Dr. Van Horn. "Well, really it was us, because we manage the decision-making about the diagnosis. But when it comes to the data on financial impact from the DMT, they're quite direct. So Larry did something spectacular."

Dr. Van Horn told the audience he knew it would be a challenge to isolate the financial benefit of Dr. Laposata's coagulation DMT pilot. "I had to come up with the ability to tell a story that said the efforts of this coagulation DMT initiative had impact punch and real tangible value," he said.

The goal of every hospital executive, he noted, is to "get admissions to the hospital and then get them out as fast as possible."

To show that a DMT can deliver on that goal, Dr. Van Horn dug into the data and other information captured in the Vanderbilt health system.

"I think that all of you appreciate that hospitals in particular are facing some pretty rough times right now, and they're only going to get rougher," Dr. Van Horn said. "For us to have the clinical impact that you all want to have

on patients, the ability to align clinical effectiveness with the business problem of hospitals, and show that you're solving the business problem along with the clinical problem, is going to make you much more effective."

"Bringing down your cost structure and being more efficient with the use of resources will always be a win," he added, "regardless of what happens with health care reform and what happens with third-party payment in the United States."



Dr. Van Horn

As Dr. Van Horn set out to determine whether DMTs save money, the main challenge was assigning financial savings solely to the efforts of the DMT. His strategy was similar to an interrupted time series approach, which relies on shifts in the distribution tied to an event to establish the effect of the intervention. It's a way to control for other changes. Dr. Van Horn chose Aug. 1, 2010—the date that corresponded with the implementation of Dr. Laposata's coagulation DMT initiative—as the starting point of his study. It included patients in two DRGs: pulmonary embolism/deep vein thrombosis and intracranial hemorrhage. "We were looking at DRGs that were appropriate to coagulation," he explained, "and that will change based on what the DMT is."

He went back in time six months before the intervention, and he went forward six months after the intervention. And he relied on there not having been a corresponding change in the process of care and how providers addressed patient needs around the Aug. 1 time period. "I need that date, or time period, to be one where there isn't likely to be other activities that one could argue are correlated with generating these outcomes," he said.

The key to his study, then, was that the DMT intervention was the only change in patient care at that point in time. The Aug. 1 start date was the "anchor point to evaluate differences due to the DMT."

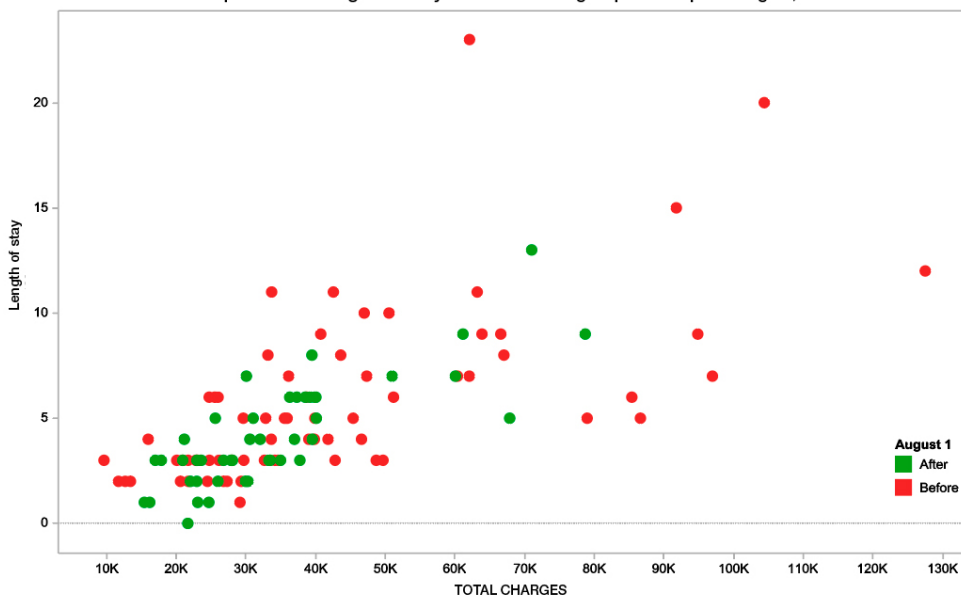
"What I'm relying on is there's an intercept shift," Dr. Van Horn said. He hoped to see length of stay and resource use drop after Aug. 1, "because we're dialing in and providing that insight and accelerating the treatment decision and taking out needless variation."

Dr. Van Horn illustrated his findings with a scatter plot showing length of stay and resource use for patients with a diagnosis of intracranial hemorrhage (Fig. 1). In the before period (red dots), "there is more volatility, there's more in the higher charge, and there's more in the longer length of stay than in the post-period, which are the green dots," Dr. Van Horn said, pointing to "a shifting and a condensation of the resource, length of stay, and total charges all pre- and post-Aug. 1."

For patients with pulmonary embolism without major complications and comorbidities, the benefits were less clear (Fig. 2). "You can see it's not perfect," Dr. Van Horn said, pointing to three green dots signaling lengths of stay greater than five days. "But that's a lot of red dots there compared to the number of green dots," he said, and most of the latter are in the lower length of stay, lower charges space.

Fig. 1 Intracranial hemorrhage (MSDRG 65)

Comparison of length of stay and total charges pre and post Aug. 1, 2010



Courtesy of Lawrence Van Horn, PhD, MPH, MBA.

The second part of Dr. Van Horn's study focused on the change in charges, with more charges suggesting higher levels of resource consumption. "Not dollar charge," he clarified. "It's more intensity."

"All of your hospitals have charge capture systems where everything that's done during a patient's stay is captured in the charge," Dr. Van Horn noted. "They have line item files where a given patient will have 100 lines for a given day where it will show a pathology test, 15 minutes of anesthesia time, room and board in an ICU or step-down [unit]. That file is what I took to do this, and it's going to be available in all of your organizations."

When he looked at the parametric results from his study of the patient charges (t-test), Dr. Van Horn did not find statistically significant changes in charges for pulmonary embolism or intracranial hemorrhage patients. When he looked at nonparametric results (a Wilcoxon signed-rank test), he saw an increase in median charges for all inpatients of 10.3 percent. And for PE patients, a statistically significant reduction in median charges of 15 percent. When viewed in the context of a 10 percent positive trend in overall median charges for the hospital as a whole, he pointed out, the net effect was a 25 percent reduction in median charges for PE. For intracranial hemorrhage, there was little evidence of absolute reduction in charges.

The stronger results, parametric or nonparametric, were related to length of stay. "In both PE and intracranial hemorrhage, we're shaving a day off the median length of stay for that DRG, all tied to that Aug. 1 event," Dr. Van Horn said. There was no change in the hospital length of stay overall.

"So we see a 33 percent reduction in median length of stay for PE, a 25 percent reduction in median length of stay for intracranial hemorrhage, which is about a day. And the hospital administration would probably say that's about \$1,000 to \$1,500 per day in terms of value."

But the question you may get is: "How do you know it's due to your activity in the DMT?" His answer: "Tell me what else you did that corresponded to a change around Aug. 1, that is correlated to what we have here? If there isn't [anything], then we're good."

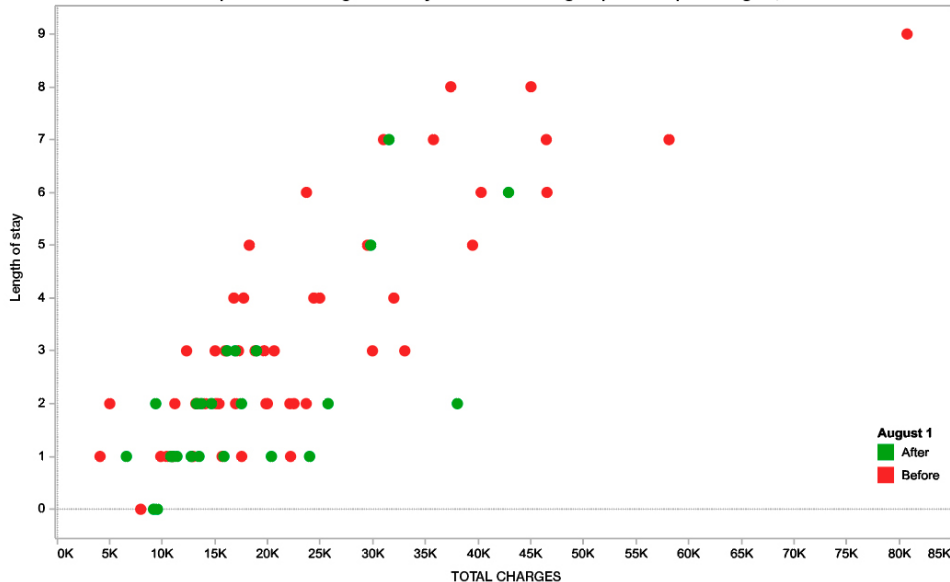
Another tactic Dr. Van Horn suggested to further verify statistically significant results is to shut down the DMT for one month and look at length of stay and charges for that month. He calls it "interrupting the interrupted time series."

“It gives you more impact. If you see a corresponding change, then take it away in the post-period. It gives you more information to make your case.”

Dr. Van Horn summed up with the steps of his analytic approach, which is “highly generalized,” he said, and can be used by others to pursue their own DMT financial impact studies.

Fig. 2 Pulmonary embolism (MSDRG 176)

Comparison of length of stay and total charges pre and post Aug. 1, 2010



Courtesy of Lawrence Van Horn, PhD, MPH, MBA.

First, make sure the DRGs studied are those that will be sensitive to DMT interventions. Get access to detailed charge-level files with inputs on every patient from every day included in the study. That information is central to the study, he said.

How might a pathologist or laboratory professional with no access to a business school partner access the data? Approach the hospital’s CFO, who knows the data structures used for costing, and the finance department, which can explain resource use while patients are in the hospital. Consider also talking to supply chain personnel, who “are very well attuned to the information flows and the data sets in the hospital that are at a granular level.”

Tie the intervention as tightly as possible to the patient of the susceptible population. “We needed to know, did [Dr. Laposata] intervene on these people or not?” Then examine windows before and after the intervention, and establish that no other organizational changes took place during that time.

Last, account for the cost of the DMT itself. “We’ve got to come up with what that incremental cost of having the DMT is so we can come back to the table with an ROI for the CFO and the C-suite that says, ‘Subsequent and continual investment in this generates a positive return,’” he said.

Could a DMT outcomes study result in positions being cut? While eliminating FTEs is difficult for any organization, Dr. Van Horn noted, the demand for services is likely to make it unnecessary.

“If we are freeing up this capacity by reducing our length of stay, we are creating the ability to put more paying patients through, which will drive the top line for the same base cost structure. The most desirable and easiest thing to do is backfill with other patients, ideally orthopedic and surgical patients that are high-margin patients for us.”

Dr. Laposata concluded with a reflection on the skepticism that’s a hurdle to DMT support at the C-suite level.

“When we first did this at Vanderbilt, the president of the hospital saw Dr. Van Horn’s data and said, ‘That’s really

not likely to be associated with the pathologist and the laboratorians. Do you think they actually made a difference in patient care because they provided a patient-specific interpretation?’ He argued that it was the new CT scanner purchased in radiology that improved the detection of PE,” Dr. Laposata said.

“The problem is the CT scan didn’t line up with the time we were doing this,” Dr. Van Horn added. “So we were able to take that [argument] off the table pretty darn quick.”

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Amy Carpenter Aquino is CAP TODAY senior editor. The second Diagnostic Management Team Conference will take place Feb. 6-7, 2018 in Galveston, Tex.