

Ups and downs of bringing in Beaker AP LIS

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August 2019—Having an enterprisewide health care platform can put laboratories in a stronger decision-making position for enterprisewide IT, whereas in most other circumstances, “we are relatively isolated,” said Raj C. Dash, MD, in a talk he gave at this year’s Executive War College.

Dr. Dash, vice chair of pathology IT at Duke University Medical Center, shared what he called the blessings and curses of his department’s move in 2014 to a lab information system that’s fully integrated with the electronic medical record. His focus was Beaker’s AP-LIS module.

On a technology hype curve, he said, “I think there is still a trough of disillusionment but it’s getting better for Beaker, and I’m here to, I hope, reset some of the expectations.” It’s about understanding what you have to put into the product, he said, to get what you want out of it.

After evaluating the 2010 and 2012 versions of Epic’s Beaker and installing the 2012 version at one of Duke’s two community hospitals, the laboratory decided to delay a systemwide implementation until Beaker’s 2014 version release. Beaker’s 2012 version, Dr. Dash said, “wasn’t even as good as a glorified word processor.”

The 2014 version, however, included rich text formatting, a maturing CP module, workable microbiology and AP modules, and “solid” cancer synoptic implementation.

Duke University went live with Epic EMR in 2013. Duke’s laboratories, having moved to an enterprisewide system, have “never been closer” with IT, said Dr. Dash, who is also medical director of laboratory information systems, Duke Health. In pre-Beaker days, Duke had only one director in the labs who worked with the LIS team. Now, 60 Beaker super-users meet monthly, and LIS analysts meet on site in all the laboratories. “They have gotten to learn Epic Beaker together,” he said, “and it’s a very collegial relationship.”

Before Beaker, when Duke implemented a new CPOE system, pathology was involved only from an interfacing perspective and not in designing decision support rules. “We were happy to just manage our area,” Dr. Dash said. “And I didn’t recognize the potential benefits or the potential workload of getting involved at the enterprise level.”

Standardizing lab test order names was tough as Duke prepared to transition to Epic EMR.

Before implementing Epic EMR, Duke’s three hospitals each used a different system—Meditech, Siemens, and a homegrown EMR—and a McKesson CPOE. “And we did not have the same names for most of our most commonly ordered tests,” he said. The version of Meditech the hospital used had a 12-character limit for lab order names.

“Twelve characters for over 8,000 order [names]? You can imagine the series of letter combinations we had,” he said.



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At the time, Duke had a laboratory orders team operating as part of an EMR and independently of pathology. “And they started building things based on this interface.” The ambulatory systems were sending orders to the lab’s Cerner system and a mapping occurred. “We could just use the Cerner names in our laboratory, so it didn’t affect the lab directly.” As the lab moved to Beaker, “it became an imperative to own laboratory orders because we were the recipients of the build.” Thus, even before selecting a new LIS, the pathology department spent several years harmonizing lab order names across the three hospitals.

“But what we should have done is taken ownership of laboratory orders right from the beginning,” in the pre-Beaker days, “and it would have simplified a lot of our downstream efforts,” said Dr. Dash.

There are many ways to use Beaker’s features in the wrong way and few “guardrails” to help, Dr. Dash said. Beaker’s virtual laboratories can be designed with a “department” structure or a “section” structure. The department structure, he explained, allows for highly granular specimen tracking as specimens enter or leave a department. Epic asked: “Do you want to be able to track your specimens with the highest level of granularity and in the most robust way?” And that’s using packing lists to transfer. “We said sure. Who wouldn’t want the most robust tracking mechanism? Little did we realize that meant a lot of work, even if you’re moving something from a lab that’s one counter over.”

They learned from other users that virtual labs called departments or sections should be designed based on physical location. The packing lists should be used only when specimens are traveling a distance and there is a relatively high chance of their being misdirected. “It’s a very configurable system,” Dr. Dash said of Beaker, “but there are not a lot of guardrails that keep you moving on the right path. You can go sideways and someplace you don’t want to go.”

Another surprise: dependencies with other departments. An asynchronous workflow issue arose between OpTime, Epic’s operating room management system, and Beaker’s AP module, for which Epic didn’t have a solution at first.

OpTime would sometimes send to the lab out-of-sequence information. When surgeons removed multiple specimens, the first specimen to populate in the LIS would sometimes differ from the initial specimen removed, which resulted in pathology being out of sync with the OR. “We wanted our specimen A to be their first specimen and our specimen B to be their second.”

Epic has since resolved the problem with an enhancement that allows labs to decide how reconciliation should occur—“whether the lab should order it in the sequence that it’s created in the OR, or the order in which the specimen is received in the laboratory.” Changing this order dynamically in the LIS, however, involves an error-prone manual cut-and-paste process. “There’s still opportunity for improvement there, but you are dependent on the choices that your OR makes” and the different Epic modules, Dr. Dash said, though he noted the lab has more control now over what comes in and can “push accessioning to the point of collection” in the outpatient and inpatient settings and in the OR. “But it’s complicated and we didn’t benefit as much because we didn’t get involved early in the process.”

The laboratory developed a number of solutions to avoid dependency problems, particularly between the OR and pathology, but also with regard to the hospital’s ambulatory systems.

For example, the lab does not use operating room procedures to create the rules that drive protocol selection. Duke’s surgeons had created synonyms in Epic to refer to the same procedures. “It was five or 10 different flavors of a mastectomy for different surgeons, even though it’s the same procedure,” Dr. Dash explained. “Creating rules based off that to drive protocols became a mess, and we decided not to do that.” Instead, they created their own combination of anatomic site and procedure to drive what blocks are created and what default stains might be

produced.

Ordering immunohistochemistry was a problem at first: too many clicks, Dr. Dash said. His team recognized a solution by creating sets. "I would like to be able to say, 'This is the way to rule out breast-invasive carcinoma,' and it clicks all of the relevant needed IHC stains at once. And now there's a way to apply things to multiple blocks, so gradually over time the workflow has become optimized."

Still, he'd like to see Epic develop a functionality allowing Beaker users the ability to download and share sets of IHC panels from other labs. "There's a nice bulletin board and knowledge-sharing meetings, as well as the website, and we learn a lot of great ideas, but we have to implement it ourselves. The more we can move to just downloading and implementing in our systems, the better it would be."

Beaker's synoptic cancer reporting protocol still needs smoothing out, Dr. Dash said, citing formatting errors that occasionally occur after the automatic protocol updates Epic provides Beaker customers, accomplished through a backend content file integration with the CAP.

After protocol updates, patient reports would, for example, sometimes display out of alignment the types of nodes and the number of each type examined, leaving to the end user the task of validating reports pre- and post-update. "And it's a huge effort to validate it," he said. While Epic has since rectified the alignment problem, the complex level of functionality needed to keep the CAP integration running makes opportunities for error relatively likely. "I think we need some type of automation," he said, to solve what is now a difficult manual process.

A few helpful features:

- Point-of-collection specimen tracking. "We didn't have fully barcode-driven workflow before, so this all came to us from Epic. We can tell things that have been ordered but not collected, collected but not received, received but not resulted, and our lab managers are looking at reports every day to see if there are specimens that were sitting in the clinic that weren't collected by the couriers and trying to track those down." Also helpful: "the audit inquiry that we get with specimen inquiry and case inquiry, so we can see where things are in process, either outside in terms of collection or inside the lab," he said.
- Snapshot reports. Dr. Dash calls them "one of Beaker's greatest features." This function pulls data from the clinical record, including future appointments. "Now I look at this and can decide which patients I'm going to look at first." A feature to prioritize the caseload for him "would be great," but until that day, a resident looks up the future appointments and sort orders the cases for him. "So there are some things that I wouldn't ever have been able to do, but I want to take it a step further," he said, and have the system do the prioritizing.
- A new self-service data tool called Slicer Dicer. Duke is rolling it out now. "It's a very intuitive kind of interface, and our faculty have loved it." A five-minute tutorial explains the basics of slicing and dicing, "and the difference between populations versus measures," for example, allowing

the user to home in on the information. As with any tool that provides access to large amounts of information, he said, “you have to advise your clients how you’re going to validate that the data is correct and ensure they are using the tool in the right way according to policy.”

Colleagues often ask Dr. Dash about legacy data migration. While the standard recommendation is to maintain five years of records (“and then it becomes a negotiation,” he said), Duke transferred all patient records back to 1990. But they’re in slightly different formats.

In Beaker, data from 2004 to 2014 are in a discrete format “where the diagnosis is still in the diagnosis section, the gross description is still in the gross description section—and very granular for all the clinical lab data.” Pre-2004 it’s all charted: “The whole report is just one report and it’s in the system.”

Blessings
<ul style="list-style-type: none">■ Greater functionality leveraging EHR data.■ Rapid improvement over time.■ High level of customizability and configurability.■ Specimen tracking, barcode-driven workflow, and data provenance transparency.■ Fewer interfaces.
Curses
<p>Data model complexity and information overload lead to:</p> <ul style="list-style-type: none">■ Increased “clicks,” time.■ Unexpected dependencies and system fragility.■ Increased numbers of FTEs for maintenance.■ Need for greater coordination among teams for changes.■ Increased overhead for change control.■ Potential for “epic” downtimes.
Future opportunities
<ul style="list-style-type: none">■ Better designed workflow, particularly for AP/surgical pathology.<ul style="list-style-type: none">– Digital pathology workflow support.■ Better designed workflow and data model for molecular diagnostics.■ Greater integration among Epic modules (e.g. OpTime ↔ Beaker ↔ Beacon).■ Opportunity to position pathology/pathologists to create more value for the organization.

“What’s really important when I’m looking at a patient’s sample is I can see all the prior history, and Epic is great about doing that,” Dr. Dash said. “You can seamlessly integrate your legacy data and your Beaker data in displays for your pathologists.” When old data have to be modified, though, it’s not as smooth as he would like it to be. “That’s a cost and a penalty to the client.”

“Will my practice lose money with Beaker?” is another often asked question. Charges can fall through the system, Dr. Dash warned. “We put a lot of effort into validating, but there are still parts of the process that require diligence.” His team designed a process for validating and reconciling charges that documents each time a charge is lost and whether the loss resulted from incorrectly built protocol or user error. “I wish the AP reconciliation report had existed from the get-go. For CP it did,” he said. Pathologists and laboratorians at Duke now work closely with the billing department. “We hadn’t done this in the past. We mapped to CPT codes and that was it.”

Dr. Dash highlighted a few opportunities for the future (see box), the “greatest” being the ability to create more value in the organization and to be more valued. “Once you have a pathologist who understands what the IT system can bring to the health care system and the patients and providers, then you have an asset within that organization. And you have someone who is going to be placed highly within the decision-making bodies of the organization.”

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