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# Seeing is believing: Medical Imaging looks at the forest and the trees

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*The story of how Dr. Spencer Lister used the simple act of showing his team data to improve Medical Imaging performance starts about 450 years ago. No, really.*

He begins with the discovery of the microscope a revolutionary invention which changed our understanding of the world and laid the foundations for modern medicine. It allowed us to see what we had never seen before. Lister sees data visualization as a similarly transformative technology, a "macroscope" that can be used to understand the systems that surround us in health care.

"In Medical Imaging, pictures tell us a story about each patient.  When you take the date from many individual patient exams and put them all together, that data tells a different story — a story about our Medical Imaging team. This data can help us frederstand how we're doing as a team and to understand where we're headed."

As the former Program Medical Director for Medical Imaging (now Executive Medical Director for Performance and Accreditation), the calmly determined Lister turned to the data out of necessity.

"Fraser Health is really big," he points out. "We're doing a million exams a year. We're doing half a million outpatient exams, a quarter million inpatient exams, a quarter million emergency exams a year. It's the biggest medical imaging department in Canada. I realized when I came into this job that in a way, physician leaders like me are in a forest surrounded by trees. If I didn't find some way to figure out where we are in that forest, and share that with our team, how will we know where we are and where we are headed?"

The data shows variations, whether they're pockets of excellence, areas that could be improved and need more support, or areas that have already shown quality improvements. People can look at the numbers and take ownership of them.

The forest of data indicated, for example, that turnaround times for providing imaging reports varied greatly from the time to get an exam done, the time for a radiologist to read the exam, the time to type and then sign off on a report. By showing there was room for improvement through data ranked by site, physician and modality, there was a massive improvement in terms of days waiting for those reports.

"Change starts to happen by itself," says Lister. "If the data is meaningful to you, you'll run with it. The data is about starting the conversation. Those conversations can happen anywhere, in a hallway, a phone call, in a meeting. Usually if you have like-minded folks who want to change something, they'll find a way to do it."

## Low-Hanging Fruit

So what did Dr. Lister think the data could be used to improve?  As in any program, there were a host of areas with potential for improvement. In Medical Imaging he pointed to areas such as false positives, the impact of radiation doses, potentially unnecessary pre-op chest X-rays, wait times for procedures, and hours of radiologist coverage, among others.

Lister started looking at ways the wealth of data – whether from Health Business Analytics and Information Management or Meditech and PAC (Picture Archiving and Communications) systems – could be applied to improving performance in those areas.

For example, by using audits, Medical Imaging has reduced false negatives in biopsies and provided doctors individually and confidentially with their own compliance to standards such as breast imaging classifications. "People made the choice to change their practice, and there's been an improvement in every category at every site."

Members of the team have also started to look at the radiation dose of head CT exams, trying to get that as low as possible using data to demonstrate variation. "If we do a head CT exam at one site, the dose should be the same at other sites using similar equipment. If they're lower and we're getting good results that might allow us to move to a new standard. "

That's what happened with the use of pre-op chest x-rays, which used to be ordered frequently.  Now we know they are often of little value and members of his team have focused on reducing the number of unnecessary exams. "Data visualization allows us to understand how we are doing.  How many do we do? We might find the number seems about right, or we might find more opportunity for improvement."

Lister says it's important not to lose sight of the patient even when looking at the data.

"Sometimes an assumption is made that there's a trade-off between quality and efficiency. What you find frequently when you look at these issues is it's not a choice – you can have both. You don't have to compromise quality to use imaging tests more appropriately. To the extent we can do that, we should, because it saves everyone money, it saves patients their time, and it can contribute to reduced hospital length of stay. It's better for everyone. Where you can reduce utilization and not affect quality at all, that's the low hanging fruit. And there's lots of it."

## The most challenging issue

Lister tackled some more difficult issues with the introduction of a peer review quality improvement program for radiologists, where they could anonymously provide constructive feedback on each others' performance by reviewing cases, assessing adherence to standards of care and diagnostic accuracy. It was the first of program of its kind in Canada. Though participation as a reviewer is voluntary, 90% of radiologists participate as reviewers. "It goes to show radiologists care about quality improvement. It matters to them, and they want to help each other out."

"There has been some skepticism," he admits of the new uses for data. "I think it's healthy because it means we're talking about something that matters."

His strategy for implementing quality improvement measures is to incorporate as much feedback as possible without stalling for a consensus.

"If a member of the team doesn't buy into something they usually have their own good reasons and it's important to respect that. At the same time, it shouldn't stop others from using the data to make changes they think are useful," he adds.  "The more you can promote change as a voluntary exercise, the better."

One issue that has emerged over the past few years is the need for a shift in radiologist service delivery to a 24/7 on-site model instead of the traditional after-hours on-call approach. When a radiologist is on site at all times, the time to read an exam speeds up and in certain cases can save lives. It wasn't always obvious that the on-site model is more beneficial, but when Lister and team reviewed patient safety data, that was a theme that emerged.

On Lister's watch Fraser Health began implementing evening on-site radiologist coverage. "That's a big deal," Lister says, particularly the overnight shift which requires collaboration across Fraser Health instead of within a site.

"Of all the issues facing Medical Imaging, 24/7 on-site coverage is one of the most challenging. There's a history of acrimony around this issue in many health organizations around the world. There's also a history of success. We've been struggling, but we all agree 24/7 is something we have to do and now we are discussing how it should be done. That has been a very difficult issue for all of us to grapple with. It's a huge change."

It requires many conversations, exploring alternatives, and "pushing from a position of leadership."

"It's better for patients, better from a system perspective, and can be better for radiologists, but it's a huge change for individuals, especially if they feel they haven't been involved sufficiently in the conversation," Lister says.

"Eventually this challenge will be something our team overcomes because it means something to them. First there is a challenge accepting the patient safety message. Once the message is accepted, individuals may struggle with what that change means for them."

"It's been a long journey but we're at the point where we agree 24/7 has to happen," and Lister is confident in his

team. "I know we can do it well. The barriers can be overcome."

Big Data has become a buzzword in recent years with the explosion of the amount and availability of information, and the resources to make use of it. Fraser Health Medical Imaging is harnessing the transformative technology of data analysis to improve patient care and system efficiency.

"Data visualization in health care presents a tremendous opportunity. It feels like we're just scratching the surface today. It's an important tool which can help any health organization manage the challenges of the present and plan for the future."

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