# Digital Pathology Implementation at Alverno Laboratories

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**Becca Battisfore:**

Welcome to the latest edition of the College of American Pathologist’s CAPcast. I'm Becca Battisfore, Content Specialist with the CAP. In this episode, Dr. Joe Sirintrapun will be talking with Sam Terese from Alverno Laboratories about his experience with implementing digital pathology. Before we get into the questions, let's learn more about our guests. Dr. Sirintrapun, would you like to introduce yourself?

**Dr. Joe Sirintrapun:**

Thanks, Becca. Hi, I'm Joe Sirintrapun. I'm at Memorial Sloan Kettering Cancer Center. I am the director of Pathology Informatics and have been quite a while in the digital pathology and AI space. Some background on me, I was the past president, I think in 2021, of the Association of Pathology Informatics. And in regards to CAP, I've been around also. Currently, I'm on the Digital and Computational Pathology Committee. I'm kind of a co-lead on the implementation work group, part of that committee. And that's me in a nutshell.

**Becca Battisfore:**

Thank you. And Mr. Terese?

**Sam Terese:**

Hi, this is Sam Terese. I'm the president and CEO of Alverno Laboratories here in the Midwest. We are an integrated laboratory system, kind of in a hub and spoke model. We have our large central laboratory just outside of Chicago, and we support pathology services now across about 34 hospitals and numerous clients as well. Within our group, or within the laboratory, we have a little bit north of 100 pathologists active, all of which today are using digital pathology.

A little bit about myself, I've been around laboratories for probably many more years than I would like to admit, so I've crossed the 40-year mark. And intriguingly, digital pathology, while we look at it as being something brand new, I can go back almost 30 years or so and remember my first dialogue about digitizing slides. And at that point, there was just not a mechanism to do it. From a memory standpoint, we were still talking about floppy disks, believe it or not, so it just didn't quite work. So, thrilled to be here and thank you for having me.

**Becca Battisfore:**

Thank you. And thank you both for joining the podcast today. Dr. Sirintrapun, I'll let you take it from here.

**Dr. Joe Sirintrapun:**

Thanks, Becca. So, Sam, I just wanted to say, I'm so excited to have you here, because the intent of these podcasts, we have, I guess you could say, early adopters of digital pathology. And it's great to see labs, the community practices, not just the ivory towers, where I'm from, for instance, being represented in digital pathology. So having your perspective would be great for our audience, so thanks again for agreeing to do this.

What were your challenges getting your institutional leaders/laboratory to agree to the digital pathology implementation? Now, knowing you, you are the leader, but you get the gist of the question.

**Sam Terese:**

Yeah, let me kind of attack that question from some different perspectives. Absolutely, so we do have the benefit of making our own decisions, but that doesn't necessarily say that we don't have to go through the process of getting buy-in from not only leaders and parent organizations, but also our pathologists and our leaders. Because when we talked about this, and we got excited about digital pathology the day that the FDA announced, and that's when we made our decision to move forward, because it works in our model.

Those early dialogues, you would think were going to be easy, but they're not, because, do we trust this? Is it the right thing to do? The cost. So we face the same questions, but we don't have to at least go and try to find the funds from other parent organizations or hospital leadership. So we don't compete in that front, but we still have the same challenges of getting buy-in because, without it, the project fails.

**Dr. Joe Sirintrapun:**

Wow, that's really remarkable. I guess for the audience, getting buy-in, in terms of business model, what were the things at the time... This is really early on, and to take this bold move, to take on digital, right when the FDA approved it, that's remarkable in terms of the bravery. What are things that were crossing your mind, and what are the incentives to make you push forward?

**Sam Terese:**

Yeah. So, I mean, a lot of it applies or pertains to the Alverno model. So we are an integrated hub and spoke model. So what happens in our world is that we literally move across the system, on a daily basis, literally thousands of cassettes. I think typically for us about 2,500 cassettes in a given evening are tissue samples.

That's one challenge, but the secondary challenge is, in that evening, literally we have to prepare and get those slides and everything ready to actually get them back on a pathologist's desk by 7:00 in the morning. Or, I'm sorry, 8:30 in the morning actually, not quite that early, although we do have a few that start at 7:00, but not many. And when you think of trying to move that much material across a pretty broad geography, it's almost impossible to do it effectively or to do it consistently. And so digital pathology solved that problem for us.

And so today, we have about 12 scanners in place. And we probably scan, on a given night, 5,000 to 6,000 slides, all of which are instantly accessible to all of our pathologists, of course, by the sites they're in and what's their cases that are appropriate. So it solved a massive logistic nightmare. And so you compound that with, in the summer it's not so bad, but when you get a foot-and-a-half of snow or vehicles get stuck on Lake Shore Drive here in Chicago, it creates those challenges. Not to mention, construction season and all those lovely things. So it really was that driving force, which was about improving service. Because the faster we get them back to our pathologists, the quicker diagnosis makes and the better care we're able to offer our patients.

So a lot of those elements were kind of the key leaders. And it was challenging to be first, but we're glad we did it, and it's opening some other doors for us as well as we start moving further down the path into artificial intelligence or computer-aided diagnosis.

**Dr. Joe Sirintrapun:**

That is great feedback. I'm sure for the audience, too, because I suspect there are a lot of people in the audience that are facing something similar. You found a problem where it just happened to match well, and I'm so glad it worked out really wonderfully. Well, let me go to the second question, and this is speaking of those that have now been pretty experienced, what did you face from pushback when you implemented digital pathology?

**Sam Terese:**

Well, it's always an interesting story. I mean, for the most part, we spent a lot of initial effort in our strategic thinking around it to truly address... You had the IT folks saying, "You're going to do what?" and, "We're going to move how much information through the network?" and, "Can we really support this?" and, "What does it mean?" So we had to wrestle with those concerns. And then, while we had great buy-in for a number of pathologists, not everybody was on board with this, and there was a little bit of fear that, "You're going to replace me. I'm so comfortable with my glass. It's going to be too slow." So we had to overcome all those challenges.

And how we did it is, actually is, we have multiple groups within our system. The team that did all the selection and work actually included a key member or key pathologist from each of the groups. And I got to tell you, they were great troopers with us because, in our selection process, we did many journeys across the ocean. And they were right there with us and very involved, and actually became kind of the lead group that adopted, and became kind of the spokesperson for what we were trying to accomplish.

That said, I assure you, there are a few that refused, but not many. I think once they got comfortable with it... And we did every possible thing we could think of, from speedier graphic cards to your interface devices, whatever you needed to make it work, we provided. And today, we're really blessed in that virtually all of our pathologists are currently using it. We still have two sites that are transitioning work, but they are excited as ever to really engage on a digital front. So, so far, it's been a success. Not without challenges, but definitely a success.

**Dr. Joe Sirintrapun:**

Yeah, that's great. And, I mean, in some ways it's like change management 101. It looks like you found champions, and that sort of helped to lead the charge in a lot of different things. And I think that's something that all of us, some of the young aspiring informaticians that are out in the audience, probably have to learn things. You need to find some champions to really help you out on this journey.

**Sam Terese:**

It's very much a change process, but I think what helps is if everybody understands the benefit. And if the benefit is tangible and real, I mean, how can you argue with quicker turnaround time, better feedback outcome to patients? Once you attach to a mission and a value proposition for patients, we find our medical staff really do engage in that and it becomes meaningful for them.

**Dr. Joe Sirintrapun:**

I was thinking about something that's happened over here. We did a survey in terms of digital pathology implementation, oh, I can't remember, 2016, and then we redid the survey probably around 2020, around the pandemic time. And you can see how the response, like how receptive, and people really were embracing the technology.

One thing that occurred to me, because I talked to some people also at other ivory towers that have gone digital, and they often say, "Well, now that we've gone digital, they don't want to go back.” And I'm wondering, has your pathology group, have they kind of got that sentiment? I wouldn't say that's the same here, we haven't gotten to that point, but embracing it has definitely gotten better. I'm curious, have they had that sentiment, "Are we going back? There's no chance that we'll ever want to go back to glass?"

**Sam Terese:**

Yeah, no, it's an interesting question, Joe. I haven't really asked it, but if I was to venture what the response would be, I would say, no, we're never going back. Don't you ever make us go back. I think people are generally excited. And, yeah, I mean, being first in kind of a wide scale implementation does have its pain points, no doubt. And so, if I had asked that question a few years ago, I might have gotten a different answer, even for myself. But I think today, it's just so much part of the workflow that I don't know that they could imagine going back to glass.

**Dr. Joe Sirintrapun:**

Yeah, amazing, amazing. Yeah, once you hit it, then you really know, it was well worth the journey to get there, and the journey's still continuing.

**Sam Terese:**

It is. Yep, very much so. Yeah, I think, now that we're fully digital, and now you started opening the door to many other opportunities. Going back to your question, would they ever go back? They had an interesting dialogue, and they were talking about preparing for a tumor board or a cancer board, and they go, "It used to take us days to get ready and pull slides." Yeah, now 10 minutes before, we just go and pull up the images and we have them. It's become such a embedded tool in how they do their work and, I think, at the end of the day, has made it easier.

So sometimes you create those changes and, sometimes it feels like it's creating more work. And initially, I mean, they commented that, "We're a little slower," we haven't kind of picked up that pace, but nowadays, I haven't even heard that anymore. So it's really been a great success. It took us a few years to get there, but absolutely a success.

**Dr. Joe Sirintrapun:**

Yeah, yeah, for us, with primary sign out, not everybody does that, like with the folks at your lab, but certain things, I know for sure, I know my colleagues would scream if we didn't have whole slide images is the archival. We have so many things scanned for frozen sections that, if we were to take that away and go back to glass, that would be a revolt, guaranteed. So from that standpoint, we're never going back, over our dead bodies. It's almost at that level.

**Sam Terese:**

Yeah, I think that's an interesting question because, I mean, one of the open items we have is just, how do we attack archiving? We have not gotten through that challenging piece of, "There's so much data involved with images, how do we manage that?" Because right now, yes, they can archive selected cases for the long-term, and we do have a fair amount online for an extensive period, but long-term storage for us still remains glass.

But when you look at the cost of managing, and we do about 1.4 million slides or so a year, it's such a big number that we haven't quite gotten through how we could potentially do that at a reasonable cost. But our sense is it will come, and we're working through that, but that's kind of the one of the next ways for us as we continue to evolve in our digital use.

**Dr. Joe Sirintrapun:**

Yeah, that's such an interesting question, and that's probably something we'll have to table for a different conversation. But I remember, in a previous presentation you gave, that you don't keep everything. And that's different from us, we do keep everything. But I can imagine all the work it took to scan it. It's such a shame that you don't have it, you have to purge it [inaudible] point, but it's just the nature of the cost structure that you have. That is a very important conversation that we can have maybe at a later time, but...

**Sam Terese:**

Technology will eventually catch up, but we're not there yet.

**Dr. Joe Sirintrapun:**

What tips would you give yourself if you could do this project again?

**Sam Terese:**

Oh, there's so many stories that come to mind. We often question some days whether do we really want to be first all the time? There are funny stories about temperatures and humidity in rooms and what they do to scanners, and we learned that lesson the hard way, I think, as we destroyed a couple of them. Because somebody forgot that when you set up heating and air conditioning in the winter months, it's kind of different when you hit July and high humidity. But those are the kinds of things you learn and you take with a grain of salt.

So I don't know that there's a lot we would've done differently, perhaps being a little bit more prepared to just what it's going to mean to create. Because in our world, we're very collaborative, and so, you reach out to colleagues. And there was nobody to reach out to, so that was kind of painful. But it's a lot about who we are as an organization, what we do, whether it's in digital pathology or in other areas in the lab. So, yeah, that would probably be about the only things that really come to mind.

**Dr. Joe Sirintrapun:**

And it sounds a lot like the culture of Alverno is a learning type of culture, so it's built on that. You do make mistakes, but you learn from them. I think that's a very good culture to have, especially when you want to become an early adopter. If everything's penalized, "Oh, you made a mistake," and it's like, "Oh my gosh," that's a hard culture to really adopt something, when nobody's going to help you along that journey when you're implementing something.

**Sam Terese:**

We've been pretty blessed, and that's been who we are now for a lot of years. We talked about innovation and our vision and mission, and that's what we attempt to do. We're very clear in that, if we do something and can share that with others, that's part of also what we do. So it's not necessarily secrets. I mean, why do we do things like this, is to share our experiences so that maybe somebody else can benefit. So, yes, we've spent a lot of time on developing that culture, and it's something that really has helped drive the organization forward for a number of years now.

So, yeah, Alverno's a fun place to work. Nobody ever gets in trouble for trying something and it doesn't go well. People sometimes don't want to admit it didn't go well, but I don't think we've ever taken a stance of a fault kind of environment. It's, try it; if it fails, have it fail quickly so you can move on and try something different. So I forget who's saying that belongs to, but it's not one that I've made up.

**Dr. Joe Sirintrapun:**

It sounds like Silicon Valley in some ways, [inaudible].

**Sam Terese:**

[inaudible], I'm pretty sure.

**Dr. Joe Sirintrapun:**

Yeah, fail fast, and that sort of blah, blah, blah, that sort of thing. But still, I think it's a good important lesson for our audience to learn that, when you go down this thing, you're going to learn things individual that nobody else went down the same path, and you have to learn to overcome it, learn from the next mistake, and just know that it's part of the process, it's part of the journey when you're on this thing. And I think that's an important lesson for everybody.

**Sam Terese:**

Yeah, very much so. I can't imagine doing the things we do without having that culture in place. That it would be, I think, very difficult for an organization to move forward without the individuals that are part of it and having that comfort level, that a mistake doesn't mean trouble or anything bad or anything along those lines, it just means another opportunity to do something different. That's the only way we've had more wins than losses, so I guess we're doing okay.

**Dr. Joe Sirintrapun:**

[Laughs] So let me move on to the next question here. What was your first experience with digital pathology?

**Sam Terese:**

Okay. That's a really interesting question. It actually goes back to actually very early in my career. In those days, I was actually in a more academic and research setting, so not in the clinical laboratory. And at the time, things like creating study sets were really big, and we had glass study sets that would be shared and used. And so it's, "Well, we can digitize this." And the problem was, because the optics weren't very good, and I think the biggest storage unit, if I remember correctly, was a 10 megabyte Bernoulli Box. I've dated myself. So I think we would've needed like 100 of them to probably store five slides.

But the technology's been there for quite a while now, we just had to wait for technology to kind of catch up. So we needed better cameras and imaging and quicker speeds and all of that to make it happen. And then we needed enough memory to move it, and then we needed networks that could support this big data flow. Which, as you go through a project, I got to tell you, you have to spend a fair amount of time understanding what that's like in our world, where we have six different LISs spread in our hospitals, and how data moves is a really big question. So we had that strategic element.

But, yeah, it goes back a couple decades now at least. So it's been out there, but I think it's here today. And I don't think it's going to go away, and I think we'll continue to see it evolve and continue to have a bigger presence in the marketplace, particularly with... We've talked a lot about technical shortages and that kind of stuff, but within the pathology ranks that's going to be part of our future as well.

**Dr. Joe Sirintrapun:**

Yeah, hear, hear on that, I was just thinking about technology, and I've always thought technology has its time. And even though it might happen, I think of the digital camera that happened, what, in the 1970s, and it didn't become big until recently?

**Sam Terese:**

Yep.

**Dr. Joe Sirintrapun:**

Sometimes it's, is it time? And I know for at least whole slide imaging, particularly the way you've done it in your lab, its time is definitely now and it's time for other labs to kind of adopt it. So it's all about technology and the time. But anyway, let me move on to the next question now. I think you've answered a lot already, but what are the immediate wins your institution experienced? Well, you mentioned a lot of wins already. Was there anything you left out?

**Sam Terese:**

I think the win that we're kind of on the cusp of right now is really, how do we apply AI now to an image? So I think that positioning that digital allows is pretty incredible. First and foremost, I would not ever say that the intent of AI is to ever really replace the pathologist, but only to give them another tool to enhance their ability. That win, I don't know that we have quite fully realized, but positioning ourselves to be able to adopt that and bring that component into our environment is clearly a win. It's something we could not really do without DP as the precursor. So I don't want to over-hype AI, it's not a panacea by any means, but the reality is it's a benefit that we will now have access to where we would never have access to it without digital.

**Dr. Joe Sirintrapun:**

Yeah, I totally agree with you on that. And in fact, that's a great segue to the last question about things. Where do you see digital pathology heading in the next five to 10 years? You touched on one with AI. [inaudible] anything else you want to say about that?

**Sam Terese:**

Yeah, I think it still has some challenges with adoption. I think obviously there'll be ongoing evolution in scanners. I think it'll go kind of the way of many things, which it becomes more economically easier, kind of going back to your first question, which is kind of the institutional challenge. So I would imagine we will see more and more labs moving in that direction, particularly as the economics behind it change, where the adoption levels become so significant that you really can't practice it without digital pathology. So that will be, I think, one element that will continue to percolate over the next several years.

I think you'll see growth in the AI world. Right now, there's a great number of players in that space, I guess, or companies working in that space. I do not see, I would always be very clear, I do not see that digital pathology and AI will ever replace the role of a pathologist. That I don't foresee. The quote I use, which I don't think is mine either, is just that I don't see the technology replacing a pathologist. I do see that pathologists who don't use those tools potentially would be replaced, but I think it's just going to become part of the overall practice of pathology across all of our labs over the next X number of years.

**Dr. Joe Sirintrapun:**

Yeah, I absolutely... That saying also resonates with me as well. I think it's just part of all of us that we evolve with the technologies that are there. And it's going to be part of the workflow moving forward, you just can't get around it.

**Sam Terese:**

Sure.

**Dr. Joe Sirintrapun:**

And I think that's a very important ending note for all of us on this. Well, Sam, it's been a pleasure. I'm so glad to actually have you join. And thanks for your time. I'm going to turn it over to Becca here for some closing remarks.

**Sam Terese:**

Sure. Yep, and, Joe, thank you for having me. I very much appreciate it. And it seems like to be a favorite topic. We talk a lot about digital pathology these days, so I guess that goes along with being one of the early adopters.

**Dr. Joe Sirintrapun:**

Thank you.

**Becca Battisfore:**

Well, thank you both for joining the podcast to talk about your experiences. And I want to thank you all for listening to this CAPCast. To learn more about digital pathology, the Digital and Computational Pathology Committee has a great resource center on the CAP's website. The link to that will be in the episode description. And for more information about the CAP, visit cap.org.