HOW TODAY'S INTUITIVE, STATE-OF-THE-ART HAND HYGIENE TECHNOLOGY FITS THE EVOLVING HOSPITAL ENVIRONMENT

GOJO Industries assembled a panel of thought leaders and experts in Real-Time Locating Systems (RTLS) and infection control.

They were invited to participate in a webinar called *How Today's Intuitive, State-of-the-Art Hand Hygiene Technology Fits the Evolving Hospital Environment*. The goal of the webinar was to evaluate the ways RTLS technology has evolved through the years to support the high-performance culture of today's hospitals, as well as how these systems can drive costs down and patient safety and satisfaction up.

The following is a synopsis of the moderated webinar, in question and answer format, as shared by the panelists: Ari Naim, President and CEO of Centrak, Inc.; Todd Scarola, President of Hygistics; Jane Kirk, MSN, RSN, CIC, Clinical Director, GOJO Industries, Inc.; Tim Cambier, Compliance Programs Director, GOJO Industries, Inc.; and Aaron Reynolds, New Systems Development Sr. Manager, GOJO Industries, Inc. The webinar was facilitated by Scott Newell, former weekend co-anchor of Channel 3 News (NBC affiliate) and former host of the WKYC program, "AM Cleveland" in Cleveland, Ohio.

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Moderator: Let's start off by talking a little about how RTLS technology has evolved in healthcare and how it has changed the operations of hospitals for the better. Ari, will you start off?

ARI: Technology over the last decade has introduced incredible innovations to improve hospital operations for more efficient and safe patient treatment. As a result, a greater burden has been imposed on staff to provide continuous inputs to operate the technology. The concept behind Real-Time Locating Systems, or RTLS, is to provide continual updates regarding the location of equipment, staff and patients, the many applications running the hospital—and to alleviate the need for people to provide those inputs. In a way you can view this as a direct connection between the physical world and the myriad investments in the IT and workflow applications. Of course, an automated system can take many more measurements with far greater accuracy than humans. As all these systems rapidly innovate, the weakest link in all of them is the human being who is being relied upon to input the data they depend upon.

Similar to the evolution of other technologies, such as Wi-Fi, RTLS was introduced more than 15 years ago in hospitals with expectations it would solve all problems. After many years of trial and error, the technology has finally matured and is becoming ubiquitous in healthcare. I believe more than 15% of hospitals now have a system in place, with 10% having been installed only in the past 5 years. Rate of adoption is accelerating and there is little doubt that, in the next 10 years, it will be as common as Wi-Fi is today. What is exciting for hospitals that have implemented an RTLS is that they can leverage it for many applications, one of which is the monitoring of hand hygiene compliance in real time.

JANE: I will never forget the first time I heard about ECM. It was at a local APIC meeting and the guest speaker was a pioneer in this space I was working as an IP in the hospital, responsible for the hand hygiene program, and I used to spend hours making observations, then tallying them up and creating reports for leadership. I was hurt to hear that, in spite of all my efforts, my numbers were statistically insignificant. So I was excited to learn about ECM! Fast forward seven years and I believe most IPS have heard about ECM and are beginning to look at the differences in the systems that are available today.

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Moderator: Todd, things can change a lot, can't they? Can you weigh in on where we've come from?

TODD: I think one of the biggest impacts we've seen in the application of real-time location data is the ability to provide visibility to operational components of the hospital that require C-Suite level attention and provide it in real-time. Traditional systems document historical clinical actions—what happened to the patient, what was done to this piece of equipment, etc. Such systems provide little information about how we arrived at these clinical endpoints and the data is typically very coarse in granularity. What's really needed is real-time visibility as to how all these various components are interacting—where and when the patient is moving, what is going on around the patient, where the clinician has been and what's the state of the equipment.

So, what's exciting is the convergence of sensor technologies that can measure these meaningful end points, with *applications* that mine this data to provide higher granularity insights to operational workflow. This combination is giving us the ability to see what's happening inside the four walls of the hospital in real time and proactively optimize the different processes and various complexities of the hospital in ways we've never been able to before.

Moderator: Tim, can you explain how you think the technology has evolved?

TIM: Mainly, the technology has become more reliable and accurate. Years ago when early electronic hand hygiene monitoring was introduced, it involved a variety of technologies being piloted in hospitals. During that time, many of the solutions didn't account for the complexity of the hospital environment or the fast-paced workflow of the healthcare worker. Needless to say, many of them fell short in terms of accuracy and customer expectation. For example, the inability to read a badge correctly or to give credit to a healthcare worker for performing a task accurately definitely showed shortcomings in the technology. As a result, providers of hand hygiene monitoring solutions have reworked their technology, evolving and refining it to exist in the complex and fast-paced world of healthcare. These technological advancements allow for greater reliability and accuracy in recording healthcare worker movement, patient interaction and hand hygiene performance.

For instance, years ago, when a patient was admitted into the hospital, it was done through pen and paper format and through a constant hand-off of forms and charts. Patient encounters, doctor interactions and other information were tracked through pages and pages in a patient binder. Now with the advancements in healthcare technology, Real-Time

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Locating Systems, can automatically log and report when a patient was admitted, who they met with, what tools or apparatus was used on them, what procedures took place, when they took place and everything else all the way through the discharge. Therefore, all that information is then shared with the different caregivers who would interact with the patient. It's all done in real time, electronically, so the advancements in technology have also led to larger data sets being collected and utilized for additional value.

Moderator: And more data usually means better data?

TIM: In this case, yes. In the past we've had to leverage smaller data sets to gain efficiencies in healthcare. Now that we're collecting a larger data set across the broader healthcare environment, we have the ability to mine it or analyze it to find ways of improving patient care, streamlining healthcare worker workflows, increasing the quality of patient-to-staff interactions, and identifying efficiencies across hospital functions that can ultimately lead to better patient outcomes… not to mention exerting a positive impact on the hospital's reputation and bottom line.

JANE: As far as data, it is wonderful that we are getting so many data points around hand hygiene. But, as with any quality improvement measurement, in my opinion, what you do with the data is just as important as taking the measurement.

Moderator: Aaron, what's your perspective on all of this?

AARON: I'd have to say that in the last ten years there has been a lot of growth in the hardware side of the technology, so I'm sure there are a lot of people out there who had bad experiences in the past with technology that didn't work quite correctly or wasn't easy to use. Now, there has been a great deal of development in areas like energy management, where devices last longer. The technology is also more robust and communicates better and more securely. I also see a lot of development in terms of the human factors—the interface and how people interact with the technology, so that from ten years of trial and error and experience in the field, the technology is much, much more applicable to the hospital environment. I think people will embrace and work with it much better.

ARI: Aaron and Tim raised very good points. When the Real-Time Locating Systems were first introduced into healthcare about a decade ago, they were basically providing single-point solutions such as tracking assets in the hospital, and the accuracy was not very good. They were using a form of triangulation like you see with GPS systems outdoors.

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But when you take that technology and put it indoors where things move around from floor-to-floor and room-to-room, a lot of the goals were not really achieved.

Over the last, I'd say, five years we have made incredible improvements in accuracy and overall performance of RTLS. We've added not just single but multiple technologies. We have about four different technologies running simultaneously in single devices, each one accounting for the abnormalities and unique situations you encounter in a hospital, such as various kinds of wall construction, and all sorts of other physical challenges. Today, we're literally able to achieve 100% accuracy within rooms, bays, hallway segments, etc. That ability to track tags attached to staff, patients and equipment with that level of accuracy gives us the ability to make associations between a patient with other things in the room—such as a doctor that's coming to visit them or a piece of equipment being used. Or, for example, we can track a specific staff member who has used a dispenser and has then decided to visit a specific patient.

Moderator: And one question that arises is, what are the drivers and also the restraints in adopting these Real-Time Locating Systems? There seem to be a lot of factors involved. Ari, why don't you start by outlining some of them?

ARI: I think one of those factors is the history. There are a lot of "wounds" out there for those who have tried these technologies over the last decade and found it hasn't fulfilled their aspirations, so one restraint to adoption is getting over that stigma. But today, there are many hospitals that have demonstrated the return on investments is 12 months or less, just on tracking equipment. Contributing to ROI is the fact that installation has become much simpler too, especially when the Wi-Fi network can be leveraged and/or the equipment is primarily battery-operated, taking just a few minutes to install in every room.

Another one of the main barriers that has been removed is the idea that Real-Time Locating Systems are just single-point solutions. The systems today solve more than just one problem. They are addressing asset management, bed management and a host of workflow applications. Like your Wi-Fi infrastructure, they are solving many problems in the facility. So the return on investment is growing all the time. These systems have evolved to the point that they can address complex problems like hand hygiene compliance. It's a difficult problem because you have to track the staff, who are the care providers, washing their hands… you have to associate them with the soap or gel dispenser… and, then you

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have to associate that activity with the location they're in relative to the patient they're administering the care to. So, the nice thing is that, today, that solution is leveraging an infrastructure that is being used for many types of applications in the hospital, not just for hand hygiene compliance.

One other thing we've witnessed is that people had been using the systems and not feeling that they were being properly credited for, say, washing their hands. One of the exciting things about today's technology is that we have achieved a level of accuracy and performance that makes people very comfortable with the system—that it is truly providing the right data, which is very, very important in the adoption of these systems.

JANE: Any change in practice involving technology can be challenging for staff to accept. When EMR was first implemented there was a lot of pushback and complaints. Now it is standard practice, a way of life in many hospitals. Training all the staff to be knowledgeable, proficient and accepting is no easy feat—it's a culture change. In our work with hospitals, installing and implementing hand hygiene compliance programs, we have found that if the staff own the ideas and solutions, change is more likely to occur. We also work closely with hospital leadership to seek their support of the staff and projects. We become a partner with frontline staff and leadership.

TODD: A Real-Time Locating System is fundamentally an instrument that provides a measurement. Its value is derived from the applications consuming data and transforming it to provide business impact. One of the challenges we've seen with RTLS is getting a critical mass of applications consuming data to justify an ROI for the broader platform.

I think one of the unique things about its application in the hand hygiene monitoring space is the ability to rapidly affect change and deploy a system to do so in manageable chunks. There is a very distinct before/after effect that can be seen quickly. Traditional deployments of RTLS for things like asset management have a much longer ROI tail and are more invasive to get up and running. Having an application that's easier to digest can be a great catalyst to get started.

It also directly targets something related to patient safety, which is very compelling. I think the ROI is not only compelling financially, but also morally. We are able to put something in the hospital that has a direct impact on patient care.

ARI: The other interesting thing you can do with real-time locating is— if a patient has an infection, we can very quickly know what equipment and staff were in their presence to help determine the way the infection could have possibly propagated.

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Moderator: Are there any studies that indicate these systems reduce infection or produce a hard dollar return?

JANE: We know in Infection Control that there are studies linking improved hand hygiene compliance to decreased HAIs. These studies measured HHC by direct observation or product consumption. To date, there are studies showing that when ECM was implemented, HHC improved. We don't have yet a robust study that demonstrates that HAIs decreased when the only variable that changed was adding ECM. What we are looking for is sustained, improved HHC and, ultimately, a decrease in HAIs. This will take some time.

When you look at the study done at Dartmouth that Hitchcock published in 2012 in *BMJ Quality & Safety*, they were able to improve hand hygiene from 41% to 87% the first year of interventions. Compliance increased to 91% the following year. Their interventions included leadership accountability, measurement and feedback, availability of ABHR education/training and marketing communication. At the same time they saw improvement in HHC, they also experienced a sustained reduction in the incidence of HAIs—*staph aureus* and *c.difficile*, specifically.

ARI: Jane, that was a good point. I think another important aspect to this is the acceptance and adoption of both RTLS and hand hygiene in particular. For us, this culminated in the Veterans Administration project. The entire VA network of 152 medical centers is installing RTLS. One of the very important use cases they're spending a lot of money on is in the area of hand hygiene compliance. The accuracy level of the data captured with this technology and its use for multiple applications has really pushed them in the direction of wanting to make the investment. They feel that the return on investment is going to be very high. Hand hygiene monitoring is something that we're just starting to implement there, and it was one of only four of the top use cases that they signaled as top of their priority.

TIM: To build on that, these technological advancements have provided options to hospital end-users, so we now have the means to conduct electronic observation, replacing the current method of clipboards, pencils and hours of manual data entry. We've also found ways to electronically measure community-based and person-specific hand hygiene metrics. So what we've created is a value chain that fits a hospital's budget and readiness state. As budgets allow, a hospital can introduce or install larger infrastructure platforms to leverage an RTLS system for asset tracking, temperature monitoring, patient flow and hand hygiene. In some cases, in smaller rural hospitals or community hospitals, they may only have budget to *start* managing hand hygiene electronically through community-based metrics or electronic observation.

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TODD: It speaks to the maturity of the technology, because I think a lot of hospitals may want to install a hybrid of solutions. They may want to have 24/7 monitoring in high acuity areas where budget allows them to put in real-time and full-time automation, while in other areas of the hospital, community metrics make more sense. So what we're seeing as these technologies evolve is the need to have this sort of hybrid approach where we can get a data collection across the facility using a variety of data capture techniques—so that hospitals are reaping the benefits of the ability to capture data in a variety of ways and still perform deep analysis across different data capture platforms.

AARON: I would just add to that, on the hardware side, that we also have options. In the past, where there may have been just a dispenser on the wall, probably in an inconvenient place, now we have smaller systems that can be placed in multiple areas. We have small devices that can go on tabletops, for instance. They can be placed at the point of care. There are many more options on the hardware/dispensing side.

ARI: From a C-Level perspective, the thing that's exciting about these technologies isn't just the fact that we're creating automated ways to replace current manual techniques. The exciting piece is that the kind of data we're capturing is opening up new insights. Where historically we collected observation data by pen and paper, we are now able to identify what compliance levels were like last month or the previous week. We're not only able to replace the manual collection, we're able to make determinations about observations in real time. So we can see, for instance, which clinicians are spending time with patients and how long they are in the room. We can capture the patient's experience. The technologies go beyond time saving to provide the ability to look at operations and add context to what's going on in the hospital beyond what we are capturing today.

TODD: Yes, one of the major challenges that hospitals face is a bit of this "mental reset" that occurs when you put in systems like this. A lot of folks are collecting data manually today and their compliance appears to be in the high 80s or in the 90s. And then they put in an automated system and all of a sudden compliance is in the 40s, and they think the system's broken. The kind of data we're collecting is so much more detailed and the volume of data is so much greater than we were collecting with a manual system. Statistically, the system's much more accurate because of how you're collecting observation data. If you look at a typical hospital—say an average 300-bed hospital—that collects somewhere between 500 and 700 observations a month. These are typically done during the day shift, not the weekend shift—they're typically done at certain points in the week. And when you look at an automated system, it's running 24/7 and you're taking about 5,000 observations a day. So the data volume you're collecting and from which you're then deriving hand hygiene compliance is much, much more

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statistically accurate and significant. But getting over that "mental reset" is one of the biggest challenges hospitals face when adopting these kinds of systems.

TIM: Right, Todd. The other value-add that it brings is that the volume of data we're now capturing in real time or near-real time allows us to identify trends, both good and bad, almost immediately. So if we analyze a person-to-person or unit-by-unit comparison, we can now identify where there are areas of concern or areas of success for hand hygiene. We can go to that unit or address staff that may demonstrate subpar hand hygiene performance and help them improve to bring those metrics up. It has really given us the ability to be proactive and more predictive using the new measurement tools.

Moderator: We've talked about a number of things—the quality and quantity of the data—but if you were to suggest one takeaway for those in the C-Suite, what would you encourage them to do?

ARI: I would encourage the C-Suite to take a view of the enormous investment they've already made in the hospital—from all the software applications and the systems they've installed—and realize that the weakest link is in the interaction of the staff with those systems. To get the most out of that investment, you really need a Real-Time Locating System to make that connection. This is the last mile, which will enable them to implement systems like the hand hygiene compliance monitoring that provides such an enormous return on investment for an infrastructure like that.

TODD: This type of investment has a compelling ROI and a dramatic impact on patient safety. These systems provide the ability to grow incrementally with metered investment. It is easy to get started and results can be seen quickly.

TIM: I would ask that the C-Suite take away that the technology has really evolved. It has improved, and today we're able to automatically gather volumes of data about workflow, patient care, hand hygiene and overall performance in the healthcare setting. I'd ask that they take time to understand the value this brings to patient outcomes and patient well-being.

AARON: I would say that the technology we have now is light years from what we had in the past. It not only provides compliance data, but it can also make your job easier. I think the robustness of the systems that are out there now is far above what they've been in the past. This is really an asset that can be used and not just something to worry about. It can

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provide a lot of information and data to make the patient safe as well as to make the work environment more efficient.

JANE: I think the first step is to assess your readiness. Ask yourself, "What type of system will fit best with my culture? What are our goals and objectives for doing this?" Maybe you need to start out with an activity-based system that gives a community rate before installing person-specific monitoring. Or maybe you are a believer in accountability and are prepared to work with person-specific monitoring. Communicate broadly to all who might be involved with the decision, including Infection Prevention, EVS, IT, Quality & PI and Nursing. If you used direct observation in the past, be prepared to see much lower compliance rates than you had anticipated based on those reports. I ask the C-Suite to consider these questions: Are you prepared to make hand hygiene improvement a priority and allocate resources to do so? Can you afford not to?

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