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RFID for Healthcare Standardization and Interoperability

By Claire Swedberg

Michigan State University's Axia Institute has been building membership in the technology and healthcare industries as it tests RFID, identifies use cases, develops best practices and supports an interoperable system to share product data.

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May 01, 2022 [Michigan State University's Axia Institute](#) is undertaking standardization efforts and certification testing for the use of RFID technology to track medical devices and pharmaceuticals, in addition to other ongoing value chain research. As part of that effort, the group is increasing its membership to include technology companies and members of the supply chain, as well as manufacturers and healthcare providers.

The Axia Institute is a research and education center dedicated to developing effective and sustainable solutions for value chains. Its stated goal is to become a conduit for technology, techniques and best practices related to commercial supply chains overall. Initially, however, its focus is on pharmaceutical and healthcare products. The Institute hopes to create a standard, easy-to-deploy system for tracking a product's identity in accordance with the FDA's Drug Supply Chain Security Act (DSCSA).



John Hatfield

Recent Axia Institute members include RFID solutions company [SensThys](#), which joined this spring to play a technical role in the organization's efforts. The company was introduced to the Institute by another member, supplier [Health Care Logistics](#) (HCL). SensThys hopes to leverage its membership to learn more about the needs of its potential customers, as well as serve as a solutions consultant. SensThys joins other industrial players, such as [GS1 US](#), [Fresenius Kabi](#), [Henry Ford Health](#) and [Spectrum Health](#).

The Axia Institute was founded in 2013 with the goal of exploring value chain challenges and solutions, according to John Hatfield, the organization's executive director. "We see the value chain as the delivery of any product or service to an end customer," he states. The lab has recently been testing and validating RFID-tagged items with a focus on value chains in three areas, he says: healthcare, food and agriculture, and advanced manufacturing. It is beginning with healthcare.

The present focus is on building a consortium of supply chain members and technology companies from throughout the healthcare value chain—first to understand industry challenges involving product tracking, and then around the deployment of RFID systems that address those challenges, says Bahar Aliakbarian, the Axia Institute's director of research and development. "We have worked with individuals from raw material [providers] all the way to care providers at the hospital level," she says. "We brought them together just to discuss their challenges and what their issues were."

The primary challenges expressed included a lack of information about what data should be encoded into UHF RFID tags, as well as the lack of standard protocols to develop the data-encoding system. "The other issue that we heard from members," Hatfield adds, "was the lack of standards and protocols to test and validate RFID-tagged items." While there are testing procedures for apparel and other inventory applications, he says, there are fewer guidelines, even from standards organization GS1, for the specific application of RFID in healthcare, particularly with regard to pharmaceutical products.



Bahar
Aliakbarian

Potential users of RFID have expressed a lack of a quantitative return on investment (ROI), Hatfield reports. "In order to facilitate the application of RFID across an entire supply chain," he explains, "we need to provide that ROI to the manufacturers and end users." With that in mind, Hatfield says, the healthcare industry requires a system for testing, as well as cases study research of entire supply chain solutions.

As a result, Aliakbarian says, "We synthesized what we heard and came up with a plan, including our proposed portfolio of research projects." Part of the effort is to test tags at Axia's lab in Midland, Mich., in a way that they are typically used. By reading tags on a variety of common products, Aliakbarian says, the group intends to help users understand the effect of dielectric properties and packaging structure of a pharmaceutical product, whether it's a vial or a syringe, as well as how the tag can most effectively be used with that product.

The group will look at standardization of encoding so that tag data can be universally read throughout the supply chain. The lab's goal is not to certify RFID products, which the [Auburn University RFID Lab](#) does for apparel tags, but rather to validate and test the performance of RFID tags based on the requirement of a specific customer. The Institute is also working with GS1 to develop pharmaceutical-specific grades for Tagged Item Performance Protocols (TIPPs), Aliakbarian adds. Once grades are established with GS1, she says, "It's our aim to test samples and say 'These tags or these tagged items qualify for this GS1 pharma grade.'"

The lab includes a standard anechoic chamber for item-, box- and pallet-level tag testing, in addition to common containers and infrastructure used in the healthcare sector, such as smart enclosures and cabinets with built-in RFID readers. The organization will collaborate with researchers in other Michigan State University departments, including at the College of Business, the College of Engineering and the school's packaging research area. By next year, Hatfield predicts the Institute will have completed several case studies to illustrate the ROI of implementing RFID. Already, he says, most companies in this supply chain sector are exploring RFID use in some way or are already deploying the technology.



Kurt Wolf

HCL is a member focused on supporting an open standard for the RFID tracking of healthcare products. "We think the data should be readily available," says Kurt Wolf, HCL's VP of technology, whether via a barcode or a UHF RFID tag. The company introduced the Axia Institute to technology provider Senssthus. Axia's efforts, Wolf says, will lead to greater interoperability between what have been disparate systems, from drug manufacturers to wholesalers or pharmacists.

One immediate benefit to open and interoperable systems, Wolf says, will be preventing counterfeit drugs from entering the supply chain. If RFID technology is in place for those at the point of care, he explains—at a hospital, for instance—and if the data employs an open standard, there can be greater assurance that drugs administered to a patient can be verified via a standard RFID reader, and that they are, therefore, always genuine. Wolf expects the technology to be more readily adopted going forward.

One challenge for companies considering RFID deployments has been centered around labor. "Some of the biggest pressure that a lot of our customers are facing right now is just human capital problems," Wolf states, as they lack the labor required to deploy and learn a new technology-based solution. Recently, HCL's customers have been indicating that the savings the technology will provide, in terms of labor, are becoming clearer to such businesses. "Companies are now coming back to say, 'We're at a point where we want to continue these conversations' about RFID."

As a relatively new member of the Axia Institute, Senssthus hopes to serve a consulting role, but also to learn from other industry members, according to Jo Major, Senssthus's CEO. He says his company can gain a sense of key issues and challenges that need resolving. One such challenge involves security, Major notes. "I think the value to us," he states, "is getting smarter about how the healthcare world works and what they need."



Jo Major

Major cites the need to make technology both secure and private. Thus, he says, in addition to providing

effective technology to capture and manage data, companies need to be able to assure their customers that the data cannot be hacked. "We find that device security robustness against attacks is something that the hospital environment is going to need," he explains, "and we'd like to listen to those needs and make sure that we're providing solutions for them."

The [DoseID Consortium](#) is a private group of industry members that is also working toward establishing a standard use of RFID tag data in the healthcare sector. "I can't speak to what DoseID is doing," Hatfield says, "but Axia is working with GS1 on standards for the readability of pharmaceutical tagged items, and to promote open and interoperable standards for the industry." Following the research and testing for the healthcare industry, the organization reports, similar efforts will take place involving the food, agriculture and advanced manufacturing sectors.

Exhibitors at [RFID Journal LIVE! 2022](#) will offer solutions for tagging pharmaceutical products. To learn more, visit [the event's website](#).