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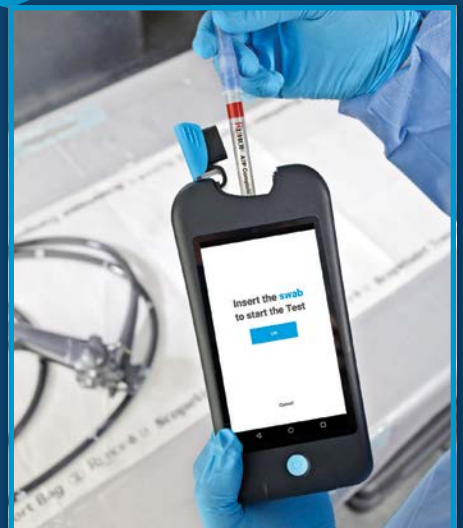
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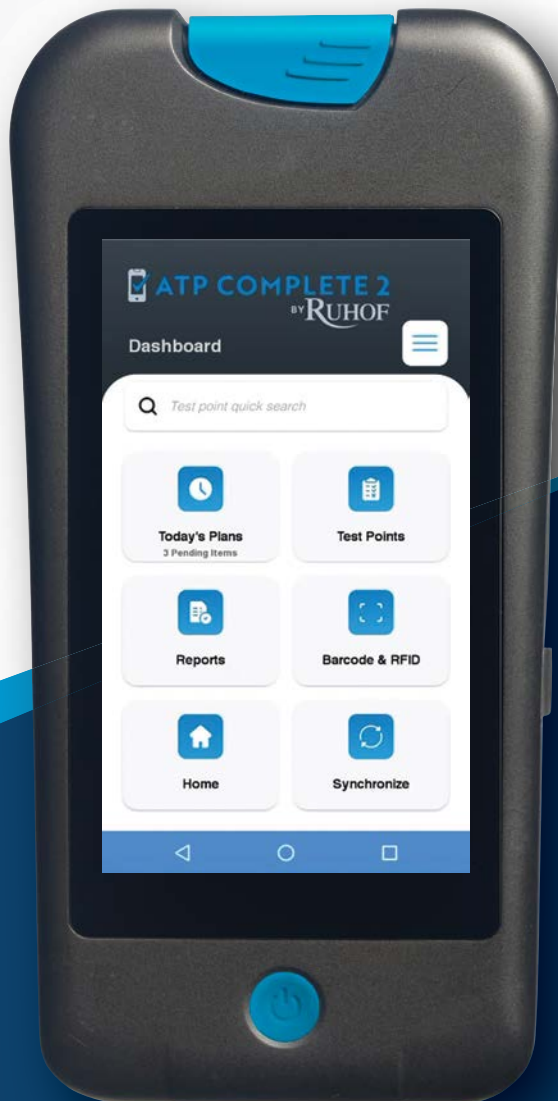
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## EDITOR'S NOTE



**Janette Wider**  
Editor-in-Chief

# New Year, New(ish) Editor- in-Chief, New AI Opportunities

Some of you may remember that I authored the Buyline featured in August 2023 introducing myself as Editor-in-Chief of *Healthcare Purchasing News*. Now

that we're officially in 2024, I will be taking over the Editor column, and calling it Editor's Note. I plan to provide you with comments on the industry's latest and greatest topics.

Speaking of the year 2024 and the latest and greatest, it seems that artificial intelligence (AI) is all anyone in *any* industry can talk about. For readers of our publication and other healthcare publications, everyone is jumping on the AI bandwagon due to its potential capabilities.

One such capability that sticks out to me is to ease staffing burdens. In almost every interview I conduct, the burnout and pressures faced by healthcare staff always come up in one way or another. The Bureau of Labor Statistics estimates U.S. healthcare organizations will have to fill more than 203,000 open nursing positions every year until 2031.

Researchers at Penn Nursing's Center for Health Outcomes and Policy Research (CHOPR) in collaboration with the U.S. Clinician Wellbeing Study Consortium sought information in 2021 from 21,050 physicians and registered nurses practicing in 60 Magnet-recognized hospitals in 22 states on hospital clinician wellbeing. Their study was published in *JAMA Health Forum*.

Forty-seven percent of nurses and 32% of physicians experienced high burnout. Twenty-three percent of physicians and 40% of nurses said they would leave their jobs if possible. Less than 10% of physicians and nurses reported experiencing joy in their work. Not having enough nurses to care for patients, having little control over workloads, lack of confidence in management to resolve problems in patient care, and concerns about patient safety were all associated with higher burnout, job dissatisfaction, and intent to leave among both nurses and physicians.

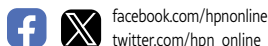
An article in *Sage Open Nursing*, entitled, "The Impact and Issues of Artificial Intelligence in Nursing Science and Healthcare Settings," said, "AI technologies may be able to improve the nursing care of various health conditions, provide complete information to support decision-making, manage medical records, minimize medical errors, optimize nursing care processes, make healthcare more accessible, provide better patient experience, improve nursing care outcomes, and reduce per capita healthcare costs."

This month, we covered AI in Supply Chain. The article takes a deep dive into the opinions of industry executives.

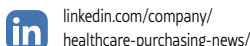
Senior Editor Rick Dana Barlow wrote, "For some (e.g., entrepreneurs, innovators and opportunists, etc.), AI represents shortcuts and workarounds to be more efficient at work and either enjoy more recreational time or focus on other expedient tasks courtesy of the additional time.

"For others (e.g., conspiracy theorists, cynics and skeptics, etc.), artificial intelligence (AI) calls to mind robots besmirching humans through deep fake audio, video and text or even replacing humans for jobs and revenue and taking over the world."

His story is on page 26. Be sure to check it out as well as our November 2023 Virtual Forum on AI that I moderated, here: <https://endeavor.swoogo.com/2023HPNVirtualForum/todays-landscape>.



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## Keeping supply arteries clear and flowing

by Rick Dana Barlow

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**H**andling material throughout a healthcare organization – whether housed in a storeroom, supply closet or warehouse – involves more than just managing, moving, storing and transporting products and equipment.

The overarching process represents the circulatory system within an active facility whose clinicians and administrators require routine access to the necessary products and services to care for and repair patients.

While most supply chain executives and professionals may recognize the science behind material handling, many also recognize the art behind the strategies and tactics put in place that rely on creativity, forward thinking and horizon scanning.

Supply chain pros in the storerooms and warehouses – and to some extent the nurses and technicians who fortify supply closets and carts on nursing floors and in patient rooms – acknowledge the challenges and concerns they face with material handling and access that were exacerbated by the pandemic-driven backorders and shortages during the last several years.

### Post-pandemic outlook

With the global pandemic roughly eight months in the rear-view mirror, corporate executives with material handling

experience and expertise point to a plethora of challenges that remain constant, if not consistent, within industry change wrapped by the flag of resiliency.

“The tension between resiliency and efficiency has made life exceedingly more complicated for supply chain professionals who are increasingly challenged to keep their teams focused on the consequences of their failure to perform at a high level,” observed Doug Lowe, senior implementation consultant, Jump Technologies. “The ability to deliver a high-performance supply chain requires supply chain leaders to understand how processes affect their operations and cross-functional teams, and to be able to identify the root cause of a problem and the real-world solutions that can help them overcome the situation.

“Unfortunately, all too many of the resources and assets that supply chain teams rely on every day, whether internal or external, are not under their direct control, which can make it difficult to bring balance to potentially disparate forces and systems,” Lowe continued. “Prior to the pandemic, hospital supply chain teams were being driven by the demand for more

efficient operations and cost reduction, less inventory, streamlined procurement workflows, and just-in-time (JIT) replenishment as their primary goals. In the post-pandemic world, as supply chain instability continues to affect product and staffing shortages, supply chain professionals are experiencing increased complexity due to high demand for supplies, increased conversion activities and a general fear of the new normal. As a result, I have seen hospitals with skids of excess supplies lining the corridors outside of central supply. Meanwhile, the stockouts and shortages continue, along with what appears to be gross overstocking and poor service.”

Lowe spent most of his career in supply chain leadership roles in various industries with his last role as manager, Supply Chain Logistics and Inventory Planning at Hennepin County Medical Center.

Shawn Ducey, associate principal, Advisory Solutions, Vizient, highlights three areas of concern that healthcare supply chain operations face. Labor shortages and staff turnover is the first.

“Labor shortages are no longer a short-term issue, and this is affecting key activities across distribution



Doug Lowe



Shawn Ducey



channels,” Ducey noted. “They have become the new norm. Even with some of the robotics and conveyance solutions that move product to the outbound prep areas, warehouse operations are challenged with recruiting staff for the physical and often taxing tasks of picking, packing and shipping products. The limited access to labor has labor costs exceeding inflation rates, and the competition for labor adds another level of complexity along with the cost to recruit, onboard and train.”

Warehouse efficiency is next, according to Ducey.

“It is not unusual to observe a warehouse facility that is underutilized with poor process,” he indicated. “This varies by the level of sophistication of the design (setup) and available technology. Warehouse efficiency is centered around people, process and technology. Processes need to be designed to remove waste throughout the warehouse operation and optimize use of the available technology. This includes product slotting, receiving and putting away, picking, transport and outbound shipping.”

Finally, Ducey cites long lead times for material handling equipment (MHE) as the third culprit.

“The lead time for select MHE, such as forklifts, conveyors and storage racks, is greater than 24 months and is driving up the cost for continuing operations with rentals and older equipment,” he added.

Terry Elliott, partner, Diamond Storage Solutions, warns about three lingering issues that hover between process and technology. The first is using excess inventory as a [bandage] to minimize stockouts versus deploying a robust consumption tracking and forecasting system. The second is maintaining insufficient documentation of material consumption, requiring frequent inventory physical counts that waste manpower. Finally, he emphasizes the lack of using Lean tools to eliminate waste that he defines as activities or resources deployed that do not add value. Elliott specifies four examples: “Waste [can be] in the form of transportation, such as unnecessary movement of materials or products; inventory, such as excess stock or supplies; motion, such as unnecessary movement of people or equipment; and waiting, such as idle time or delays.”

Three overarching areas represent material handling challenges that need to be addressed and overcome, according to Tom Redding, senior managing director, Healthcare, St. Onge Co.

Redding leads with facility layout and configuration. “One of the biggest concerns with material handling has to do with how well the space is organized

to facilitate an efficient and effective storeroom and/or warehouse,” he told *Healthcare Purchasing News*. “Additionally, the space is not organized to accommodate growth, which may result in a less optimal operation over time. Lastly, the space is not designed to accommodate technology which may result in congestion and further inefficiencies.”

Material and people flow come next. “Many facilities are older with limited clear height and don’t organize the space to optimize how materials flow in and out the space,” Redding said. “This may result in back tracking to get supplies and/or creating a pinch point when accommodating inbound and outbound activities.”

Storage utilization represents the third leg. “Another challenge with material handling in a storeroom and/or warehouse is related to how well the available storage is utilized,” he noted. “If the storage is not planned and utilized correctly then it may result in a loss in productivity. Additionally, low storage utilization may require more travel time and unnecessary handling requirements to fulfill daily orders.”

David Phillips, marketing manager, Hänel Storage Systems, adds three more to the mix.

First for him is floor space. “More than ever, hospitals must do more with less – less space for storing surgical supplies, but more product for the increasingly complex surgeries being performed,” Phillips indicated. “Space is typically cut from storeroom areas, whether it’s sterile storage, materials management or central supply to provide more space for an OR expansion, for example, and those departments are then asked to store up to 40% more inventory within a much smaller footprint.”

Don’t overlook ergonomics, according to Phillips. “Storerooms, warehouses, sterile processing and even the maintenance department suffer significant man-hours lost to back strains and repetitive hand/arm injuries, not to mention falls and trip hazards,” he insisted. “Management in all hospital departments must analyze the work time lost to injuries and develop corrective actions to reduce or eliminate the causes.”

The third spans inventory management and tracking. “From the central supply room to the Sterile Processing department to the OR, inventory tracking is a challenge



**Tom Redding**

but critical. Imagine building a case cart that reaches the OR, only to find that a sterile wrap had somehow already been ripped, and then you need to scramble to replace that tray of instruments,” he added.

## Human versus tech

Healthcare professionals can embrace two processes for addressing material handling challenges: One that doesn’t rely on technology tools, the other that uses technology tools. The former translates to lower upfront costs but potential long-term costs, the latter may require higher upfront investment costs with the potential of reducing ongoing long-term costs.

“With the deck stacked against them, supply chain professionals need to stay on the path of continuous process improvement,” urged JumpTech’s Lowe. “Healthcare is always changing, and when you add to this mix unprecedented regulatory requirements, complex multi-faceted supply chains and rapidly evolving realities within individual healthcare and on the global stage, the value of process improvement becomes clear. Healthcare organizations should strive to maintain an ongoing process improvement model that is driven by operational leadership and grounded in cost of quality, measurement and corrective action, communication, education, teamwork and recognition.”

With or without tech, supply chain pros have myriad options, according to Lowe.

“Supply chain teams can achieve this without tech tools by implementing things like information-rich daily huddles, training and development initiatives, open feedback sessions, team building activities and accountability training,” he recommended. “Meanwhile, supply chain and C-suite leaders should look for supply chain technology solutions that deliver data standardization, advanced forecasting and demand planning, real-time analytics and reporting across the organization or an entire IDN, and integrated PAR and perpetual inventory or order management capabilities.”

St. Onge’s Redding denotes the advantages of human-driven versus tech-assisted options.

“Most of the identified concerns can be resolved with taking the necessary time to review the inventory and throughput requirements and aligning the available space and storage to minimize walk time, handling requirements and reduce the potential of congestion,” he advised. “In most cases, focusing on a tech solution only will not solve the problem, only make it worse.”



**David Phillips**

# SOURCING & LOGISTICS

But Redding cautions against rallying behind new tech investment without gauging existing capabilities.

"I believe most of the tools are available within the existing [enterprise resource planning] system to manage how well the storeroom and/or warehouse will function," he noted. "There are other opportunities to leverage technology, which includes 'follow-me' robotics, [real-time location systems] to monitor aisle traffic

and congestion and drones to monitor storage utilization, to name a few. Prior to jumping to a technology solution, it is best to leverage the skills and expertise of the supply chain leaders and/or outside consultants to provide their insights on how best to operate the storeroom and/or warehouse."

Diamond's Elliott promotes Lean philosophy as a non-tech tool to make a difference. "Foster a culture of continuous

improvement, 5S (sort, set in order, shine, standardize and sustain), value stream mapping, error proofing, Kanban (visual management) and deploying a plan-do-check-act management method," he suggested. "Select storage systems and solutions that minimize installation time, protect product integrity and facility sound Lean practices."

If tech options generate interest, then "deploy inventory management software

## Juggling different material handling solutions for effective, efficient product flow

Recommending safeguards against potential pitfalls and pratfalls with material handling practices and processes tend to be rooted in experienced from hindsight. Yet material handling experts offer a number of suggestions in a "do this, not that" scenario that may motivate you to stop questionable procedures or prevent them from being implemented.

**"Do This:** One of the primary practices that every storeroom and/or warehouse should be [practicing is] to continually cycle count inventory, monitor and address underlying issues for inventory accuracy (e.g., picking wrong unit of measure, picker performance issues, etc.). Another important practice is to continually assess how well the inventory is slotted to reduce aisle congestion but also reduce the travel time associated with picking each order. Lastly, exploring opportunities to pick multiple orders at one time and/or consider a 'put wall' approach for common items.

**"Not That:** Avoid the temptation to pick multiple units of measure from the same pick location; consider the potential to have a location for full case picks and another for 'each' picks. Too often, consolidating to one location results in miss-picks and inventory accuracy issues. Lastly, avoid the potential for nursing and/or non-supply chain staff to have access to the storeroom and/or warehouse inventories."

**Tom Redding, senior managing director, Healthcare, St. Onge Co.**

"Do not move to deploying tech tools without first creating robust non-tech processes and systems. Develop an understanding of what needs to be improved and deploy non-tech tools (Lean) and the best storage solutions. Then you will be better equipped to evaluate and select the tech tools that will best serve your needs."

**Terry Elliott, partner, Diamond Storage Solutions**

"There are times when Joint Commission, CMS or similar arrive for an inspection and find not only surgical trays and soft goods

stacked closer than 18 inches from the ceiling, but they also many outdated/expired items. By using an automated vertical carousel with inventory management software such as the Rotomat, the surgical trays, soft goods, instruments, implants and any other sterile items can be stored in a six-sided, enclosed box maximizing the usable floor-to-ceiling height while managing and tracking all inventory transactions and expiration dates. Since the Rotomat carousel is enclosed on all sides, it also cuts down on the dust and other contaminants that can compromise sterile inventory.

"Visibility to all stored inventory is desirable to effectively manage materials. In the industrial manufacturing and warehouse sectors, companies routinely rely on integrated software systems to avoid multiple, disparate and redundant tracking. Hospital management systems should be able to allow the flow of information from department to department. This would greatly increase many efficiencies in the acquisition of new inventory, tracking inbound items, maintain proper stocking levels while in storage and report movement of inventory away from the storeroom or warehouse. Many material handling specialists have experience both in industry and in healthcare to design fully integrated inventory management systems to accomplish the goal of eliminating 'islands of inventory' not visible to management.

**David Phillips, marketing manager, Hänel Storage Systems**

"Warehouses should have a standard process to measure and monitor capacity, inventory performance metrics, and focus on days inventory on-hand targets. Do not allow your distribution facility to become

the repository for any type of dead stock storage. This includes old furniture, spare parts, obsolete products, supplies, equipment, returns etc.

"Warehouse staff should improve utilization of the available existing technology. Too often we see warehouse operations using 50-60 percent of a technology's capability. You need to understand what you have and know how to tie it to your processes and management of the labor investment to realize full efficiencies.

"Consider collaborating with your distributor, 3PL provider, or supply chain advisory partner to review best in class solutions and process improvement opportunities that provide meaningful value in the material handling category."

**Shawn Ducey, associate principal, Advisory Solutions, Vizient**

"A few of the actions that should be at the center of materials handling best practices include fostering an environment of continuous learning within your organization, striving for clear and consistent communication between internal and external stakeholders, encouraging collaboration and knowledge sharing across teams, and implementing a kanban inventory management system. A common misstep for healthcare materials management teams that should be avoided is mistaking a PAR replenishment system for a true inventory management approach. A PAR replenishment system does not deliver the real-time data insights that hospitals and health systems need to avoid stockouts and keep patients and staff safe."

**Doug Lowe, senior implementation consultant and supply chain subject matter expert, Jump Technologies**

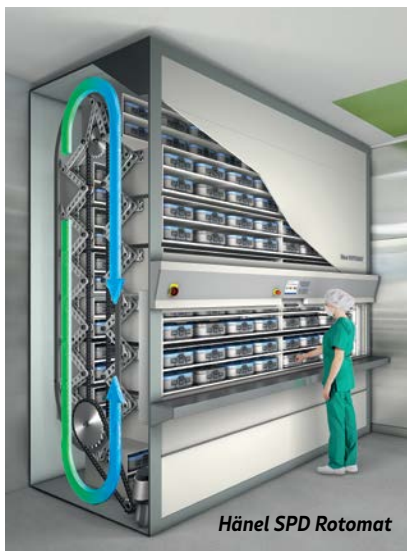


that uses [radiofrequency identification] technology to minimize physical inventory counts. Deploy an enterprise resource planning system (ERP)," he added.

Vizient's Ducey acknowledges that balancing people, process and technology as options vary by organization capabilities and needs.

"Without investing in new technology, healthcare organizations address warehouse inefficiencies by utilizing a third-party logistics (3PL) provider or distributor partner for outsourcing equipment, inventory management, labor and warehouse management," Ducey noted. "All warehouses should ensure Lean practices are in place for existing operations to remove waste throughout each of their processes."

On the other hand, "investing in new technology can help healthcare organizations address warehouse inefficiencies, but organizations must also invest in time and training so that staff understand how these tools can optimize operations," he continued. "Technologies include warehouse management systems, robotics, autonomous mobile robots, voice pick and conveyance to supplement labor and reduce cycle times."



Hänel SPD Rotomat

Hänel's Phillips encourages tech solutions but recognizes that budgets and footprint limitations can redirect priorities.

"While the best ROI is found with high-tech solutions, such as an automated vertical carousel, inventory management software, bar-code scanning and handheld devices, many hospitals still find themselves with financial or room design

constraints that do not yet permit these solutions," Phillips acknowledged. "In those instances, lower-tech solutions can provide a way to control inventory without costing a lot of money. One example is Kanban, in which just-in-time inventory levels are managed via a system of index cards and bins. This system still requires considerable amount of floor space but can provide a significant inventory management tool if none currently exist."

Phillips promotes the Hänel Rotomat Vertical Carousel as addressing such issues as the floor space, ergonomics and inventory management/tracking issues. "By utilizing the complete floor-to-ceiling height, or even extending through a ceiling, a Rotomat can provide the storage space needed within a very small footprint," he indicated. "This allows for better workflow, tighter control on inventory and ultimately increased productivity. Its automation and ergonomic workstation can replace traditional static systems to bring sterile supplies to the worker and the worker doesn't need to travel distances, walk up and down stairs or interact with dangerously stacked items on wire carts or metal shelves that span from the floor to near the ceiling." **HPN**

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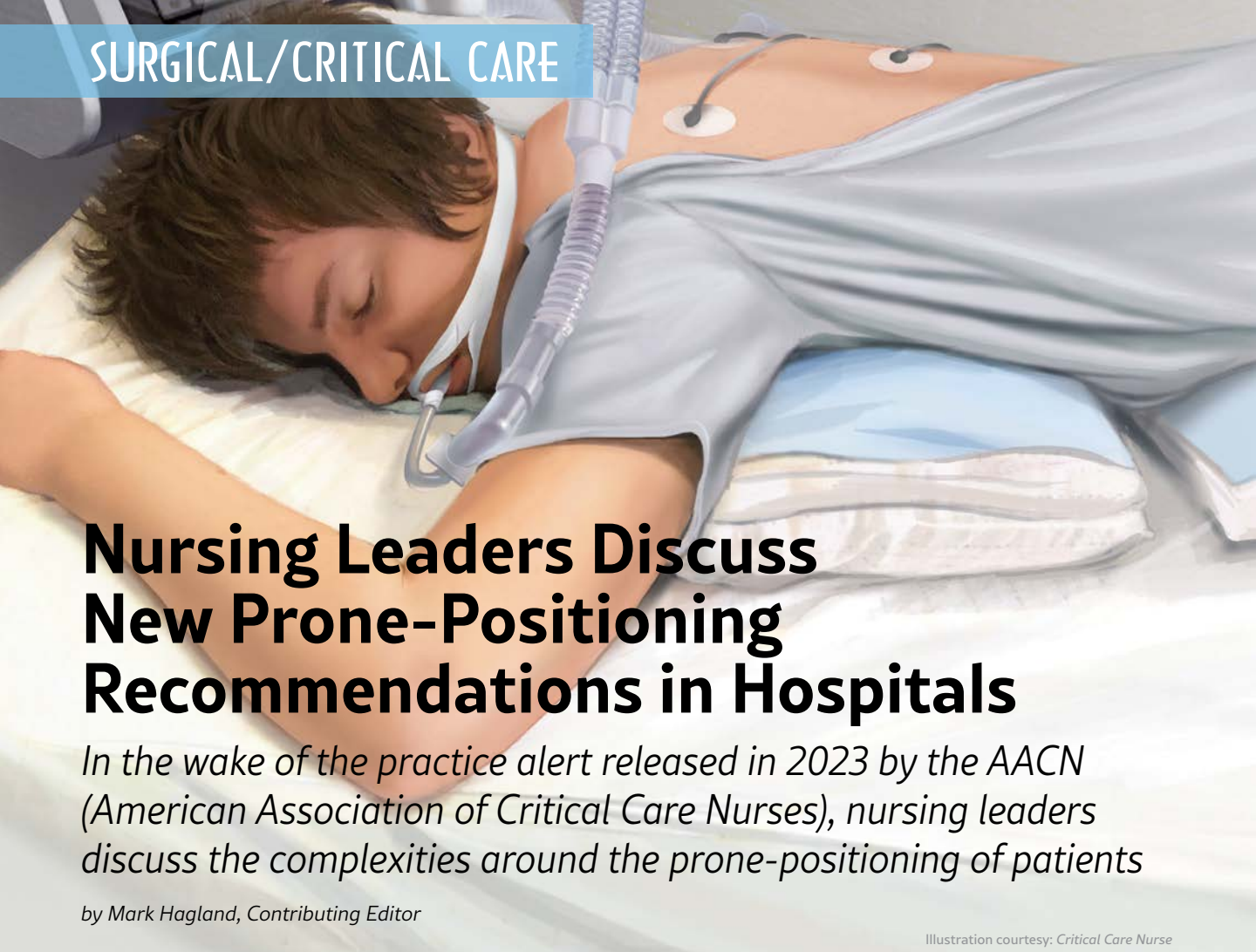
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# Nursing Leaders Discuss New Prone-Positioning Recommendations in Hospitals

*In the wake of the practice alert released in 2023 by the AACN (American Association of Critical Care Nurses), nursing leaders discuss the complexities around the prone-positioning of patients*

by Mark Hagland, Contributing Editor

Illustration courtesy: Critical Care Nurse

**A**s a resource article entitled “Preventing Pressure Ulcers in Hospitals” and posted to the website of the Agency for Healthcare Research and Quality (AHRQ) notes, “Each year, more than 2.5 million people in the United States develop pressure ulcers. These skin lesions bring pain, associated risk for serious infection, and increased health care utilization. Moreover, the Centers for Medicare & Medicaid (CMS) no longer provides additional reimbursement to hospitals to care for a patient who has acquired a pressure ulcer while under the hospital’s care. Thus, pressure ulcer prevention presents an important challenge in acute care hospitals. A number of best practices have been shown to be effective in reducing the occurrence of pressure ulcers, but these practices are not used systematically in all hospitals.”

What’s more, that article—first posted in 2012 and reviewed in 2023—notes that “Pressure ulcer prevention requires an interdisciplinary approach to care. Some parts of pressure ulcer prevention care are

highly routinized, but care must also be tailored to the specific risk profile of each patient. No individual clinician working alone, regardless of how talented, can prevent all pressure ulcers from developing. Rather, pressure ulcer prevention requires activities among many individuals, including the multiple disciplines and multiple teams involved in developing and implementing the care plan. To accomplish this coordination, high-quality prevention requires an organizational culture and operational practices that promote teamwork and communication, as well as individual expertise. Therefore, improvement in pressure ulcer prevention calls for a system focus to make needed changes.”

Per that, the Aliso Viejo, Calif.-based American Association of Critical Care Nurses (AACN) on May 16, 2023, issued a new practice alert focused on prone positioning. The practice alert was posted to the association’s website. It begins, “During the COVID-19 pandemic, prone positioning became a customary treatment for

patients with severe SARS-CoV-2 infections. Consequently, prone positioning was rapidly adopted by caregivers. Safely and effectively positioning the patient prone reduces risks of morbidity and mortality for the patient while reducing the risk of injury for the nurse and other caregivers. This Practice Alert addresses reducing the risk of harm to intubated adult ARDS patients undergoing manual prone positioning for at least 12 to 16 hours per day. Continuous prone positioning has been found to increase the risk of complications.”

“Many nurses proned their first patient during the pandemic, and as patients remain prone for longer stretches, the risk of complications grows. AACN developed this practice alert to provide a single place for clinicians to find best practices supported by published evidence,” said Devin Bowers, MSN, RN, NE-BC, AACN’s director of practice excellence. “Standardizing the practices related to prone positioning helps minimize associated patient risks while maximizing care



team safety.” And the practice alert noted the following things:

“The practice alert focuses on evidence-based strategies to prevent the most common proning-related complications for patients with ARDS who are undergoing prone positioning for more than 12 hours per day:

- Pressure injuries
- Airway obstruction and unplanned extubation
- Ocular and nerve injury
- Enteral nutrition issues”

The alert also discusses the importance of caregiver safety in minimizing risks of injury that can occur while turning a patient.”

The practice alert’s authors were Lauren Morata, DNP, APRN-CNS, CCNS, CPHQ, director of quality and performance improvement in the Clinical Quality area at Lakeland Regional Health in Lakeland, Florida; Kathleen Vollman, M.S.N., R.N., CCNS, a clinical nurse specialist and consultant based in Northville, Mich.; Jennifer Rechter, M.S.N., R.N.-BC, AGCNS-BC, a clinical nurse specialist and sepsis coordinator at Parkview Health in Fort Wayne, Ind; and Jill Cox, Ph.D. R.N., APN-C, CWOCN, of Rutgers University and Englewood Health, both in New Jersey. The four clinicians also presented an overview of the practice alert as part of the AACN Critical Care Webinar Series.

To what extent will it be necessary in any hospital organization for multidisciplinary governance and protocol development to be put into place in order to create consistent implementation of clinical protocols in this area? “Specific to prone, it is absolutely necessary,” says Lakeland Regional Health’s Morata. “Evidence has found a reduction in pressure injuries with implementation of these protocols; however, they need to be tailored to your patient population and the quality data specific to your institution. In addition, the latest evidence and guidelines should be incorporated into the protocols. Clinical protocols promote standard work and aid in accountability.”

To what extent is it possible to identify in advance the patients most at risk for pressure injuries resulting from prone positioning? Meaning, can advanced data analytics help support proactive intervention in this area? “It is clinically recognized that patients who require prone positioning have an increased severity of illness

predisposing them to an increased risk for developing a pressure injury,” says Jill Cox, Ph.D., R.N., APN-c, CWOCN, FAAN clinical professor at Rutgers University School of Nursing (Newark, N.J.), and a wound/ostomy/continence advanced practice nurse at Englewood Health in Englewood, N.J. “Data analytics could be used to identify patients at risk based on level of acuity, comorbidities, baseline mobility, oxygen needs, BMI, and skin risk assessments. However, advanced data analytics (e.g. AI, machine learning) are currently in their infancy in pressure injury risk prediction,” Cox adds.

How about online tools? Can videos, for example, address the educational needs of bedside caregivers? “Not necessarily videos,” Cox says, “but there are online resources through National Pressure Injury Advisory Panel (NPIAP) and American Association of Critical Care Nurses that are available to bedside caregivers.”

## Considering protocols before and after the COVID-19 pandemic

It is interesting to note that single-use, prophylactic multilayer polyurethane foam dressings were an established part of the nursing care plan that was already in place for patients at risk of impaired tissue integrity, prior to the COVID-19 pandemic. With regard to that, Kelly McFee, DNP, FNP-C, CWS, CWCN-AP, NE-BC, FACCWS, MAPWCA, a wound care nurse practitioner and the director of wound care at Mosaic Life Care Wound Care and Hyperbaric Medicine in St. Joseph, Mo., says that “The pressure injury prevention protocol that we had put in place prior to the pandemic did include the prophylactic dressings for use over bony prominences. However,” she notes, “what we generally encounter with the typical hospitalized patient was use of prophylactic dressings on posterior pressure points, such as the sacral area and heels. At the onset of the pandemic, as we started to understand the treatment protocols for COVID-19, we realized that we would be encountering risk for pressure injury in a manner that we hadn’t routinely noticed before, so we expanded our pressure injury prevention

interventions for COVID patients in our critical care areas undergoing prone to include anterior pressure points, such as the collar bones, anterior hips, etc.”

In that regard, McFee notes that “Pressure injury prevention also included the face at this point – forehead, bridge of the nose, and cheeks and included consideration for dressing use under respiratory equipment. This really highlighted our awareness of pressure injury prevention with medical devices on a broader scale.”

To what extent will it be possible to identify in advance the patients most at risk for pressure injuries resulting from prone positioning? And can advanced data analytics help support proactive intervention in this area? “I’m certain that advanced data analytics could support proactive interventions, but I am not aware of what those would have been during the pandemic,” McFee says. “We focused on the tools that we had and continue to use, which are the Braden Skin Risk Tool to assess risk for skin breakdown, good nursing assessment, critical thinking, and applying pressure injury interventions based on those tools and assessments. The patients that we focused on were in the intensive care setting, so our most acute patients, and certainly our highest risk. These patients not only had complications resulting from COVID-19, but were sick enough to require the intensive care unit, were likely intubated, being prone, and required a high level of care.”

In that regard, McFee stresses, “It is imperative that pressure injury prevention be a multidisciplinary approach. There are too many moving parts and stakeholders involved for this to simply be a nursing or wound care endeavor.”

## Education, nursing-materials management communication: crucial areas of activity

A number of questions around both educational issues and issues involving nursing-materials management communication, arise in this area. For example, leaders will have to determine what forms of education might be developed to support bedside caregivers, and whether in-person classroom-type training might be necessary, or whether online training can be effective. “I would anticipate that multiple forms of education will be ideal for pressure injury and medical device-related pressure injury prevention,” McFee says. “We have used both in-person and online training and continue to provide both. I think it is important to offer a



Jill Cox



Lauren Morata



Kelly McFee

# SURGICAL/CRITICAL CARE

variety to meet the various ways that caregivers learn."

As for nursing leaders communicating with materials management leaders, McFee says that "When we started on our pressure injury prevention journey and began evaluating prophylactic dressings, we worked with and communicated with our supply chain partners and our Value Analysis Team (VAT) throughout that process. Our VAT process includes communication about anticipated usage of new materials for planning purposes.

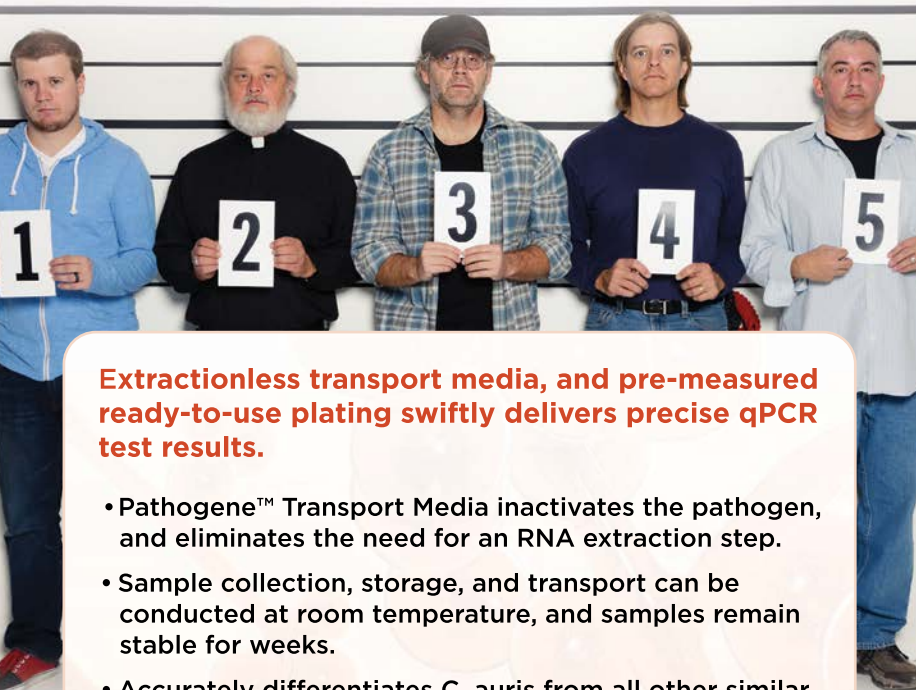
Most manufacturers can supply leaders with a VAT pack, which includes cost projections and cost savings projections for product use."

Indeed, there are numerous implications here for nursing-materials management communication, Morata emphasizes. "As clinicians," she says, "we rely heavily on our purchasing/materials management teams to support implementation of new clinical protocols. We need to work together to ensure the appropriate supplies are obtained, par-

levels are maintained, and the product is consistently available. The purchasing/materials management team can involve the clinical team to assist with identifying appropriate alternatives should material surges occur, staying ahead of the increased demand and a potential crisis. When usage increases unexpectedly, the purchasing/materials team should provide this feedback to clinical leaders. Through collaboration the two groups can identify the root cause for the increase, then determine the need for additional in-servicing or the potential need for an alternative product."

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### Into the future—with NPIAP updates

How might the landscape around this change in the future? And how will the National Pressure Injury Advisory Panel (NPIAP) communicate with clinician leaders U.S. healthcare system-wide about additional learnings that should be shared with clinician leaders system-wide?

"The National Pressure Injury Advisory Panel is good to share up-to-date information related to pressure injury prevention, medical device-related pressure injury prevention, and even information related to prevention during the COVID-19 pandemic," McFee emphasizes. "They share this information on their website and via their national conferences. As a wound care clinician and Director of Wound Care, I made it my responsibility to stay abreast of NPIAP updates and incorporate best practices into our standards of care. I think it is important that inpatient skin and wound programs continue to lead that charge for communicating updates to organizational leaders and implementing best practices moving forward."

Cox agrees, adding that "NPIAP has a website that updates if practice changes occur around pressure injury prevention or treatment. Other professional organizations, such as the Wound, Ostomy, Continence Nurses Society have regional and national conferences to communicate practice standards regarding pressure injury prevention and treatment. In addition," she notes, "clinical practice guidelines are updated every 5 years with the NPIAP and are disseminated globally and highlight the latest evidence-based practice surrounding pressure injury prevention and treatment. The next guideline will be published in 2025." **HPN**

*Mark Hagland is Editor-in-Chief of HPN's sister publication, Healthcare Innovation.*



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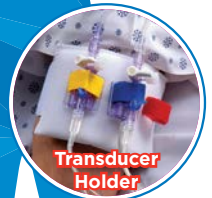
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# Catheters and Infusion Pumps: Trends, Advancements, and Education

*Two educators share up to date information with Healthcare Purchasing News on the state of catheters and infusion pumps*

by Janette Wider

Writing about catheters and infusion pumps is not new for *Healthcare Purchasing News*. In December of 2022, we covered catheters in our print magazine, we wrote, “As a device that enters the body, a catheter has the potential to cause infection, while some designs and purposes present greater risk than others.”

A blog post from Infectious Diseases Society of America, stated, “In a recent article in *Clinical Microbiology and Infection*, Buetti et al. evaluated the infection risk from different types of intravenous catheters in place for more than 10 days and the risk factors associated with infection.

“The investigators analyzed data from four randomized controlled trials that had been conducted to assess interventions for preventing catheter infections. They evaluated 15,036 intravascular catheters from 24 intensive care units in France.

“Infections occurred in 46 (0.7%) of 6,298 arterial catheters, 62 (1.0%) of 6,036 central venous catheters and 47 (1.7%) of 2,702 short-term dialysis catheters. By using a Cox model, the investigators found that interaction between dwell time beyond 10 days and catheter type was significant for CVCs ( $P = .008$ ) and DCs ( $P < .001$ ), thus indicating an increased risk of infection after 10 days. The interaction was not significant for ACs ( $P = .98$ ).”

Now, as we enter 2024, *HPN* spoke with two educational experts on catheters and infusion pumps to get the scoop on the latest as it pertains to current trends and educating staff on this important, and sometimes overlooked, topic.

## Past and current trends

Diane K. Newman, DNP, CRNP, FAAN, BCB-PMD gave *HPN* a brief overview on past and current trends for urinary catheters. She said, “Since the beginning of time, people develop problems where

they cannot urinate, so they can’t empty their bladder. In the past, people would use steel rods, weeds, and all different things to put into the bladder, so that if there was something obstructing the area to drain urine out. This was only actually in the beginning. During WWI the balloon retention catheter was invented by Frederick Foley, who was a urologist, and basically that allowed individuals who could not urinate from a war injury to have a device in place that could drain the urine out and it had a balloon so that it stayed in the bladder. And that was actually called, and what we call a Foley catheter.”

She added, “In that area, there haven’t been a lot of changes since. Yet, if it stays in more than a month, it can cause problems, especially infections, and that’s



**Diane K. Newman**



become a really driving issue with government agencies, especially Medicare, because the cost of what we call a catheter associated earning your track infection or just significant and it also increases mortality and individuals. So, the goal has been to not use these types of catheters long term."

Nancy Moureau, RN, PhD, CRNI, CPUI, VA-BC is CEO of PICC Excellence Inc., said, "We definitely saw a change in the way we were having to monitor patients during COVID because of the need to have full protection and limitation on those supplies over time. Infusion pumps were brought outside the room so they could be managed and programmed so that medications could be changed, longer tubing was attached—there were many of work arounds established that weren't all necessarily good and that has all gone away now since the epidemic has passed."



**Nancy Moureau**

"I hope that we've learned a number of things through that process and how well infusion pumps work is as important of an aspect as well as the alarms that are associated with pumps. But we also have to recognize the impact that a catheter has on the function of the infusion pump. If it's a peripheral catheter that becomes obstructed, then the pump is going to alarm. Why is it alarming? Then you have to figure that out and back it up to the catheter. Even the different devices used on the catheters will impact the function of the pump, such as the needleless connectors.

"Based on the research that I've done, installing antireflux needleless connectors are key to reducing the level of occlusion and increasing function of all types of catheters, peripheral and central. So just little changes, little improvements like making sure that you are using antireflux connectors instead of the positive pressure, negative pressure and so called neutral which there truly are no neutral needleless connectors."

Moureau added, "There have been some significant improvements over the last few years with some materials that have been released that seem to be performing at a higher level than other types of catheters. Over the last 30 years or so we've had antimicrobial catheters, we've had multiple catheters that came out that supposedly had antithrombotic characteristics with research showing differing levels of effectiveness of the antithrombotic components. Now we have a catheter material that is considered hydrophilic and

hydrogel, which the hydrophilic or water loving quality of this catheter reduces the adherence of cells. And so, by nature of that hydrated surface, you're going to have an antithrombotic and potentially an antimicrobial catheter that reduces biofilm formation."

## Education is key

Newman commented, "I teach at the School of Nursing at the University of Pennsylvania, which is one of the top nursing schools in the country. I do what we call the GU urinary or bowel and bladder lectures at the undergraduate and graduate level and I don't I get an hour or two hours. I can't even get into catheters because of all the other topics.

"I always ask the students how many of you have put a catheter in a patient in their training and maybe one or two hands go up and they and other people say they practice on models, or they use simulation stuff so there isn't a lot of education."

She added, "The thing is, there is a lack of education and there's no question. You have very novice registered nurses coming out of hospitals. And I have to tell you, they're using [catheters] inappropriately. There's a lot of information on this as far as recommendations, for example the CDC has recommendations on when it's appropriate or not appropriate to use a catheter. They are put in sometimes at the nurses' convenience—for example say someone who was incontinence and they leak all the time, as opposed to changing their pads, it is just easier to leave a catheter in. Sometimes nurses do it to decrease nursing burden, as it is a nightmare right now in hospitals and healthcare as far as nursing burnout. So, it's a real issue and it's easy to manage a patient if you have a catheter in, even though we all know it's more harmful to the patient."

When asked about her organization, Moureau said, "PICC Excellence was formed in 1994 as an education service provider and a resource for clinicians who wanted to learn more about peripherally inserted central catheters. And later we expanded into midlines and all different types of intravenous devices."

"We felt like in the beginning there just wasn't enough information and resources available," she added. "We simply wanted to be a source of information. We focus on evidence-based practice and very practical education and training. PICC Excellence not only has online educational courses and pathways that are specific to different devices and care and maintenance and foundations and vascular access, essentials

of infection prevention and various age groups of adult, pediatric and neonatal, but we also have workshops where we provide simulation, training and opportunities for precepted insertions in various locations across the United States."

Moureau continued, "We also spread information and education and training, and not only in the United States, but in various parts of the world with different organizations. I am a speaker, especially in relation to the research that I performed and many of the courses that I've developed. I've worked closely with the World Congress of Vascular access as a committee chair and consensus leader for minimum training requirements for central venous catheters and a new project where I'm a committee member updating that information. And so PICC excellence is just involved in a variety of ways to spread knowledge, to provide a good quality education."

Additionally, she added that PICC Excellence also has certification programs because Moureau personally felt it was necessary for clinicians to prove that they had completed the qualification process. The certifications she said are certified PICC, ultrasound inserted (which is primarily for adult and pediatric clinicians) CPUI, and a certified neonatal PICC inserter certification for PICC lines, CNPI, that were released a year ago, along with two new IV Therapy and Ultrasound Mastery Learning Certificate programs.

Moureau also said, "We've also recognized some issues with variation and fragmentation with ultrasound guided peripheral catheter insertion training. We have done research on that to validate and then have worked closely with a number of groups in Washington state, as well as Chicago to create an ultrasound guided peripheral catheter mastery learning certificate process. We've also created another one for IV therapy that meets state requirements for licensed, practical and licensed vocational nurses and a graduate nurses and others who want to learn just general IV therapy."

PICC Excellence also offers custom on-site training where hospitals contract with the organization to provide specific types of education that meet their goals and needs. In conclusion, the aim of PICC Excellence is to promote the application of best practices for all types of vascular access and infusion therapy to benefit patients with the best outcomes for their treatment process. We know, according to research, that education of clinicians results in improved outcomes for patients. **HPN**



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## Meaningful Partnerships Drive Reprocessing Workflow Improvements

by Kara Nadeau

According to Merriam Webster, perioperative is defined as “the period around the time of a surgical operation.” When the topic of perioperative processes arises, most think of the core operating room (OR) team prepping for a case, performing it, and managing the patient post-operatively.

But as anyone involved in these processes will tell you, there are many other stakeholders who play a role in a successful patient procedure, including sterile processing (SP) and infection prevention (IP), supply chain (SC), environmental services (EVS), etc. The work of all these teams – OR, SP, IP, SC, EVS – impact one another. Nobody functions in a silo.

Instrument reprocessing is one area where coordination of efforts among the SP, OR and IP teams can make or break the process. When these parties successfully collaborate for the benefit of their patients, they can significantly improve reprocessing workflow efficiency, effectiveness, and safety.

SP leaders from two U.S. hospitals shared their stories of reprocessing workflow improvements driven by multidisciplinary collaboration: Toni Amorine, Central Sterile Manager for Geisinger Community Medical Center (CMC) in Scranton, Pa., and Michelle Milner, Director of Sterile Processing and Equipment Processing for St. Tammany Health System in Covington, La.

### Building upon a foundation of success

Geisinger CMC is a 275-bed hospital with 14 operating rooms. Its Central Sterile department reprocesses an estimated 54,000 instrument sets and 25,000 peel packs and supports nearly 9,000 surgical procedures annually.

CMC’s reprocessing workflow improvements have been driven by meaningful collaboration between the Central Sterile and OR teams.

It began when the teams launched an instrument utilization project where they assessed instruments used in a major laparoscopy tray to reduce the number of times they were reprocessed. This increased instrument longevity, reduced unnecessary repair costs, and made the tray more frequently available for cases.

It also established a meaningful connection that paved the way for the OR team to help the Central Sterile team when they needed it the most. “This project built a stronger bond between OR leadership and CSR leadership which exemplified the relationship we all wished to see from everyone in both departments,” said CMC Central Sterile Manager Toni Amorine.

### Stepping up to help with staffing

When the CMC Central Sterile department lost 14 trained technicians and two members of their leadership team, the remaining team members struggled to keep up with

the volume of instruments needing to be reprocessed. According to Amorine, there were case carts filling decontamination and spilling out into the hall, plus hundreds of trays unassembled in the prep and pack area.

The CMC OR clinical leader noticed the challenges and began sending scrub techs and nurses to the Central Sterile department to help assemble the trays when they were not assigned to rooms.

“These scrubs and nurses came down day after day to help assemble all the trays that sat building up as we did not have enough staff to stay on top of the workload,” Amorine explained. “This was in part due to the interactions and comradery built by jointly working on the instrument utilization project.”

### Addressing implant inventory

In 2022, the CMC Central Sterile and OR teams furthered their collaboration and mutually beneficial work by implementing a cloud-based clinical inventory management system to manage one of their vendor’s implant stock. Each day, the Central Sterile team lead technician or department manager scans packaging from this specific vendor’s implants used by the OR the previous day and then order replacements from the PAR set in the inventory management system.

“This system is far easier than other systems we have used in the past as you scan inventory when it arrives and scan it out





**Geisinger CMC First row (left to right) Jacob Kosik, Magaly Mayweather, Debby Smith, Melody Lyon Second row (left to right) Tabitha Lucas, Lena Kilonsky, Nasir Johnson**



**Geisinger CMC First row (left to right) Theresa Valanda, Desiree Danei Second row (left to right) Kaitlin Kosik, Keilah Slaght, Heriberto Izaguirre, Pompeyo Torres, Anaidel Ramos Mitjans**

when it is used,” said Amorine. “There is an automated order for anything that falls below PAR. The user can click off what they want to reorder from the auto-generated list. At the end of 2022, we had our first inventory since implementing this system and we posted less than a 1% variance!”

## A new start for SP

St. Tammany Parish Hospital, part of St. Tammany Health System (STHS), is a 220-bed acute care facility with 12 surgical suites in the main OR, four procedure rooms in Cath Lab, three procedure rooms in Endoscopy, two ORs in Labor and Delivery, and a 43-bay Emergency Department (ED). The SP team, comprised of 12 full-time processing staff, two liaisons, and four per diem staff, supports patient care areas with 24/7 coverage.

After working in the St. Tammany Parish Hospital SP department for 13 years, Michelle Milner, AAMI Standards Work Group 40 member and American Mensa member, became an SP travel professional learning best practices from SP teams across the U.S. In 2020, she decided to take her learnings back to STHS, becoming the St. Tammany Parish

Hospital Director of Sterile Processing and Equipment Processing.

## Staffing success

Like most SP departments, St. Tammany Parish Hospital was struggling to find qualified candidates to fill vacancies. This prompted them to collaborate with the AVP of Surgical Services, the AVP of Workforce Strategy, and many others across the system to develop and launch a 16-week, in-house, paid apprenticeship program. Program participants commit to earning their certification within 12 months and work for the department for two years.

Milner commented on her efforts to retain qualified SP technicians, stating:

“I allow my staff to do self-scheduling. I present the shifts I need covered and staff members sign up for the shifts that work for them. For this approach to work I’ve had to get creative. We historically had 7 a.m. – 3 p.m. and 3 p.m. – 11 p.m. shifts. Several people were interested in working three 12-hour shifts but that would mean we’d lose 4 hours of worked hours per person in what would be a 40-hour work week. By restructuring to offer some 13-hour shifts, I give them what they need to work only three days a week, but it

keeps them whole as a 1.0 FTE, which is what we need as a department.”

## Alleviating BI latency

Having addressed staffing issues, they turned their sights on improving reprocessing throughput and efficiency. One of the SP department’s first steps was to switch from biological indicators with an incubation time of 60 minutes to 20-minute biologicals. This allows instrument trays, including implants, to be released from the SP department 66% sooner, which has had a positive impact on procedure start times and OR turnaround times.

## Instrument-to-set matching

Another issue impacting reprocessing workflow efficiency was OR scrub techs placing sets in incorrect trays post procedure, which led to confusion in the SP department and subsequently instruments missing from sets.

To address this challenge, the SP team used matching-colored tags to identify trays and instruments used in the same procedure. For example, all instruments for Dr. X’s procedure in OR room #2 at 10 a.m. were identified with a pink tag. This helped them find instruments “missing”



**St. Tammany Parish Hospital SP team Back row (left to right) Pearl Bell, Deloras Brock, Kamren McCluskey, Michelle Milner, Mark Douglas, Terri Johnson, Angel Simmons Front row (left to right), Jeanette Stoddard, Shanon Richardson, Yvette Payne, Haylee Jarrell, Indy Claude**

# STERILE PROCESSING



from sets that were placed in the incorrect trays, increasing the number of complete trays being released by 53%. This in turn decreased the need for OR and SP staff to search for peel packs to complete trays when picking case carts.

## Tray accuracy improvements

Next, they formed a multi-disciplinary team, mainly comprised of SP, OR and IP staff members, to launch a Process Improvement (PI) initiative focused on tray accuracy with surgical instrument

tracking software supporting their efforts. Baseline data showed that only 91.89% of the trays sent to the OR were deemed accurate, so the PI team set an aggressive accuracy goal with an upper limit of 95% with a lower limit of 93%.

They acknowledged how the OR and SP teams' work impacts each other, the need for all parties to follow standard procedure, and how compliance failures add work and decrease efficiency across the board. For example, when OR technicians send instruments to decontamination in



## Planning reprocessing improvements in 2024? Consider these 3 factors

by Kara Nadeau

Staffing shortages, changing compliance and guidelines, greater device complexity, higher surgical volumes – these are some of the key challenges facing sterile processing (SP) professionals according to the Pure Processing 2023 SPD State of the Industry Report – and there are no signs they are letting up in the new year.<sup>1</sup>

The company's Clinical Education Specialist, Hannah Schroeder CRCST, CIS, CHL, CER, offered SP leaders these three factors to consider when planning reprocessing improvements to address these issues in 2024 and beyond.

- **Change management:** "Every facility needs to have a solid change management plan in place; their go-to structure or program they use to implement changes. It could be as simple as identifying the issue, evaluating current practice, and running audits on gaps in that practice to set goals to close those gaps. Education and training are also incredibly important to helping staff members feel confident in the change."
- **SP team buy-in:** "Leverage your teams' experience and listen to their challenges to assist with shaping your plan. Keep this

collaboration going as the change takes place. Leaders should work side-by-side with their teams to overcome hurdles and celebrate successes. Employees appreciate knowing their leaders are down in the trenches with them, supporting and advocating for positive changes."

- **Time to adjust:** "One of the biggest returns on investment (ROI) I've had when implementing change is a grace period. After implementing a change, allow your team a set period to make mistakes, ask questions and adjust to the new practice or process without the pressure to perform efficiently right out of the gate. We provide training and progress steps for our new hires, and the same should be provided during process changes. Depending on the scope of the change and the number of staff members involved, this period could last from a week to a month. In doing so, you acknowledge the learning curve and your desire as a leader to help them succeed."

Reference:

1. Pure Processing 2023 SPD State of the Industry Report, November 13, 2023, <https://pure-processing.com/blog/the-future-challenges-in-spd-identified-trends-from-the-2023-spd-state-of-the-industry-report/>

the wrong trays, it increases work for SP technicians and can lead to longer reprocessing turnaround times.

The ability to track a tray back to the OR room in which it was used enables the OR and SP teams to identify when OR technicians have put instruments into the wrong trays and provide re-education to improve compliance with procedure moving forward.

In turn, they also identify which SP technicians are assembling incomplete or inaccurate trays or trays with broken instrumentation, which leads to OR and SP teams scrambling to address these issues when these trays arrive in the OR for a procedure.

"The OR audits the completeness and accuracy of our trays and submits the audit results with their case carts post-procedure," Milner explained. "I can discuss tray errors with the SP technician. Getting the info in real time on issues with their trays allows me to provide re-education or counseling to prevent them from happening again. As with the OR technicians, it's often a case where the individual requires re-education, especially with new staff members joining the department."

"Within three months, we attained our goal within the target range, so we then increased our target accuracy rate to 98% as the upper limit and 95% as the lower limit," Milner continued. "To date, we have maintained the 98% accuracy rate with both experienced staff and the newly promoted specialists from the apprentice programs." **HPN**

Read "Reprocessing pressures rise in 2024 with move toward more reusable items" online at <https://hpnonline.com/53079698>





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## LEARNING OBJECTIVES

1. List hazards found in decontamination when using automated cleaning equipment
2. List hazards found on the clean side when using automated cleaning equipment

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Self-Study Test Answers:  
1. C, 2. A, 3. B, 4. A, 5. C,  
6. D, 7. D, 8. C, 9. A, 10. A

# Mechanical Cleaning Safety: A Tale of Two Sides

by Cody McElroy, Heide Ames

Most medical devices that go through sterile processing departments spend time in mechanical cleaning. Dirty medical devices enter, and clean ones leave. Many assume all the safety hazards are found on the dirty side of operation, but mechanical cleaning safety is truly a tale of two sides.

## Decontamination and Equipment Safety

Decontamination removes soils from medical devices and disinfects them in preparation for patient use or further processing as necessary in the device's instructions for use. The process is split between two principal areas of medical device processing, the "dirty side" and the "clean side." The dirty side, also called decontamination side, receives soiled instrumentation. Technicians clean, rinse, and disinfect the medical devices in preparation for patient use or further processing as needed. Technicians use ultrasonic cleaners, washer disinfectors, cart washers, and other mechanical cleaning equipment to perform this task. Technician must be aware of the hazards and safety features of their equipment.

### Ultrasonic Cleaners

Ultrasonic cleaners convert sound waves into a mechanical cleaning action. As sound waves pass through the ultrasonic cleaner's tank, small bubbles form in the cleaning solution. The bubbles implode near devices pulling soils from surfaces. This action is called cavitation.

Cavitation can cause aerosolization of the cleaning solution. Breathing the aerosolized solution brings chemicals and potential pathogens into the lungs. Lids trap aerosolized material within the cleaner. However, lids can be removed mid cycle allowing access to contents. Placing or removing instrumentation mid cycle exposes hands to ultrasonic sound waves which can irritate skin and potentially damage fluid filled joints.

Larger cleaners give rise to tray hazards. Trays cause back strains when technician bend and twist during placement and removal. Dripping trays can create slip

hazards and expose technician to contaminated cleaning solutions.

Modern ultrasonic cleaners have many features designed for safety. Lid locks stop removal of the lid mid cycle preventing technician exposures to aerosols and the temptation of adding or removing instrumentation. Some cleaners include mechanical tray lifters to reduce the amount of bending and twisting.

Automated systems that include rinsing removes dripping cleaning chemistry hazards. Some of the advanced safety features include drying of instrumentation ending the threat of slip hazards.

One safety threat cannot be solved with cleaner design, cleaning personal items. This is hazardous for both the personal items and the technician. Ultrasonic cleaners use sound waves sized for the items they clean. Too low, and the item is not cleaned. Too high, and the item could be damaged. Such is the case with personal items. Personal items include organic materials, gemstones, plated metal, and a host of incompatible materials damaged by medical device ultrasonic cleaners.

Even when the personal item is compatible, hazards exist. Cleaning chemistries used to clean medical devices are vastly different from those that clean personal items. The ultrasonic cleaner's chemistry could damage the personal item, not completely rinse off, or become trapped within the personal item transferring cleaning chemistry directly to technician's skin. Facility's must have policies with proper training to reduce the occurrence of processing personal property within department cleaners.

### Washer Disinfectors

Washer disinfectors clean racks filled with surgical devices, containers, bowls, and more. Specialized racks address the needs of specialty surgical equipment. Following initial manual cleaning, medical devices are placed in trays or directly on racks. Instrumentation that requires lumen flushing attach to flow ports. Once pushed into the washer disinfectant, devices are cleaned, rinsed, lubricated, if needed, and thermally disinfected.



Safety hazards exist throughout the process. Carrying dripping trays and devices from sinks to racks create slippery floors. Pushing loaded racks weighing upwards of 50 pounds cause muscle strain. Moving parts create pinch hazards.

Washer disinfectors use spray arms to distribute cleaning solutions, lubricants, and water for thermal disinfection reaching temperatures in excess of 80 °C/ 176 °F. Opening doors mid cycle to add or remove items could expose technicians to hazardous chemicals and scalding water.

Several safety innovations help reduce the possibility of harm from washer disinfectors. Transfer carriages carry racks from sinks to the washer disinfectors reducing muscle strain. Drips are caught in carriage bottoms preventing wet floors.

Using carriages adds new hazards. Moving carriages could cause racks to fall during transfer. Wheel locks prevent carriages from moving but often, technician will not use them. Some washer disinfectors overcome this with a docking system that locks carriages in place prior to rack transfer.

Full racks on carriages obstruct the technician's view during movement creating and opportunity for accidents injuring a technician, equipment, and other obstacles. Adding department safety mirrors can increase visibility.

Automated loading reduces the potential for injury by pulling or pushing the rack into the washer disinfectant from the carriage. Conveyor belts with automated rack movement between washer disinfectors eliminate technician back strains.

The last safety feature often overlooked is the emergency stop button. The stop button is used when there is immediate threat of damage to equipment or injury to a technician. The button stops all activity in the washer and allows immediate access to the chamber.

### Cart Washers

Cart washers are floor loading washers designed for cleaning and disinfecting case carts. Some cart washers include cycles and racks for cleaning and disinfecting rigid sterilization containers and surgical instrumentation. Cart washers have all the same risks as washer disinfectors with a few unique risks.

Cart washers install at or above floor level. When above the floor level, carts and racks must be pushed "uphill" and into the washer. The hill creates an opportunity for carts to roll backwards and across the processing area. Floor grips and wheel locks slow and prevent movement.



**Figure 1:**  
Washer disinfectant with red emergency stop button and white carriage docking system.

The tall racks obstruct technician views. Installing safety mirrors in key locations can give technician the visibility they need to prevent accidents.

Cart washers have a tilt function that raises one side of cart to promote drainage. Using a cart cycle for an instrument rack could tip racks over in the washer damaging rack contents and the washer itself. Safety is compounded when technician must enter the washer to tip racks upright exposing them to falling rack contents, slip hazards, and hot surfaces.

Employees also need to enter the washer to remove and clean floor drain screens. This creates a unique hazard of a person being trapped in the cart washer while another starts a cycle leading to severe injuries and potentially death. Cart washers with interlocking doors prevent starting a cycle when a door is open. They can also prevent the opposite side from closing the door and beginning a cycle.

Emergency stop ropes within the chamber allow trapped technician to stop the cycle from inside. It also opens the doors allowing escape. It's important that both the internal rope and the external emergency stop button immediately stop all washer activity. This is different from a cancelled cycle. Canceled cycles often complete specified activities, such as draining, before the doors can be opened. A delay like this during an emergency could cause added harm.

### Cleaning Chemistry Safety

Cleaning chemistries are common for all mechanical washers. Chemical hazards can include skin irritation, respiratory irritation, and corneal damage. Personal protective equipment (PPE) is required whenever chemistries are manually added or removed from mechanical equipment. PPE should include:

- fluid resistant shoe covers, aprons, and hair covers

- eye protection such as goggles, safety glasses with eye shields, and full-face shields
- Chemical resistant gloves that extend past the wrist to cover the sleeve

Cleaning chemistry may be supplied from a central location with bulk bottles feeding several washers. The chemistries bottles weigh 30 or more pounds with drums weighing upwards of 300. Moving and replacing containers gives rise to muscle and back pain. Foot injuries are a possibility if bottles are dropped. Employing concentrated and ultraconcentrated chemistries can help reduce the volume of chemistry needed and the bottle sizes along with them.

### Clean Side and Mechanical Cleaning Safety

Clean side technician should be aware of the safety hazards that washer disinfectors and cart washers bring to them. As mentioned before, thermal rinses create devices and racks too hot to handle with bare hands. Pooled and dripping water in carts, on racks, and devices create a burn hazard. Hot pooled water from misloaded racks or movement of concave items can splash on technician. Moisture resistant thermal protective gloves should be available to manage these items. Residual water can drain to floors creating slip hazards. Carefully consider floor grade and floor drain placement. Racks and carts should be allowed to cool to a safe temperature before transferring to use areas.

Just as on the dirty side, wheel locks, docking mechanisms, and well-placed safety mirrors help prevent injuries while moving racks and carts.

Emergency stop buttons should be available on the clean side for emergency situations. In addition to the stop buttons, the cart washer's internal safety rope should be accessible when entering the cart washer from the clean side.

Storage of cooling transfer carts and racks can quickly lead to clutter. Be aware of peak usage times and consider alternative storage of cleaned items to allow racks to return more quickly to the dirty side. A rack return may be ideal for reducing clutter. Rack returns can double as cooling stations. A bonus is that returns capture dripping water preventing slip hazards.

Though rack returns can help reduce burns, ergonomic injuries, and clutter they do bring new hazards with their use. Racks are pushed along rack returns. As with any moving items, pinch hazards are a possibility as fingers, hands and arms come between the racks or between racks and the

return. Muscle strain and back pain are possibilities as technician move heavy racks.

Racks can become misaligned during movement. This can create opportunities for the rack to tip or become stuck. Dislodging racks or lifting full racks to realign them can give rise to back injuries and an increased risk of items or racks falling onto technician. Never force a rack to move or try to reposition full racks on the rack return.

Automation of the process can help reduce potential injuries. Automation moves racks into and out of washers, and along the rack return. This can help reduce strain injuries and burns. However, just like the manual rack return, forcing movement and repositioning full racks can cause injury.

Rack return safety is increased with the introduction of robotic assistants. Technicians no longer interact with racks. Robots act as smart transfer carriages picking up racks and moving them to the next fixed location.

## Maintenance and Repair Safety

Maintenance and repair must be done in a safe manner. Personnel may be exposed to:

- electrical currents
- hot surfaces and components
- chemicals
- pressurized water

- moving components
- pathogenic microorganisms

General safety requirements for electrical equipment should be followed. Unplug equipment or turn the power off at the breaker. Use lockouts to prevent plugging in or turning the breaker on during work.

Mechanical cleaning equipment has unique safety hazards. Interior surfaces, fluid lines, and water pumps may be hot enough to cause burns. Equipment may need to be cooled prior to work.

Should equipment failure occur prior to completion of the thermal disinfection phase, or the equipment does not have a disinfection phase, all surfaces, recirculating pumps, and recirculating fluid lines should be considered contaminated with biohazardous materials and proper precautions taken. Contaminated components may require disposal as biohazardous material. Work with the waste management team to determine the right disposal process.

Take special care when dislodging stuck items within conveyor systems and mechanical washers. It may be necessary to shut down the washer and remove all racks from the conveyor line to safely dislodge items.

Access to pumps and piping may require entering a restricted space. Ensure ease of exit and follow proper protocols to

prevent injury. Components found above the washer introduce the need for ladders or step stools. Ensure ladders and stools are stable on flat ground prior to climbing up.

It may be necessary to remove portions of a conveyor to reach washer disinfectant components. More than one person may be needed to safely move the piece. Be sure to follow proper lifting techniques to prevent injury.

Required personal protective equipment will depend on the maintenance or repair activity and the PPE needed for the room that the work is performed in. For example, work performed on washer disinfectant in an active decontamination area will require face shields, safety glasses, face mask, fluid resistant coverings such as aprons, shoe covers, and hair covers. Additional PPE such as fluid resistant thermal gloves may also be required if working on a hot chamber or pump.

## Stay Safe

Working safe with mechanical cleaning equipment requires diligence on both sides of processing. Be aware, be alert, be safe. **HPN**

Reference:

1. Occupational Safety and Health Administration (November 3, 2023) Regulations Standard - 29 CFR 1910. U.S. Department of Labor. <https://www.osha.gov/laws-regs/regulations/standardnumber/1910>

## CONTINUING EDUCATION TEST • JANUARY 2024

### Practice Test: Mechanical Cleaning Safety: A Tale of Two Sides

- What is the formation and implosion of bubbles by sound waves called?
  - A. Popping
  - B. Burst sound
  - C. Cavitation
  - D. Convexing
- What is made airborne during aerosolization?
  - A. Microorganisms
  - B. Dust
  - C. Pet Dander
  - D. Lint
- Cleaning personal items in facility ultrasonic cleaners does not pose a safety hazard.
  - A. True
  - B. False
- Which safety feature prevents technician from adding items mid washer cycle?
  - A. Locking doors
  - B. Instructions for use
  - C. Training
  - D. Stop button
- Which hazard is unique to transfer carriages?
  - A. Hot surfaces
  - B. Chemical exposure
  - C. Obstructed view
  - D. Wet floors
- Which safety feature found in cart washers allows technician to stop a cycle from inside the washer?
  - A. Emergency stop button
  - B. Cancel cycle screen
  - C. Photosensitive eye
  - D. Emergency stop ropes
- What is a safety hazard associated with chemistries delivered from a central location?
  - A. Back strain
  - B. Foot injury
  - C. Eye damage
  - D. All of the above
  - E. A and B only
- Which equipment can help reduce ergonomic and burn injuries on the clean side?
  - A. Cool down area
  - B. Safety Mirrors
  - C. Rack Return
  - D. Carriage locks
- What is a unique safety concern when servicing automated cleaning equipment?
  - A. Contaminated components
  - B. Electrical hazards
  - C. Dislodging items
  - D. Lift hazards
- Which type of personal protective equipment protects technician during removal of clean racks and carts from washers?
  - A. Fluid resistant thermal protective gloves
  - B. Fluid resistant gown
  - C. Face shield
  - D. Face mask



All CEU quizzes must be taken online at:  
[educationhub.hpnonline.com](https://educationhub.hpnonline.com).  
 The cost to take the quiz is \$10.





# Key Considerations for SPD Construction or Renovation

by David Taylor



**B**uilding a new Sterile Processing department (SPD) or endoscopy center—or renovating an existing one—can be fraught with complexities and unforeseen pitfalls. Thankfully, healthcare organizations have an in-house team of subject matter experts to help ensure project success, and these experts must include SP professionals who will bring indispensable knowledge and experience and a keen understanding of their space, equipment and instrument inventory needs to ensure they can perform their many functions safely, consistently and optimally.

Unfortunately, and far too often, SP staff are not invited to the table to provide the necessary insights into their department's or facility's construction or renovation plans and projects. When they are brought to the table, it is often in the late stages of the project, when it's too late to make appropriate changes, especially more significant ones. Knowing what to plan for is essential when designing new or renovated SPDs. A key consideration is ensuring the new or renovated space will meet current and future operational needs (accounting for growth over the next 10 years and beyond). It is essential that the right people are present across all phases of construction, from planning through completion to ensure the department's and customers' needs will be effectively met and costly mistakes avoided. SP representation is imperative.

A healthcare facility's new construction and renovation projects are successful when the outcomes meet or exceed end users' requirements and expectations. Understanding who the key stakeholders are and ensuring their voices are represented throughout each phase of construction is imperative. Stakeholders are those who not only care about the project but have a vested interest in its success and will be affected by its completion. Involving stakeholders does not mean asking for opinions about wall colors, cabinets or counter tops, for example, but rather engaging them in strategic discussions about how their work is performed. This involves asking key questions, such

as: What is the step-by-step process of how work is performed? Where should equipment and workstations be placed so it benefits the work? How can efficiency and ergonomics be considered in design plans and equipment choices? What can be automated? Will the facility be performing new procedures or adopting new technologies? Where is the industry going in the next five to 10 years, and are those changes being factored into the design? Which manufacturers are being considered for the equipment choices—and which suppliers are benefiting or hindering progress? End-user stakeholders should be encouraged to share their unique perspectives, give advice, educate designers about current practices, regulations and standards and changes that could impact future workflow.

Project meetings are another effective way to disseminate information and communicate with all stakeholders close to the project. These meetings are generally held at regular intervals during the project's lifecycle to ensure all key parties are involved and can address issues, propose ideas, give perspective, and solve problems. This helps ensure the group is versed in critical matters, can reach a consensus about key decisions, and stays on track in terms of time and budget.

While on assignment at a large academic medical center in the western U.S., I was asked to approve equipment for a newly designed endoscopy reprocessing space conjoined with an SPD. I was told the space was near completion, but they were preparing to purchase equipment and needed our approval. I pushed back, and a series of meetings took place regarding the space and equipment choices being made without our involvement (none of which met even the basic requirements of daily use). I asked why no one from Endoscopy was involved in the design and planning of the scope processing space (the project began two years prior). I learned that the project management team did not even know how many procedures the endoscopy center would need to support. The team

also determined, without any input from Endoscopy, which equipment would be provided [two sinks, one automated equipment reprocessor (AER) and one drying cabinet, with no additional space for more equipment]. I was told little, or no changes could be made at that last stage because they were already painting walls and any changes would delay the project and increase costs. I explained that I would not be responsible for a space that would not meet our needs. In the end, we secured four additional drying cabinets and another AER, although we were unable to add height-adjustability to our sinks. Nonetheless, I wanted my comments about the importance of ergonomics entered into the meeting minutes—and that I opposed the decision to not pursue height-adjustable sinks.

New construction and remodeling are more than architectural drawings. Every aspect must be considered, from proper separation of workspaces (pre-staging, decontamination, assembly, sterilization, sterile storage, and case cart preparation) to storage, ensuring unidirectional workflow, providing proper lighting, workstations, flooring, supplies, equipment, and other employee needs such as break areas, locker rooms and restrooms. Also critical is ensuring the facility can maintain operations during various stages of construction. Plans must be devised to address day-to-day operations and activities, identify which changes and communication strategies are needed when dropping off and picking up items for customers; rearrange workflows as needed to accommodate construction and temporary walls; control dust; and outsource SP functions as necessary.

Successful SPD construction or renovation requires ongoing input across all stages from every stakeholder, which must include SP representation. There are many vital factors to consider, which cannot be done in the absence of SP stakeholders. This multidisciplinary collaboration lies at the heart of successful projects as well as employee, customer and patient satisfaction. [HPN](#)



# Why Certification is Important for MDRPs

## Competency, Part 3

by Stephen M. Kovach

**Q** November's Part I article asked: "We just had a staff meeting and our manager told us that 'Results from a recent survey of the department stated we need to have more competency for the staff and the work they do.' Do you know how many competencies a department should have?"

**A** For the last couple of months, I stated competencies go hand-in-hand with certification, which I refer to as "my C<sup>2</sup>" (certification/competency). I will explain "Why?" later from my point of view. In December's article I mentioned, "Our work is ever changing...", because we are in a profession that is ever changing. Certification helps ensure medical device reprocessing professionals (MDRPs) stay up on their profession and usually requires continuing education units (CEU) to maintain certification.

As a profession, I feel at times we forget we are part of the medical profession. We need to understand the role certification plays, how important it is to be verified, and how it is part of a system for reimbursement for the facility we work at. We also must understand the role of licenses. Like certifications, licenses require some form of continuing education along with a set of competencies to practice. However, licenses are legally required by the government to work in a specific occupation, while certifications in most cases are not.<sup>1,2</sup>

People who work in a medical facility undergo different levels of education and training (e.g., medical or professional school, internship, residency, and fellowship programs). Here is the "kicker"! Health plans are only required to verify the highest level the medical professional has stated they obtained for credentialing. For a doctor, this would usually be the residency training program, while for a nurse practitioner it may be the accredited master's level program. So, what is it for our profession? According to the United States Federal Government, nothing is required to practice in our field. (Again), remember, medical plans

and reimbursement organizations must verify education and training for health plan credentialing, they do not have a choice.<sup>3,4</sup>

This is where I feel certification should be required; whether you have been in the department for one day or 20 years. For me, basic certification sends a message:

- General understanding (basic terms/technology) of what you need to work in the department.
- Projects a level of professional ability.
- Formalizes your knowledge (nothing more).
- Helps ensure you continue to learn as you remain certified.

I am not saying somebody who is not certified does not know the basics. In fact, I know many staff who are not certified and know medical device reprocessing better than people who are certified. Thus, when I see on their badge the certification letters, I know the person should possess a certain level of knowledge. Understand that professional certification in our field is a mark of excellence showing commitment to and lifelong learning in the profession of medical device reprocessing. Certification is a hot topic! Recently, many articles have been released that I feel need to be read by all MDRPs, who deal with education, training, job advancement, and certification.<sup>5,6</sup>

Here are some suggested articles on this topic from over the years.<sup>7,8,9,10</sup>

This upcoming June 2024, we will be celebrating 20 years of the State of New Jersey (NJ) being the first state requiring certification. At that time, I thought all the states would follow in their footsteps; however, it has not happened.

I want to thank all the people who helped bring about certification for NJ. A special thank you to three key people: Tony Monaco, Nancy Chobin, and the late Ann Cofield.

I believe certification is the first step when doing a competency for any staff member. Is the staff member certified? Why does it matter? It is simple: certification requires you to attend continuing

education and maintain your foundational knowledge for our medical device reprocessing profession. If we believe that we are an important part of the delivery of health care, then why (after 20 years of a master blueprint from NJ) do we have such few states requiring certification? I just released a podcast interviewing some of the important people involved in the NJ certification. Here is the link to take listen to this podcast: <https://www.youtube.com/watch?v=5lQay8sBgX4&t=12s>

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# AI: Opportunities, threats meet, tease healthcare supply chain

*Does haste, hype and demand signal actual or superficial benefits?*

by Rick Dana Barlow

To adapt a refrain from the cartoon philosopher Homer Simpson, “AI – the cause of and solution to ALL of supply chain’s problems.”

For some (e.g., entrepreneurs, innovators and opportunists, etc.), AI represents shortcuts and workarounds to be more efficient at work and either enjoy more recreational time or focus on other expedient tasks courtesy of the additional time.

For others (e.g., conspiracy theorists, cynics and skeptics, etc.), artificial intelligence (AI) calls to mind robots besmirching humans through deep fake audio, video and text or even replacing humans for jobs and revenue and taking over the world.

Still for others (e.g., forward-thinking dreamers and open-minded schemers), AI represents the first-generation leap to Star Trek-like automated decision support with automatic universal translators (no need to take language courses in high school and college to graduate!) that should accurately second-guess even the second-guessers on a global scale.

Recently, the U.S. Food and Drug Administration jumped into the frenzy by creating a new Digital Health Advisory

Committee “to explore the complex, scientific and technical issues related to digital health technologies, such as artificial intelligence.”

At least one study posits that AI likely will reach a half-a-trillion-dollar industry by 2027, giving additional meaning to “generative” AI. That’s within three years and represents a faster market stickiness (in terms of prospective adoption and implementation) and predictive revenue trajectory than the internet and online exchanges, internet-of-things (IoT) and blockchain achieved during their hype cycles.

But beyond the hype, pomp and circumstance, does AI amount to anything more than a decision-support tool that requires training for the end user as well as the application itself? Is it a generative relative of blockchain? A veritable electronic Swiss Army Knife for healthcare supply chain? A “shadow” database/virtual professional assistant not unlike Amazon’s Alexa, Apple’s Siri, Google’s Assistant with Bard or Microsoft’s Cortana?

*Healthcare Purchasing News* reached out to numerous corporate executives on the supplier and provider segments of the industry

to gauge their anticipation, application and prognostication of AI as it relates to supply chain operations. The wide-ranging exploration spanned the promise of process effectiveness and efficiency to the precariousness of potential abuse, control and cybersecurity dangers.

Optimists foresee much promise; pessimists highlight areas of concern that if left unchecked could have considerable repercussions. Overall, optimism, which is shared here and on HPN Online, seems to surpass pessimism, which can be found on HPN Online.

Several experts salute the promise that AI brings to supply chain, particularly around data collection and number crunching.

“Artificial intelligence will be able to make use of large amounts of data to make accurate predictions around usage and supply availability,” said Jack Koczela, director, Sourcing & Transformation, Supply Chain, Froedtert Health. “It can also comb through data from different sources, such as clinical



**Jack Koczela**



systems and business systems, to create insights that we have not been able to process at scale in the past. For me, this is one of the most exciting applications of artificial intelligence. As we move into a clinically integrated supply chain, we have many small, manual models that indicate we could see significant improvement if we could just get through all the data that is available at our fingertips."

Archie Mayani, chief product officer, GHX, marvels at the past decade of development and growth of interest in AI, particularly for supply chain applications.

"Ten years ago, the healthcare industry was just beginning to talk about AI," she recalled. "Now, it is beginning to transform healthcare and, more specifically, the supply chain. As the industry continues to use generative AI to sort and manage the influx of data, supply chain management processes will become more predictive, effective and efficient. If used correctly, AI has the potential to refocus healthcare teams on higher-value work such as supply chain resiliency and aid in future crisis mitigation, waste reduction, and cost-containment efforts that will help hospitals reinvest funds into patient care. In the era of smart supply chains, AI is the prescription for optimizing, not just organizing."

But another supply chain expert offers a profound observation seasoned with a pinch of irony that suits today's workforce.

"AI can help us make better use of scarce labor and rid ourselves of repetitive low cognitive work," noted Joe Dudas, division chair, Supply Chain Innovation and Strategy, Mayo Clinic. "It can change our jobs to be more human."

### Accentuate the obvious

The mere notion of AI motivates many experts to list a bevy of obvious applications that can benefit supply chain operations. A dozen experts share their insights with *HPN* that at times converge on common themes.

"Proper inventory management is a core competency for efficient supply chain management and an area where AI applications will continue to emerge for the foreseeable future," assured Vasco Kollokian, director, Innovation and



**Archie Mayani**

predict accurate levels of inventory to ensure optimal stock levels.

"Once optimal levels have been established for a particular healthcare provider network, maintaining suitable levels of inventory through location-specific replenishment becomes another clear application for AI," he continued. "Leveraging dynamic real-time inventory visibility through IoT-based technologies, AI-driven processes can optimize the minimum and maximum inventory counts and automatically replenish to match various hospitals' consumption-driven needs for specific locations, such as operating rooms, catheter labs, nursing floors and in-hospital pharmacies."

Kollokian further believes that AI will interface or integrate with materials management information systems (MMIS), enterprise resource planning (ERP) systems, item masters and chargemasters, regardless of brand. "ERPs typically have control over item masters," he indicated. "If visibility into fine-grained location-specific consumption and replenishment information is provided by other, more specialized, vendors, then integration is often necessary."

The root of such connectivity varies between built-in product programming, "bolt-on" software application or online download.

"Usually, integration APIs are provided by vendors to accommodate information exchange among disparate supply chain management solution systems," Kollokian explained. "For example, order quantities in ERPs typically are at the 'pallet' level, yet Automated Dispensing Cabinets (ADC) replenish at 'each' or 'box' level. Such system disparity often results in fragmented information fabric, requiring a 'bolt-on' approach. Whether vendors agree to provide such integration (usually considered competitive) is an orthogonal matter."

### Demand planning rules

The global pandemic elevated predictive demand planning to the forefront of "must-have" capabilities on automated wish lists, and Kollokian agrees that it's ripe for AI.

"While some demand spikes are quite apparent, like seasonal demand for flu vaccines, others are less so," he indicated. "For example, states not mandating motorcycle helmets are likely to see increased head trauma cases resulting from motorcycle accidents, prompting the need for proactive prior stock-up. AI can detect epidemiological healthcare patterns for less apparent trends without reliance on tribal knowledge."

John Freund, president and CEO, Jump Technologies, zeroes in on demand forecasting as the most obvious use. "AI algorithms can analyze historical sales data,

patient demographics and other relevant factors to predict future demand more precisely than traditional methods," he told *HPN*. "This can help healthcare providers optimize inventory levels, reducing costs and improving access to essential medications and supplies."

Connectivity throughout multiple systems for supply chain is essential, according to Freund.

"The demand forecasting engine needs consumption information so the inventory management tool would be needed either from the ERP system or third-party system like JumpStock," he indicated. "It also needs vendor performance information at the product level, so it needs receipt data either from the ERP system or third-party system. It needs census data, so it needs data from the EHR. There may also be a variety of other third-party data sets that are needed to do this properly. An AI-based demand forecasting engine will need data from a variety of sources."

Expanding supply chain automation and optimization beyond current capabilities is another valuable contribution, Freund posits.

"AI can automate various tasks throughout the healthcare supply chain, from procurement and ordering to warehousing and distribution," he said. "For example, AI-powered chatbots can handle routine customer inquiries, while robotic process automation (RPA) bots can automate repetitive tasks such as data entry and order processing. This can free up human workers to focus on more complex tasks, improve efficiency, and reduce errors."

But AI doesn't necessarily duplicate other pre-existing automated tasks, he insists.

"Today in many hospitals requisitions flow down to purchasing, who in turn place those orders with vendors, in some cases considering multiple sources for a given product," Freund explained. "AI can automate that entire process, taking the human element out of it. Think of the number of calls to purchasing looking for order status. AI chatbots can analyze data on product defects and customer complaints to identify potential quality issues. Chatbots can [help] hospitals with regulatory requirements by tracking and reporting recall levels. There is a wide variety of ways that AI can work here."

Arnold Chazal, CEO, VUEMED Inc., remains solidly behind AI as creating more accurate predictive models for supply re-ordering and replenishment and balance for inventory management. "AI can



**John Freund**



**Vasco Kollokian**

# SPECIAL FEATURE

help ensure that proper orders with the adequate quantities are placed in time to support the clinical work regardless of the cyclical or seasonal variations and take into account the greater supply chain challenges such as backorders and recalls," he noted.

"AI can optimize even more dynamically the on-hand inventory to meet the needs



**Arnold Chazal**

of each individual clinician by avoiding stock-outs while at the same time avoiding over-stocking, Chazal continued. "AI can do this by learning to predict what each clinician will actually need and use for each type of procedure, taking into account the specifics of anatomy and disease stage of patients to be treated based on their medical records. This application will definitely be helpful for addressing the case cart and preference cards disconnects with the clinical requirements once the patient is being treated, thus

ensuring the preparation of a case cart that is more adapted to the physician's practice and habits and the patient being treated. It will advance customized care to benefit both the patient and the clinicians."

AI can enable supply demand forecasting for providers and suppliers alike, observes Tom Redding, senior managing director, Healthcare, St. Onge Co.

"Unfortunately, the healthcare supply chain primarily has a transactional relationship with their health system," Redding lamented. "There is a significant potential to gain insights from transactional history to inform future purchasing decisions. Additionally, it may inform any contract negotiations with their suppliers to ensure they can meet the organization's total demand requirements and the anticipated demand variation. Health systems are stuck in the allocation model, which drives them to seek other product options during peak periods."



**Tom Redding**

AI can assist supply chain operations within clinics, surgery centers and other non-acute facilities, too, Redding stresses.

"With more 'low-demand' non-acute facilities coming online in the coming years, there's a need to continually monitor demand and adjust the available units of measure," he noted. "There are opportunities to right-size the required units of measure. Manufacturers spend a considerable amount of time trying to determine the packaging size to optimize their costs but that doesn't mean it meets the needs of their customers."

GHX's Mayani sees AI improving demand planning and forecasting overall based on data access. "AI can analyze historical and current inventory utilization data to help a hospital more accurately predict the demand for various medical supplies and equipment," she said. "With the help of AI, high-performing hospital supply chains have an opportunity to reduce supply expenses as well as ensure the right product is available at the right time for the right procedure to support better clinical outcomes."

Yet AI makes sense for improving clinical inventory management at the point-of-use level as well, according to Mayani. "As healthcare decision-makers consider inventory levels and their related inventory systems, inaccuracy at the point-of-use can create significant operational hurdles when trying to either reduce costs or maintain high service levels. AI models can help drive supply capture at the point-of-use and automate and streamline these workflows

## GHX offers quick tutorial on AI-supply chain links

Archie Mayani, Chief Product Officer, GHX, appreciates how artificial intelligence can assist healthcare supply chain performance improvement as well as how supply chain executives and professionals show growing interest in the technology. But she recommends that the industry takes this technology extremely seriously. Here's why.

Building Generative Artificial Intelligence (GenAI) and [Machine Learning]/AI healthcare applications involves handling sensitive data, and implementing robust data governance practices is crucial. Here are some best practices for data and governance in the development of GenAI and AI healthcare applications:

- **Data Privacy and Security:** Implement encryption and other security measures to protect genomic and healthcare data. Adhere to industry standards and regulatory requirements (e.g., HIPAA, GDPR, UDI) for data privacy.
- **Data De-identification Techniques:** Implement robust data de-identification techniques, such as anonymization or pseudonymization, to protect patient privacy while still allowing for meaningful analysis and application functionality.
- **Informed Consent, Data rights and Ethical Considerations:** Clearly communicate data usage policies to patients and obtain informed consent for customer data collection. Adhering to ethical guidelines to ensure responsible and transparent use of data with appropriate data rights is critical.
- **Interoperability Data Quality and Standardization:** Implement data validation processes for high-quality healthcare data and standard data formats and coding systems for consistency and interoperability. Design applications to be interoperable with existing healthcare systems and databases. Utilize standards like EDI, GTIN, FHIR (Fast Healthcare Interoperability Resources) for seamless data exchange.
- **Data Governance Framework:** Establish a comprehensive data governance framework

that includes policies, procedures, and guidelines for data management, usage and compliance. Regularly review and update these policies to adapt to changing regulations.

- **Transparent Explainability:** This is most critical! Ensure transparency and explainability of AI algorithms. Provide clear documentation on how algorithms operate and make decisions, especially in applications involving patient care.
- **Continuous Monitoring and Compliance:** Implement continuous monitoring mechanisms to help ensure ongoing compliance with data protection regulations. Regularly conduct risk assessments and audits to identify and address potential vulnerabilities.
- **Collaboration and Stakeholder Involvement:** Collaborate with relevant stakeholders, including healthcare providers, researchers and regulatory bodies. Involving stakeholders helps ensure that the application aligns with industry standards and addresses specific needs.

By integrating these best practices into the development and deployment of GenAI and AI healthcare applications, developers can ensure the responsible and ethical use of genomic and healthcare data, fostering trust among patients, healthcare professionals and regulatory bodies.

Healthcare is still early in its journey of leveraging AI to transform the supply chain. AI will help providers in a multitude of ways moving forward; however, it is still important for organizations to tread carefully in these new waters. While providers will consider how and why they should implement AI, it's important they identify a trusted resource as they embark on this innovation journey. Technology partners have an opportunity to act as an enabler for providers implementing AI, leveraging the right technologies to solve customer problems, whether that is to reduce clinical burnout or driving overall value-based care.





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with seamless and interoperable data with electronic medical records.”

St. Onge’s Redding foresees AI driving inventory management optimization. “In most cases today, the process to manage clinical inventories is still a predominately manual and an arduous process,” he noted. “AI can provide a real-time monitoring and provide adjustments to how much inventory is needed and make decisions on when to order supplies to eliminate guess work.”

If anything, AI can help the healthcare industry speed up demand planning communications, according to Josh Wolfe, senior vice president, Inventory Management, Medline. “In an industry where data sharing and integration between trading partners has lagged, AI could help eliminate inaccurate demand signals, reduce supply disruptions,” he noted.

Bruce Lieberthal, vice president and Chief Innovation Officer, Henry Schein, agrees on demand forecasting’s inherent benefits. “AI can be used to



**Bruce Lieberthal**

consider the myriad of factors affecting demand to help create forecasting models that are more accurate and cost-effective,” he said. “This is important so that healthcare companies can reduce stockouts or over-ordering.”

## Maintaining equipment

Predictive maintenance for medical equipment is another function that AI could manage, according to JumpTech’s Freund. “Medical equipment is expensive and critical for patient care,” he indicated. “AI-powered predictive maintenance systems can analyze sensor data from medical devices to identify potential malfunctions before they occur. This proactive approach can help prevent costly downtime, extend the lifespan of equipment, and ensure that critical devices are always available for patient care.”

This extends a step further than the real-time maintenance programs offered by several original equipment manufacturers that automatically alert the OEM when

something goes wrong onsite at the provider facility to minimize operational downtime.

“AI algorithms can go deeper than purely maintenance data,” Freund assured. “For example, AI could study sensor data from machines used to coat the joints with a bio-compatible material. The algorithms can detect defects in the coating, such as air bubbles or uneven thickness. AI can be used to optimize the coating process by adjusting the machines’ speed, improving the joint’s quality or reducing recalls.”

For James Kollai, senior director, Client Solutions, PartsSource, AI reaches into the parts and inventory management aspects of equipment maintenance. “AI could optimize inventory management by predicting which parts are likely to fail and when,” he said. “This would then help clinical engineering and healthcare technology management teams ensure that the right components are



**James Kollai**

## AI and healthcare: A courtship of convenience, convergence

For better or for worse, artificial intelligence and all its ilk, including generative and machine-learning versions, have captivated the hearts, interests and minds of consumers and industries everywhere – healthcare being no exception.

From a content perspective, educators fear (but students love) its ability to craft essays and research papers; Hollywood screenwriters despise (but studios secretly favor) its ability to pen scripts; media outlets quiver about promoting AI-created photorealistic fake images and videos and issue codes of ethics as guidelines for use; corporate executives appreciate its ability to collect and crunch data for analysis even as they establish usage guardrails for employees; and healthcare organizations espouse a litany of clinical, financial and operational benefits – from providers to payers to suppliers – even as they worry about burgeoning cybersecurity threats.

During the last three years, the global AI industry reached \$240 billion in value and 250 million users worldwide, according to Altindex.com, which also projects the global AI market to exceed \$500 billion in value by 2027.

Based on the quantity of media releases that *Healthcare Purchasing News* has received during the last year alone, healthcare seems quite enamored with the promise that AI brings. A curious headline from the public relations segment of the media industry

speaks volumes: “Made by Humans: The New Gold Standard for Marketing and PR Output?”

What follows are a sampling of curated headlines and media release promotions with live links trumpeting noteworthy applications, some delicately seasoned with a pinch of hyperbole.

“Getting technical with US consumers on healthcare,” [https://7796197.fs1.hubspotusercontent-na1.net/hubfs/7796197/GRAPHICS/23\\_CAR011\\_Consumer\\_Survey\\_Infographic\\_F%20%281%29.pdf](https://7796197.fs1.hubspotusercontent-na1.net/hubfs/7796197/GRAPHICS/23_CAR011_Consumer_Survey_Infographic_F%20%281%29.pdf)

“AI is revolutionizing the visualization of heart conditions, enabling doctors to predict the likelihood of a heart attack or the development of cardiovascular disease like never before.”

“AI technology is playing an increasingly prominent role in clinical trials in the U.S., with large biotech and pharma companies training AI to find suitable trial patients.

“To increase patient participation diversity, especially with African American participation in clinical trials as low as 4.8%, drug giants are looking toward AI for success.”

“To streamline cardiac monitoring and virtual telemetry, InfoBionic, a digital health company providing AI-powered diagnostic remote patient monitoring solutions, recently announced its collaboration with Mayo Clinic to incorporate its extensive know-how in cardiac patient monitoring, AI-ECG, and virtual telemetry to optimize and build upon its existing monitoring platform.”

“IBM Study: Businesses Work on Adapting to Generative AI, Hybrid Cloud,” [https://www.techrepublic.com/article/ibm-hybrid-cloud-user-survey/?utm\\_source=Sailthru&utm\\_medium=email&utm\\_campaign=e312\\_11.21.23\\_DT\\_Update\\_Paylocity\\_Spotlight&utm\\_term=daily-tech-insider-active](https://www.techrepublic.com/article/ibm-hybrid-cloud-user-survey/?utm_source=Sailthru&utm_medium=email&utm_campaign=e312_11.21.23_DT_Update_Paylocity_Spotlight&utm_term=daily-tech-insider-active)

“Premier Weighs in with FDA on Use of AI in Drug Manufacturing,” <https://premierinc.com/newsroom/policy/premier-weighs-in-with-fda-on-ai-in-drug-manufacturing>

“AI is helping translate disparate medical records.”

“Avoiding the GenAI hype machine,” [https://www.oliverwyman.com/our-expertise/perspectives/health/2023/november/avoiding-the-gen-ai-hype-machine.html?utm\\_source=dynamics-marketing&utm\\_medium=email&utm\\_campaign=ow-health-newsletter&utm\\_content=17-nov-2023&utm\\_id=cmp-15851-j9l8k4#msdynt-trid=OQshi39mSGBIQBf2\\_6KRrA9CwrOtUdAXoL8qQ7KUF8g](https://www.oliverwyman.com/our-expertise/perspectives/health/2023/november/avoiding-the-gen-ai-hype-machine.html?utm_source=dynamics-marketing&utm_medium=email&utm_campaign=ow-health-newsletter&utm_content=17-nov-2023&utm_id=cmp-15851-j9l8k4#msdynt-trid=OQshi39mSGBIQBf2_6KRrA9CwrOtUdAXoL8qQ7KUF8g)

“Free AI health assistant app that allows you to scan your face and eyes and measure vitals with your phone camera.”

“The potential power of AI in bridging the gap between our lifespan and healthspan.”

“FDA Launches Pilot Program to Help Further Accelerate Development of Rare Disease Therapies,” <https://www.fda.gov/news-events/press-announcements/fda-launches-pilot-program-help-further-accelerate-development-rare-disease-therapies>



available when needed without excessive stockpiling.”

PartsSource strives to integrate AI in critical decision support for dual and digital marketplace of providers and suppliers, according to Kollai. “One of the more obvious applications where we have used AI is through lead time predictions,” he noted. “In recent months, we have established a process leveraging our industry leading supply chain and transactional data sets along with a proprietary AI to predict lead times for a large portion of items purchased from our online marketplace. Approximately 90% or more vendors do not provide inventory feeds with accurate shipping information, which is crucial to customers who need parts to repair their medical equipment. Our AI can predict shipping times based on data from previous purchases by customers from the supplier to accurately fill in those inventory gaps.

“Additionally, PartsSource uses AI to help inform our Guaranteed Stock offering for our customers,” Kollai added. “Our teams are currently working on integrating AI for forward stocking, also called local stocking, options to minimize equipment downtime.”

### Accentuate the alternatives

In addition to demand planning, AI can help manage clinically acceptable alternative products and sourcing, which attained a fever pitch during the COVID-19 pandemic.

“Given the new normal of supply disruptions, the ability to efficiently and accurately recommend clinically viable alternate products is a necessity in today’s healthcare supply chain,” indicated Medline’s Wolfe. “AI provides some exciting opportunities to meet that need.”



Josh Wolfe

GHX’s Mayani contends AI can compile a list of substitutes to help avoid backorders and shortages, effectively serving as an extension of demand planning. “AI has the ability to offer more efficient and effective ways to manage supply chain disruptions and shortages,” she indicated. “Machine learning (ML) and AI algorithms can easily analyze historical data and market trends to predict potential backorders and make recommendations on product alternatives and substitutes based on evidence-based clinical outcomes. This not only helps limit overstocking and reduce waste, but also helps drive value-based care upstream and across the continuum of care.”

Carl Natenstedt, CEO, Z5 Inventory, concurs. “AI can be used to automate the

‘alternate sourcing scurry’ that occurs during backorders and product shortages,” he said. “AI can learn from past product shortage resolutions to mimic the human sourcing function and identify alternate sources of the same or similar product and place emergency orders.”

### Evaluating supplier service

AI can assist in making considerable progress with supplier performance measures and programs, St. Onge’s Redding suggests. “Health systems will gravitate to AI to inform their decision-making process on which suppliers will get their business in the future,” he said. “Health systems can’t simply look at the cost of the product only. They will need to take into consideration the total cost of the relationship. If the health system takes into the consideration all their internal time and effort to resolve issues with a supplier, substituting supplies from a different supplier potentially at a higher cost, expediting freight costs and many other factors, the supplier relationship may not be worth all the effort.”

Product access and availability are the triggers, Redding insists.

“Every health system will share without pause that product availability is their biggest challenge daily; it was a challenge prior to the pandemic, and it has accelerated since the pandemic,” he noted. “Health systems will need leverage AI to continually monitor supplier performance and gain insights into the health of their suppliers. Creating a reliable, efficient and resilient supply chain starts with collaboratively sharing data/information between the health system and suppliers to ensure there is end-to-end visibility and each party can inform their internal decisions. Too often, we see reluctance to share data/information because there is concern that the other party may take advantage of the situation, either from a cost savings point of view and/or shifting

away from the supplier because of lack of internal performance.”

### Homing in on the granular

Demand management and monitoring warehouse performance top the list for George S. Godfrey, chief supply chain officer and corporate vice president, Financial Shared Services, Baptist Health South Florida, but he takes a cue from Amazon Prime, FedEx and UPS and points to delivery calendars for inbound and outbound shipments to manage “real-time scheduling that adjusts to traffic delays, urgency of goods, etc.”



George S. Godfrey

Z5 Inventory’s Natenstedt sees benefits to automated and constant PAR area optimization and physician preference card management and maintenance from AI deployment, too.

“AI can learn from each replenishment assessment the consumption patterns of each specific PAR area and apply intelligent adjustments on a near-daily basis to streamline and reduce investment in inventory,” he indicated. “AI can learn from past case records and post-case waste and returned product assessments to constantly update and adjust the items on preference cards and their classifications to reduce product waste in the OR.” **HPN**

*Editor’s Note: For additional exclusive coverage of AI’s not-so-obvious uses, potential dangers and specific areas where AI is and will make clinical, financial and operational inroads relating to supply chain, visit <https://hpnonline.com/53079756>. Back in November 2023, HPN conducted an AI Virtual Forum, “Can AI Ease Current Healthcare Burdens?” View it here: <https://endeavor.swoogo.com/2023HPN/VirtualForum/todays-landscape>.*

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# The Increasing Strategic Importance of Supply Chain

by Karen Conway

**T**he new year always brings a flurry of predictions about what lies ahead for the healthcare supply chain. In contrast, this edition of *Value.Delivered.* takes a look at how far supply chain has come in the past 15 years. Such reflection comes as a result of a new edition of a textbook entitled *Strategic Management of the Healthcare Supply Chain*. The first edition, published in 2007, was written by Arizona State University professors Gene Schneller and Larry Smeltzer. As we began to emerge from the pandemic, Dr. Schneller asked a few of us to help him update the book to consider, among other things, the innovations developed in response to COVID-19 and the continued pursuit of a value-based system. I have highlighted a few of the major changes since that first edition, which in aggregate have elevated the supply chain as a strategic asset, although not yet to the level that my co-authors and I believe it should be.

## Preparedness and Response

The challenges faced in procuring supplies needed during the pandemic, especially personal protective equipment (PPE) and ventilators, raised awareness of the frailties of a supply chain dependent upon just in time deliveries and products made and shipped from Asia. There have been notable efforts to onshore more PPE production, with some health systems and group purchasing organizations investing in domestic manufacturing. Unfortunately, the priorities of many health system executives have since shifted away from supply chain resiliency to other priorities, such as strengthening their bargaining position with payors.

## Value-based healthcare

The implementation of key aspects of the Affordable Care Act prompted creation of the Cost, Quality, Outcomes Movement by the Association for Health Care Resource & Materials Management

(AHRMM), the professional supply chain association of the American Hospital Association. The CQO Movement seeks to expand the perspectives of supply chain professionals to think beyond the pursuit of the lowest unit acquisition price and consider the role of products and process in improving the total cost and quality of healthcare. The pursuit of a more value, vs. volume, based healthcare system continues, although sometimes at a glacial pace. As a result, with many health systems facing record deficits in the wake of the pandemic, the demands for supply chain cost reductions remain high.

## Clinical-Supply Chain Integration

During the pandemic, as health systems scrambled to address product shortages, clinicians began working much more closely with supply chain professionals to source what they considered suitable alternatives. This accelerated a movement that had begun before the pandemic toward what has been referred to as the clinically integrated supply chain, while the number of health systems with formal supply chain medical directors has grown. Physicians have also become more focused on the cost of the care they prescribe as they, too, have seen their compensation tied to cost and quality.

## Non-acute care

Physician specialists, especially in orthopedics, have also driven growth in ambulatory surgery centers (ASCs). Many physicians also have ownership stakes in such facilities, as they seek to offset reductions in traditional reimbursement. Both government and commercial payors have also enacted reimbursement policies designed to drive more care to these locations, given their high scores on cost and quality. Both technology companies and supply chain professionals are actively working to support these expanding care delivery locations.

## Social Imperatives

The move to value has also expanded supply chain's purview to support the social determinants of health, such as employment and access to nutritious food, safe housing and transportation that play more of a role in someone's health and longevity than the clinical care received. This work has been primarily focused on increasing spend with diverse suppliers, but more recently health systems have sought to support economic development in the local communities where their most at-risk patients live.

Supply chain professionals also have an important role in reducing the impact of healthcare operations on climate change given that a majority of greenhouse gases associated with healthcare are tied to the supply chain. Work is underway by many to source more sustainable products and collaborate with suppliers to reduce the greenhouse gas emissions in the procure to pay cycle. Most recently, supply chains are also being asked to be more vigilant about the potential for purchasing products made with forced labor.

## Fully Integrated Supply Chain Organization (FISCO)

The book also introduces readers to the concept of a fully integrated supply chain organization or FISCO, which was developed at Arizona State University. A FISCO recognizes that the supply chain is a system of systems, operating in support of the larger health system. As such, rather than focusing on any one aspect, FISCOs take a more holistic approach to optimize how the various supply chain functions and stakeholders operate in concert to support clinical, financial, and operational performance and ultimately the best use of resources to generate health.

For more information on the book, visit [Wiley.com](http://Wiley.com) and search on *Strategic Management of the Healthcare Supply Chain*, 2<sup>nd</sup> edition. [HPN](#)





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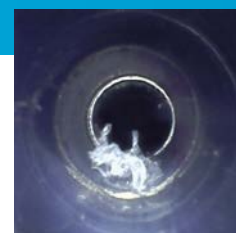
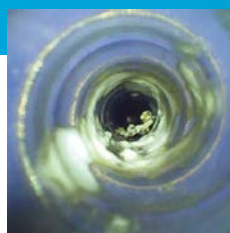
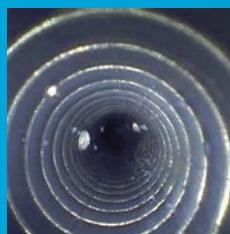
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Scope attachments are available in  
varying diameters & lengths**

**CT-101:** 1.9mm Diameter, 110cm Length

**CT-102:** 1.06mm Diameter, 110cm Length

**CT-103:** 1.9mm Diameter, 60cm Length

**CT-104:** 1.9mm Diameter, 200cm Length



### Scope Viewer Software: For Documentation of Photo & Video



Capture Images



Record Video



Simple Interface

Scope Viewer Software allows you to easily capture and save photos and videos with the Flexible Inspection Scope. An image reference window also allows the user to display a previously saved image to reference alongside of the live view of an item being inspected.

### NEW! WatchDog Endo AI

When used in conjunction with the Flexible Inspection Scope, this artificial intelligence software identifies anomalies within the working channel, such as scratches, crimps, stains, and moisture droplets. Interested in learning more? Contact us!