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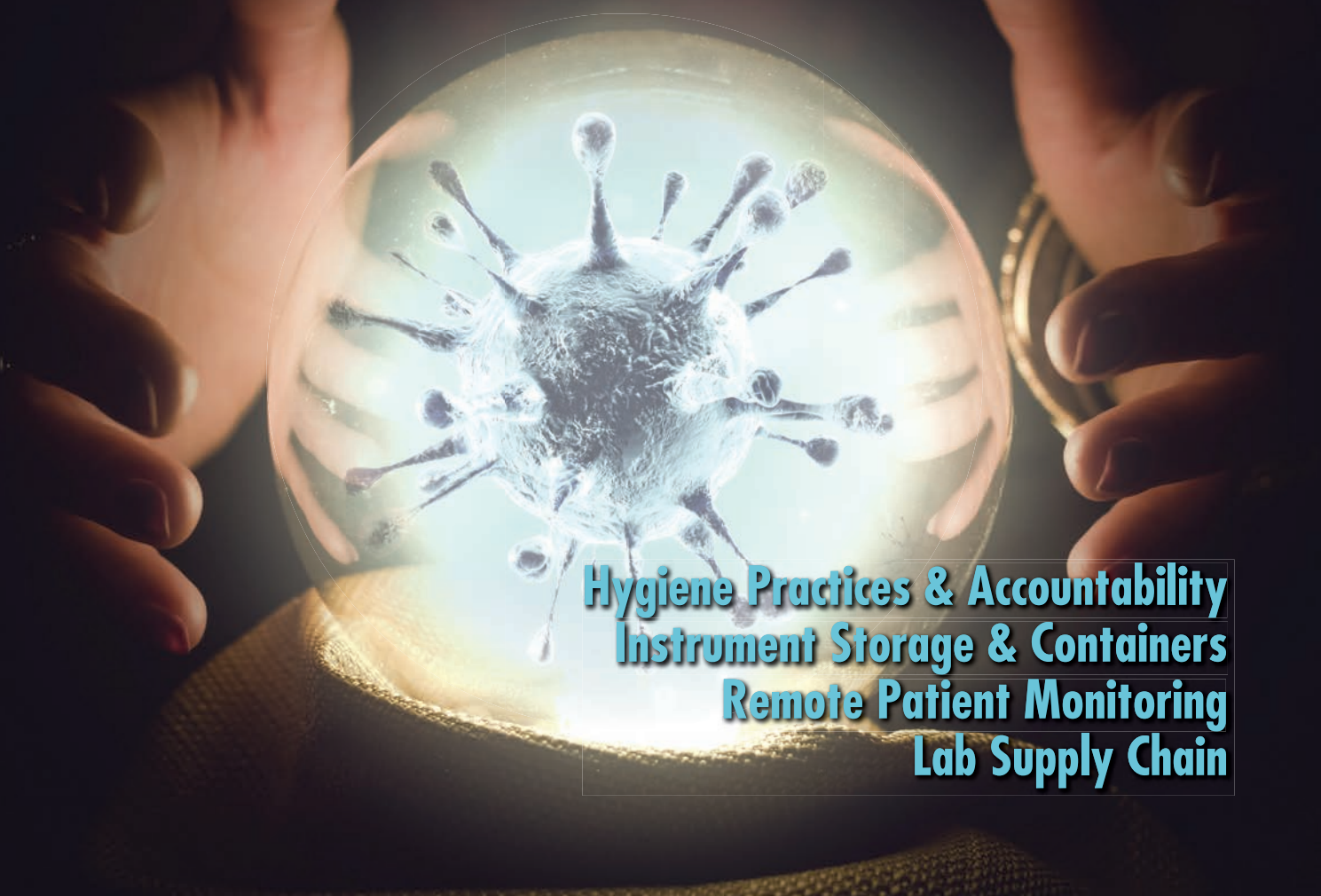

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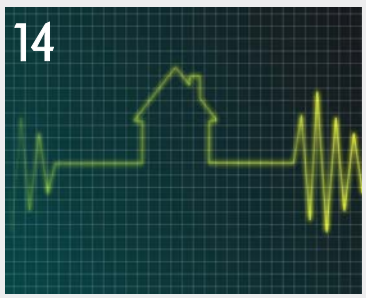

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BRISK

Taking stock of doc blocs

NASHVILLE – Supply Chain professionals from around the nation gathered here in late August for AHRMM's annual conference to network and to discuss, learn about and try to solve some of the top industry challenges.

Leading the ticker was the pandemic's impact on the supply chain but figuring rather prominently below the radar was a decades-old supply chain topic: Working with physicians and surgeons. The latest impressions about physician involvement in the supply chain – from physicians themselves – signal serious fissures in the fortress of perceived stereotypical physician attitudes and reactions.

Those stereotypes include: Physicians allegedly always get what they want, and if they don't (because supply chain takes away their favorite stuff to save pennies on the dollar) they stampede the C-suite, complain to the CEO about all the business they bring and threaten to take it elsewhere. Physicians claim they either learned about their preferred product in medical school, favor the sales rep or have a vested interest in the sales growth and success of the product.

Meanwhile, supply chain pros have heard seemingly endless refrains of "show docs the data" and everything will be all right because they'll toe the line.

But here at AHRMM, several presentations shined new light on a reforming reality. Two doctors who had participated in an enterprise-wide value analysis project demonstrated a surprisingly deep empathy for and understanding of expense management.

One of their pet peeves? Being "voluntold" about changing products without a thorough analysis of the impact on procedural integrity and patient outcomes. Together with Supply Chain, they conceived a comprehensive measurement process to evaluate suppliers and purchasing patterns. From that effort the clinical crew reached a consensus that saved their organization millions of dollars.

During another physician-led presentation, one of the speakers wanted to shatter the myth that docs don't like change.

"It's not that we don't like change," he said, "it's that we don't like to be told to change." And specifically, to be told without accurate, irrefutable, verifiable evidence that supply chain can and should be providing because physicians really seek and want it. Physicians are on board about clinical integration and resource stewardship, he added, so long as they actively participate in the process as equal players and share in both the risks and rewards.

Sounds like good business. Now to make it standard operating procedure.

DATA BANK

From the 2021 Supply Chain Salary Survey:

What certifications do you have?

None	54.8%
CMRP (Certified Materials & Resources Professional)	19.3%
Other	7.0%
CRCST (Certified Registered Central Service Technician)	7.0%
RN (Registered Nurse)	5.9%
CPM (Certified Purchasing Manager)	5.2%
CPSM (Certified Professional in Supply Management)	3.0%
CHVAP (Certification of Healthcare Value Analysis Professional)	2.6%
CST (Certified Surgical Technologist)	2.2%
CHL (Certified in Healthcare Leadership)	1.9%
CNOR (Certified Nurse Operating Room)	1.5%
FACHE (Fellow American College of Healthcare Executives)	1.5%
CSPDM (Certified in Sterile Processing and Distribution Management)	1.1%
CHFM (Certified Healthcare Facility Manager)	0.7%
CPSD (Certified Professional in Supplier Diversity)	0.7%
CHESP (Certified Healthcare Environmental Services Professional)	0.4%
FAHRMM (AHRMM Fellow)	0.4%

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FAST STATS

Long-term symptoms associated with COVID-19 represent an emerging public health concern that is not well understood, according to the Centers for Disease Control and Prevention. A CDC survey of adults conducted April 9-23, 2021 produced the following numbers regarding the prevalence of the most commonly reported symptoms.

65.9 %

of respondents previously tested positive for COVID-19, and reported having experienced long-term symptoms associated with the virus.

3,135

is the number of survey respondents. All reported having been tested for SARS-CoV-2 since January 2020, prior to the nationwide rollout of COVID-19 vaccines. None had been vaccinated, and all were over 18.

698

is the number of long-haul study subjects who had tested positive for COVID-19.

2,437

is the number of long haul study subjects who reported having testing negative for COVID-19.

22.9%

of the study group experienced fatigue four weeks (or longer) after having tested positive for COVID-19.

17.3%

of the study group experienced change of smell or taste four weeks (or longer) after having tested positive for COVID-19.

15.5%

of the study group experienced shortness of breath four weeks (or longer) after having tested positive for COVID-19.

14.5%

of the study group experienced having a cough four weeks (or longer) after having tested positive for COVID-19.

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NEWSWIRE

2022 AHRMM Advisory Board announced

The Association for Health Care Resource & Materials Management (AHRMM) membership elected Maj Ricardo Aldahondo, MBA, CMRP, medical operations planner at Headquarters United States Air Force, Pamela L. Bryant, BS, MBA, senior vice president and chief supply chain officer at Parkland Health & Hospital System, and Ed Hisscock, senior vice president of supply chain at Trinity Health as provider representatives on the 2022 advisory board.

Aldahondo, Bryant and Hisscock will begin their advisory board terms on January 1, 2022. The 2021 AHRMM Advisory Board elected Laura Kowalczyk, JD, MPH, CMRP, vice president, supply chain and support services at UAB Medicine-The University of Alabama Birmingham as chair-elect of the 2022 advisory board.

Kowalczyk will serve as advisory board chair in 2023. Laura Kowalczyk is an executive with over 25 years of extensive legal, business and operational management experience in health care operations. She has had the opportunity to utilize her background and experience to foster the development and implementation of unique business strategies across the health care continuum. In her current role, Laura Kowalczyk is responsible for the strategic direction of UAB Medicine's end-to-end Supply Chain, Environmental Services, Food and Nutrition Services, Guest Services, Patient Advocacy, Patient Transport, Spiritual Care and Clinical Ethics.

As chair-elect, Kowalczyk intends to provide ongoing leadership that supports the continued consistency necessary to foster the work that is being done to meet AHRMM's goals, and the needs of AHRMM's membership. Kowalczyk has been an AHRMM member since 2003.

Maj Ricardo Aldahondo serves as a medical operations advisor and liaison to the Air Force Surgeon General at the Pentagon. Aldahondo has been with Headquarters United States Air Force since 2018. As a provider representative, Aldahondo will work to grow AHRMM's military and civilian membership, promote and invest in young professionals and maximize AHRMM's potential to better position supply chain professionals to face the issues and successes of tomorrow. Aldahondo has been an AHRMM member since 2019.

A proven senior vice president and chief supply chain officer, Pamela L. Bryant is responsible for all aspects of the supply chain, including procurement, strategic sourcing, informatics, value analysis, supplier diversity, logistics, distribution, customer service, mailroom services, vendor management and equipment/asset management. Bryant has been with Parkland Health & Hospital System since 2019. As a provider representative, Bryant will work to support local chapters to enhance their reach and sustainability. Bryant has been an AHRMM member since 2011.

With 36 years of experience in healthcare, Ed Hisscock is currently the senior vice president of supply chain at Trinity Health where he has led the implementation of an entirely new suite of supply chain applications and co-led the field's largest selfdistribution deployment and clinically driven supply chain initiative. Hisscock has been with Trinity Health since 2015. As a provider representative, Hisscock will focus on growth strategies with, and through, the chapters and will advocate for the adoption of industry standards needed to improve supply chain resiliency on state and federal levels. Hisscock has been an AHRMM member since 2010.

Ed Hardin named 2021 Chuck Lauer Award winner at the Fall IDN Summit

IDN executives, Suppliers and GPO partners safely gathered in Phoenix for the 2021 Fall IDN Summit August 30 - September 1. They celebrated Ed Hardin's legacy as he was named the 2021 Chuck Lauer Award.

After a lifetime of service to the healthcare supply chain, Ed Hardin posthumously received the 2021 Chuck Lauer Award. Ed Hardin's legacy was celebrated as a supply chain leader, an educator and mentor, a longtime IDN Summit Board Member, and, most importantly, and as a friend to many.

AMA releases 2022 CPT Code Set

The annual update to the CPT code set incorporates a series of 15 vaccine-specific codes that are the model for efficiently reporting and tracking immunizations and administrative services against the coronavirus (SARS-CoV-2). The work was initiated to meet the urgent public health need for streamlined reporting and tracking of COVID-19 vaccinations is presented in a press release of the 2022 Current Procedural Terminology (CPT) code set published by the American Medical Association (AMA).

Working closely with the Centers for Disease Control and Prevention to develop vaccine-specific CPT codes, the AMA introduced the first codes in the series for use in Nov. 2020 to clinically distinguish each

coronavirus vaccine and dosing schedule for better tracking, reporting and analysis of patient vaccinations. These CPT codes were available prior to the public availability of the COVID-19 vaccines to facilitate updating of health care electronic systems across the U.S.

To help ensure accurate coding and reporting of COVID-19 vaccines and administration services, the AMA offers a vaccine code finder resource to help identify the appropriate CPT code combination for the type and dose of COVID-19 vaccine provided to each patient. The 2022 CPT code set also includes an appendix for one-stop access to all the codes for COVID-19 vaccine reporting.

The COVID-19 vaccine and administration codes are among 405 editorial changes in the 2022 CPT code set, including 249 new codes, 63 deletions and 93 revisions. The CPT code set continues to see growth in new and novel areas of medicine with 43% of editorial changes tied to new technology services described in Category III CPT codes and the continued expansion of the Proprietary Laboratory Analyses (PLA) section of the CPT code set.

Changes to the CPT code set are considered through an open editorial process managed by the CPT Editorial Panel, an independent body convened by the AMA that collects broad input from the healthcare community and beyond to ensure CPT content reflects the coding demands of digital health, precision medicine, augmented intelligence and other aspects of a modern healthcare system. This rigorous editorial process keeps the CPT code set current with contemporary medical science and technology so it can fulfill its vital role as the trusted language of medicine today and the code to its future.

Other important additions to the 2022 CPT code set respond to the fast pace of innovation in digital medicine services that can improve health care access and enhance outcomes for patients across the country. This is illustrated by the creation of five new CPT codes (98975, 98976, 98977, 98980, 98981) to report therapeutic remote monitoring, an increasingly important avenue of patient care especially during the COVID-19 pandemic. These codes expand on the remote physiologic monitoring codes that were created in 2020 (99453, 99454, 99457, 99458).

As digital medicine services have quickly expanded in recent years, the CPT code set has responded with a unique educational guide. A new appendix included in the 2022 CPT code set provides a taxonomy for digital medicine services that supports increased awareness and understanding of approaches to patient care through the multifaceted digital medicine services available for reporting in the CPT code set.

The CPT Editorial Panel also created new codes for principal care management (99424, 99425, 99426, 99427), which allow physicians and qualified healthcare professionals to report care management services for patients with one complex chronic condition. Medicare policy for principal care management services has been evolving and the new CPT codes, along with revisions to existing CPT codes for care management, better align with Medicare guidelines. These CPT changes add to nearly a decade of coding content work that respond to the reporting needs of physicians and others who help manage the chronic conditions of America's aging population.

Coding books and products, including the CPT Professional 2022 codebook, are available from the AMA Storefront on Amazon. HPN

SPECIAL FOCUS Sponsored by jump TECHNOLOGIES

Future-ready supply chains linked to data, sourcing, real-time visibility strategies

Pandemic sparks process revolution to ignite procedural evolution

by Rick Dana Barlow

As hospitals and healthcare organizations continue to grapple with the ongoing pandemic, their supply chain future vision focuses more on palpable and realistic options than on some of the manufacturing and retail technology that has turned heads and gained popularity over the years.

Augmented and virtual reality for education, training and stock location purposes may draw attention; drones and self-driving vehicles may elicit oohs and aahs; warehouse robotics and 3-D printing may raise eyebrows even as 3-D printing was used to create personal protective equipment (PPE) components to satisfy COVID-19-driven demand spikes.

Against the backdrop of the global pandemic crimping and crippling supply chain fluidity, healthcare supply chain leaders and professionals have been forced to concentrate on short-term problem solving for product access as well as long-term horizon scanning.

If the aftershocks of COVID-19 taught supply chain practitioners one thing about their industry and its resilience, it's this: Know where available product is at all times up and down through the entire supply channel among a network of companies. The outlook emphasizes enterprise planning to extend beyond a single organization, no matter how large.

In no uncertain terms, healthcare supply chain experts told *Healthcare Purchasing News* that future-ready supply chains command and control data, sourcing and real-time visibility as fundamental and foundational tenets of standard operating procedure. Any technology tools simply should reinforce those aims. Period.


Chaun Powell

"While healthcare is one of the most noble, exciting and innovative industries in the world, COVID-19 has also exposed its sprawling, fragmented and often inefficient operations," observed Chaun Powell, Group Vice President, E-Invoicing & Payables, Premier Inc. "The pandemic has been instrumental in changing not only the way providers deliver care, but also the way they do business."

Tom Redding, Senior Managing Director, Healthcare Services St. Onge Co., emphasizes the stark lesson learned from the coils of COVID-19, that of layering operational nuances to the process.


Tom Redding

"If we've learned anything from the pandemic, predicting and managing demand is a critical component to operating a highly effective supply chain," he noted. "The pandemic-induced bullwhip has and will continue to impact manufacturers' and distributors' ability to meet the needs of their customers. As a result, most healthcare systems no longer trust that the end-to-end supply chain will function properly when it is needed. Therefore, health systems are building another layer to the supply chain to absorb fluctuations in demand and product availability."

Communication, transparency and visibility are critical to buildingtrust and a stable, responsive supply chain, according to Greg Colizzi, Vice President, Marketing, Health Systems, McKesson Medical-Surgical.


Greg Colizzi

"When it comes to emergency preparedness efforts, building trust and increasing collaboration between clinical, supply chain teams and distributors is key," he said. "We've all had to adapt, and we've learned that with greater visibility and transparency into each other's supply chain operations, providers and suppliers can better manage the flow of supplies from the manufacturer all the way to the patient's bedside.

"Transparency is critical," Colizzi continued. "Providing our customers with more frequent communications and visibility to shared data were among the first things we implemented to help our providers avoid potential disruptions to patient care, including allocation updates, alternative product lists, critical product availability reports, quality and compliance standards and direct sourcing recommendations."

While available to the general public for the last three decades, the internet and World Wide Web in which to conduct electronic commerce has proven to be a consumer and business convenience as well as a reliable part of life, according to Bill Koptike, General Manager, Amazon Business Healthcare.


Bill Koptike

"E-commerce provides the opportunity for healthcare providers and manufacturers to globally, in real-time, access an expanded source of suppliers to meet their evolving needs," Koptike told HPN. "While this technology is no longer a new subject, its adoption into mainstream procurement continues to grow at a pace faster than traditional sources of supply."

Ongoing technological developments facilitate growth and progress, he observes.

"Both cloud and AI-enabled e-commerce technology help customers access new feature innovations to make it easier and more effective in deployment," he continued. "The access for business speed solutions outpaces the traditional, confined sourcing methods for individually negotiated contracts. It is an everyday industry flaw that healthcare providers are forced to manage backorders, to the point where it impacts patient care. This does not need to be the expectation of our present supply chain."

Three by two

Healthcare companies should be adopting technologies that require moderate investment and provide return-on-investment (ROI) quickly, according to Bindiya Vakil, CEO and Co-founder, Resilinc, which has emerged within the last two years as one of the go-to subject matter experts and software evangelists for crisis management. Vakil points to three key solutions that should be adopted now and why, followed by two that have been in the pipeline for at least a year.

Leading Vakil's priority list? Supply chain monitoring and mapping.

"Companies that invest in technology-based supply chain risk management tools, particularly monitoring and mapping their supplier networks, have an unmatched visibility and a clear picture of how any evolving disruption will affect their supply chains in the weeks to come," she said. "This

kind of technology-driven visibility allows companies to conduct what-if analyses for different regions and work with suppliers in these regions preemptively to protect supply lines."

This strategy shouldn't break the bank as others might, Vakil insists.

"The investment required in supply chain monitoring and mapping is considerably lower than some of the other technologies – 3-D printing, for example, requires millions of dollars in investment – but provides an almost immediate ROI. What's more, mapping and monitoring capabilities already exist, and for a few hundred thousand dollars, you can have a thoroughly mapped supply chain."

Up next? Artificial intelligence (AI).

"AI has tremendous potential to impact the global supply chain," Vakil continued. "It can do this by taking over time-consuming and error-prone manual work. AI can more efficiently predict demand, improve delivery times, reduce costs and take over customer support roles. When it comes to supply chain monitoring and risk mitigation, AI is able to scan through millions of news sources to identify disruptive events and from there, identify the region or suppliers that could potentially be impacted.

"To ensure supply chain resiliency, companies need to be able to detect problems promptly, understand the impact and act quickly," she added. "The way to achieve this is by leveraging AI and machine learning to ultimately reach a level of automation where decisions are made, based on data by machines, in a split second."

Completing the trinity? Predictive analytics.

"Much like AI, predictive analytics can and is having a positive impact on the supply chain," Vakil said. "When it comes to supply chain risk management, with predictive risk capabilities, organizations can prepare in advance to avoid allocations and idle production lines, as well as protect their Order Fulfillment Cycle Time and Perfect Order Fulfillment Metric, ultimately saving tens of millions of dollars."

It's all about timing, according to Vakil. "In a typical supply chain disruption scenario, all mitigation activity happens after the disruption occurs; the chances of recovery are significantly reduced," she noted. "By leveraging predictive analytics, companies can get alerts about a new, potentially disruptive event anywhere in the world, predict impact likelihood, predict which suppliers are most at risk of delivering late and by how long, identify how affected suppliers will perform and propose a risk-mitigation action plan."

But Vakil remains realistic about what's really first and foremost on supply chain minds: Distribution strategies that involve multi-sourcing and safety stock access as well as domestic sourcing to avoid global shipping and transport challenges.

"For healthcare systems that relied on one primary supplier for their main products, COVID likely halted production facilities at one or several points, leaving the organization scrambling," she said. "This is why we're currently seeing procurement professionals working closely with suppliers. A 2021 Gartner study revealed that companies are very actively investing in more profound and more collaborative supplier relationships. According to the report, 77% of companies said they are investing in the short term for supplier relationship and resiliency.

"The shift to domestic sourcing is currently happening as well, with many companies investing in manufacturing PPE and other products in the United States," she continued. "COVID-19-induced supply chain disruptions in China – which led to the inability for the U.S. to receive critical shipments of PPE – brought the conversation mainstream. However, there have been growing business reasons to have a diversified strategy since well before the pandemic: Rising labor costs, human rights issues, tariffs and geopolitics are all playing a role."

Chris Luoma, Senior Vice President, Global Product Management, GHX, maintains his own longer-term triple aim with shorter-term dual targets hitting the ground first.

Chris Luoma

Luoma recommends healthcare organizations modernize data management practices by creating a solid foundation of data that is continuously updated to improve operational efficiency and performance. "This is particularly important as hospitals and health systems could face a total revenue loss between $53 and $122 billion this year due to the pandemic," he said. "They simply can't afford to make decisions founded on bad data."

Healthcare providers also must leverage tools and approaches to help minimize and avoid supply chain disruption, such as predictive analytics and sharing data with the organization – between supply chain, financial and clinical teams – and with other local healthcare providers, he suggests.

Further, they must implement technologies, such as bar codes, smart labels, robotic process automation (RPA) and AI to help automate manual and tedious processes, according to Luoma. This, in turn, will enable highly skilled supply chain professionals to focus on more value-added tasks like patient care transformation, he adds.

Realistically, however, Luoma believes supply chain professionals will rally around two areas: Revamping distribution practices and tapping into the power of RPA, because the others require the creation of "net-new infrastructure" that involve resources and time, both in short supply.

"The industry is looking for quick wins after the setbacks it experienced throughout COVID, and these actions can help deliver," he assured.

"On the distribution side, providers are exploring how to better avoid stockouts or backorders that affect or delay patient care without carrying costly, excess inventory. The most common strategies are leveraging multiple distributors and requiring allocations," Luoma said. "However, we've also seen the creation of regional collaboratives where geographically close providers trade supplies to help build up safety stock. Living stockpiles are also being explored and there has been renewed interest in domestic production, such as HCA Healthcare's venture with A Plus International. And providers have become their own manufacturing source, such as Ochsner Health, which will now make its own PPE.

"On the technology side, RPA isn't new to the healthcare supply chain, but COVID has undoubtedly accelerated the need to automate," he continued. "We saw firsthand the crippling effects of a rigid infrastructure that was unable to quickly pivot when operations had to move virtually. As the healthcare supply chain focuses on improving agility and resiliency, there is a lot of conversation around digitization and the need to improve quality, operational efficiency and productivity. This is why RPA is one of the fastest-growing software markets."

Shawn McBride, Vice President and General Manager, Cardinal Health WaveMark Supply Management & Workflow Solutions, opts for three approaches that should be among the first to be adopted during the ongoing pandemic but be enabled two other priorities.

Radiofrequency identification (RFID) represents the "most effective" tool to automate significant data capture, according to McBride. "It also enables workflows that support clinical and supply chain teams to capture and document product disposition throughout the supply lifecycle from receipt to use," he noted. "This turns your supply chain into a strategic asset with accurate, real-time data, and gives you access to insights that support decision making."

With more intensive reliance on automation comes the need for data protection, McBride insists. "Cybersecurity software is a requirement to operate in today's digital world and to ensure business resilience," he

said. "Equally as important, health systems must work with vendor partners that make data security a top priority, going above and beyond all standards to protect vulnerable PHI [protected health information] that travels through their systems."

McBride calls distribution strategies that involve multi-sourcing and safety stock access as a response to the product shortages experienced during the pandemic as vital. "Automated inventory management technology is critical to the successful execution of this strategy," he insisted. "Automation tracks that inventory and provides insights to its most effective use, enabling staff to reallocate products where needed most, which is critical for hospitals, especially during COVID-19 surges when products need to be strategically utilized to ensure the health and longevity of inventory levels. In addition, this automation helps identify any expired or recalled product and keeps it away from patients, supporting critical patient safety initiatives."

Solid data infrastructure buttresses these three areas, McBride emphasizes.

"It is critical to have clean and reliable data, adhering to global standards, to drive actionable insights and improve supply chain effectiveness," McBride said. "Given multiple and disparate systems and the speed of expansion at many institutions, data sets have not been maintained and the capture and curation of data is ineffective. Ensuring all products are tracked using a consistent, globally adopted standard (like GS1), supports that enterprise visibility to inventory throughout the health system."

Workflow optimization and automation remains key, too, he adds. "Many health systems still manually track product inventory at the point-of care, which leads to errors and missed revenue capture and lack of insights that drive improvement," he added. "The right automated technology helps ensure clinicians have the products they need – when they need them – without stocking unnecessary inventory. This means millions in potential savings for hospitals and great satisfaction with employees."

Crossroad continuum


David Gillan

The sheer volume of pandemic-related supply disruptions has led providers and suppliers alike to explore "practical, new supplier resiliency solutions," according to David Gillan, Senior Vice President, Supply Chain, Vizient. Such solutions aim to foster end-to-end supply chain transparency to improve forecasting, product availability and consumption of goods.

"Blockchain could take this to the next level, providing more accurate data and visibility throughout the supply chain," he predicted.

But if greater transparency for increased resiliency remains the top pursuit, supply redundancy clocks in at a close second, Gillan insists.

"Healthcare organizations are looking for ways to still drive standardization in key supply areas for cost optimization without eliminating options for allocation from alternative suppliers," he said. "Creating and maintaining safety stock of certain equipment and supplies for use by an individual organization is also being evaluated. Nearly every hospital organization that we have surveyed has indicated a significant shift towards the creation of their own stockpile of essential products. This shift comes with a lot of challenges, including cost, distribution, local storage sites and ongoing management."

St. Onge's Redding contends that healthcare remains at a "critical juncture" where demand management and predictive analytics should be implemented to assure the entire supply chain continuum works more effectively and seamlessly.

"We continually speak with supply chain leaders about their vision for the future, and demand management is always one of the top items," Redding noted. "With the goal of achieving success in demand management, it starts with building the digital infrastructure – bar-code scanning, voice-activated capture, vision capture, etc. Health systems will need to take the important step of evaluating their digital supply chain strategy to ensure they are prepared to meet the ever-changing needs of patient-centered care. If they don't, they will continue to struggle to capture the appropriate information to properly predict demand. To become more predictive, supply chain systems will need to establish the product usage relationship for clinical commonality, preference and patient uniqueness to truly predict product demand."

Cory Turner, CMRP, Senior Director, Healthcare Strategy, Tecsys Inc., and a former supply chain executive within Greenville (SC) Healthcare System, *HPN*'s 2013 Supply Chain Department of the Year, agrees that demand planning and predictive analytics will drive technologies on the cusp of widespread adoption.


Cory Turner

"These are the things that healthcare organizations simply cannot succeed without," Turner said. "The pandemic has proven that our antiquated ways of forecasting are no longer enough to provide the clinical support that our roles demand. From the largest IDNs to small rural hospitals, we must be able to accurately and timely know the needs of our clinicians. More effective demand planning calls for more robust analytics systems, but it also means we need to get better at feeding those analytics systems with better data. After all, junk in, junk out. So I think that processes, tools and technologies that automate – or at least streamline – demand chain data will play a pivotal role as well."

Demand management and predictive analytics software reinforced by AI must be implemented as part of routine operations, according to Pete Bennett, Vice President, Global Planning, Cardinal Health Medical Segment.

"Demand management and predictive analytics software is mission critical for a few reasons," Bennett contended. "First, it creates a collaborative environment with common processes and technologies to get better insights and align with our customers. It also creates a common infrastructure for demand, deployment, inventory and supply for all product lines with common processes and technologies to operate. Finally, these are crucial in providing end-to-end visibility in our supply chain, which we know is more important now than ever amid the ongoing pandemic. Part of that visibility includes being able to use data for more common and consistent practices, it outlines 'What If' scenarios so supply chain leaders can be prepared for what may come, it offers predictive indicators and helps outline new KPIs [key performance indicators]."

Meanwhile, AI should be deployed "to monitor and learn from patterns, anticipate delays due to external factors – weather, congestion, capacity, etc. – and provide options to overcome delays, and recommend options to move products faster to the customers," Bennett added.

Pete Brennan, Regional Vice President, Operations, Cardinal Health U.S. Medical Segment, agrees that AI can help resolve supply chain issues before or as they happen, but he points to Amazon as proving the essential importance of demand management/predictive analytics software.

"[Amazon's] predictive analytics when placing an order are key when determining delivery – how fast, when and what route it will ultimately be on that week," Brennan said. "With more uncertainty in the supply chain, having better predictive analytics can help you reduce costs and improve service. Predictive analytics take the guess work out of the equation [and] helps you understand customer patterns. In fact, this technology could help you know them better than they know themselves."

Brennan also believes domestic sourcing will be pursued to avoid shipping and

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transportation issues and decrease backorders. He also supports robotic process automation (RPA), which "helps you complete repetitive tasks with bots, which means less headcount needed [that] could be passed to customer as savings."

Realistically, Brennan anticipates AI, automated guided vehicles (AGVs), bar coding, handheld/wearable technology and robotics being implemented first because "these are easier to get in place. We are already using and seeing these initiatives in market."


John Freund

Still, demand management, predictive analytics and AI go hand-in-hand, according to John Freund, CEO, Jump Technologies.

"I believe that the entire healthcare supply chain, from manufacturing to distribution to consumption, will need to implement more advanced AI = to better predict swings in demand based on outside indicators," Freund said. "Using historical data to create demand plans would not have been helpful in avoiding the supply constraints that occurred when COVID hit. Pulling in more comprehensive demand indicators from the market to be able to predict the surge will be required. To accomplish this across the entire healthcare supply chain will require a substantial effort in data normalization, which this industry has traditionally struggled with."

Throughout the pandemic, real time inventory visibility of critical items in the healthcare supply chain was lacking at a time when it was most needed, according to Jason Rosemurgy, Senior Vice President, Sales and Marketing, Terso Solutions.


Jason Rosemurgy

"There have been so many stories about missing, misplaced, or diverted PPE, ventilators, key therapies and drugs that it exposed the lack of controls that were in place," Rosemurgy said. "It became so prevalent that a new understanding seems to have been generated within many health systems that 'we can never let this happen again.'"

Strategies being implemented with more fervor include Item-level tracking with radiofrequency identification (RFID), real-time location systems (RTLS) and inventory management software platforms that work together to share data and provide healthcare systems with information so that they know where key products are, if they have been used, what temperature they have been stored at, if they are not where they are supposed to be and who had them last, he explains.

"This information is so essential in effectively managing the complexity of a hospitals' inventory," Rosemurgy noted. "Without the technology in place, people become reliant on old data and manual systems. RFID should be and will be the first technology adopted because not only is it addressing a real concern that has been magnified due to the pandemic, it is also able to be adapted to current workflows and existing technologies, making it the next logical step in inventory automation and security."

The big picture

Premier's Powell urges healthcare facilities to extend their scope beyond traditional supply chain areas, such as procurement and sourcing but also incorporate finance to streamline the procure-to-pay (P2) process and root out cumbersome manual tasks that generate massive inefficiencies and waste.

"Take, for instance, that healthcare finance – including accounts payable/receivable – still largely comprises manual, paper-based processes," he said. "As many as 70 percent of all invoices in healthcare are paper-based and nearly 85% of all healthcare purchasing is still done manually via paper checks. Across the industry, these transactions can add as much as $18 billion to $22 billion in unnecessary annual expenses for providers and even the simplest errors can lead to an average delay in supplier payment by 61 days. Not only is paper inefficient and expensive compared to digital alternatives but it also leaves room for errors when all of those paper forms are entered into purchasing systems.

Peter Saviola, Vice President, Logistics and Supply Chain Optimization, Medline Industries, views low-risk but high-speed maneuvering as essential.


Peter Saviola

"Process changes will come first because they typically require little to no capital investment, and provide speed to value, and in today's constantly evolving environment, rapid change and rapid deployment is essential," he said. "Technology will be quick to follow especially where proven technologies versus evolving technologies exist – specifically, technologies that address and simplify the labor effort." These include wearable devices that provide digital and voice-activated capabilities and automated guided vehicles.

Workflow improvements from wearable technology can make a difference, according to Mark Wheeler, Director, Supply Chain Solutions, Zebra Technologies.

"Implementing wearable technology can help accomplish a number of operational objectives that are critical to success in the healthcare supply chain," he observed. "These objectives include optimizing labor productivity and effectiveness, meeting customer service level agreements and controlling and improving visibility of lot-controlled and serial-controlled inventory. Wearable technology can make scanning and data capture of every materials transaction efficient and ergonomic. In doing so companies can ensure item-level traceability and process accuracy. Wearable tools are also an ergonomically sound option for workers who need the technology to work with them as they perform their tasks and not add to their burden. I can see this being the first to be adopted and implanted due to the impact the technology can have on improving processes and its proven success to date."

From weather events to geopolitical policy changes, supply chain has seen its share of disruptions within the last few years, but the global COVID-19 pandemic "opened a lot of eyes to inherent fulfillment challenges and exacerbated them for many," according to Ken Fleming, President, Logistyx.


Ken Fleming

"Exploding e-commerce order volumes, increasing carrier capacity crunches, shipping surcharges and price increases, and, of course, heightened customer expectations for rapid and inexpensive shipping have all complicated order fulfillment and logistics for shippers around the world," he observed.

"To effectively manage these and keep them from destroying both customer satisfaction and the bottom line, companies should implement a cloud-based multi-carrier parcel shipping solution, replete with advanced business intelligence," Fleming said. "By integrating a multi-carrier shipping solution into a supply chain tech stack, companies no longer have to ship with just one or two carriers. Instead, they can tap into an extensive carrier network that includes dozens of regional carriers, making it easier and faster to add and maintain carriers' rates and services and enabling them to quickly react to carrier capacity limitations, surcharges and rate increases to better control costs and maintain on-time deliveries. HPN

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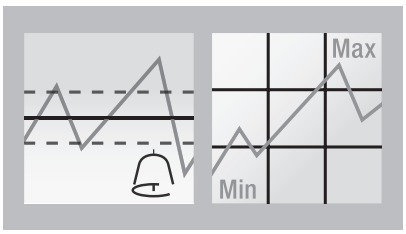

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Remote patient monitoring

Breaking down walls, barriers for expedient and meaningful use of data

by Kara Nadeau

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Advances in technology, payment reforms, patient-centered care and the digitization of healthcare delivery have driven a momentous evolution and expansion of patient monitoring over the past two decades. The COVID-19 pandemic has further accelerated patient monitoring trends, with both a desire and a need to deliver care effectively and safely in the home.

Digital technology, including remote monitoring, artificial intelligence and automation, could save health systems around the world anywhere between $1.5 trillion and $3 trillion a year by 2030, according to The McKinsey Global Institute.[1]

Extension of monitoring from the hospital into the home supports many factors that can improve care quality while reducing costs, such as continuity of care, transition of care from the acute to non-acute setting and care coordination among clinicians. For patients, remote patient monitoring (RPM) offers greater convenience, with the ability for their care teams to monitor their health status without the patient having to leave home.

Monitoring solutions that transmit patient data, within a hospital's network, remotely back to hospital or office-based clinicians, to home care nurses, or even to an off-site third-party RPM service provider, present challenges as well. These include risks to electronic protected health information (ePHI) and lack of interoperability with connected systems due to proprietary hardware and software.

Then there is the problem of data overload. Monitoring devices generate an abundance of data but it is quality over quantity that counts. Healthcare providers must find ways to cut through the data clutter and garner useful insights to inform care decisions.

Individual manufacturers of monitoring technologies, trade associations, healthcare organizations and other stakeholders are working on ways to leverage advanced patient monitoring capabilities for the benefit of the industry and the patients they serve. The possibilities are endless, and with growing consumer interest in more convenient and accessible care, now is the time to act.

Care delivery ever expanding

In its future of health vision, Deloitte predicts that more care will be delivered to patients at home, or through virtual, outpatient and other settings. The focus of care will shift from treating diseases to promoting wellness and prevention. The consulting firm notes that the transition of care from acute care to outpatient and home settings is already happening today.[2]

Ushered in by the COVID-19 pandemic, the Centers for Medicare & Medicaid Services (CMS) Hospital Without Walls initiative is evidence of this shift. Launched in March 2020, it allowed health systems and hospitals to provide services in locations beyond their existing walls to accommodate patient surges.

CMS expanded this effort in November 2020 with an "Acute Hospital Care At Home" program that provides "eligible hospitals with unprecedented regulatory flexibilities to treat eligible patients in their homes." As of August 9, 2021, 69 U.S. health systems, including 148 hospitals in 32 states, were approved by CMS to participate in the program.[3]

Under the program, a registered nurse (RN) evaluates home-based patients once per day (in-person or remotely). The patient also receives two in-person visits daily from either an RN or a mobile integrated health paramedic (based on the patient's nursing plan and hospital policies).[4]

Patient monitoring to facilitate care expansion

There are obvious risks in transitioning patients from an acute care hospital to a non-acute facility or to the home. Monitoring of vital signs and other biological parameters is clearly easier when a patient is in a hospital bed versus in a post-acute setting or in the varied and unpredictable setting of a home environment.

Leading manufacturers of monitor technology and other medical equipment with decades of experience in the acute care setting have been innovating to facilitate monitoring of patients well beyond the four walls of a hospital. This includes both monitoring for early detection of emerging issues and for the management of pre-existing conditions.

Hillrom, a medical technology company that nearly 100 years ago was focused on bringing the home into the hospital through more comfortable furnishing, is now leading the charge toward advancing connected care in the hospital and back into the home. In 2015, Hillrom acquired point of care diagnostics provider Welch Allyn, and has since been adapting its hospital grade solutions to facilitate effective, safe and connected monitoring and intelligent diagnostics, delivering data clinicians can trust.

Andreas Frank

"Our mission has always been to enhance outcomes for patients and caregivers. Technology is a means to do a better job of that," said Andreas Frank, President, Front Line Care, Hillrom. "Where in the past healthcare was centralized, with a patient going

to a hospital or physician office for care, today it is becoming much more distributed and COVID has accelerated that. The need for care expansion is breaking down the walls of the hospital. At Hillrom we find ourselves in a perfect position because we have the trusted experience, footprint and solutions to support this shift, coupled with the desire to help."

Continuity of care inside and outside of the hospital

The U.S. healthcare industry has increasingly turned to long term acute care (LTAC) facilities to care for higher acuity patients transferred from hospital intensive care units (ICU). The COVID-19 pandemic has accelerated this trend by driving a greater number of sicker patients into LTAC settings as hospitals reach ICU capacity.

While acute care patients have the same care needs regardless of the setting, caring for critically ill patients is more challenging outside of the ICU. "Patients requiring care in long-term care facilities are disproportionately older and chronically ill, and they often enter long-term care after an acute hospitalization," states the Agency for Healthcare Research and Quality (AHRQ).[5] "When transitioning patients from costly and resource/space constrained ICUs to LTAC facilities, it is critical to maintain a similar level of high acuity monitoring and care to ensure safety and prevent untoward events," explains Mike Hodge, Director Business Development, Alternate Care Solutions, Dräger. "According to the AHRQ, 'Patients in long-term care settings may be particularly vulnerable to safety problems in the course of their care.'"[5]


Mike Hodge

Dräger has applied its 100+ years of critical care expertise and know-how to specifically address the needs of the LTAC environment. For example, the company's bedside monitors can be transported along with the patient within hospital units and through to the LTAC. This facilitates continuous ICU level monitoring while eliminating the need for separate transport monitors.

Remote patient monitoring

Remote patient monitoring (RPM) can help providers and patients by facilitating safe and effective continuity of care all the way through to the home. As Frank points out, hospitals struggle to strike a balance between reducing length of stay (LOS) for financial reasons, but not discharging patients so early that they are at risk for readmission (and the risk for reimbursement penalties). Remote monitoring can help overcome this challenge.

"A patient can be discharged with a monitor and instructed to perform spot checks three or four times per day. The data is transmitted to the clinician or a central location to monitor trending and act on it accordingly," said Frank. "This can significantly reduce the risk to the hospital that the same patient is re-admitted and they don't get reimbursed for that second stay."

While there are obvious benefits to this approach, Frank says there are also many logistical challenges to a hospital sending its monitors out into the community. He states:

"You have all of these patients with assets worth thousands of dollars that belong to the hospital. So how do you discharge them and how do you bring them back? There is a whole back-end logistical infrastructure that needs to be put in place."

Frank says there are service providers that have built businesses around the need to supply and manage remote monitoring equipment, and Hillrom has partnered with some of them. In these cases, Hillrom provides the monitoring devices, and the service providers handle the logistics, as well as engagement strategies to drive patient compliance with the prescribed monitoring.

Early detection and disease management

Patients with chronic conditions require close monitoring to manage health status and detect deterioration. Monitoring patients in their daily lives is fundamental to effective population health management. Even before COVID-19 hit the U.S., 88% of providers surveyed said they had invested or were evaluating investments in RPM to support management of patients with chronic conditions and at risk for hospital readmissions.[6]

"Early detection and avoiding patient deterioration present a huge value proposition for digital and connected technologies," explains Frank. "Secondly is managing patients at home. COVID has forced us to do that in many ways, but there is undoubtedly a huge, proven benefit of patients being able to recover in the comfort of their homes with connected infrastructure around them."

Frank describes how Hillrom has complete solutions for remotely monitoring patients and delivering useful insights back to clinicians. One example is a device for the detection of arrythmias, where the patient wears a sensor that captures every heartbeat for up to two weeks. The device collects the data, transfers it to a central location for analysis and delivers a diagnostic report to the patient's physician(s) as a service.

Another is a solution that enables providers to easily perform retinal exams in a remote setting. Patients with diabetes can be at risk for losing their eyesight due to retinopathy, so they require regular screening. The clinician uses a device to take a photo of the patient's eyes, and the image is transmitted to a qualified retina specialist. Upon analysis of the image, the clinician reports back with a diagnostic screening result and recommended course of care, such as referral to a specialist.

Harnessing the value of data

As Frank explains, the volume of data generated by connected devices grows at a rapid rate. In some cases, this data has surpassed the human capacity for analysis, driving the need for artificial intelligence (AI) to help clear through the clutter and get down to what is most valuable for clinicians.

Because there are so many device manufacturers, each with their own proprietary technologies, the challenge for healthcare organizations is finding a way to collect data from each device, aggregate and normalize it, and present it in a way that makes sense. Frank speaks to one business model that has emerged as a solution.

"There are companies serving as neutral data aggregators that provide either connectivity software or data analytics on top of the information they are gathering," he comments. "They provide back to the healthcare organization workflow insights or clinical insights that drive better outcomes, whether they are better clinical outcomes, lower costs or greater efficiency."

According to Frank, collaboration throughout the healthcare industry and beyond, including non-healthcare information technology (IT) providers, is key to harnessing the value of connected device data. Hillrom has partnerships with Microsoft, Apple, Amazon and Cerner for cloud, AI and software development work.

For example, combined offerings from Hillrom and Microsoft dynamically analyze real-time sensing data from medical devices and historical medical record information and communicate potential patient risk and hospital protocol actions directly to caregivers at the point of care. They leverage Hillrom's clinical knowledge and streaming operational data from medical devices and Microsoft's cloud, including Azure IoT

and Azure Machine Learning, to help drive enhanced patient outcomes.

Cybersecurity and data standards

The Internet of Medical Things (IoMT) refers to the countless devices that collect and transmit patient data over various networks, from vital signs monitors to fitness trackers. COVID-19 has driven a surge in IoMT devices, as clinicians and patients seek ways to monitor and manage health remotely.

With device connectivity and transfer of ePHI comes heightened concerns over protecting data from cyberattacks. A recent development that points to growing worries around medical device cybersecurity is the U.S. Food & Drug Administration's (FDA) February 2021 appointment of Kevin Fu as the acting director of medical device cybersecurity within the Center for Devices and Radiological Health (CDRH), which is a newly created position.

There is also movement among the U.S. government and industry stakeholders to create a framework for interoperable, safe, effective and secure integrated medical systems, including the implementation of remote and autonomous care.

Referred to as the medical device interoperability reference architecture (MDIRA), the initiative is funded by the Defense Health Agency through the U.S. Army Medical Research and Development Command (USAMRDC) and led by the Johns Hopkins Applied Physics Laboratory (APL). APL is collaborating with a multidisciplinary team that includes the Johns Hopkins Armstrong Institute for Patient Safety and Quality; Massachusetts General Hospital's Medical Device Interoperability and Cybersecurity Program; Dräger; Philips Healthcare; DocBox; Trusted Solutions Foundry and Arcos.[7]

Dräger is contributing expertise in standardized medical device interoperability based on the IEEE 11073 service-oriented device connectivity (SDC) family of standards, which defines a communication protocol for point-of-care (POC) medical devices. The SDC facilitates interoperability among POC medical devices, and secure data exchange between POC devices and HL7 compatible clinical and hospital information systems, such as electronic health records (EHR).

"Medical device interoperability (MDI) can improve patient safety through standardization of healthcare delivery, but medical device industry contribution is needed to define technical aspects of interoperable platforms, architecture, medical devices, standards and data models that can be used across multiple medical areas," said Tobias Klotz, Systems Architect at Dräger.

"Our contributions to the MDIRA project from a research and development, and hardware and software perspective are important to the establishment of a reference implementation for secure data sharing and use to facilitate advances in healthcare diagnosis and treatment for both the military and civilian healthcare systems," he added.

The future of patient monitoring

The push toward care outside of the hospital and into the home has no signs of stopping, rather it continues to accelerate. In response to this trend, patient monitoring manufacturers, healthcare IT solutions providers and healthcare organizations must find ways to keep pace with the change.

The global remote patient monitoring market is projected to reach $117.1 billion by 2025, up from $23.2 billion in 2020.[8] While this presents significant opportunity for all stakeholders, it also presents challenges and responsibilities.

Frank says there are two key factors that the healthcare industry must address to unlock greater value from connected care.

"The first challenge is taking our proven and trusted hospital-grade technology and making it more consumer friendly," said Frank. "A nurse may be able to operate a monitor a certain way but that doesn't mean if I send it home with the patient, they will do the same. We really need to transform our ability to bring functionality into the hands of consumers."

"The second aspect critical to unlocking value is how we position ourselves to drive our own solutions, while partnering with others in the industry on advancements," Frank added. "As a device manufacturer, the days where we believed we could do everything ourselves are over. That is not the reality anymore. We will increasingly find ourselves collaborating with others in our space, and companies that may not currently play in healthcare. The question becomes, how do we do that effectively to move together with greater speed for innovation in the heavily regulated healthcare environment?" **HPN**

How high-quality consumables support care continuity

David Karchner

When it comes to patient monitoring and continuity of care within the four walls of the hospital and beyond through to long-term care and the patient's home, high volume medical supplies and accessories are an important consideration, explains David Karchner, Sr. Director of Marketing, North America, Operating Room, Patient Monitoring, Enterprise Services, Dräger:

"Despite their small price tags, their impact on clinical outcomes and cost can be significant. Products such as blood pressure cuffs, breathing circuits/components, ECG leads and temperature probes come into direct contact with the patient so they must be both comfortable and durable."

Karchner notes how when patients are transferred between departments in a hospital, let's say from the operating room (OR) to the intensive care unit (ICU) to the step-down unit, it is common for a patient's monitoring accessories to be switched so they are compatible with different monitoring devices in each of those care settings. He says a better approach is for the hospital to select disposable and reusable supplies that are compatible with a variety of manufacturers' devices when used with appropriate adapters and trunk cables.

Dräger provides a variety of high-quality single patient use and reusable medical accessories that can help manage infection control; support the care and comfort of the patient; provide caregivers with products that are intuitive to use and balance administrative challenges.

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Sterility, utility, facility

Must-haves for storing sterile instruments

by Kara Nadeau

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Most Central Service/Sterile Processing & Distribution (CS/SPD) departments today must contend with storage spaces designed and built decades ago, when the number and variety of surgical instruments was much lower. Even those that have updated storage areas and equipment over the years find their upgrades becoming obsolete as their surgical services and volume of procedures continuously grow.

"There has been an increase in the number of instrument trays used per procedure," said Cory Ezell, North America Sales Director for Belintra, partnering with O&M HALYARD. "For instance, a procedure five years ago may have only required three instrument trays. That same procedure today may require five trays to accommodate specialized products, which would be an increase of 40%. The SPD may not have enough space to accommodate the increased number of trays."

Adequate storage space and equipment designed to protect the integrity of sterilized items are important in many different ways. From a workflow perspective, the ability to easily find what is needed for a case increases efficiency in the CS/SPD and enables department professionals to support on-time procedure starts.

"The lack of space is always a big challenge for the SPD," Ezell added. "We've seen hospitals go through construction of new operating room (OR) suites or remodeling without thinking about the needs of sterile storage. Often the footprint of the SPD is reduced to the point that it cannot accommodate the number of sterilized trays needed to support the number of OR procedures being conducted."

Maintaining the sterility of items, through intact sterile wrap and/or properly sealed containers, prevents the need for reprocessing, the risk for case delays, and most importantly, the risk for contamination and subsequent patient infections.

For example, the Hospital for Special Surgery in New York was experiencing approximately 30-40 holes per day before implementing a new solution to protect wrapped trays, which reduced the number of holes to an average of five per week (see full story in this article).

Then there are staff safety considerations as well. Poorly stacked trays and containers, the need to place heavy trays high up on shelves due to space constraints or having to bend down to pick weighty trays up off from lower shelves all put CS/SPD professionals at risk for injury. Ease of access makes it safer and easier for staff members to do their jobs. And with the critical role that the CS/SPD plays in patient care, healthcare facilities can't risk losing their talent for any time period.

In recognition of the importance of safe, sufficient and sustainable storage in the CS/SPD, healthcare facilities are investing in this area, and suppliers are delivering new innovations to support efficiency, safety and quality goals.

How Hospital for Special Surgery Supports the OR with Sterility Protection

The Hospital for Special Surgery (HSS) in New York has been ranked by U.S. News & World Report as the number one hospital in the nation for orthopedics for 12 years in a row. Its surgeons perform more than 32,000 surgical procedures annually, including more hip surgeries and knee replacements than any other hospital in the U.S.

Orthopedic surgical trays are notoriously heavy, straining the barriers of sterile wrap. According to Richard Ortiz, CST, Senior Director, Central Sterile Processing (CSP) and Durable Medical Equipment (DME) for HSS, holes in wraps were a "huge issue" for the hospital.

"It led to CSP needing to reprocess trays and delays in the OR. Sometimes the hospital did not have extra trays because they were loaner trays, and this delayed cases," Ortiz explains. "We used corner guards and still do but most of the rips/tears/holes are found in the spine of the tray, not the corners."

With approximately 30-40 holes in wrapped trays per day, Ortiz and his team knew they had to take action. They implemented Tray Belts from Cygnus Medical, which provide a cushioned barrier from the many sharp edges that can easily rip and tear sterile wrapping. A CS/SPD staff member applies a belt to the tray after wrapping it, protecting it from the external damage that can occur during sterilization, storage and transport.

"We now average five holes per week. So, it was a significant difference," said Ortiz. "We can rest easier with the use of

Wrapped instrument sets protected by Cygnus Medical's Tray Belts.

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the Tray Belts knowing the tray is protected from rips, holes and tears."

Ortiz says the response from the OR staff and surgeons has been extremely positive. It has enabled both the CS/SPD and OR teams to be more efficient. When HSS first began using the Tray Belts on select trays, they found surgeons questioning trays that did not have the belts. This prompted the hospital to expand belt use on all trays processed through the CS/SPD.

"If the surgeons are noticing it, then it is a win," said Ortiz. "It is definitely a win for operations. The Tray Belts pay for themselves."

When asked for advice by other CS/SPD teams when implementing the Tray Belts, Ortiz says communication and collaboration between the CS/SPD and OR teams is important to compliance. The Tray Belts are a "visual cue" to the staff. They provide a reminder that the trays need to be handled carefully to prevent rips/tears/holes.

Container considerations

As Aesculap CSD Lead Consultant Juan Ramos, BSBA, CRCST, CIS, CHL, LGBC, points out, rigid containers serve as an alternative to sterilization wrap when it comes to protecting the integrity of sterilized instrument sets.

"Sterilization containers allow for the proper organization, packing and appropriate sterilizing agent penetration while maintaining the integrity of the package from sterilization until use in the OR," said Ramos. "Additionally, containers facilitate standardization, reduce waste and help decrease surgery setup times."

The Aesculap SterilContainer System features an extensive range of container sizes and heights to meet all of a CS/SPD instrument sets requirements. Its lightweight aluminum construction is 15% to 20% lighter than leading competitors, helping departments meet the Association for the Advancement of Medical Instrumentation (AAMI) 25lbs weight recommendation. The 90° Stop handle protects staff from finger injuries during handling, and the single motion latch design secures the container quickly to reduce time and hassle in CS/SPD and OR.

Aesculap SterilContainer System

"Sterilization containers are one of the best tools available to the nursing team to prevent nosocomial infections," Ramos added. "Adherence to the manufacturers' instructions for use (IFU) is paramount for sterilization containers' effectiveness."

Beyond instruments

While huge instrument tray sets are the most visible challenge to space constraints, it is important to consider all of the other supplies required in the OR and other procedural areas.

One example is surgical skin markers. Preventing mistakes in surgery is one of The Joint Commission's 2021 Hospital National Patient Safety Goals. The agency recommends marking the correct place on the patient's body where the surgery is to be done to make sure that the correct surgery is done on the correct patient and at the correct place on the patient's body.[1]

Nina Morales, Marketing Associate for Viscot Medical, says the company packages several of its non-sterile marker product lines in clear, plastic containers that are easy to store, identify and access.

"The cylindric plastic containers are more compact and have less wasted space internally than boxes," said Morales. "The containers have a smaller footprint than most boxes, so they take up less space on a shelf or table and can be easily stacked. They're clear, making the stock easily visible. There's less concern for ordering too soon or too much when you can see exactly how much you have left."

Viscot surgical skin markers

How UPMC Shadyside Hospital maximized storage space, and workflow efficiency

UPMC Shadyside Hospital in Pittsburgh offers a wide range of surgical procedures, including robotics, as treatments for many diseases and conditions. U.S. News & World Report consistently ranks the hospital among the nation's best hospitals in many specialties.

Storing instruments and supplies for a broad range of surgical specialties and accessing what the OR team needs was a significant challenge for the hospital's CS/SPD team.

"It was difficult to put trays in the storage area, which impacted our workflow greatly," said Tiffany McCarthy, CST, CRCST, CHL, CIS, CER, Supervisor Central Sterile Processing, UPMC Shadyside Hospital. "Use of an instrument tracking system to scan trays to the shelf was difficult. There were challenges in keeping the tray inventory organized by service and being able to add new inventory. The quality of the instrument wrap was constantly compromised by the wire rack of the shelving."

Because of space constrains in the CS/SPD, the team had no choice but to store trays in the OR. They also lacked adequate space to store case carts, which compromised case cart picking. According to McCarthy, her team spent one hour each day clearing aisles of carts, supplies and other items before case cart picking could begin.

McCarthy and the CS/SPD department director, Michael Loadman, looked at several different storage system options and met with different vendors. The challenge was finding a solution that would fit within the department's storage footprint. As McCarthy explains, there were not many options that would accommodate their physical space. Ceiling height and columns in the room made the different configurations unusable.

"DSI agreed to conduct small trial space to see the impact of its storage units," said McCarthy. "We were pleasantly surprised on how spacious the shelving unit was and how we gained usable space. Since the shelves are adjustable there is no longer dead space in between shelves. The area looks clean and organized. We were able to label each tray shelf individually. There was no longer stacking of trays which made us regulatory compliant. And DSI's solid shelves prevented holes in tray wrap."

Parallel to the DSI trial, the CS/SPD and OR teams collaborated on an analysis of instrument usage. They were able to reduce inventory of seldom-used trays by 11%, allowing for more available storage space. They reallocated the extra space to case cart storage and expanded aisle space, to allow greater efficiency in case cart picking.

When asked what advice she has for CS/SPD teams that are evaluating shelving options, McCarthy recommends starting with a test area.

"If unsure about if this is the right shelving unit for you, trial a spot in the department and see if it works," she said. "And if you like it, do it section by section. Therefore, you don't disrupt your SPD

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AAMI ST79:2017, Section 2, 2.50
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while the transitioning is happening. This gives your staff time to adjust to the change, and gives a chance to go through inventory and decide if every tray is needed or can you dispose of some to give future trays a home."

"If choosing the DSI shelving unit, take into account the heaviness of your trays. Don't store heavy trays on top of shelving," McCarthy added. "Try to think about your employees and how tray size could affect them getting it safely. Think about your pick tickets and see if you get trays near each other so when picking cases, it would be quicker and more efficient for staff, especially in emergencies."

UPMC test trial area before (left) and after (right) incorporating DSI shelving

Consider going modular and/or mobile

Two options for those CS/SPD short on storage space are modular or mobile instrument and supply storage units. For example, Ezell says Belintra's UBeFlex modular storage system is uniquely designed to overcome challenges by providing extensive possibilities of configurations using various widths and a combination of shelving sizes to optimize available space. They also offer a full line of closed and open transport options for transporting sterile and non-sterile trays.

"Every space is different. For example, one of our customers in Texas was able to store 1,500 trays in 450 square feet," he said.

Belintra also offers mobile storage options to protect vendor trays during storage and transport. As Ezell explains, trays not utilized in the procedure can be wheeled back to the storage area or staged for pick up.

"Just as important as the product itself is the team who provides assessment and installation," he said. "Our trained and certified installation team leverages their firsthand experience working in the SPD to set your team up for success. Our team can be contacted for a no charge, onsite assessment."

The SMART-FOLD STERISYSTEM from HALYARD and BELINTRA

Questions to ask and steps toward success

Poorly stored and organized instrument trays can result in a "snowball effect," ultimately compromising patient safety and care," Ezell explained.

"If trays either don't have a home, are poorly organized, labeled illegibly or are missing, this can impact staff time and satisfaction as they struggle to find the correct tray," he said. "This can bleed into the OR in the form of delay times or worst-case scenario, a rescheduled procedure. With the cost of an OR minute being estimated at between $22-$133 a minute, that is not something that any facility would want to incur. As you could imagine, this leads to additional staff and physician dissatisfaction."

"From the patient's perspective, if the physician is having to use a tray of instruments that they are not familiar with because their regular set cannot be found or is compromised, it could potentially lead to a medical error. If the tray needed cannot be found, the procedure may be delayed or cancelled, which is less than ideal, especially in the case of an emergency," Ezell said.

When asked how a CS/SPD can overcome these challenges, even leveraging its existing storage space, Ezell recommends they ask themselves the following questions/take the following steps:

- **Understand utilization**: What is the growth plan for your facility? Will you be adding surgeons or specialties? If so, do you have enough space that is optimized to accommodate the number of trays needed?
- **Determine an accurate instrument tray count:** What are you using today and what are your planned future purchases? Be sure to account for the percentage of vendor trays that are in use. Are you considering adding vendor trays to consignment? Will they live at the facility full time or only be brought in at the time of procedure?
- **Analyze and adapt workflow**: Develop a workflow to minimize the number of touch points for each instrument tray. It is important to understand the flow between decontamination, sterilization, storage and transport to the OR and identify any opportunities in the process. The entire puzzle must be reviewed, not just a single piece.
- **Maximize your footprint**: Ezell says he has seen redesigns in which the CS/SPD was one of the first areas to be cut regarding space and they ended up with less room than expected. He notes that there are options to maximize dead space or the air space between each rack to store the number of trays needed.

"It's important to consult with experts with SPD experience who understand the potential pitfalls and can aid in construction and design," said Ezell. "Ideally, these experts are brought in to help before blueprints are even drafted to assess current workflow, and understand future goals and growth in order to best suggest space requirements moving forward." HPN

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LEARNING OBJECTIVES

1. *Understand the background and make up of chemical sterilization indicators (CIs)*
2. *Understand the way in which chemical indicators change color during exposure to sterilization processes*
3. *Understand how and under what circumstances chemical indicators are used*

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SELF-STUDY SERIES

Chemical Indicators for monitoring sterilization processes

by Brian Kirk

There are many processes used for the sterilization of single use and re-usable medical devices.[1] In industrial settings where large scale sterilization takes place, physical processes such as irradiation with gamma, e-beam or "soft" X-rays and chemical processes employing ethylene oxide gas, are used. Steam sterilization is extensively used in the Pharmaceutical Industry to produce many water based injectable fluids. In the healthcare sector such as hospital sterile processing departments (SPDs), or dental surgeries and general practitioner's offices, steam sterilization is the predominant process used. In hospital SPDs there are some reusable medical devices such as flexible endoscopes, which need to be sterile but cannot withstand the high temperatures and pressures used in steam sterilization. In these cases, low temperature sterilization processes are used employing ethylene oxide or vaporised hydrogen peroxide. Low temperature steam mixed with formaldehyde vapor is also used in some countries, but not in the U.S.

Whichever and wherever a sterilization process is used, it must be validated and routinely monitored to ensure ongoing efficacy.[2] The characteristics that must be monitored within the process are those that kill any microbial contaminants present on the medical device; these are called the process variables.[3] Thus, for example, in steam sterilization, the characteristics of the process which cause microbial kill are the temperature and time of exposure in the presence of moisture.[4] The steam sterilization process takes place in a saturated steam environment in a sealed pressure vessel (called an autoclave), so moisture is present in a more-than-adequate amount. However, the presence of residual air from an inadequate air removal stage during the process or the presence of contaminating gases in the steam supply (called non condensable gases; NCG) can lead to inadequate moisture levels at the surfaces that need to be sterile. This compromises the efficacy of the process.

There are three basic methods for monitoring sterilization processes. One measures the physical characteristics of the process such as temperature or time of exposure (physical indicators). Another consists of a preparation of bacterial spores, presenting a known resistance to the process, but inactivated by an efficacious process (biological indicators). The third method consists of a mixture of reactive chemicals (printed on a substrate) that responds to defined characteristics of the processes so that visible change is observed after suitable exposure (chemical indicators; CIs). It is the purpose of this series of articles to expand further on this latter approach for monitoring sterilization processes.

CIs for monitoring sterilization processes

Historical perspective:

Chemical indicators are, in essence, products which give some visual evidence of exposure to a specific combination of process variables. Thus, in moist heat sterilization they respond to time and temperature in the presence of moisture when autoclaved. Chemical indicators have been used for many years and textbooks from the early part of the 20th century discuss their use.[5,6] One of the earliest was a wax plug enclosed within a sealed glass ampoule, called a Diak tube,[7] designed for monitoring steam sterilization processes and still available today. The wax melts at the sterilization temperature indicating that at least this had been achieved but provides no evidence of time of exposure or presence of moisture. Autoclave tape has been used for many decades.[8] Several studies have been conducted to assess CI performance,[9,10] including one in 1958 by the famous microbiologist, Kelsey, who proposed the attributes of the ideal chemical indicator.

"The ideal chemical indicator should follow a temperature time curve which runs parallel to that of a pathogenic spore bearing organism but offset by a distance which allows a reasonable margin of safety…… The indicator should show an unequivocal color change which is completed

suddenly at the end of the exposure time and it should be stable in storage, cheap and, if possible, sensitive only to moist heat….."

Chemical Indicator formats.

The simplest form of chemical indicator is an ink printed on a substrate. The substrate may be paper or plastic based and used to make an adhesive label which can be fixed onto the outside of surgical instrument sets and sterile packs. The ink might be printed directly onto sterile packaging materials such as paper bags or pouches. The ink might also be applied to adhesive tapes to make indicator tape which can be used to secure instrument sets wrapped in flexible wrapping materials.[8]

There are also special kinds of chemical indicators, called "moving front" CIs.[11] These CIs have a more complex construction. They consist of a pellet of dye which is placed within an indentation on a foil base. A paper wick is then placed in contact with the dye pellet and the whole assembly then sandwiched between a semi permeable membrane and the foil base. An adhesive label is then usually placed over the semi permeable membrane with informational material printed on it. Figure 1, below, shows the construction of a typical moving front chemical indicator.

In recent times a new kind of CI has been introduced in which the indicator ink is printed on a substrate covered with an impervious polymer sheet with gaps cut along its length. Beyond the "accept" line printed on top of the CI, the overlying sheet totally encloses the ink creating a small gap down which the sterilant must penetrate to affect the color change.[12]

Chemical Indicators have also been supplied in other formats in which they are incorporated into some form of test device which is then used in a special test to ensure the sterilizer is functioning correctly, for example the Bowie and Dick test.[13]

Chemical indicator inks.

The inks used for making printed CIs are usually made from chemical substances which react together when exposed to the process variables of a sterilization process. For example, in steam sterilization the presence of moisture enables the reaction to rapidly take place and the time and temperature of exposure enable the reaction to proceed at an appropriate speed so that the color change occurs by the end of the process. The chemical reactions which take place usually give rise to a color change which can then be interpreted by the observer. As an example, two reagents may be included in the ink which give a cream starting color but during the reaction they combine to give a black colored by-product.[13] These inks often contain inorganic chemical reagents. Alternatively, the color change may be due to the two reacting chemicals giving rise to a change which cause an additional reagent included in the ink to change color. For example, the ink may contain a pH indicator which changes color due to the release of an acidic by-product from the reaction between the two principal reagents. These inks often contain organic chemical reagents.[15] A third category of ink is one in which the moisture present in the sterilization process causes the ink to change color. In this instance the chemical reagent is reacting with the moisture in the steam to change from one hydrated state to a second,[16] this giving rise to the color change. Figure 2 shows examples of the reactions which are used. It is important to recognise that CIs are designed for use in specific sterilization processes because the chemical reagents included react to the process variables associated with the sterilization process. Thus, a steam CI should not be used in an ethylene oxide sterilization process and vice versa because the EO indicator will have reagents which are designed to react with the EO present in the process.

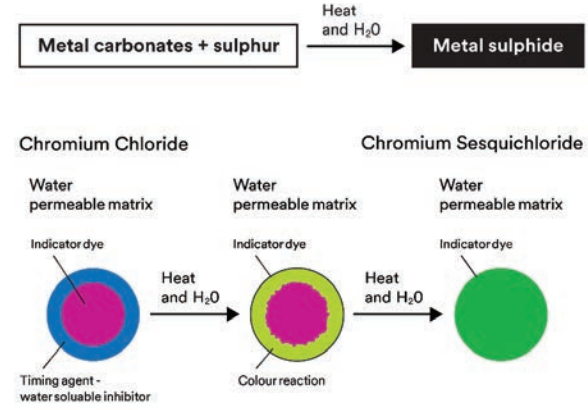

Figure 2:
Some exampls of chemical reactions used in chemical indicators

For moving front chemical indicators, the color change is due to a physical change - rather than a chemical reaction. When exposed to the process variables the dye pellet enclosed within the sandwiched layer of foil base and semipermeable membrane (see figure 1) melts and begins to migrate along the attached wick due to capillary action. The speed of migration is governed by the temperature of exposure and by the presence of moisture passing through the semipermeable membrane.[11, 17]

The nature of the color change.

The nature of the color change depends on the reactions taking place within the ink. For some color change indicators, the change from the starting color to the end color is gradual. Figure 3 shows a plot of the depth of color (optical density) occurring as the time of exposure in a steam sterilization process progresses. It can be seen from the shape of this curve that as the exposure time increases the speed at which the color changes slow down until it reaches a plateau. For other printed inks the color change may be quite rapid at a specific point in the reaction. Thus, the starting color is maintained until a predefined exposure time is reached at which point the color changes to a second color over

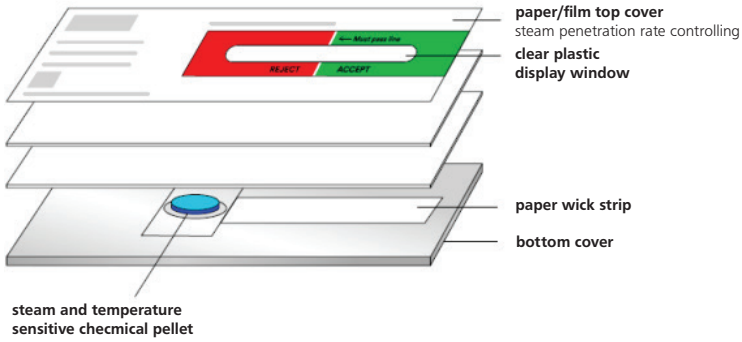

Figure 1:
The construction of a moving-front chemical indicator showing an aluminum platen (bottom), and indicator dye pellet (indicated), a paper wick (indicated), a semipermeable membrane (middle) and a paper label showing graphics (top).

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

a period of a few seconds and then stays at that color for the remaining exposure time.[15]

For CIs used in special tests the indicator ink will be designed to react to certain conditions occurring in the sterilization process. As an example, in the Bowie and Dick test, the indicator inks will be designed to change color when exposed to a specified temperature (.g. 134ºC) for a defined period (3.5 minutes) when in the presence of moisture (saturated steam). The sensitivity of the ink towards moist heat conditions is especially important in this test since the concept behind the test is that any residual air within the test device prevents the ingress of moisture and so the ink does not change color.[13]

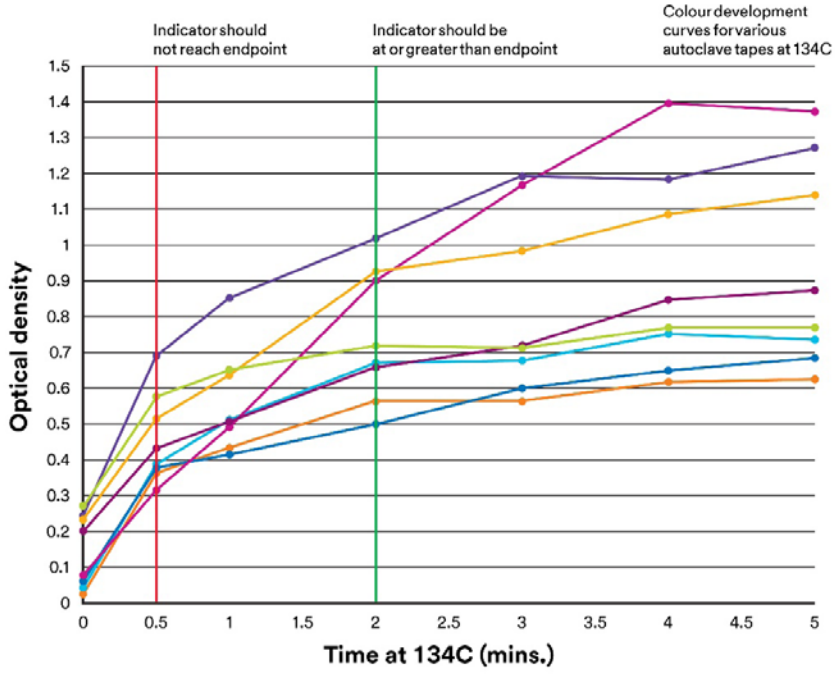

Figure 3:
Graph showing the color change of some chemical indicators printed on commercially available autoclabe types. The vertical lines show the exposure conditions to whicha type 1 process indicator must show a fail result (red line) and pass result (greenline).

The use of chemical indicators.

Chemical indicators are used to monitor various aspects of a sterilization process and can be divided into three categories based on how they are employed:

- External chemical indicators
- Internal chemical indicators
- Special test indicators.

External chemical indicators are placed on the outside of every sterile pack to give a clear indication whether the pack has been exposed to a sterilization process or not. It is important to understand that these types of indicators do not provide any evidence that the pack is sterile, but simply that the pack has been put through a process. The overarching purpose of such indicators is to ensure that instrument packs which have not been processed are not released from the SPD and aid product flow through the SPD. They are also used by the operating room professionals to again ensure that they are using a sterile set which has been processed. Such indicators should have a very clear color change which cannot be misinterpreted.

Internal chemical indicators are placed inside sterile packs during assembly. They are designed to indicate that sterilizing agent has penetrated through the packaging materials and appropriate conditions have been met at the point of placement. It is important to understand that such indicators cannot alone be used to judge if the pack is sterile; other factors must also be considered.[2] Internal pack indicators are primarily interpreted by the OR practitioners, and it is vital that they are appropriately trained in the interpretation of the CIs and have available appropriate reference material such as wall charts and clear instructions. It is vital that the SPD has a good communication channel with the OR management teams so that any changes in the internal indicators used can be communicated to the end user.

Special Test Indicators are used in specific performance tests described in standards and guidance documents to ensure that the sterilizer is performing according to specification. An example of such a CI would be the Bowie and Dick Test, which employs a chemical indicator placed within a stack of textile material (13). When used daily within the sterilizer, the test is designed to assess the capability of the process to remove air and enable steam penetration. The test is described in many standards and guidance documents[2, 4] and involves placement of a chemical indicator A4 sheet placed in the centre of a stack of towels. There are many alternative commercially produced test packs available which have equivalent performance but are more consistent and convenient in use.

Conclusions

Along with Physical measurements and Biological Indicators, Chemical Indicators are one of the three basic types of technology which can be used to routinely monitor the efficacy of sterilization processes used in industry and the hospital SPD. They can be used to identify unprocessed from processed surgical instrument sets when adhered to the outside of packs thereby avoiding non sterilized packs being sent to the OR department. They can be used to indicate that sterilizing agent has penetrated through the sterile barrier system packaging and stated exposure conditions have been met thereby avoiding inadequately or incorrectly processed loads being used.

Chemical Indicators are therefore an extremely useful and practical tool for ensuring SPD processes are functioning correctly. HPN

This article is part of a three-article series. Part two will be in our December issue.

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CONTINUING EDUCATION TEST • OCTOBER 2021

Chemical Indicators for monitoring sterilization processes

Circle the one correct answer:

1. **Radiation sterilization is used extensively in hospitals for sterilizing surgical instruments**
   A. True
   B. False

2. **Steam Sterilization is used to sterilize many intravenous infusion fluids.**
   A. True
   B. False

3. **Select the basic method for monitoring sterilization processes:**
   A. Chemical Indicators
   B. Biological Indicators
   C. Physical Indicators
   D. All of the above.

4. **Chemical Indicators were first used in...**
   A. The 1600's
   B. The 1700's
   C. The 1900's
   D. The 2000's

5. **What is a characteristic of a moving front CI?**
   A. A dye pellet
   B. A foil base
   C. A semi permeable membrane
   D. All of the above

6. **Some chemical indicators rely on physical changes to cause the color change.**
   A. True
   B. False

7. **There are three basic uses of CI's. Indicate the correct ones.**
   A. External CIs
   B. Internal CIs
   C. Special test CIs
   D. All of the above.

8. **Internal CIs are designed to show that the pack is sterile.**
   A. True
   B. False

9. **The Bowie and Dick test is used to test a sterilizer:**
   A. Hourly
   B. Every Shift
   C. Daily
   D. Weekly

10. **Commercially produced Bowie and Dick Test packs must have equivalent performance to a standard stack of towels with a CI sheet.**
    A. True
    B. False

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Proteolytic detergents; instruments common to open-heart surgery

by Stephen Kovach

Q Can you explain what the term "proteolytic detergents" means to people working in a medical device reprocessing department?

A Proteolytic detergents are any detergents that breakdown protein soils. This includes protease enzyme detergents, high alkaline detergents, neutral detergents—any detergent designed to hydrolyze and breakdown proteins. Blood is the number one soil on the majority of clinically used medical devices. Since blood is made up of proteins, it makes sense that cleaning chemistries be formulated to clean blood off of medical devices. Cleaning chemistry companies look to ASTM standards to help show their products can do what they say they do, which is to remove blood protein and other soils from medical devices.

Why do I mention ASTM? ASTM International, formerly known as the American Society for Testing and Materials (ASTM), is a globally recognized leader in the development and delivery of international voluntary consensus standards for materials, products, systems and services used in healthcare, medical device design, and many other industries.

ASTM has many committees focused on medical device products. Using ASTM test methods can help users to independently compare cleaning solutions using standardized tests for evaluating their effectiveness. I will highlight some ASTM standards that I feel users should ask for when comparing or changing cleaning chemistries, or cleaning verification tests for challenging their equipment's ability to clean blood, protein, and other soils from medical devices.

1. ASTM D7225-13(2019)e1 Standard guide for blood cleaning efficiency of detergent and washer disinfectors
2. ASTM D8179-18 Standard Guide for Characterizing Detergents for the Cleaning of Clinically Used Medical Devices
3. ASTM F3208-20 Standard Guide for Selecting Test Soils for Validation of Cleaning Methods for Reusable Medical Devices
4. ASTM F3293-18: Standard Guide for Application of Test Soils for the Validation of Cleaning Methods for Reusable Medical Devices
5. ASTM F3321-19: Guide for Methods of Extraction of Test Soils for the Validation of Cleaning Methods for Reusable Medical Devices
6. F3438-21 Standard Guide for Detection and Quantification of Cleaning Markers (Analytes) for the Validation of Cleaning Methods for Reusable Medical Devices

These are just some of the tests I would use. You may combine the results from these standardized tests with other information, and you can make an informed decision based on data and science to keep or change your cleaning chemistries and/or cleaning verification tests. You can purchase the ASTM Standards at www.astm.org.

Q I just moved to a major hospital that does open heart surgery. Where I worked before, we did not do those type of procedures. It is a lot of new instruments. What is the best way to learn them?

A The way you worded your question, I must assume you do not have a dedicated educator at your new facility. My advice is the following (not necessarily in this order):

- Recheck with your manager on what they already have for training in the department for cardiovascular instruments.
- Ask who is your main supplier of surgical instruments and see if the company has any learning exercises on cardiovascular instrumentation.
- Ask your manager who is the best person to mentor (shadow) within your department for these instruments.
- Ask to spend a day in one of the cardiovascular operating rooms (OR) to observe surgery.
- After the observation, ask an OR staff member to share how they have learned cardiovascular instrumentation.
- Search on the Internet under, "cardiovascular instrumentation," to find programs to help you learn these instruments.
- Take lots of notes and pictures, and create your own "book."

Remember, you were hired because you have the critical thinking skills to work at your new facility. Take this opportunity to show you have what it takes and put in place a training program on learning these instruments for others (both new hires and current department staff) as a refresher guide.

Lastly, if you are certified with IAHCSMM, apply to write your fellowship on how you put a learning program together for cardiovascular instrumentation, or a poster for the annual IAHCSMM meeting. I think it would be a great topic for either project. You have identified a concern, worked with others to resolve the learning knowledge gap, and, thus, improved quality in the department by increasing the knowledge of all staff. Good luck on your new journey. HPN

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Sterile Processing Week

Thoughtful planning sets stage for long-term benefits

By Julie E. Williamson

There are many more reasons to celebrate Sterile Processing Week (Oct. 10-16) than just food, beverages, decorations, games, and an educational inservice or two added to the mix. While those all have a welcomed place in Sterile Processing departments (SPDs) during the course of the honorary week, proper planning can yield far-reaching perks that benefit the team in big ways—long after October draws to a close.

Over the years, many SP professionals have shared with the International Association of Healthcare Central Service Materiel Management (IAHCSMM) how their advanced and thoughtful Sterile Processing Week planning led to greater recognition and understanding of the SPD's hard work and critical contributions to patient care (from not only the departments they serve but those in the C-suite). Often, that garnered improved employee satisfaction and interdisciplinary teamwork, and in some cases, even healthier budgets, to ensure SP professionals have the vital resources needed to manage their daily responsibilities effectively, efficiently and safely.

Open invitations close gaps

Sterile Processing Week affords the opportunity to bridge disciplinary gaps and demonstrate firsthand the skills, hard work and diligence required to meet customer demands and promote positive patient outcomes. Getting there requires SPD leadership to invite representatives from these other departments to participate in Sterile Processing Week events. Ideally, this will include departmental tours and SP-led education to demonstrate all that goes into every processed instrument, from decontamination to sterilization, preparation and packaging, storage, and delivery for patient use.

"Developing better relationships with administrators and those in infection prevention, surgical services and beyond is very important," stressed Damien Berg, BA, BS, CRCST, AAMIF, IAHCSMM's VP of Strategic Initiatives. He explained that forging more fruitful relationships with the C-Suite, for example, helps them better understand and even visualize the vital role of the SP technician and the value that well-trained, certified and competent staff members in the SPD bring to the organization. And it can begin with a simple conversation and invitation during SP Week.

That approach has worked well for the SPD at Eastern Idaho Regional Medical Center in Idaho Falls. According to the facility's SP manager, Jan Prudent, BA, CRCST, CIS, CHL, the department hosts open houses that blend refreshments with "Did You Know?" fact sheets to spotlight the various processes within the department, and the SPD's many accomplishments. All senior leaders within the facility are invited to participate, along with surgeons and other staff members from the Operating Room and other hospital units. Prudent and her SPD team also celebrate the governor's proclamation for Sterile Processing Week. The organization's senior leadership participates by including a copy of the proclamation and a brief explanatory writeup for the hospital's newsletter. The SPD's certified employees are also recognized in the newsletter. Beyond that, bulletin boards are posted around the facility to showcase the SPD's successes and the many ways the department's professionals impact patient care and patient safety.

"A congratulatory email is sent out to SPD staff, OR leadership and the C-suite, and the email goes 'viral' with everyone chiming in with their appreciation of the accomplishments," Prudent said. "Our CEO seems to always be the first to respond."

In Hartford, Conn., the SPD at the Bone & Joint Institute at Hartford Hospital carves out time to celebrate Sterile Processing Week but is wholly dedicated year-round to drumming up broad, facility-wide support and recognition for its hardworking team. As Education Coordinator, Sarah B. Cruz, CRCST, CHL, CSPDT, noted that the SPD adopted a targeted education program to raise the profile of the SPD across all hospital leaders. She explained how the facility's chief surgeon—a loyal SPD advocate—helped her launch a program to enhance the relationship and teamwork between the two departments. Under this program, the SPD chooses one doctor per month and works to address their instrumentation concerns.

For other SPDs who might be struggling to gain similar support and attention from their facility's leaders, Cruz reminds that solid, well presented data is essential. "You need to document your department's successes and track the progress and challenges along the way."

Whether SP professionals already have strong partnerships with those in the OR, infection prevention and the C-suite or are still hoping to make those breakthroughs, Berg reminds that Sterile Processing Week is the perfect opportunity to open those doors.

"When I served as regional manager for UCHealth in Northern Colorado, we found that celebrating Sterile Processing Week led to year-long recognition of our department and staff, Cruz said." Each month, the department recognized one employee for their contributions to the team, event participation and dedication to quality, safety and customer service, he said.

"Every SPD should take time to honor their team and profession during Sterile Processing Week, and I strongly encourage that they plan well to make the most of each of those days. But we shouldn't limit recognition and acknowledgments to just that one week," Berg said. "The real benefits come when it's an ongoing endeavor." HPN

Free IAHCSMM Resources Help Create Your Best Sterile Process Week Ever

IAHCSMM offers many free resources to help SP professionals kick their celebrations up a notch. These resources include Sterile Processing Week customizable templates (notecards, posters, appreciation certificates and more) that can be downloaded and printed; tips to boost organization-wide awareness and participation; and inspiring ideas to blend high-impact education with the week's celebratory events. Visit iahcsmm.org/about/sp-week.html to access these resources.

A show of hands

Technology makes a solid showing in the world of hand hygiene compliance monitoring

by Nancy Pasternack

Photo credit: peterschreiber.media | stock.adobe.com

Nearly two years after U.S. hospitals documented their first cases of COVID-19, calls for vigilance in hand hygiene protocols have not let up.

Neither has the demand for hand hygiene-related products.

"Hand hygiene has always been a top priority for healthcare facilities," says Deborah Chung, North America Marketing Manager, Healthcare/Professional Hygiene for Essity.

The emergence of the SARS-CoV-2 virus, followed by its virulent and highly transmissible Delta variant, have kept hand soaps, hand sanitizers – and especially EMS technology – front and center.

"People are now more aware of their own need to follow proper hygiene practices," Chung said. Her company makes Tork skincare solutions, including Tork Alcohol Gel Hand Sanitizer, and Tork Vision Cleaning, an electronic monitoring system (EMS) that reports hand towel, toilet paper and skincare product use. It uses high-resolution indoor positioning technology which can, according to the company's website, "provide healthcare professionals with more accurate data that can be presented to staff in real time."

It's one of a diverse and growing array of technology-based hand hygiene monitors now on the market.

The pandemic heightened awareness about the virus' high transmissibility, and the need to find products, "to effectively wash, dry and sanitize hands to prevent the spread of illness," Chung said.

Demand for hand sanitizer, across all segments of the healthcare landscape, has been strong.

During COVID-19's early surges, "many hospitals across the country reported hand sanitizer usage of three-to-four times normal levels," says Jaimee Rosenthal, Acute Healthcare Market Director of GOJO Industries, which makes PURELL hand sanitizers.

To keep up with elevated demand, she said, "GOJO substantially increased both production and distribution capacity and created a vertically integrated supply chain." Rosenthal said. Her company responded quickly to the spike in demand, "to ensure we can be even more effective and efficient as we support our customers."Yessica Artzerounian notes several purchasing trends in her role as Senior Portfolio Executive at Vizient.

Her company, which boasts a membership of more than half the healthcare organizations in the U.S., leverages its scale as purchasing power for hospitals, academic medical centers, pediatric and other healthcare facilities.

Recently, Artzerounian said, "our members have diversified their purchasing strategy to incorporate different sourcing streams."

She has seen other market changes too.

"Our members have pivoted from gel hand sanitizing products to foam products when possible," she said. "Foam has efficient sanitizing dosage that improves the total cost investment and higher skin health satisfaction reviews from our frontline users."

Diversification

Artzerounian said the product diversification she has seen in members' purchasing habits includes increased investment in electronic monitoring.

"Infection Prevention teams across the U.S. are revitalizing their overall approach to hand hygiene and looking into technology such as hand hygiene compliance monitoring systems to help them do so," she said.

"The goal is to implement a hand hygiene program for their team to provide top quality care by committing to high hand hygiene standards to reduce infections or the spread of disease," she said.

Healthcare products company GOJO offers its own technology-based monitoring system.

The GOJO SMARTLINK system was used recently in a hand hygiene compliance study conducted at The University of Chicago Medical Center. Findings from that study were published in the July issue of the *Journal of American Medical Association*.[1]

"An infrared sensor anonymously records all dispenser uses, and entries into and exits from inpatient rooms," to estimate hand hygiene compliance, according

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1. KCP Onvation Study, 2017.

to an explanation of GOJO's product in the study summary.

The data collected by these devices can reveal useful information to healthcare facility leadership and staff, not only by looking at day to day hand hygiene compliance, but by revealing more long-term compliance trends.

For instance, Rosenthal of GOJO said, "Hand hygiene compliance rates increased dramatically during the first few months of the pandemic but have since gone back to more typical levels for hospitals."

An ability to pinpoint such information accurately can assist healthcare workers in reversing those compliance declines and help save lives in the process.

The Hawthorne Effect

GP PRO's own EMS, the SafeHaven Personal Hand Hygiene Monitoring System, was activated in April of this year at Gulfside Healthcare Services facilities in Pasco County, Florida.

Gulfside issued the small device to 220 employees who work in hospice, home health and palliative care. The portable device clips onto clothing or a lanyard, which allows the user to perform hand hygiene at any time. A small screen on the device shows the user their individual performance data. Each time a user passes one of several base stations, that data is uploaded to the Cloud and is then available on a live facility dashboard that displays aggregated facility data for management.

"You can also log in as a personal user," to check on your own hand hygiene habits, said Lindsay Cole, who runs nursing and CNA training programs at Gulfside, and helped implement the system trials.

Custom programming allows each facility to set and alter goals for different users, "depending on what is realistic for a particular job," Cole said. "Some of our staff members visit five or six locations a day, so these (devices) are our eyes when employees are off-site."

Cole said she has staff members train other staff members, and publicly recognizes employees whose hand hygiene behavior is exemplary.

Data generated by SafeHaven and other electronic hand hygiene monitoring systems, over the course of the last several years, have become increasingly regarded as reliable, according to a study published last year in the *Journal of Infection Prevention*.

The study, conducted in a National Health Service acute care medical ward in the United Kingdom, sought to measure the accuracy of EMS products as compared with manual observation-documentation techniques.[2] Those techniques, which rely upon human monitors, are still the industry standard for hand hygiene compliance monitoring.

Efficiency of EMS, according to the study's summary, "is estimated to be tenfold compared to manual monitoring."

"Less effort is required (with EMS) than with manual observation which is laborious, expensive in terms of manpower and subject to bias," according to the summary.

The range of electronic monitoring systems now on the market has grown significantly in a few short years. The ongoing pandemic provided the necessary incentive for an increasing number of healthcare facility leaders to take the leap and invest in monitoring technology.

Among electronic products now on the market is Ecolab's Hand Hygiene Compliance Monitoring System, which works by employing what its website literature calls the "Patient Zone."

The system defines an area around a hospital patient's bed for electronic monitoring, "to detect every hand- hygiene opportunity."

A badge worn by healthcare workers, "measures and records every hand hygiene event," Ecolab's website explains. "Visual and audible feedback is immediate."

Data is compiled, "to track performance by individual, department hospital or system," according to the website. "Compliance trends are reported as well as equipment status, sanitizer," etc.

Paul Alper is now the VP Patient Safety Innovation for Medline Industries, Inc. through an exclusive engagement with his consulting practice, Next Level Strategies, LLC. Medline recently formed a collaborative partnership with Intelligent Observation, to offer a hand hygiene compliance monitoring system under the brand name, IntelObserve. The technology platform behind the product – Near Field Magnetic Induction or NFMI – is new and different, Alper said.

The system monitors, "both hand washing with soap and water and the use of hand sanitizer with a high rate of accuracy", he said, "providing highly actionable data to drive sustainable improvement."

Alper, like Artzerounian of Vizient, noted that technology-based compliance monitoring is beginning to gain real traction.

The uptick in interest is due, in part, he said, to Medicare reimbursement penalties for Hospital-Acquired Conditions (HACs), and to increased standards for hand hygiene compliance, generally. Those standards have leapt forward, thanks to an industry watchdog organization called the Leapfrog Group. Leapfrog issues a grade to each hospital that is willing to be transparent with patient safety records – and most hospitals are. The grades are posted on the group's website.

But the tipping point that may very well change the landscape of hand hygiene entirely is the emergence and persistence of COVID-19.

It doesn't hurt proponents of EMS that a number of reputable institutions have now compared their rates of accuracy and influence on behavior to the traditional, human means of monitoring hand hygiene compliance.

According to results from the University of Chicago study, EMS is "far more effective than human observation in measuring compliance."

One reason for the difference, according to the study summary, is that mere observation practices capture too few hand hygiene events, "leading to inaccurate measurements."

EMS can help resolve those inaccuracies by monitoring consistently, and constantly.

Inaccuracy created through traditional human monitoring, according to the U.K. study, is due also to the "Hawthorne Effect." This principle posits that human behavior changes when the subject being monitored is aware that he is being observed by another person.

Hand hygiene compliance, according to this principle, will increase during the time a subject is being monitored in this way, then drop off precipitously once the perceived observation ends, according to the principle.

Compliance data, when collected in this way, can be skewed, "by a factor of three," according to the U.K. study.

The evidence from such studies, Alper said, suggests that long-accepted methods of direct observation, "lead to overstated compliance and a false sense of security."

And that, he says, leads to complacency.

These studies no doubt contribute to the growing popularity of EMS. It's a theme familiar to Vizient's Yessica Artzerounian.

"We expect to see an increase in use for these systems as we continue to navigate through COVID hospitalization spikes and the upcoming flu season," she said.

"2021 and 2022 will be watershed years," said Alper. Technology-based hand hygiene monitoring systems, "are going to be much more widely adopted." HPN

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PRODUCTS & SERVICES

Lab should not be overlooked in the supply chain frontier

by Rick Dana Barlow

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Some consider the work the laboratory performs to be part of the epicenter of a hospital's or healthcare organization's practice, yet the department seems to linger on the fringe of expense management attention.

Such oversight must be corrected because the department and function are too important to neglect, according to several supply chain experts who specialize in lab operations.

Mark Krhovsky

Mark Krhovsky, Vice President of Laboratory Sales, Medline Industries, calls the laboratory "one of the most critical departments in any hospital." He further cites a commonly quoted statistic that 70% of medical decisions depend on lab results.

"That alone should put the lab at the top of every Supply Chain executive's priority list, Krhovsky insisted. "Also consider that lab has historically been left to their own devices to navigate a complex market of contracts and sourcing initiatives. If I am a supply chain leader, I want to find the areas where my services and assistance can be most impactful. Undoubtedly, one of those areas is the lab, and if the lab runs well, in turn, the entire system has a much higher probability of functioning efficiently."

Eric Jurinic

Eric Jurinic, Vice President, Corporate Supply Chain, Accumen, refers to a similar statistic quoted in the peer-reviewed scientific journal, *Annals of Clinical Biochemistry*, 11 years ago. "Many people may not realize that lab results can be the majority of a patient's electronic medical record – some estimate it at 70% to 80%," he noted.

Jurinic points to the COVID-19 pandemic as a relevant and useful lesson reinforcing the need for Supply Chain and Lab to partner up.

"If the last year has taught us anything, we've realized that the Lab Supply Chain is somewhat fragile and challenging," Jurinic observed. "Many products only have one or two vendor options on group purchasing organization (GPO) contracts. This is manageable by staying proactive and thinking out of the box. We've learned there are a lot of quality suppliers out there for the same item. You just need to hunt a bit [as] they're not on GPO contracts. Supply Chain can help use their network to find other solutions, whether they be hard-to-find products or lower-cost alternatives of equal or better quality. (Editor's Note: See Chart 1 for examples.)

"As a support function, a well-managed and proactive supply chain is foundational to ensure the lab produces a quality result at the right price," he continued. "Quality, lower cost, continuous improvement are the three pillars of Supply Chain."

Barbara Strain began her healthcare career in the late 1970s as a children's hospital-based medical technologist before moving to the University of Virginia Health System for the next 34 years, first a microbiology manager, then overseeing Supply Chain analytics and then leading the system's Value Management department. Strain retired from the system in mid-2019 to launch her eponymous consulting firm.

Barbara Strain

Strain, Principal, Barbara Strain Consulting LLC, posits that Supply Chain and the Lab should make beautiful music together from clinical, financial and operational perspectives.

"For the laboratory internal supply chain to function the provider supply chain operations and external supplier processes all need to align like a fine-tuned orchestra," Strain told *Healthcare Purchasing News*. "For lack of a better term let's envision this as the 'Supply Chain Triad' [where] each part must understand the other's work streams to assure clinical decision making by relying on accurate verbal and electronic communication."

Further, Supply Chain should help the Lab master three critical articulation points that form a successful equation, according to Strain: Supplier order receipt timing to assure delivery demand, provider order requisition deadline and lab inventory cycle to match the need. (Editor's Note: See Chart 2 for examples.)

"Timing is everything, so transparency of needs and how best to tweak processes to match those needs along the Laboratory Supply Chain is critical," Strain insisted. "It starts with a Supply Chain automated and manual inventory management methodology review and alignment with leading practices to assure no links are broken and are monitored by mutually developed metrics that foster a reliable collaboration."

For Jean Sargent, a veteran hospital supply chain executive-turned-consultant, the expertise of both supply chain and laboratory professionals should be inviolable and respected, particularly as genomics emerges as part of routine lab work.

Jean Sargent

"Supply Chain are the experts in supply chain, not clinical functions, and clinicians are experts in clinical functions, not supply chain – aside from the need to have clinicians at the table for Value Analysis, etc.," said Sargent, Principal, Sargent Healthcare Strategies. "Supply Chain should be responsible for all supplies and purchases within an organization. The clinical lab annual spend is significant, and it is time for Supply Chain to step in and be the subject matter expert to support the clinical lab's needs. This allows the staff to perform the duties/functions they were hired to do. As healthcare evolves, the use of genomics will expand and become a point of discussions when products specific to a patient's needs are required. Developing that collaboration now, will set the foundation for the future conversations."

Closing the lab loop

While Supply Chain may see value in helping the Lab manage its supply chain expense stream, the Lab also must recognize

it needs, could use and should value the assistance, according to lab supply chain experts.

Supply Chain creates value by impacting three fundamental areas that most Laboratory department leaders deem important, Medline's Krhovsky indicates.

First: The direct effect that the purchasing and materials management arm of supply chain can have on budget management. "Laboratory leaders usually have oversight of their budget, but with that responsibility comes executive-level pressure to ensure the department is spending responsibly while procuring the necessary supplies to function, Krhovsky said. "However, laboratory leaders often do not have formal supply chain management training. This is why hospitals and IDN systems in the U.S. have a purchasing/supply chain department.

"I truly believe that one of the defining characteristics of labs that operate well-balanced budgets is the presence of a symbiotic partnership between lab and supply chain," he continued. "In these instances, lab leaders can lean on supply chain partners to create impactful purchasing habits that ultimately affect the bottom line of the lab."

Second: Allocation of personnel and resources. "In today's current labor climate, labs are also facing a workforce shortage while being asked to do more," Krhovsky noted. "More testing, quicker turnaround times, additional shifts, implementation of new technology and automation—all while shorthanded, and in many instances, underfunded. With this staffing crisis as the backdrop, it is easy to understand why many lab leaders and their managers and supervisors are sensitive to spending too much time searching for items within their labs, negotiating contracts with suppliers and/or attempting to find out why a product hasn't arrived in the lab on time.

"By working with Supply Chain executives and their subsequent partners, lab leaders can ensure they have sound supply chain strategies to drive workflow efficiencies, build processes for issue resolution regarding backorders and product availability, and most importantly, keep their staff at the bench leveraging every minute of their time to execute the critical work at-hand," he added.

Third: Availability of product and access to technology. "If COVID exposed anything within the healthcare market, from both a provider and supplier standpoint, it was the availability of inventory on critical, pandemic-related supplies," Krhovsky said. "In our world within laboratory, this was most apparent with swabs, VTM (Viral Transport Media) and COVID tests. With lab leadership absorbed with the day-to-day testing demands that erupted during COVID, there was little-to-no-time available to look at procuring new swab options or understanding the constantly moving target of new test technologies. Although equally overwhelmed during COVID, this is exactly why supply chain departments exist. I think it was evident that the hospitals that had the most active supply chain teams, with the deepest supplier relationships and networks, were inevitably the facilities that faired the best."

The pandemic fostered a new healthcare environment where it's now more critical than ever for Laboratories to have all the necessary supplies they need to perform the tests ordered in the time requested, according to Accumen's Jurinic.

"As we have witnessed over the past year, not having the necessary supplies on hand can have an adverse effect on patient care," he said. "Laboratories rely on Supply Chain to provide this support function, along with the associated heavy lift on the cost analytics, the tactical and strategic part of the supply chain. This allows laboratorians to focus and spend their time putting out quality tests that clinicians can rely on and appropriately diagnose. This makes timely lab results arguably one of the most important aspects of accurate diagnosis and ultimately treatment. It's no surprise quality lab results in a timely manner result in better patient outcomes."

Strain emphasizes the importance of Laboratory's processes that directly affect critical patient care outcomes as motivation alone for the department to partner with Supply Chain.

"A medical laboratory produces tens of thousands life-dependent results daily informing physician decisions that may alter short- or long-term outcomes," Strain said. "Each result relies on a variety of chemicals, reagents, blood products, kits, specimen collection, quality control standards and other products and devices to accomplish this work without fail.

"For decades, laboratories have used the concept of data-driven task assignments to ensure their in-lab supply chain is highly functioning – burn rate, expiration date, seasonality, inventory, lead times, order placement, labeling upon receipt, documentation, alerting section leads new reagents are available to quality control and other key laboratory operation steps centered around products and devices." Supply Chain can – and should – consult with Lab on all of it and be welcomed by the Lab, she added.

Sargent concurs. "The clinical lab needs Supply Chain to create PAR locations with min/max, place orders, check on back orders, determine the quantities required for standing orders and blanket orders," she said. "The next step is to understand usage due to consistent orders, reduce the number of standing or blanket orders, adjust PARs, get involved in the equipment needs, purchases and services to provide a methodology to track costs, savings and reliability." HPN

Visit https://hpnonline.com/21237999 for the sidebar, "Opening the channel between Supply Chain and Laboratory."

Chart 1: Hard-to-find lab supplies

- Nitrile Gloves
- Vacutainers (Sodium Citrate 3.2%, Lithium Heparin, etc...)
- Universal and LTS Sterile Pipette Tips
- Swabs and Transport Media Kits (including Viral Transport Media (VTM), Universal Transport Media (UTM) and Phosphate Buffered Saline (PBS))
- Spectrum Saliva Collection Kits
- Saliva Direct Collection Kits
- Neutralizing Antibody Testing
- Rapid Over-the-Counter Point-of-Care (POC) Antigen (Ag) tests

Source: Accumen, September 2021

Chart 2: Top Laboratory Supply Chain Issues

- Products arrive too late in the day
  - Deliveries at an agreed upon time before lab supply chain staff end of shift
  - E.G. Put away in lab often includes labeling of each unit of measure with date &/or time stamp or other special handling once received
- Products do not arrive on expected date
  - Hospital and reference laboratories run 24/7
  - Notification of time delay or back order not received
  - With it's slim margins laboratories use processes to avoid high freight costs by balancing short lived expiration date inventories
- Temperature sensitive deliveries
  - Boxes from suppliers to clearly state refrigerator or freezer temperature sensitive materials
  - Supply chain process for goods to be delivered directly to lab and by- pass dock
  - If not directly delivered then dock to have refrigerator and freezer storage capabilities

Source: Barbara Strain, September 2021

Cash Conversion Cycle: Creating a formula for success

Here's how to unify the D-Suite of O's

by Judi Proctor, Senior Supply Chain Consultant, Vizient

In early 2020, I was working in a hospital with the supply chain staff as part of a standard review of their inventory spend. Fast forward six months when the world was well into the COVID-19 pandemic, this same hospital's inventory spend had escalated by 10 times the original amount.

This was not an isolated occurrence; it happened in many hospitals across the United States that were proactive in obtaining personal protective equipment (PPE) and other needed supplies during the pandemic. Products became scarce as hospitals across the nation stockpiled.

Another unforeseen consequence of the pandemic was the dearth in elective procedures. These procedures were cancelled or delayed for several months in 2020 to have the capacity, PPE and other supplies as well as staff to treat COVID-19 patients. Today, delays are still ongoing, and the cancellations have led to an overstock of items, which creates the potential for expiration on some devices.

Healthcare organizations are now in a difficult position with excess inventories (working capital) of certain supplies, such as catheter/balloons, endo mechanicals and suture, and custom procedure packs in storage, and an uncertainty of elective procedure patient volume coming back to pre-COVID levels in the near term. To get beyond this scenario and improve management efficiency, liquidity and overall financial position, organizations can use a metric called the cash conversion cycle (CCC). The supply chain has a role to play in this effort.

Do the math: How to calculate your CCC

Traditionally, healthcare facilities measure liquidity by these ratios: quick, current and days cash on hand.

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- Quick ratio = liquid assets/current liabilities
- Current ratio = current assets/current liabilities
- Days cash on hand = annual operating expenses/365

These are useful metrics, but they are static.

While the current ratio assumes the sale of inventory to pay current liabilities, the quick ratio excludes inventories, and neither speaks to the time element. Days cash on hand only looks at available cash and does not consider the inventory/working capital.

To incorporate the element of time and focus on inflow and outflow of dollars, as well as the timing of those inflow and outflows, you need to use the cash conversion cycle or CCC.

The CCC improves the efficiency of management—how to manage inventory, receivables and payables—and can improve cash on hand by providing visibility to the finance department for areas that need improvement.

The CCC provides a measurement in days of product cycles, beginning with inventory purchases, moving on to utilization for patients, patient billing processes, payment to suppliers, and finally, receipt of cash back into your facility. It is typically calculated on a quarterly basis—the most recent average for publicly traded healthcare companies is about 30 days. The average for all hospitals, pre-pandemic, was 64 days, according to research recently published by Soumya Upadhyay, Bisakha Sen, Ph.D., and Dean Smith , Ph.D., in the *Journal of Health Care Finance*.

To calculate the CCC, you need three activity ratios: days inventory on hand (DIO), days payable outstanding (DPO), and days receivable/sales outstanding (DSO).

- DIO = 365/turn ratio
- DPO = accounts payable/ (cost of sales/no. of days)
- DSO = (accounts receivables/net credit sales) x 365
- CCC = DIO + DSO – DPO.

When it comes to the ratios needed to calculate the CCC, obviously Supply Chain has control over DIO, but it also has some control over DPO. How? When supply chain negotiates the payment terms and conditions of a contract, it forges a direct link to DPO.

Strategies to optimize your cash conversion cycle

A decreasing or stable CCC is a positive metric for the direction and financial stability of an organization. Inventory with a lower turn rate will increase the CCC; inventory with a higher turn rate will decrease it. There are many different strategies that will improve the days of inventory on hand, and they should be regularly reviewed and re-implemented when necessary to manage the turns and thus DIO. Some of these strategies are:

- reducing inventory variability, for example, by reducing the number of stock-keeping units (SKUs) in product categories.
- increasing consignment inventory with vendor-managed inventory.

- implementing an accurate forecasting system; improving predictive demand planning for high dollar items.
- reviewing contract payment terms.

Supply Chain should consider these strategies if inventory is not turning efficiently and is greater than the average or benchmarked leading practices for the healthcare industry—12 inventory turns in a year for cardiac catheter labs and seven to 12 inventory turns for operating room or surgical services. These strategies can assist in the facilitation of a faster turn rate for all inventories and therefore a reduction of the days inventory on hand, which can lead to a decrease in days for the cash cycle to be completed.

The next area for developing a strategy is DPO, and one of the areas for your supply chain team to review, is contract payment terms. These terms can be extended to improve the CCC. If you are at 30 days for payment, you could try to extend to 45, or even 60 days.

However, if you overreach by asking for an overly long extended timeframe for payment, it could impact the organization's relationship with these same suppliers, send a mixed message and eventually drive up costs or threaten their ability to ship. Supply Chain must strategize with the accounts payable department to determine what would be beneficial for the organization in payment terms, days to pay and discounts. Strategies include:

- structure accounts payable, sourcing and purchasing functions and policies for improvement.
- develop new guidelines for payment terms.
- review payment terms for discounting.

This remains a precarious balancing act for Supply Chain, which must have inventory available for use at any given time, maintaining a fill rate at target levels for critical items with a turn ratio that decreases the days of inventory on hand.

An organization will do itself a disservice if they look at DIO, DSO and DPO as standalone metrics. The CCC metric incorporates them all, and measures and evaluates management effectiveness when calculated quarterly, trended and tracked consistently. Organizations experiencing an increasing CCC should investigate their metrics to determine the root cause, and correct it.

Other industries such as automotive and retail have used the CCC metric for many years. It is now time for hospitals and healthcare organizations to look at their cash conversion cycle and comparisons within the industry. Supply Chain can assist with this. Given what hospitals have been through during the past 19 months, there is a need to reassess strategy on working capital and look for a better methodology for evaluating the effectiveness of management and financial wellbeing. The cash conversion cycle is a good place to start. HPN

Judi Proctor is a senior consultant with Vizient and brings more than 30 years of experience exclusively in health care supply chain. She leads initiatives in supply chain assessment and optimization, supply and inventory automation, strategic sourcing, value analysis and operational cost improvements. Proctor holds the designation of certified materials resource professional (CMRP) from AHRMM and is a master instructor in process management. Her educational background is in finance with a Master of Business Administration and Health Law.

VALUE. DELIVERED.

Call the same thing the same thing:

UDIs in recalls and beyond

by Karen Conway, Vice President, Healthcare Value, GHX

I have been researching and writing about the value of unique device identifiers (UDI) for nearly 15 years, but it really all comes down to this: Call the same thing the same thing regardless of what you are doing with the thing.

For those who have not been with me on this nearly 15-year journey, the U.S. Food and Drug Administration, UDI regulation requires manufacturers to assign and label their products with UDIs, and publish additional information about those products in the FDA's Global UDI Database (GUDID). The UDI itself is made up of two parts: 1) the device identifier (UDI-DI) representing a specific version or model of a product at a particular unit of measure, and 2) the production identifier (UDI-PI), which includes data related to production of a specific device, e.g., the lot, batch or serial number, expiration date, etc.

The ability for multiple stakeholders (manufacturers, distributors, and hospitals, etc.) to identify products in a consistent manner across the product lifecycle offers myriad benefits from better patient safety to greater supply chain efficiencies and cost savings. When the rule was published in 2013, the primary focus was the ability to identify and manage devices associated with adverse events and subject to recalls more quickly, thereby getting potentially dangerous devices off the market faster and making the lives of patients safer. (See Standard Practices, July 2019).

The good news: The percentage of medical device recall notices containing UDIs has grown nearly 10-fold since 2016, the year the highest risk devices (Class III) were first required to bear UDIs. Deadlines for less risky devices have since followed. The bad news: Still less than 20 percent of those notices (and less than one-quarter of those for implantable devices) contain UDIs today.

This caught the attention of the Association of Healthcare Resource & Materials Learning UDI Community (LUC), which launched a workgroup to study the value of UDIs for recalls, and develop recommendations to achieve those benefits. After two years of work by more than 70 representatives from across the healthcare supply chain, the group has published a comprehensive report at www.ahrmm.org/luc. Here are a few key findings and recommendations.

Highly manual, variable, and error prone

The workgroup found significant variation in not only the information included, but also the process by which recalls are communicated and managed. Most of that information is shared in paper-based formats, which require manual (and in turn, error prone) entry by stakeholders into multiple technology systems. As a result, the ability to find and remove recalled products from the market can be delayed.

Manufacturers have a variety of means to report recalls to the FDA, but most are handled via emails using pdfs and excel documents. Across those submissions, there is variability in the data shared, including UDIs.

Manufacturers notify providers almost exclusively via mail or delivery service, e.g., FedEx, although some mostly fee-based systems handle this for subscribing hospitals and health systems.

UDI data is needed across multiple systems by multiple stakeholders

Currently, when manufacturers issue recall notices, they blanket the market (both distributors and healthcare delivery organizations). When providers receive such notices, they often have to query multiple systems: enterprise resource planning (ERP) and other procurement software, inventory management systems and electronic health records (EHRs), to determine if they bought the product, if they have the product on hand, and/or if they used the product in patient care.

The challenge is: UDI is just one of the codes that the FDA says manufacturers can use to identify the product being recalled, and as a result, manufacturers often choose a proprietary number, such as a catalog number. Providers, on the other hand, sometimes create their own proprietary numbers to document products in their respective technology systems. As a result, when it comes to looking to see if they bought, stored or used the devices, they may not have the corresponding identifier in their systems. This can critically delay their response, creating the potential to use the devices in patient care and making it hard to track down patients who may have a recalled device implanted in them.

Providers are also only mandated to record UDIs for implantable devices in patient records as part of the U.S. Core Data Set, which means they may or may not have record of all recalled products used in patient care.

Beyond the patient safety aspects, this lack of a consistent identifier makes recall management a time consuming and expensive process. Based on real world examples, the workgroup found that managing a single recall, depending on the kind of device, can cost a provider from $480 to more than $3,000 per recall.

Recommendations

A primary recommendation of the workgroup is to urge Congress and the FDA to create a structured electronic recall process leveraging the data and process used by the GUDID. By using APIs and/or downloading capabilities similar to those used for the GUDID, data about recalled products could be electronically populated in distributor and provider systems, while the FDA could stand up a searchable database as a single source of information about all recalled products.

Currently, the US FDA manages nine different sites where data on medical device recalls is stored, often containing different information. The manual processes involved can also delay posting recalls in these systems from weeks to even months. Leveraging the GUDID, standardizing how recalls are reported (using a standard template and data elements) and enabling automated queries could save time for all involved, not to mention supporting the needs of patients.

The success of such a system requires coordination among a variety of parties in the healthcare ecosystem:

- Manufacturers should use the full UDI (both DI and PI) in their recall notices.
- Distributors and providers should also leverage the UDI in their respective systems to know if they bought, are storing and/or used a product in patient care. Fortunately, many ERP and EHR systems can hold the UDIs, especially with the increasing prevalence of cloud-based systems.

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Creating an electronic medical device system and changing processes comes at a cost, but based on the workgroup's research, there is a sizeable ROI for all involved. To help organizations estimate their own savings, the LUC workgroup has created cost calculators for each of the key parties: manufacturers, distributors and providers. If you consider that there have been an average of 2,900 recalls per year since 2014, even if a provider only handled one-quarter of those recalls (725) and at the lowest estimated cost ($480), the annual savings would be nearly $350,000. Using a prototype medical device recall system developed by the work group, distributors estimated they could reduce time to handle individual recalls from 50 to 30 hours, while manufacturers attribute their biggest costs to the notification process and provider response time, both of which can be significantly streamlined with use of standard data and automated processes.

But as with so many things in healthcare, the real bottom line cannot be measured in dollars. The most important and compelling reason is our collective ability to protect patient safety through better visibility, and faster response to adverse events and recalls. We will be able to minimize any negative impacts of care already delivered as well as the number of patients who could otherwise be treated with a faulty device. That's delivering value in healthcare. HPN

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Value management must align with organizational business tactics

by Barbara Strain, MA, SM(ASCP), CVAHP

There may not be a more significant time to observe "an otherwise obstructed field of view above the surface" with such meaning as it has since the beginning of 2020. The learnings during this time have been written about at length with many theories about how to get a foothold on the tactics that were moving healthcare forward toward the Quadruple Aim versus the new variables we have yet to meet.

Let's start with what we know works. When speaking to audiences about understanding what business their organization is in, I usually see facial responses marked by furrowed brows. Whether you have recently taken a role in a new organization or are seeking to bring a greater level of value to your current role while understanding your organization's business tactics your next move is now more important than ever before to achieve actionable, sustainable, collective value.

This is value management. It's not a new term, it's not a substitute for value analysis and its meaning can vary depending on the audience or industry. It is a critical science and art used to create a greater understanding of the practice of consumer-centered healthcare. We should not — and cannot — work in siloes and assume we will reach best value. Healthcare is perceived as complex; however, when there is a shared expectation among all roles across the continuum each link in the value chain grows stronger. This includes providers, suppliers, insurers, government, academia and consumers, encompassing the entirety of healthcare.

In 2010, new financial pressures were realized through pay-for-quality programs created the spark to proactively infuse value principals into practice and function within each provider organization. This sent a ripple across the healthcare industry. The COOs and CFOs were imploring their direct reports to seek out individuals with value analysis, quality, data intelligence and performance improvement skill sets and either create roles or whole departments that would contribute to this knowledge evolution.

This exceeded a traditional new product introduction committee view and represented a shift from incremental savings to programs that used proven practices from other industries. Planned tactics became known and communicated through a series of leadership meetings within provider organizations. This was not like turning on a switch overnight. It consisted of developing a curriculum taught at every level, creating relationships, learning your organization's business. To that end using accurate, single-source-of-truth data to assure transparency was paramount to mature your processes from:

- New products, drugs and services
- Standardization of practices and programs
- Utilization of resources — human, physical and financial
- Reduction in variation and waste
- Value-Based Care
- The Next New Need

These processes are additive, adjunct and/or concurrent. Depending on the evolutionary point of your organization, the knowledge, skills and abilities of staff remain key. They do not have to reside in one department but should be made available to the organization to participate in data-centric root-cause analysis, quality initiatives, risk mitigation, process improvement, financial driven reviews, innovation brainstorming and other activities that create value.

I've learned from personal experience that when a relatively few staff are working peer-to-peer, the value earned amounted to approximately 2% of non-labor spend. As leadership involvement and communication increased, the value improved to almost 40% from 8 %, which was demonstrated by higher key quality indicators and Press Gainey scores. The pace of value improvement can be fast or slow depending on awareness, effort and resources. The ongoing struggle is keeping a close eye on inpatient metrics, such as average length of stay and acuity using the "Case Mix Index" as well as outpatient and other local services that allow consumers to stay in their communities and out of expensive care environments.

You often hear we need to improve or "make margin." Data illuminate the highest- or lowest- margin contributing procedures, which can be analyzed by time of year, gaps in expertise or direct-to-consumer marketing campaigns. Value management can influence margin by flexing known tactics based on the organization's reimbursement strategy across the spectrum from Fee-For-Service (FFS)- to Value-Based Care (VBC)- often referred to as volume-to-value.

In the FFS model the concentration is on performing as many procedures/encounters as possible that can lower the price of goods and services to create margin. An example in procedural areas is average cost per procedure, what products are driving costs, sharing the data with those performing the procedures and discussing how to move closer to average balanced with equal or better outcomes. The VBC model looks at bundles of care. The CMS Bundled Payments for Care Improvements program began in 2013 with one payment for care across the continuum by procedure, improving quality and coordinating care while lowering costs.

This brings us to 2020. From the first weeks of March, executive and clinical leadership were exposed to value analysis professionals, clinical resource managers and supply chain expertise where provider organizations have experienced value management firsthand. Testimonials ranging from, "I understand what you have been trying to teach us all along," to "this is how we should assess our need vs. our want," and other sentiments resonated. Continue to apply the learnings on what worked and what didn't, what to keep and what to innovate, what finances should look like based on the real level of consumer need while using a value centric process. Keep those principles close and recognize the people who make value materialize closer. HPN

Barbara Strain, MA, SM(ASCP), CVAHP, is Principal, Barbara Strain Consulting LLC. Strain previously served as Director, Value Management at the University of Virginia Health. She is a Founding member, Past President, and current Board Strategic Liaison for the Association for Healthcare Value Analysis Professionals (AHVAP) and was inducted this month into Bellwether League Foundation's Hall of Fame for Healthcare Supply Chain Leadership.

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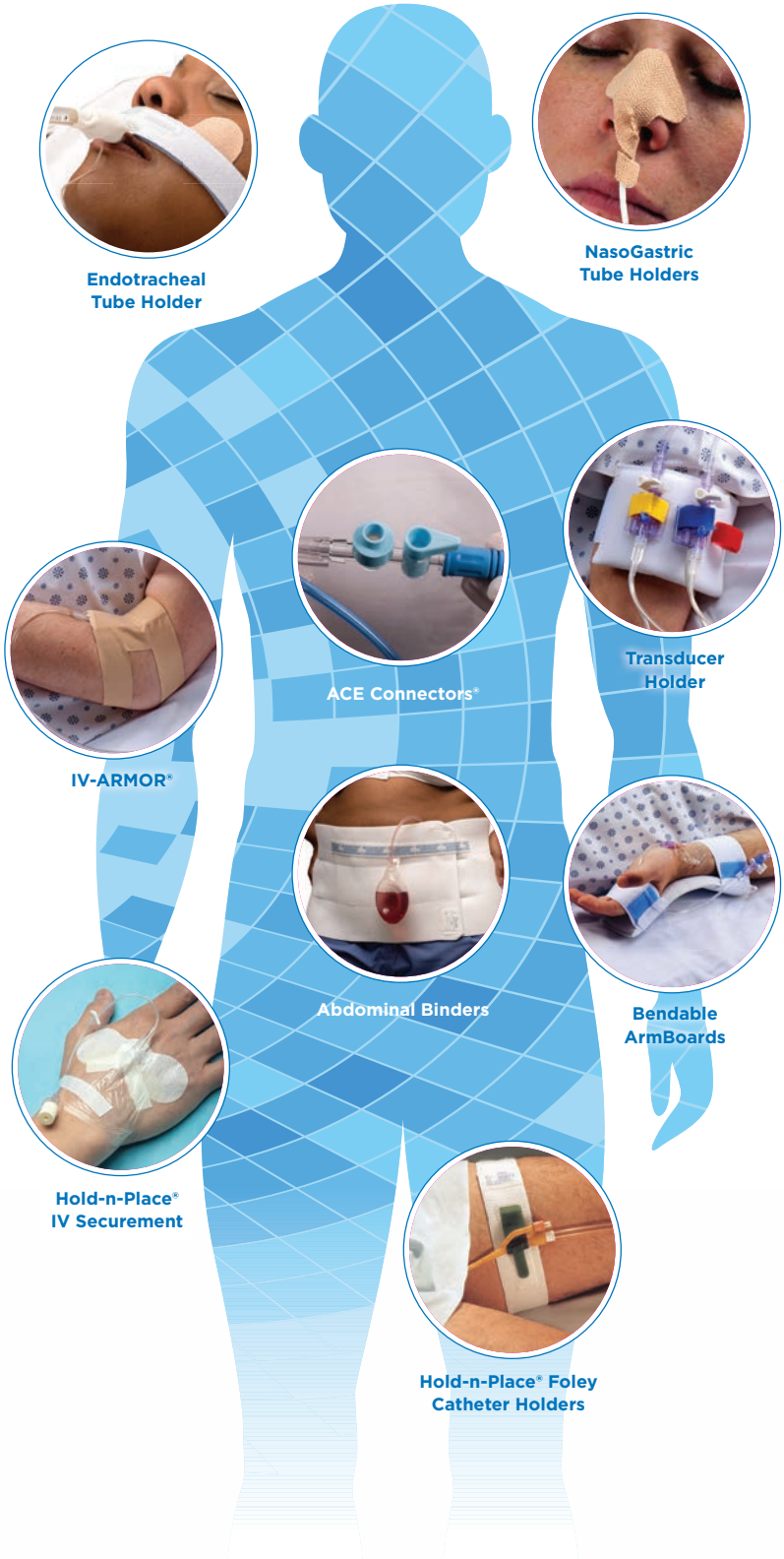

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