

WHITEPAPER

THE FUTURE OF CARE SPACES

Innovations and Strategies for Success

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Table of Contents

- 3 Executive Summary
- 5 Beyond the Command Center: Extending Digital Care Into the Home at Guthrie
Terri Coutts, SVP and Chief Digital Officer | The Guthrie Clinic
- 9 Leveraging Remote Patient Monitoring for Treat-in-Place Care and Reduced Hospital Readmissions at Guthrie
Robert Krukltis, MD, Chief Applications Officer | The Guthrie Clinic
- 13 The Bedside Voice – Nurses’ Perspectives on Technology in Healthcare
Maureen Nylin, Clinical Nursing Informatics | Genesis Health System
- 15 Leveraging AI and Building Foundational Infrastructure for a Digital-First Healthcare System
Stacey Johnston, MD, CIO | Beacon Health System
- 18 Ochsner Virtual Emergency Department (OvED) – A Strategy for ED Avoidance and System Optimization
Lisa Fort, MD, CMIO | Ochsner Health
- 21 Unlocking Value from EHR Data – Bridging the Gap and Leveraging Underutilized Tools
John Lee, MD | HIT Peak Advisors
- 23 Navigating the Shift to Outpatient Care and the Pursuit of the “Killer Healthcare App”
Jake Dorst, CIO | Tahoe Forest Health System
- 26 Innovation in the Military Health System
Chani Cordero, CIO | Brooke Army Medical Center
- 28 The Transformative Power of Critical Feedback and Embracing “We” Leadership
James Wellman, CIO | Nathan Littauer Hospital & Nursing Home
- 30 Micro Trends Impacting Healthcare Economics
Mike Mosquito, Head of Enterprise Automation & Digital Integration| FOX Rehab, Host | Buzz Podcast, and Co-Founder and Forum Chair | Future of Care Spaces
- 33 Business Continuity and Resiliency in Healthcare
Theresa Meadows, SVP & CDIO | Cook Children’s Healthcare System
- 36 Operation: Nashville – A Comprehensive Healthcare Cyber Resilience Tabletop Exercise
Group participation led by Marty Momdjian, GM & EVP | Ready1 by Semperis & Andrea Daugherty, Founder | Novhera Health
- 41 Charting a Resilient, Patient-Centered Future

Executive Summary

Navigating the Evolving Landscape of Healthcare Delivery

The healthcare industry stands at a critical juncture, grappling with seismic shifts driven by evolving patient needs, technological advancements, economic pressures, and persistent operational challenges.

This whitepaper synthesizes insights shared by a diverse group of fifteen healthcare executives, drawing from their firsthand experiences and strategic perspectives presented during the April 2025 Future of Care Spaces event in Nashville, Tennessee.

A central theme resonating throughout these discussions is the **fundamental market move from traditional inpatient-centric models to a future dominated by outpatient care and services delivered across a distributed network**. This shift is not merely operational but also represents a profound change in where, when, and how care is accessed and compensated. Echoing a perceptive observation from the past years, one executive put it this way, *“In the last decade, there has been a shift to the outpatient side of healthcare. While we often get caught up in the inpatient world, 70% of our revenue last year came from outpatient services. The hospital will eventually become a cost center supported by outpatient usage.”*

Navigating this transformation requires healthcare organizations to **confront** deeply ingrained operating models and leadership paradigms. The transition necessitates strategic investments in outpatient infrastructure, innovative care delivery models, and effective utilization of technology. Discussions highlighted the growing importance of capabilities, such as ambulatory surgery centers (ASCs), expanded outpatient clinics, telehealth, remote patient monitoring (RPM), and hospital-at-home programs.

Integral to the success of these models is the intelligent application of data and technology, including electronic health records (EHRs) and advanced data analytics tools, and the burgeoning potential of artificial intelligence (AI). These technologies promise to enhance patient engagement, improve care coordination, enable proactive interventions, and potentially redefine documentation workflows through ambient solutions.



However, the path forward is complex. Executives underscored the ever-present and **escalating risks posed by cybersecurity threats and the critical need for robust business continuity and incident response planning**. While offering efficiencies, the reliance on single, integrated EHR systems also presents a consolidated risk in the face of extended downtimes.

The financial sustainability of these shifts is tied to **evolving reimbursement models** that are slowly moving towards value-based care. Yet traditional fee-for-service and critical access structures can create misaligned incentives.

Leadership, culture, and effective partnerships—both internal among clinical and technical teams and external with vendors—emerged as crucial elements for driving successful technology adoption, building trust, and overcoming resistance to change.

This paper delves into these interconnected challenges and opportunities, offering insights and strategies for healthcare organizations seeking to thrive in the future of care spaces.



Beyond the Command Center: Extending Digital Care Into the Home at Guthrie

Terri Coutts, SVP and Chief Digital Officer | The Guthrie Clinic

Introduction

Terri Coutts, SVP and Chief Digital Officer for The Guthrie Clinic, presented Guthrie's strategic evolution from a centralized inpatient command-center model to a broader care-in-place approach, which extends digital care into patients' homes. Presenting alongside her colleague, Dr. Robert Krukltis, she highlighted the necessity of this shift for Guthrie, given the changing healthcare landscape, workforce constraints, and the growing importance of the home as a care setting.

Guthrie's Context and Strategic Vision

The Guthrie health system serves a largely rural, 10,000 square mile region across three states and operates six hospitals. Recognizing that not every patient receives the same kind of care due to geographic constraints, Guthrie embarked on a five-year strategic journey to serve patients wherever they live to keep healthcare close to their community.

Their initial focus was establishing a command center, primarily for the inpatient setting, to improve throughput, staffing efficiency, and access to specialty care. Over the last two years, the focus has shifted to providing care regardless of whether the patient is in a hospital. Driving this strategic pivot is the understanding that simply adding more hospital beds is unsustainable and not feasible in their resource-constrained community.



Command Center Foundation

Guthrie's command center, the Pulse Center, was established as a foundational building block. It was especially critical following COVID-19 when the system faced nursing shortages, high travel spend, and overwhelmed EDs. The Pulse Center centralizes several key functions: bed placement, transfer centers (in and out of the system and among hospitals), telemetry, virtual nursing (med-surg and ICU), virtual intensivists, and tele-sitting. Housing these teams in the same physical space creates significant synergies, allowing for seamless communication and quicker responses. This centralized model has demonstrated measurable impacts, such as **a half-day reduction in the usual length of stay in the ICU.**

Limitations and the Shift to Home-Based Care

Despite its successes, the command center has inherent limitations. It is centralized but **limited in reach, and primarily reactive**, addressing only patients already in the system. Guthrie is expanding its digital framework to become more proactive and align with the growing need for care in the home and the shift towards value-based care. Increasingly, the home is seen as the new front line of care.

Reimagining the Home as a Care Node

Guthrie is actively working to reimagine the home as a node in the care network, moving from episodic to continuous care. It involves creating a digitally connected home environment integrated with Pulse Center insights. This **expansion of the command center framework into the home, termed care in place**, acknowledges that homes are different for everybody.

Key pillars supporting this include:

- Remote patient monitoring (RPM, vitals, devices)
- Virtual care: Telemedicine, virtual visits
- In-home services: Hospital-at-home, PT, and labs
- Patient and caregiver engagement tools

They are piloting this in long-term care facilities and through remote patient monitoring for select patient journeys.

Building and Implementing the Digital Thread

Implementing this vision requires building a digital thread that ensures data flows seamlessly: 1) from the home > platform > command center > clinician, 2) integrates with the EHR, and 3) leverages alerts and AI overlays. Guthrie adopted a phased approach, focusing on specific digital journeys for patients. **A critical lesson learned is the absolute necessity of workflow integration.**



"... we had to make sure that we didn't buy niche products that didn't integrate into that workflow. The workflow is so, so important. Otherwise, you just have a bunch of tech that no one's going to use."

~ Terri Coutts

Significant work is involved, including:

- Technical integrations and process design within the command center
- Nursing and physician workflows, with detailed job breakdown structures
- Education of staff and patients on technology use and understanding the data
- Evaluation of patient appropriateness for technology

Challenges and Considerations

Implementing home-based digital care in a rural setting presents significant challenges, including:



Limited broadband and wi-fi access



Cell service issues



Digital literacy of patients (especially older adults, though Ms. Coutts noted the misconception that they don't use technology) and caregivers



Addressing social determinants of health to avoid a digital divide (Guthrie doesn't currently bill for these services and seeks partnerships and donations to cover costs.)



Regulatory landscapes, such as alarm restrictions in long-term care facilities in the state of New York, also require creative solutions



Managing the volume of data generated by remote monitoring requires centralized monitoring and rounding programs



IT capacity if vendor claims of easy IT lift are inaccurate

Role of AI

Guthrie already utilizes AI within its command center and recognizes its importance in addressing workforce challenges. They have **established an AI governance structure**, emphasizing that AI implementation must be intentional. Implementation should include long-term measurement to monitor for drift and to ensure desired outcomes are consistently met.

Outcomes and Metrics

A key focus for Guthrie is defining and measuring outcomes to justify investment and demonstrate value to leadership. They are currently tracking or plan to track metrics such as:

- ED utilization percentage (aiming for reduction)
- Percentage of patients discharged to home (goal is to get patients home sooner)
- Chronic disease-specific goals tied to digital journeys
- Readmission reduction

While they have seen initial positive shifts in long-term care facilities and are working with frequent ED utilizers, comprehensive outcome data for the home-based program is still emerging, as it is in the early stages (last three months). They plan to scale intentionally over the next year, aligning expansion closely with these outcome metrics and value-based care incentives.

Conclusion

Terri Coutts' presentation illustrated Guthrie's forward-thinking strategy to **move beyond the reactive command center** by extending digital care into the home. This ambitious **care-in-place** initiative builds upon existing infrastructure while addressing the unique challenges of serving a rural population. Success hinges on strong workflow integration with EHR, careful patient selection and education, overcoming digital access barriers, effective data management, sound AI governance, and a clear focus on measurable outcomes to drive sustainable, proactive, patient-centered care regardless of location.

Leveraging Remote Patient Monitoring for Treat-in-Place Care and Reduced Hospital Readmissions at Guthrie

Robert Kruklytis, MD, Chief Applications Officer | The Guthrie Clinic

Introduction

Dr. Robert Kruklytis, Chief Clinical Officer at The Guthrie Clinic, presented Guthrie's strategy to utilize remote patient monitoring (RPM) as a cornerstone for a treat-in-place model aimed at keeping patients out of the emergency room and hospital and reducing readmissions. Building on the centralized, digital foundation of the command center, Guthrie is actively expanding its care delivery into patients' homes, viewing the home as a critical node in the care network.

Challenge: Avoiding Unnecessary Hospitalization

Dr. Kruklytis highlighted a common patient scenario, particularly for those with chronic conditions like COPD, presenting with symptom flares outside of regular office hours. This can lead to a default recommendation to visit the emergency room (ED). For Guthrie's COPD patients, the result is often hospitalization. Numbers show that 93% of its COPD patients presenting to the ED are admitted.

Hospitalization often occurs despite patients' potential response to initial ED treatment. This decision is usually driven by provider caution regarding potential readmissions. Guthrie recognized the need for a structured alternative to avoid these potentially unnecessary admissions.

Guthrie's Care-at-Home Solution

Guthrie has deployed a care-at-home program designed to provide comprehensive support for patients in their homes as an alternative to ED visits or hospitalization.



This program is built on several key components:



Remote Patient Monitoring (RPM)

This is the starting point, enabling continuous monitoring of key vital signs like heart rate, pulse oximetry, and respiratory rate. Guthrie partners with a vendor whose technology is designed for ease of use, particularly for older adults. It requires only a cell phone signal via a small cellular hub plugged into an outlet, eliminating the need for home internet, wi-fi, or a computer. Data is seamlessly transmitted directly into the patient's electronic health record (EHR). Nurses in the command center monitor this data, using it to enhance connection and engagement with patients.



Home Health

The program integrates with home health services, allowing in-home nurse visits to provide direct care and assessment.



Video Visits

Providers, including dedicated hospitalists, conduct virtual visits with patients at home, allowing for clinical assessment and management remotely.



Paramedics | Mobile Integrated Health

Leveraging paramedics when not on 911 calls, Guthrie can deploy them to patients' homes to provide urgent interventions like nebulizer treatments or IV steroids.

This **multimodal approach provides white glove service and wrap-around care**, giving ED colleagues the confidence to send patients home. It's understood that the patient will receive structured follow-up and support. Implementing this requires creating an easy button, such as an Epic order for care at home, that initiates the cascade of services and ensures patient safety.

The Future: Predictive Analytics and Proactive Care

While current RPM enables continuous monitoring, Dr. Krukltis emphasized that the future goal is to move beyond reactive observation to proactive prediction and prevention. Drawing inspiration from examples of non-healthcare predictive analytics, Guthrie aims to predict events like COPD exacerbations before they become severe enough to require hospitalization.

Achieving this requires combining diverse data elements beyond just biometric vital signs. Additional data includes:

- **Biometric/vital** sign data from RPM
- **Environmental** data, such as air quality or pollen counts
- **Publicly available** data, like search query trends indicating community illness
- **Claims** data, such as checking if a patient picked up prescribed medications
- **Clinical** data from the EHR

By integrating and analyzing these disparate data sources, Guthrie seeks to identify early warning signs. When warning signs are identified, the care at home services SWAT team can be deployed for proactive intervention to keep patients in their preferred care setting: home.

Regarding the potential of utilizing continuous respiratory data from RPM, Dr. Kruklitis noted: “This shows us that we’ve got the ability. We need to learn how to see this data differently so that we can prevent the next patient from going to the hospital.”

Implementation Considerations and Funding

Implementing care at home in Guthrie’s 10,000–square-mile rural service area presents challenges, including potential broadband/cell service limitations. Fortunately, the chosen RPM technology helps mitigate some of these issues. Digital literacy and social determinants of health are also factors to address to avoid a digital divide.

Funding for the program is currently complex. While CPT codes exist for RPM and video visits, the system incurs costs for many fee-for-service patients. Value-based care arrangements and grants provide some financial support. Guthrie has also used its funds and donations to provide devices to patients. A key commitment is to offer services based on clinical need, not payer type, especially for donated devices. Future efforts include building out billing capabilities and analyzing outcomes by the payer to demonstrate value and use as leverage.



Conclusion

Dr. Kruklitis's presentation underscores Guthrie's commitment to transforming care delivery by leveraging technology to provide care in the home. Its care-at-home program, built upon RPM, home health, virtual visits, and mobile integrated health, offers a structured alternative to traditional ED visits and hospitalizations. Its strategic vision extends further, aiming to integrate diverse data streams to enable predictive analytics, allowing for proactive interventions that keep patients healthy and at home. Success requires seamless workflow integration, overcoming rural infrastructure challenges, and developing sustainable funding models, while prioritizing the "right care, ideally always in the right place, and ideally in their home."



The Bedside Voice – Nurses’ Perspectives on Technology in Healthcare

Maureen Nylin, Clinical Nursing Informatics | Genesis Health System

Introduction

Maureen Nylin’s presentation aimed to bring the voice of bedside nurses forward regarding their perspectives on technology in their daily work. She shared a video featuring interviews with three nurses from different specialties: surgical inpatient, ICU, and behavioral health. Ms. Nylin also emphasized the importance of listening to those using the technology and providing patient care.

Key Insights From Bedside Nurses

The nurses interviewed shared candid insights about the role and impact of technology on their practice:

Evolution of technology | Nurses have experienced a significant shift from paper orders and documentation to electronic systems, described as a “huge lifesaver” that likely reduced errors.

Current state and frustrations | While acknowledging that technology is involved in nearly every aspect of their job, the nurses expressed frustration with systems that do not communicate with each other. This lack of integration leads to manually charting data already available electronically (e.g., hemodynamics). They also noted situations where technology, such as telemedicine, can seem to get in the way, especially in behavioral health settings.

Views on artificial intelligence (AI) | There is general hesitation and a touch of fear regarding AI. While curious, they expressed concerns about its potential to remove human skills and the human aspect of healthcare, which they believe are critical to retain. Privacy and the line between helpfulness and invasiveness were also concerns. They firmly believe that the nursing job, especially the human interaction and touch, can’t be done by AI.

Desire for involvement in selection | Nurses’ lack of involvement in choosing the technology they use daily was a significant theme. Decisions about crucial equipment like IV pumps, beds, and EHR systems are often made by those who aren’t at the bedside. Nurses want a voice in technology selection. They bring valuable insight and ideas for improvement.

Technology wish list | The nurses interviewed identified several areas where technology could significantly improve workflow, patient safety, and time management:

Upgraded beds with features like integrated documentation and reliable, audited bed alarms

Voice-activated charting and scanning devices

Wireless monitoring leads (pulse oximetry, blood pressure, etc.) to reduce cords, particularly for mobile patients

Bidirectional smart pumps that auto-program from orders and communicate changes back to the EHR

Monitoring and multiple camera angles on units for staff and patient safety, especially given the prevalence of violence, would help document incidents without requiring nurses to relive traumatic events through repeated retelling.

Future possibilities | Nurses are excited about technological options that could ease their workload, connect them more deeply to patients, and provide time back for direct care. They see potential in virtual nursing and technology that connects patients to support systems regardless of location. They remain committed to using new tools and therapies to save patients' lives.

Conclusion and Call to Action

Ms. Nylin emphasized that leaders designing the future of healthcare should view nurses not just as caregivers or technology users but as co-creators who can act as a compass for technology decisions. Involving nurses in the design and selection process is crucial for creating effective tools and achieving better patient outcomes.

Echoing the presentation's core message, she stated:

"Because when we build with nurses, not just for them, we don't just create better tools, we create better outcomes."

By actively listening to and collaborating with nurses, healthcare leaders can ensure that technology implementations truly support, rather than hinder, the essential work of bedside care and enhance nursing's deeply human aspects.



Leveraging AI and Building Foundational Infrastructure for a Digital-First Healthcare System

Stacey Johnston, MD, CIO | Beacon Health System

Introduction

Dr. Stacey Johnston, CIO at Beacon Health System, presented Beacon's strategic journey in **becoming a digital-first organization**. This included focusing on implementing artificial intelligence (AI) solutions, specifically ambient listening technology. Her session at the Future of Care Spaces event highlighted the critical importance of executive leadership buy-in, cultural transformation, and foundational data and technology infrastructure to successfully adopt and scale AI in healthcare.

Beacon Health System's Strategic Direction

Located in northern Indiana and expanding into Southern Michigan, Beacon Health System partners with the University of Notre Dame. Beacon is undergoing a significant transformation, working with leading vendors to be an early user of next-generation electronic health record (EHR) technology. Dr. Johnston stressed the commitment to becoming a digital-first organization, a vision supported by Beacon's CEO. It requires substantial financial investment, shifting technology from an afterthought to a strategic investment.



Implementing Clinical AI

A key component of Beacon's AI strategy is implementing an ambient listening solution designed to help providers with documentation. Beacon has achieved rapid adoption and scale, becoming a global leader in producing AI-assisted notes. Presented trend data shows a significant increase in usage events, reaching over 14,000 by March 2025. With active users of around 165, this number indicates frequent, repeat use from those who adopted the technology, showing exponential growth.

Implementation Strategy and Provider Impact

Beacon adopted a structured approach to AI implementation for clinical documentation, including:



Securing **executive leadership buy-in**

Strategic provider selection (starting with highly engaged primary physicians) and a phased expansion plan

A strong **project management framework**, including change management, education, and at-the-elbow support

Provider education covering the ambient listening concept, strategy, demos, workflow tips, and, crucially, the importance of reviewing and editing notes generated by AI

The reaction from its providers has been overwhelmingly positive. Initial phase 1 users reported dramatically improved quality of life and relief from extensive charting time. A phase 1 PCP famously remarked, *“Now I need to figure out what to do with myself on Sunday afternoons because I don’t have to chart anymore.”* Survey results showed a significant increase in provider satisfaction with the documentation process just three weeks post-go-live, moving from a score of 2.63 to 4.33 on a 5-point scale.

Challenges and the Importance of Review

While highly beneficial, the AI implementation highlighted challenges and critical requirements. Dr. Johnston stressed the absolute necessity for providers to review and edit AI-generated notes. There is a concern that providers might become complacent and bypass this step, potentially leading to medical errors or misinformation. Tracking edits and providing feedback to vendors is essential for product improvement. Issues that needed to be addressed included AI’s wording choices, challenges with physical exam documentation, and pediatric use cases.

The Foundational Imperative: Data, Analytics, and EHR

A central theme of the presentation was that AI success hinges on having a robust foundational infrastructure. Dr. Johnston warned of the “garbage in, garbage out” problem, stating that deploying AI on a weak foundation leads to uphill battles.



Beacon is making significant investments in this area:

- Investing approximately **\$5 million this year in data and analytics**
- Spending an additional **\$13 million to ensure the core EHR is on a stable, foundational model experience.**
- Establishing **new governance structures**, including an executive steering committee and an AI advisory council, to oversee strategy and policy
- Focusing on **data literacy and data cleanup** efforts, it was acknowledged that years of data dumping into systems (e.g., during Meaningful Use) have resulted in data quality challenges that must be addressed before effectively leveraging AI.

Culture, Investment, and Prioritization

Dr. Johnston reiterated that changing organizational culture to see technology as a necessary investment, not just a cost or afterthought, was paramount. These technology investments, particularly AI, aim to reduce provider cognitive burden, bring joy back to the workplace, and allow clinicians to focus more on patient care. Prioritizing AI solutions is driven by identifying specific problems the organization needs to solve, learning from other organizations' successes, and partnering strategically with foundational vendors.

Future Roadmap

Beacon's roadmap includes future technology enhancements that its AI vendor delivers, such as action assistance to queuing up orders or follow-ups based on conversation, improved voice-to-text, invoked auto-texts, and E&M coding assistance. These features are expected to decrease cognitive burden further and streamline workflows.

Conclusion

This presentation provided a clear case study on implementing clinical AI within a large health system. While AI's significant potential to improve provider experience and efficiency was underscored, successful adoption requires a multifaceted approach encompassing:

- ✓ Strong executive leadership
- ✓ A culture that values technology as an investment
- ✓ Robust, clean data infrastructure
- ✓ Sound governance
- ✓ Commitment to continuous improvement and provider education

Ochsner Virtual Emergency Department (OvED) – A Strategy for ED Avoidance and System Optimization

Lisa Fort, MD, CMIO | Ochsner Health

Introduction

Dr. Lisa Fort, Chief Medical Information Officer of Inpatient and Medical Director for the Virtual Care Center at Ochsner Health, presented the implementation and impact of the **Ochsner Virtual Emergency Department (OvED)**. Ochsner developed this initiative to address the significant challenges facing traditional emergency departments (EDs), including increasing visit volumes, long wait times, high costs, and the burden of low-acuity visits that could be better managed in alternative settings. Ochsner recognized that many non-urgent patients utilize the ED due to convenience, payment flexibility, or even advice from their primary care providers. The OvED is a crucial component of its strategy to divert appropriate patients from the physical ED and optimize care delivery.

The OvED Solution: A Virtual Front Door for Appropriate Care

Following a system mandate driven by observed vs. expected ED utilization and shared payment agreements, the OvED launched rapidly in about 5 weeks. The OvED is designed as a virtual service led by an emergency physician who is available seven days a week, 8 AM to 8 PM. The core function is to act as a screening and referral point for patients typically directed to the ED by the nurse triage line or other referring providers whose acuity might allow for care outside the traditional ED setting.



Patients primarily access the OvED using a secure chat interface through Ochsner's high-volume nurse triage line. The ED physician monitors this chat, which is supported by a nurse navigator (LPN) who assists with logistics like scheduling virtual visits or connecting patients to other services. The service acts as an easy button for referring staff and patients.

The OvED physician reviews the patient's chart and uses clinical judgment to determine the most appropriate care pathway.

This pathway may involve:

- A **virtual visit** with the patient to conduct a remote assessment
- Providing **asynchronous care** through an E-visit
- Directing the patient to **urgent care or primary care**
- Connecting the patient to **specialty clinics or hospital-at-home programs**
- Identifying and facilitating **rapid transfer for high-acuity patients** who truly need the ED or specialized care

Impact and Results

Since its launch on October 1, 2024, the OvED has seen a significant volume of patients. A key metric of success is its ability to divert patients who would otherwise have gone to the physical ED:



"We have been able to take care of 70%
of our patients without sending them to
the emergency department."

This diversion rate demonstrates the program's effectiveness in managing patients virtually or directing them to lower acuity settings. The program also boasts an impressive **82% linkage-to-care rate**, ensuring that when patients are referred elsewhere, such as a specialist or urgent care, they successfully connect with that service. OvED serves all patients, including a substantial portion (42%) in some type of **value-based program**. The program has shown a 4% reduction in ED utilization in the 65+ population across relevant locations.

Beyond diversion, the OvED plays a vital role in ensuring that patients who do need emergency or specialized care get there quickly. Dr. Fort shared a compelling story of using the OvED to rapidly identify a critically ill infant, with coordination of swift helicopter transport to the appropriate facility, saving valuable time compared to a traditional ED presentation.

OvED also leverages system-wide visibility tools, allowing physicians to direct patients to the least crowded or most appropriate facility based on their specific needs (e.g., proximity to a specialist or recent surgery site).

Financial and System Opportunities

While the virtual visits are largely non-reimbursable in the fee-for-service model, the value of OvED lies in the broader system impact. **By diverting patients, OvED improves ambulatory throughput and optimizes ED capacity** for high-acuity cases. It offers the potential for shared savings agreements and benefits for capitated patient populations by reducing expensive, unnecessary ED visits and lowering per-member-per-month costs for payers like Medicare Advantage and Medicaid MCOs. OvED creates alternative revenue streams through billable, virtual modalities and contributes to financial sustainability under value-based care models.

Implementation Considerations

Implementing OvED required building a dedicated virtual department within the EHR, creating new workflows, and training staff. While most patients handle the technology well, digital literacy can be a factor for some older adults. Ongoing challenges include facilitating outpatient access to diagnostics like CT scans, which can sometimes lead patients back to the ED if prior authorization is difficult. Ochsner is engaging with radiology and payers to improve this process. The service currently operates 12 hours a day, with plans for expansion.

Conclusion

The OvED represents a successful and impactful approach to managing the flow of patients within a large health system. By establishing a virtual front door led by ED physicians, Ochsner effectively diverts a significant percentage of non-urgent patients from the physical ED while ensuring timely access to care for those with higher acuity needs. This model supports system efficiency, patient satisfaction, and financial sustainability, particularly within the context of value-based care.

Unlocking Value from EHR Data – Bridging the Gap and Leveraging Underutilized Tools

John Lee, MD | HIT Peak Advisors

Introduction

The discussion led by John Lee highlights a critical challenge in healthcare organizations: the difficulty in efficiently accessing and utilizing vast amounts of patient data stored within electronic health record (EHR) systems. This access challenge particularly applies to research, population health, and quality improvement. Drawing from his consulting experiences, Lee illustrates how a disconnect often exists between clinical and operational needs, technical understanding of where relevant data resides, and how to structure queries effectively. His work bridges this gap to unlock the potential of existing data and tools.

The Core Problem: Data Access and Interpretation

Lee encountered organizations struggling significantly to identify patient cohorts for studies, even for seemingly straightforward criteria. The problem wasn't necessarily a lack of data but rather the inability of data teams, like business intelligence (BI), to correctly locate and extract the specific information needed by clinical or research staff. This inability often resulted in initially finding only a small fraction of the eligible patient population.

Lee describes his role as an interpreter or bridge between the clinical/operational side and the IT/data side. He understands both clinical workflows (how data is documented) and the underlying data structures within the EHR, which allows him to guide the process more effectively.

Underutilized Tools and Inefficient Workflows

A significant finding was the underutilization of powerful, native EHR tools for data access and analysis. Many research coordinators were unaware of these tools or not trained to use them. When trained, they could achieve results in minutes (e.g., finding 1,500 patients in 30 minutes) that previously took BI teams weeks to months to deliver due to backlogs.

However, he noted that poor data governance and “wonky” or overly customized system builds often hamper tool effectiveness. Issues with the foundational data structure or lack of governance prevent data tools from working efficiently roughly two-thirds of the time. Examples include inconsistent documentation practices and decisions to custom build that make downstream data extraction difficult. Encouragingly, some research coordinators recognize this issue and advocate for better data governance within their organizations.

Beyond data extraction, Lee observed inefficient downstream workflows. A common, lamented practice was exporting patient cohorts to spreadsheets, which were sent to vendors for physical mail merge outreach. This analog method for recruiting study patients resulted in predictably low conversion rates. Lee highlights that organizations were not leveraging existing population health tools designed for identifying patient cohorts based on data criteria and conducting targeted outreach. Many users were unfamiliar with these tools or even the concept of population health.

Opportunities for Improvement and Future Potential

Lee argues that organizations are “leaving a lot of stuff on the table” by not fully utilizing their existing EHR capabilities.

Key opportunities identified include:



Empowering users: Training and enabling clinical and research staff to use native analytic tools allows them to access data faster and iterate on their queries.



Prioritizing data governance: Investing in cleaning up data structures and establishing strong governance processes is crucial to ensure accurate data capture and easy accessibility for downstream use. Fixing workflow problems is often a prerequisite to capturing correct data.



Leveraging population health tools: Utilizing tools for data-driven identification and electronic outreach can significantly improve the efficiency of patient recruitment and population management efforts.



Connecting data insights to workflow: Transforming insights from analytic tools into actionable work queues within the EHR allows teams to effectively manage follow-up tasks for specific patient cohorts efficiently.



Embracing ambient documentation and AI: Lee sees the potential of new technologies, such as ambient documentation and AI. These technologies promise to discreetly capture currently unstructured data, such as clinical observations discussed during an encounter, but only noted in text, making it available for analysis and population health efforts. This can potentially reduce the cognitive burden on clinicians by automating the documentation of discrete data points. However, effective use of AI still requires understanding the underlying data structures.

Conclusion

John Lee’s insights indicate that significant value is currently locked within healthcare EHRs due to technical-clinical communication gaps, underutilized tools, poor data governance, and outdated workflows. Organizations can move beyond carpet-bombing approaches by bridging clinical needs and data capabilities, empowering users with training, prioritizing data quality and structure, and adopting more efficient digital workflows and emerging AI technologies. Targeted, data-driven action ultimately leads to better outcomes. It is a substantial, untapped opportunity for organizations to leverage existing data assets more effectively.

Navigating the Shift to Outpatient Care and the Pursuit of the “Killer Healthcare App”

Jake Dorst, CIO | Tahoe Forest Health System

Introduction

Jake Dorst, Chief Information and Innovation Officer at Tahoe Forest Health System, shared insights into the significant market shift healthcare organizations are experiencing in the move from an inpatient-centric model to one dominated by outpatient care. In his discussion, he highlighted the strategic imperative to adapt to this change, the challenges posed by traditional operating models, the potential of technology, including AI and integrated platforms, and the importance of partnerships and brand loyalty in the new landscape. Tahoe Forest Health System operates with approximately \$650 million annually in gross patient revenue, leveraging an electronic health records (EHR) system, and holds a five-star patient experience rating.

The Fundamental Shift

Dorst emphasized that the shift towards outpatient services has profoundly impacted healthcare delivery and finances over the last decade. Inpatient admissions and lengths of stay have decreased while outpatient services' volume, variety, and financial importance have grown substantially. This trend is so pronounced that providers now report that most of their revenue comes from outpatient services. Dorst echoed a perspective he encountered years ago: *“In the last decade, there has been a shift to the outpatient side of healthcare. While we often get caught up in the inpatient world, 70% of our revenue last year came from outpatient services. The hospital will eventually become a cost center supported by outpatient usage.”*

This fundamental change necessitates re-evaluating strategies built on the traditional inpatient-centric, fee-for-service model.



Challenges and Strategic Responses

A key challenge identified is the inherent focus of current leaders, whose careers were often built on the traditional model, in effectively transitioning to outpatient-focused business models. This mindset can hinder the adoption of innovative approaches like telehealth or home monitoring that might not align with traditional revenue generation. Organizations may need to seek outside partners who are already successful in the new model to overcome this.

Strategies adopted to navigate this shift include:

- Development of **ambulatory surgery centers** to provide lower-cost, convenient outpatient surgical options
- Expanding **outpatient clinics and services in convenient community locations**, covering a wider range of specialties
- **Telehealth and remote patient monitoring** to provide virtual consultations and monitor chronic conditions remotely
- **Hospital-at-home programs** to deliver acute-level care in patients' residences
- **Care coordination and transitional care management** to improve transitions from inpatient to outpatient settings and prevent readmissions
- Forming **partnerships and integrated delivery networks** with other providers to coordinate care across the continuum
- Focus on **chronic disease management** through robust outpatient programs

Leveraging Technology and Data

Effective use of technology and data analytics is crucial. EHRs and data tools are essential for identifying high-risk patients, managing chronic conditions, and facilitating targeted outreach. Despite having tools available, organizations sometimes face access problems.

Dorst introduced the concept of a “killer healthcare app.” He envisions not merely an app, but an intelligent, personalized companion integrated into a patient’s life. This app would act as a secure gateway to the healthcare system and offer features such as:

Proactive and personalized health management

Using AI to analyze data from devices (monitors, wearables, and smart scales) for insights, predictive guidance, smart symptom checking, and personalized wellness plans

Seamless connection to the health system

Integrated communication with care teams, effortless appointment management, virtual care integration, secure health record access, and streamlined referrals

Advanced monitoring and diagnostics

AI-powered vital sign tracking, smart home integration for health insights, fall detection and prediction, continuous glucose monitoring insights, mental wellness monitoring, AI-enhanced remote diagnostics, and AI-guided self-administered tests

He described an earlier program that served as a precursor to this vision, which focused on ingesting disparate data (fitness trackers, EMR, claims) to identify self-insured employees at risk and guide interventions through a mobile app. It also included brand loyalty aspects like offering discounts for healthy food choices. Key considerations for any such app include data privacy and security, user-friendliness, integration with existing systems, regulatory compliance, cost-effectiveness, and maintaining human oversight.

Payment Models and Competition

Reimbursement models are evolving to support this shift. Initiatives like transitional care management services and participation in quality reporting and value-based programs (ACOs, bundled payments) incentivize outpatient care and care coordination. However, Dorst noted that critical access hospitals, like his own, are paid differently (pay-for-clinic), which does not inherently incentivize keeping people out of the hospital.

Competition in the outpatient market is fierce, as patients are likelier to shop for outpatient services than inpatient care. Organizations must offer competitive services or risk losing patients to competitors investing in home health and other outpatient strategies. Building brand loyalty becomes increasingly important in this environment.

Conclusion

Navigating the shift to outpatient care is a strategic imperative driven by market dynamics and financial realities. Success requires overcoming traditional mindsets, adopting new strategies, leveraging technology and data analytics, and potentially seeking external partnerships.

The vision of a comprehensive killer healthcare app represents a potential future where technology seamlessly supports proactive health management and connection to the healthcare system. While payment models are evolving, organizations, particularly those with critical access status, face unique challenges in aligning financial incentives with strategies that reduce inpatient utilization. Ultimately, staying competitive means investing in and effectively delivering outpatient services and building patient loyalty.

Innovation in the Military Health System

Chani Cordero, CIO | Brooke Army Medical Center

Introduction

Chani Cordero, Chief Information Officer at Brooke Army Medical Center within the military health system, presented on the creation and function of a **technology innovation group (TIG)** at her organization. With 25 years in the military system, she shared her experiences, emphasizing that her views are her own and not those of the Department of Defense.

Her presentation focused on the **process of establishing an innovation group**, starting with the fundamental question of “why” to identify the objectives and goals for such a group. A critical consideration highlighted was the level of power and control given to the group, distinguishing between generating ideas and having the authority to implement them. Team selection was based on needed expertise, cross-referencing different disciplines. Interestingly, Chani Cordero would intentionally include naysayers or “grumpy folks” who typically posed challenges alongside advocates for the technology.

Charter and Function

The TIG was established with a formal charter and functioned as an actual committee with rules and bylaws, defining membership and meeting frequency. Governance was key; the TIG served as a subcommittee to the Information Guidance Council (specifically, the IMAC) and the Information Technology Change Advisory Board, and its ideas were brought to the governance committee before being presented to leadership for decisions.

Objectives of the TIG included:



Advising the CIO
and relevant
governance boards



Providing
independent
thinking and
feedback



Serving as a
brainstorming
group and
sounding board



Communicating
technology
requirements and
best practices



Assisting senior
leadership with
problematic issues
to resolution

The presentation delved into various tools and methods used by the TIG. While mentioning Agile, which she finds great in some areas but doesn't fit everything, especially healthcare, she particularly values its tools.

Tools discussed included:

- **Sprints:** Applicable for big projects to consolidate skill sets and work towards a goal.
- **Collaboration tools/games:** This includes a buy-a-feature exercise, with team members given a set amount of points to spend on desired technology features. This exercise helped prioritize focus for purchase and shifted culture by making people realize they couldn't have everything.
- **Prioritization tools:** Identifying must-have versus should-have is very helpful.
- **Brainstorming methods:** Including Crazy 8s and a telephone-like game for writing ideas.
- **Mind mapping:** This is a tool for everything from innovation and brainstorming to planning. The concept is to free your mind and think abstractly rather than hierarchically, starting with a central topic and branching out ideas. It can help visualize possibilities.
- **Visualize the ideal future:** An exercise where participants imagine success in five years with fully aligned innovation and governance, potentially with an unlimited budget.

Conclusion

Chani Cordero explained the value of such exercises, particularly in keeping the team motivated and on track.



"When I get stuck in a rut, and I feel like I'm just going through the motions, I use this as a way to focus my efforts because sometimes you just feel like you're a hamster in a wheel going in circles."

These tools and exercises foster free thinking, help the team stay grounded and focused, and reach an endpoint or goal, especially when feeling stuck. Visualizing the future helps to guide current efforts to include future needs.

The Transformative Power of Critical Feedback and Embracing “We” Leadership

James Wellman, CIO | Nathan Littauer Hospital & Nursing Home

Introduction

James Wellman, CIO at Nathan Littauer Hospital & Nursing Home (NLH), shared a defining career moment that catalyzed significant personal and professional growth. He outlined how receiving critical feedback led to self-analysis, a pivot in his leadership style, and, ultimately, greater success for himself and his teams. Wellman’s background includes experience in the military, police, and private security, which initially influenced his early leadership approach in IT. He experienced rapid promotion during the dot-com boom, leading a large team relatively quickly.

Crossroads: Critical Feedback and Rejection



A pivotal event occurred when Wellman was a finalist for a Senior Director of Technology position at the University of Kentucky Medical Center. Despite feeling he was the most technically qualified candidate, he was not selected. His CIO delivered the news and provided a T-sheet detailing feedback from the interviewers using a pros-and-cons format. The list of cons was notably longer. Wellman went through the five stages of rejection: Denial, anger, bargaining, depression, and acceptance. The critical comments on the sheet were painful but ultimately led to the realization that “their perception was my reality.” It hit him emotionally and identified a disconnect between his self-perception and how others saw him as a leader.

Epiphany and Commitment to Change

Upon reaching acceptance, Wellman had a harsh realization: the person selected for the role was the stronger leader, as the position was about leadership, not just technical expertise. He recognized he was exhibiting behaviors he disliked in other leaders and accepted that he was not the kind of leader he would want to work for. He committed to “reinventing” himself and sought feedback directly from his team, requesting complete honesty through an anonymous method. He described this feedback as brutal and painful, confirming that while his team respected his position, they didn’t respect him personally because he hadn’t earned it. He realized he had adopted bad habits from poor leaders and relied on his authoritarian background, which wasn’t suitable for leading an IT team.

Building Good Habits and Embracing “We”

To change, Wellman created a list of admirable leadership traits, focusing on how those leaders made him feel. He looked beyond his profession for lessons. A key practice he adopted was conducting regular self-checks, starting with asking, “Would I want to work with me?” He learned the importance of engaging with his team, being open, seeking their feedback, and genuinely listening. He also became wary of the Dunning-Kruger effect, recognizing how his perceived technical confidence could blind him to the complexities of new roles.

A fundamental shift in his approach involved moving from an “I” mentality to a “we” mentality. He deliberately credits his team for their accomplishments. He views his team not as working for him, but with him, leveraging their expertise and coaching them rather than doing everything himself.

Outcomes and Lessons Learned

Earning his team’s trust and respect led to tangible improvements. For example, the helpdesk backlog was transformed from four weeks to 95% same-day service within 90 days. Hospital leadership recognized this success.

The same leaders who critiqued his interview later selected him for a leadership development program. Wellman credits the pivotal rejection with setting him on a better path. He emphasizes the importance of seeking help, finding mentors, and embracing coaching. He views mentoring as a two-way street, often learning significantly from his mentees. Becoming a CIO was challenging, but he kept pushing forward. He found passion in rural healthcare, which required him to broaden his operational understanding, ultimately making him a better IT leader.

Vendor Partnerships

He also highlighted the importance of fostering strong relationships with vendors and viewing them as partners. He shared an example of partnering with a firm for interface engine support, where the vendor team became integrated and represented NLH on calls with other vendors. He believes organizations cannot live without vendors, and relationships should be partnerships, not transactional.

Conclusion

James Wellman’s journey underscores that constructive criticism, while painful, can be a powerful tool for growth. His experience highlights the necessity of self-awareness, accepting feedback, and committing to fundamental changes in leadership style, particularly moving towards a team-centric approach. In his view, building trust, mentoring others, and fostering strong partnerships are key components of effective leadership.

Micro Trends Impacting Healthcare Economics

Mike Mosquito, Head of Enterprise Automation & Digital Integration| FOX Rehab, Host | Buzz Podcast, and Co-Founder and Forum Chair | Future of Care Spaces

Introduction

Mike Mosquito moderated a candid roundtable discussion focused on the economics of healthcare and the impact of micro trends on the industry, affecting participants personally and professionally within their companies and the broader healthcare ecosystem. The goal was to facilitate a collaborative conversation in a safe environment for participants, including CEOs and CIOs, to share experiences and challenges.

Key Challenges and Economic Pressures

Several significant economic challenges and micro trends impacting healthcare were highlighted:

Inflationary pressures and tariffs

Rising costs due to factors like tariffs on imported medical devices are a real economic fact impacting the entire supply chain. Cost increases on essential supplies, such as bandages and swabs, trickle down through the system.

Balancing cost-cutting and quality

Companies face pressure to reduce waste and costs but must avoid cutting so deeply that patient care or even lives are negatively impacted. Maintaining quality of service while managing costs is a delicate balancing act.

Thin margins and financial constraints

Healthcare systems often operate with minimal financial margins. Unexpected events, such as extreme weather causing facility shutdowns, can result in significant financial losses. A lack of margin makes strategic investment challenging.

Investment hesitation

Financial uncertainty and the need to maintain cash on hand lead systems to pull back capital investment. There is often a reluctance to invest in initiatives, particularly technology, that do not offer an immediate return on investment (ROI) within a short timeframe, such as 90 days or 6–9 months. Technology is often viewed as a cost center rather than a strategic asset.

Access to care issues

Patients face significant difficulties accessing primary care physicians and specialists,

often experiencing long wait times. This lack of access leads patients to seek care in emergency departments as a workaround for non-emergent issues or access to necessary services. Rural and underserved communities face even greater challenges, lacking providers and basic infrastructure like ambulances.

Difficulties With Value-Based Care

Implementing value-based care models presents significant challenges:

Defining and measuring value: Value is difficult to define and measure in a universally understood and accepted way. Unlike fee-for-service, which is simple to measure (such as CPT codes), measuring value, especially the avoidance of negative outcomes, is complex and can have significant reporting lags up to 18 months.

Incentive mismatches: The prevalent fee-for-service model incentivizes doing more to people, rewarding volume over value, and potentially motivating upcoding or unnecessary procedures. It can lead to disparities in resource allocation, favoring revenue-driving specialties.

Infrastructure and deployment: Even large organizations struggle with the infrastructure required to efficiently deploy value-based care, particularly in uncontrolled environments like home care. Clinicians deployed to the home may lack the essential tools or EMRs.

Broader Systemic Issues and Potential Solutions

The conversation touched on deeper systemic issues and potential pathways forward:

Consumer education: There is a critical need to educate consumers on navigating the healthcare system and choosing the appropriate care site. This responsibility extends beyond the healthcare system, requiring partnerships with community entities or local government. Technology and data could play a role in delivering this education and highlighting needs.

Alternative revenue streams: There was discussion on exploring alternative ways for systems to generate revenue beyond traditional care provision, including potentially controversial options like data monetization using de-identified or synthetic data.

Employer role: Large, self-insured employers are seen as having significant leverage to drive change by directing healthcare spending towards more efficient models like direct primary care, which could offer cost savings and improve employee access.

Payor behavior and transparency: Concerns were raised about the behavior of large, publicly traded payers, including a lack of transparency in how healthcare money is spent, potentially written into contracts with employers.

Systemic waste and error reporting: A significant portion, estimated to be one-quarter to one-third of healthcare spending, is considered waste or results in harm. However, there are poor mechanisms to identify and address this systematically, partly due to a lack of universal coding or vocabulary for error and harm events. The establishment of a national registry for error and harm events was suggested.

Investing in innovation: Despite the challenges, there is recognition that investment in new technology can remove human behavior variability and offer a path to success. However, this requires brave leadership willing to take risks.

Shared risk models: Given financial constraints, healthcare systems cannot simply write checks for new technology. Vendors and partners are being encouraged to engage in shared risk arrangements, where payment is tied to achieving agreed-upon outcomes or cost savings. While some CFOs may be hesitant to share potential upside, this model is seen as a necessary evolution.

Conclusion

The discussion underscored that navigating the current economic environment requires creative solutions and collaboration across the healthcare ecosystem. It necessitates addressing systemic issues, from financing and investment models to data infrastructure, consumer education, and the fundamental question of whether healthcare is a right or a privilege. As moderator Mike Mosquito framed the challenge:

"In this current economic environment, how can we partner? And I guess it's a question for both the partners and the providers. Now we want to bring technology to your institutions. We want to be able to, but we know that there are constraints. What are the creative solutions or shared risk areas? You know, how can we work together?"

This call for collaboration for creative solutions, including shared risk, highlights the path forward debated by the participants. Addressing these complex issues requires bravery, investment, and a collective effort beyond individual organizations.



Business Continuity and Resiliency in Healthcare

Theresa Meadows, SVP & CDIO | Cook Children's Healthcare System

Introduction

Theresa Meadows, Senior Vice President and Chief Digital and Information Officer at Cook Children's Healthcare System, presented the critical need for business continuity and resiliency within healthcare systems, particularly in cybersecurity attacks and IT disruptions. She highlighted significant challenges and a proposed strategic initiative at Cook Children's Health System to address these issues.



Top Risks Identified

Business continuity and cybersecurity have been identified as top risks for the organization by its Enterprise Risk Management Committee, placing them within the top five. A new requirement from The Joint Commission mandates organizations to have a written continuity of operations plan that specifically considers system **outages lasting 30 days or more**. Current medical center emergency operations plans often do not adequately address **business continuity** or the necessary coordination between initial **incident response and disaster recovery** during large-scale incidents. The organization has never conducted a large-scale incident response, disaster recovery, and business continuity test involving people, process, and technology across the health system.



Theresa Meadows emphasized a critical perspective shift:

"This is really a clinical issue.

This is not a technical issue that needs to be solved."



This quote underscores the point that while technology is involved, the fundamental problem and solution revolve around ensuring patient safety and care delivery, not just fixing IT systems.

Challenges Faced

The Cook Children's Health System comprises nine entities, and each entity historically operates independently regarding disaster management. There is a significant issue with insufficient or missing documented downtime plans and procedures, especially concerning business continuity. The lack of centralized oversight and coordinated activities resulted in inefficiencies and disparate disaster plans across the organization. Frontline staff's knowledge of disaster management is often limited to natural disasters or mass casualties, and they tend to believe that IT will manage and fix all problems during a cyber event.

The organization's historical success with quick technical recovery, such as the recent resolution of a cyber threat incident the same day, created a level of organizational comfort and a belief that IT will always be able to restore systems quickly. Because typical IT downtimes are brief, the frontline workforce was not well-versed in extended downtime procedures. Many staff, including providers and nurses, lack experience or knowledge of manual processes, such as writing prescriptions on paper or performing written documentation. Significant issues arise during extended downtime regarding billing and revenue cycle management, as documenting care sufficiently for payment becomes difficult. Patient tracking, including manually creating arm bands, also presents challenges. Many colleagues simply can't envision a 30-day downtime scenario.



System-Wide Acceptance

The organization proposed establishing a system-wide program for business continuity to address these challenges. A dedicated group reporting to the Chief Information Security Officer oversees the initiative. The proposed structure includes a Director of Disaster Management & Planning and distinct manager roles for disaster recovery, disaster incident response, and business continuity planning. This structure aims to provide oversight and coordination across all entities within the health system, including medical centers, home health, health plans, the physician network, health system shared services, ASC joint ventures, and the group purchasing organization.

While IT will lead and coordinate the effort, the goal is not for IT to do it all but rather to oversee and ensure the respective entities do the work. It involves working closely with existing emergency management directors in each area, helping them connect the dots between their existing disaster plans and IT outage scenarios.

Goals and Expected Outcomes

The key goals of this new initiative include:



Achieving system-wide **coordination and monitoring** of business continuity activities



Conducting an organization-wide **business impact analysis** to prioritize areas for business continuity focus, starting with the top ten risks identified



Developing an overall **plan and timeline** for organizational business continuity preparedness



Establishing **system priorities** related to investments, resources, and downtime procedures



Monitoring **key performance indicators (KPIs)** and coordinating tabletop exercises to **practice plans**



Updating the Enterprise Risk Management Committee on progress



Serving as an **educational arm** and provides **resources** to help entities develop business continuity plans. This included utilizing informatics teams that understand workflows to guide departments in operating without technology.



Working with existing emergency preparedness personnel to help them connect their existing knowledge of **disaster planning** to IT outage scenarios and **develop specific 30-day plans**.

Conclusion

The initiative acknowledges that business continuity is fundamentally a clinical issue, not just a technical one. It focuses on ensuring patient safety and care delivery even without technology. The new structure aims to overcome a lack of accountability by reporting on entity progress.

Operation: Nashville: A Comprehensive Healthcare Cyber Resilience Tabletop Exercise

Group participation led by Marty Momdjian, GM & EVP | Ready1 by Semperis
& Andrea Daugherty, Founder | Novhera Health

Introduction

Marty Momdjian and Andrea Daugherty facilitated a substantial and highly interactive tabletop exercise during the event, designed to immerse CXO healthcare leaders in the critical challenges posed by escalating ransomware attacks.

Leveraging his extensive background in healthcare IT, cybersecurity, and incident response, including prior roles as CTO and CSO in healthcare, work with the Department of Defense and the VA, and contributions to esteemed bodies like MITRE and CISA, Momdjian brought deep practical experience to the session.

He emphasized that while incident response principles haven't fundamentally changed in 15-20 years, the landscape and the complexity of healthcare targets necessitate advanced preparation and resilience. The exercise elevated awareness of the sophisticated capabilities of cyber adversaries targeting healthcare, promoted essential knowledge sharing, educated participants on effective preparation strategies, and highlighted the intricate process of recovering from a significant cyber event.

A central theme woven throughout was the assertion that **“healthcare is not a soft target – healthcare is a complex target.”** This complexity arises from highly connected technology ecosystems, sensitive high-value data, legacy system vulnerabilities, and the critical nature of patient care operations intertwined with extensive technology reliance.

Understanding Resilience

The session began with a discussion on resilience, a current buzzword in cybersecurity. It probed whether organizations have clearly defined what resilience means at the executive level. Is it merely avoiding downtime or the ability to recover effectively from it? Momdjian argued that modern healthcare companies are fundamentally technology companies that provide another service, and they are heavily reliant on technology for core functions like patient movement and care.

Recent events and updates to relevant frameworks and regulations were discussed briefly, such as the CISA Incident Response Framework, now simplified to a Prepare, Respond,

Recover Framework to replace older multistep models. The impact of regulations, like CISA's CIRCA, requiring critical infrastructure sectors such as healthcare to disclose material cyber incidents, DORA, and emerging state-specific cybersecurity laws, was also discussed.

CISA is the acronym for the U.S. Cybersecurity & Infrastructure Security Agency. It provides national recommendations and standards for critical infrastructure based on contributions from experts and acts as a baseline for security controls and risk reduction. The Health Sector Cybersecurity Coordination Center (HC3), a joint effort by CISA, NIST, and HHS, was highlighted as a valuable resource for reports on cyber threats and their impact on clinical and revenue cycle operations.

The LockBit ransomware group's ability to quickly reconstitute operations after a major law enforcement takedown, even leveraging publicly available incident response procedures, starkly illustrated the adversaries' resilience.

Exercise: Resilience

The core of the exercise was the Operation: Nashville scenario, based on a recent real-world event but applied to a fictitious, large, nonprofit health system.

This system was characterized by:

- **Significant scale:** \$10B in revenue, 5,000 beds, a Level I trauma center, and numerous physical locations and clinics
- **Target profile:** Actively targeted due to recent news presence, expansion, and acquisitions
- **Hyper-efficient integrated-delivery-network model:** Critically, it operates on a single enterprise-wide EMR instance for virtually all critical workflows – patient care, ADT, revenue cycle, etc. This single point of failure meant that an impact on the EMR could disrupt the entire system



Blue Team Instructions

Participants were cast as the Blue Team and instructed to stay in their current role, title, and responsibilities and apply the scenario to their organizations. The exercise guided discussion through the typical phases of an adversary kill chain and corresponding incident response:

1 Reconnaissance and initial access: Adversaries profile targets using publicly available information, such as LinkedIn. This information is commonly used to gain access by logging into systems using compromised credentials, often obtained through password reuse across different sites rather than breaking in. Third-party vendors and privileged accounts are frequently targeted entry points.

Preparedness: Participants grappled with their specific department's needs to prepare for an extended downtime, defined as 30 days.

Contacts: Who needs to be contacted immediately, internally and externally, including administrators on call, cyber insurance, and legal counsel. The importance of readily available contact information, with designated roles for emergency management identified, was stressed. Organizations often lack this list.

Documentation: Access to and usability of downtime forms and business continuity procedures. Challenges were noted with outdated forms and a lack of staff training on using them correctly. The prompt asked about their location and last update.

Escalation: Clear internal escalation paths.

Communication methods: There is a critical need for communication methods independent of potentially impacted systems, such as cell phones, email, and EMR messaging. Internal radio systems and satellite phones are alternatives.

Legal communication risks: Momdjian highlighted a critical point: the discoverability of personal cell phone communication during a cyber event if cyber insurance and third-party legal counsel are involved. This necessitates using official corporate communication tools that can potentially fall under legal privilege and are documented.

"Everybody relies on their cell phone for communication. If you invoke cyber insurance and third-party legal from any kind of cyber-driven legal counsel that's going to come in, then they're going to tell you to stop communicating on your phone. Period. Because your cell phones are fully discoverable during a cyber event, if you're part of the crisis response team."

Establishing who communicates with external entities, like public affairs, was also discussed. Mapping the communication structure, like a whiteboard pyramid showing roles and communication flows, is often missed.

2 Lateral movement and exfiltration: With access, adversaries “live off the land,” observing network activity, identifying high-value accounts such as service and privileged accounts, and collecting information. Data exfiltration can be surprisingly simple, such as copying files from reporting environments after gaining access as a user.

Containment: Participants moved on to detecting suspicious activity and data leaving the network.

A major decision point is when to disconnect or shut down systems to contain the threat, potentially causing downtime, even if the full scope isn’t yet understood. Questions asked included identifying the right time to declare downtime and how quickly clinical staff can switch to manual procedures. Using user behavior analytics on privileged accounts can be a potential trigger for early incident response notification.

Alerting key personnel before complete downtime is crucial for giving people time to prepare, such as driving into the office. Vendor communication procedures with designated contacts and official communication channels are critical. Relying on standard support or individual calls should be avoided, especially given the potential impact on vendor SaaS products and legal considerations.

3 Ransomware deployment: Threat actors leverage their access, often targeting Active Directory due to its central role, to deploy ransomware payloads. Participants were warned against the common instinct to reboot affected systems. A reboot trigger can trigger payload detonation and destroy crucial forensic data.

Downtime and forensics: Participants confronted the reality of extended downtime, potentially lasting weeks or months, not just hours. Recovery is dependent on the external forensics team. It can’t truly begin until forensics is complete and the threat is eradicated.

Regulatory notification: It is necessary to notify regulatory bodies like OCR as the downtime drags on.

Information for forensics/after-action: Identifying the information each department needs to provide for forensic analysis and subsequent after-action reports. Personnel outside of IT/security must document their actions and experiences during the event.

Recovery logistics: Practical recovery challenges include the logistics of reimaging thousands of devices, potentially requiring training non-IT staff, and managing encryption keys, should be considered.

Drilling procedures: It is critical to regularly drill downtime and recovery procedures, moving beyond inconvenient late-night drills to practice during the day with involved departments.

Logging actions: Maintaining logs of actions taken during an incident is necessary for after-action review, legal discovery, and insurance claims for both cyber and business interruption.

4 Ransom negotiation and recovery: Adversaries may attempt ransom negotiation, sometimes directly contacting victims. **It was strongly advised that internal staff, especially the C-Suite, should not negotiate;** this role should fall to designated external negotiators provided through cyber insurance or legal counsel.

Insurance and negotiation: Participants discussed who is designated to negotiate. A critical point was notifying cyber insurance providers immediately and early in the process. Failure to do so can jeopardize coverage, as illustrated by an example where a hospital reportedly went bankrupt after failing to notify its insurer early enough.

Insurers require involvement with the response team from the outset. Business interruption insurance was also mentioned as a source of coverage for operational costs during downtime, complementing cyber insurance. Setting social media policies and training employees not to share information about the incident externally were highlighted, as adversaries and insurers monitor public posts.

5 Triple extortion and after-action: Threat actors increasingly employ triple extortion, targeting not only the organization but also patients or partners with exfiltrated data. The long-term legal costs and public relations damage can significantly exceed the initial incident response expenses. After-action reports are vital for reviewing the incident, identifying lessons learned, and improving resilience.

Long-term impact: Participants considered their role in the long-term aftermath, including addressing potential re-targeting of patients. They discussed the need to provide input based on their departmental experiences for the after-action report and continuous improvement. The challenges faced by smaller healthcare organizations with limited resources and the concept of larger systems offering safe harbor services to affiliates or partners under specific regulations to help mitigate risk across the ecosystem were raised.

Throughout the session, it was reinforced that **cyber resilience is a holistic organizational concern** requiring preparedness, clear communication protocols, practiced procedures, and cross-departmental collaboration, extending far beyond the IT or cybersecurity teams. This exercise was a realistic and often confronting look at the widespread impact and complex decision-making involved in responding to a major cyber event in healthcare.

Charting a Resilient, Patient-Centered Future

The collective wisdom shared by healthcare executives at the Future of Care Spaces event paints a clear picture: **the future of healthcare delivery is increasingly distributed and technology-enabled, and demands a fundamental rethinking of operations, leadership, and risk management.** The **shift to outpatient care** is not merely a trend but a dominant reality requiring organizations to adapt their business models, invest strategically in community-based and home-based services, and develop lower-cost care options like ASCs and virtual care pathways.

Successfully navigating this transformation hinges on the **strategic deployment and thoughtful integration of technology and data.** EHRs, combined with advanced analytics and emerging AI capabilities like ambient listening, are essential for identifying patient populations, managing chronic conditions, enabling proactive outreach, streamlining workflows, and predicting risks. However, the effectiveness of these tools is contingent on addressing fundamental challenges related to **data quality, governance, and the complexity of integrating disparate data sources.** The executives emphasized that technology adoption must prioritize user experience and workflow integration, particularly for frontline staff like nurses, ensuring tools genuinely reduce cognitive burden and free up time for direct patient care.

Along with operational and technological evolution, healthcare organizations must prioritize **cybersecurity and business continuity.** The increasing frequency and sophistication of cyber attacks and regulatory requirements for extended downtime preparedness highlight the critical need for robust incident response plans, regular drills, strong vendor partnerships, and a clear understanding of manual downtime procedures. Relying on past technical recovery successes is insufficient; a commitment to continuous preparation and education across the entire organization is paramount.

The future requires **adaptive and self-aware leadership** capable of challenging traditional inpatient mindsets, empowering teams, and fostering a culture of collaboration and trust. Strong partnerships with vendors and within the organization are vital for accessing expertise and driving change.

As the industry evolves towards value-based models, **demonstrating impact through outcome metrics** will be crucial for justifying investments and ensuring financial sustainability. While challenges remain in aligning financial incentives universally, the imperative to deliver high-quality, cost-effective care across a distributed network is clear. By embracing these challenges as opportunities, leveraging technology thoughtfully, prioritizing resilience, and centering the patient and care teams in strategic decisions, healthcare organizations can successfully navigate the future of care spaces.