Managing Efficiently
Future Pandemics

Editorial

Managing Efficiently Future Pandemics

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Pandemics, like the one we are currently experiencing, claim millions of lives, destroy economic stability and disrupt the wellbeing of society. The COVID-19 pandemic demonstrated the lack of preparedness of healthcare systems across the globe and revealed its fragilities. The Omicron wave and particularly the vaccination process at a global scale, though very asymmetric, may have slowed down the impact of COVID-19, but this does not mean healthcare systems should become complacent.

Experience from this pandemic highlights the need to prepare for large-scale outbreaks and similar pandemics in the future. This is the time to evaluate the lessons learned during the last two years. We must use those lessons to strengthen the capabilities of our healthcare systems, improve our response and preparedness, focus on prevention and surveillance strategies and improve our understanding of elements that may have pandemic potential in the future. It is also the time to reinforce the strategies to reduce the burden of NCDs (noncommunicable diseases), in particular cardiovascular conditions, one of the main collateral damages that resulted from the COVID-19 pandemic.

In this issue, our contributors discuss their experience of COVID-19 and how the management of pandemics can be improved in the future. They outline strategies that can be adopted to build better resilience in global healthcare systems and ensure the world is not as unprepared as during the recent pandemic.

Áine Carroll explores the future of healthcare as we emerge from the coronavirus pandemic through the lens of complex systems and pillars of integrated care and highlights the importance of reconceptualisaion of health and care to create a learning system that can adapt and respond to knowledge from different areas.

Giuseppe Tortora and Davide Caramella provide an overview of the logistic challenges during the pandemic, and the use of drones in the future to trigger logistic advancements both in normal operating conditions and emergencies and to reduce legacy vulnerabilities of healthcare systems.

Jodi Keller, Nancy Lehr, Melissa Rose and co-authors discuss a newly developed Surge Operations Call Center (SOCC) that help avert overload in individual hospitals in Ohio by directing patients to hospitals with available bed and staff and how such a system could help improve management during emergencies and improve coordination of patient traffic between hospitals during patient volume surges. Hannah Jackson and Pooja Arora discuss locum general practitioners and how this field remains a worthwhile career trajectory in a post-pandemic world.

Amit Vaidya looks into the impetus behind pharmaceutical development trends and how healthcare policymakers and payers should adapt to emerging new treatments and considerations for a managed approach to adoption. Rahul Varshneya provides an overview of data management challenges that can help improve efficiency, compliance, data security and interoperability in healthcare.

We also feature Charlotte Beardmore, the Director of Professional Policy for the Society and College of Radiographers and President of the European Federation of Radiographer Societies (EFRS). Charlotte discusses the future of radiography and describes ERFS' strategy for meeting the changing needs of radiographers.

We hope you will enjoy this issue. As always, your feedback is welcome.

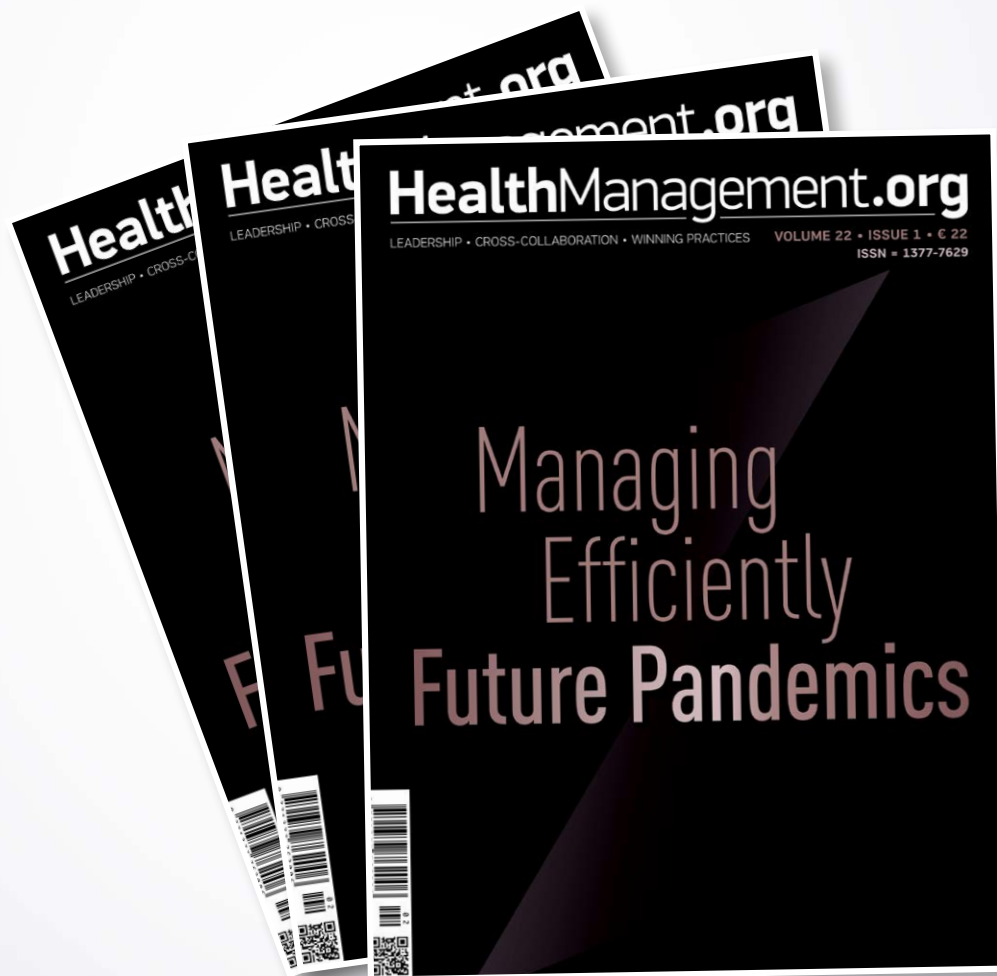Happy Reading and keep safe in an unsafe world!

Contents

Contents

Upcoming Issue

Cover Story: Successful Digitalisation Pathways

Healthcare digitalisation increases operation efficiency, provides better access to care and increases patient convenience. Careful planning and implementation of operational changes consider interoperability, culture, and technology. Why are some successful and others fail? What are the best practices for successful implementation?

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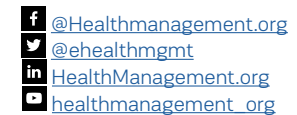
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The Future of Healthcare in the Wake of COVID-19 - Time for a Paradigm Shift

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This paper explores the future of healthcare as we emerge from the COVID-19 pandemic through the lens of complex systems theory and the pillars of integrated care.

☑ Key Points

- COVID-19 has exposed and amplified the inequities in our health and care systems.

- In seeking to address these inequities, we need to recognise that health and care systems are complex adaptive systems.

- Integrated care is an important guiding principle for necessary service redesign.

- This reconceptualisation of health and care requires a combination of expertise across a diverse range of disciplines and fields to create a learning system that can adapt and respond to knowledge from many different areas.

Introduction

I find myself in a particularly reflective frame of mind as I write this piece. Russia has just invaded Ukraine and the world stands on the brink of another world war. Like many others I find myself wondering "*how can this be? Have we learned nothing?*" What has this got to do with the future of healthcare you might be wondering. In my opinion, the parallels are clear. Globally, health systems have been struggling for decades with the dual challenge of emerging demands and system constraints. Despite considerable improvements in people's health and life expectancy in recent years, these improvements have been unequal among and within countries. Globally, more than 400 million people lack access to essential health care (Organization and Bank 2021). The stark reality of these inequities have been exposed and amplified by the COVID-19 pandemic (Marmot and Allen 2020). Whilst many governments are collectively patting themselves on the back for a job well done and removing all restrictions, the question must be asked - how can we have got it (and continue to get it) so wrong? Why do we fail to learn?

Complexity and Healthcare

I believe the answer lies in our failure to recognise and engage with our health and care systems as complex adaptive systems (CAS). According to Johnson (2009), complexity is "the study of phenomena which emerge from a collection of interacting objects". Plsek and Greenhalgh (2001) define a CAS as "a collection of individual agents with freedom to act in ways that are not always totally predictable, and whose actions are interconnected so that one agent's actions changes the context for other agents". Six organising principles have been identified that allow a discernment of complex systems (Preiser 2018); three structure related [(1) Are constituted relationally, (2) Are radically open, (3) Are context dependent] and three process related [(4) Have adaptive capacities, (5) Are dynamic, and (6) Are Emergent].

Complex systems approaches to health and care have been receiving increased attention in recent years as

it has been recognised that the traditional reductionist approaches that have predominated healthcare research to this point have yielded only limited insights (Braithwaite et al. 2018; Foundation 2010; Greenhalgh and Papoutsi 2018; Rusoja et al. 2018; Thompson et al. 2016; Carroll et al. 2021). However, although there

responded better to the COVID-19 crisis. In this report, they build upon knowledge gained over many years working with and studying integrated care systems around the globe and identify nine pillars as a conceptual framework to support the successful delivery of integrated care. These nine pillars are:

To accomplish a health service that delivers what people want demands an understanding of what people want. In Ireland, Irish people came together in a participatory project to co-create a definition and generic descriptors for person-centred coordinated care. The report and methodology are published elsewhere

Those health and care systems that came together quickly to 'act as one' and collaborate across disciplines and sectors responded better to the COVID-19 crisis

has been a lot of interest in viewing the health and care systems as CAS, as Greenhalgh and Papoutsi stated "we embrace the theme of complexity in name only and fail to engage with its underlying logic" (Greenhalgh and Papoutsi 2018).

Over the last five years, there has been an exponential growth in the number of publications purporting to engage with complexity science and theory; however on closer inspection most papers fail to demonstrate that engagement and there are very few empirical studies (Carroll et al. - paper in preparation).

Integrated Care
Around the world, many health and care systems are being redesigned and in many, a guiding principle for this redesign is integrated care (Hughes et al. 2020). However, as a concept, integrated care is often misunderstood or is vague. The International Foundation for Integrated Care have sought to address this lack of clarity with the publication of 'Realising the True Value of Integrated Care: Beyond COVID-19' (Lewis and Ehrenberg 2020). They recognised that those health and care systems that came together quickly to 'act as one' and collaborate across disciplines and sectors

1. Shared values and vision
2. Population health and local context
3. People as partners in care
4. Resilient communities and new alliances
5. Workforce capacity and capability
6. System wide governance and leadership
7. Digital solutions
8. Aligned payment systems
9. Transparency of progress, results, and impact

No one of these pillars takes priority over the other and all must be considered as a dynamic interactive whole.

However, these pillars do not take into sufficient consideration the complexity of our health and care systems and therefore in order to understand the value of integrated care, there is a pressing requirement to have an additional complexity focus for the study of health and care systems. Indeed integrated care has already been demonstrated as a complex adaptive system in itself (Carroll 2021). This will require novel research methods that will facilitate as Greenhalgh states '*rich theorising, generative learning, and pragmatic adaptation to changing contexts*' (Greenhalgh and Papoutsi 2018).

(Phelan et al. 2021; Phelan et al. 2017). The definition generated from service users' narratives is as follows: "*Person-centred coordinated care provides me with access to and continuity in the services I need when and where I need them. It is underpinned by a complete assessment of my life and my world combined with the information and support I need. It respects my choices, building care around me and those involved in my care*".

Although a short paragraph, it clearly demonstrates what people expect from health and care services. If any of us consider our own context and self-assess our current services against this definition, I am sure each of us would find our current services wanting. So, when people ask me "how will we know when we've got there?" I respond, "when our citizens respond to this definition and say yes to each element".

It has been interesting to watch health systems already move away from the term integrated care as if we have accomplished what we set out to do and now it's time to do something new. Terms like 'population health approach' and 'value cased care' are coming into vogue yet when we apply the domains or pillars of integrated care, although there are many examples of good practice for specific diagnostic categories and

age cohorts, not all citizens are having the same experience of care.

So, what can be done?

Such complex issues cannot be solved by one faction alone. Health systems are inextricably linked to social and ecological systems, so we need to create a knowledge generating and sharing, learning system with a participatory approach to probing, exploring and hopefully answering these complex questions. This will require a collaborative union of governments, academics from many different disciplines such as social science, engineering, economics etc., civic society and healthcare professionals all united in a shared curiosity and passion for improving how we think about, design and implement our health and care systems. This is not new thinking. Gregory Bateson and Margaret Mead and many others have left us many of the necessary foundational principles. It is now up to us to choose to take up the baton and continue their work. I have had the privilege of meeting and working with many great thinkers in this space which fills me

with hope and optimism for what lies ahead.

We will require this radical and disruptive thinking if we are to achieve the revolutionary transformation essential if our peoples are to flourish in this fragile world of ours. As we emerge from the pandemic, we urgently require such a societal commitment for change. Most health and social care models remain hospital focused, episodic and cure orientated. A paradigm shift in thinking is required to address the social determinants of health and provide universal access to person-centred coordinated integrated care. This needs to be accompanied by, as Greenhalgh and Papoutsi state, '*rich theorising, generative learning, and pragmatic adaptation to changing contexts*' (Greenhalgh and Papoutsi 2018). A move forward is the adoption of Preiser's six organising principles of complex adaptive systems and IFIC's nine pillars and the creation of a learning system. We are all learning and none of us have all the answers, but we can sense and learn together.

Conclusion

At a time of such fear and uncertainty, it can be easy to lose hope. But hold fast to hope. We are all connected. We are all in this moment sharing this world together. We are not alone. We are full of vitality, creativity, curiosity, and care. Feel your feet on the ground. Feel the air as it enters and leaves your body. Feel your heart beating in your chest. In this moment, sense your connection to the world and the universe around us. We are surrounded by and infiltrated with positive energy. The dark forces are a minority and will pass. Together, anything is possible.

As the late Donella Meadows said "*We can't control systems or figure them out. But we can dance with them*" (Meadows 2001).

Let's dance together.

Conflict of Interest

None. ■

A paradigm shift in thinking is required to address the social determinants of health and provide universal access to person-centred coordinated integrated care

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Surge Operations Call Center: Managing Capacity Through Innovation and Collaboration

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Early during the COVID-19 pandemic, a newly developed Surge Operations Call Center (SOCC) averted overload in individual Central Ohio hospitals by directing patients to hospitals with available beds and staff.

☑ Key Points

- The SOCC, designed to load balance patients during emergencies to network hospitals according to bed and staff capacity, helped prevent hospital overload during the COVID-19 pandemic.

- Streamlined processes, 'backstage' execution, and consistent messaging for all referring providers are designed into the SOCC to prevent confusion and frustration in referring providers/facilities and unnecessary rework.

- The SOCC increased relationship building and staff collaboration between separate hospital systems.

- During emergencies, the SOCC brought about better coordination of patient traffic between hospitals to help address patient volume surges.

On 26 March 2020, the three adult healthcare systems in Central Ohio received a call to action requesting that they develop a process to manage the surge of patient volumes related to the COVID-19 pandemic. A conference call with the Central Ohio Trauma System (COTS) Team and hospital leadership occurred that afternoon. The teams collaborated and coordinated with all key stakeholders to develop the Surge Operations Call Center (SOCC), which was activated on 8 April 2020. The initial goal was to monitor the COVID-19 patient population in the Central Ohio area and the overall census capacity in each hospital. A large surge of COVID-19 patients was anticipated. SOCC's goal was to direct patients to hospitals with available beds and staff to avoid overloading individual hospitals. If one hospital reached capacity, the SOCC would evaluate census across the region and direct patients to the closest most appropriate hospital with capacity. We arranged for 24/7 physician coverage to assist the SOCC registered nurses (RNs) with decision-making support as needed. Physicians from each health system

collaborated and developed a rotating call schedule for the SOCC. Fortunately, we never reached a point where our health systems could not accommodate a patient's hospital of choice.

In addition to the activation of the SOCC, we also had a daily multidisciplinary video conference call with participants from across the region to discuss capacity and COVID-related issues. These participants included transfer centre leadership, health system executives, and COTS leadership. As we progressed further into the pandemic, participation expanded to include Columbus and Franklin County Public Health, leadership from the Ohio Department of Rehabilitation and Corrections (ODRC), and leadership from 46 hospitals across our entire zone.

Who We Are

Central Ohio Trauma System
The Central Ohio Trauma System, located in Columbus, Ohio, is a 501(c)(3) private non-profit organisation that coordinates trauma care, emergency care, and disaster preparedness systems throughout 36 counties in central, southeast, and southeast central Ohio. COTS began its collaborative work in 1997 to improve outcomes for injured patients through the coordination of a citywide trauma data registry and trauma education. Today, COTS serves as the hospital preparedness coordination agency for the Ohio Homeland Security Regions 4, 7, and 8. The Central Ohio Trauma System established the Healthcare Incident Liaison (HIL) role to support Central and Southeast, Southeast Central Ohio hospitals and partnering agencies in the event of a disaster, regardless of its scale. The HIL serves as a conduit for situational awareness and information sharing, assists with regional resource allocation, and facilitates response activity coordination for 43 trauma and acute care hospitals.

The facilitation and coordination role of the COTS HIL designates COTS as the coordinating agency for the three regions, which have now become known as Zone 2. The HIL was essential in coordinating the planning of the Alternate Care Site located at the Greater Columbus Convention Center (GCCC). This site was designed to admit COVID-positive (+) patients in anticipation of a surge that would exceed hospital capacity. Each of the three Central Ohio hospital systems were prepared to set up operations at the GCCC. Fortunately, we did not have to operationalise this during the height of the pandemic.

Mount Carmel Health System
The Mount Carmel Health System is a part of Trinity Health, one of the nation's largest multi-institutional Catholic health care delivery systems, serving diverse communities that include more than 30 million people across 22 states. The Mount Carmel Health System was founded in 1886 by the Sisters of the Holy Cross. Today, the health system is comprised of four hospitals and three free-standing emergency centres serving more than one million patients in Central Ohio each year.

Ohio State Wexner Medical Center
The Ohio State University Wexner Medical Center is a multidisciplinary academic medical centre located in Columbus, Ohio, on the main campus of The Ohio State University. The origin of The Ohio State University Medical Center dates back to 1834 with the founding of the Willoughby Medical University of Lake Erie in Willoughby, Ohio. The Willoughby school moved to Columbus in 1846 to expand and improve its clinical facilities by becoming Starling Medical College, the first teaching hospital in the United States. Over the next six decades, the Starling Medical College merged several times. In 1914, all of its assets were donated to The Ohio State University. It has been named in honour of Ohio State alumnus and The Limited founder Les Wexner since 2012.

As one of America's top-ranked academic health centres, our team of more than 23,000 is driven by our mission to improve patients' lives in Ohio and worldwide through innovation in research, education, and patient care. The Ohio State University Wexner Medical Center is comprised of seven hospitals with 1604 patient beds, nine multispecialty centres, 100+ facilities, and a National Cancer Institute (NCI) designated comprehensive cancer centre.

OhioHealth
OhioHealth is a nationally recognised, not-for-profit, faith-based, charitable healthcare outreach of the United Methodist Church. Based in Columbus, Ohio, OhioHealth has been serving its communities since 1891. OhioHealth is a family of 35,000 compassionate associates, physicians, residents, fellows, and volunteers that support a system comprised of 12 hospitals and more than 200 ambulatory sites, hospice, home health, medical equipment, and other health services spanning a 47-county area.

Annually, OhioHealth provides care and services to our patients, their families, and the communities we serve through multiple access points, including over 2.6 million outpatient visits, 541,349 emergency department (ED) visits, 162,754 inpatient and observation hospital admissions, 106,942 surgeries, 14,050 births, and 500 research studies.

Surge Operations Call Center Drill
During the COVID pandemic, it quickly became apparent

that the Surge Operations Call Center (SOCC) could be utilised to support additional emergency and patient capacity situations post-COVID. The following debrief describes the first real-world utilisation of the SOCC post-COVID. The Franklin County National Disaster Management System (NDMS) hospitals partnered with the Central Ohio Trauma System and Wright Patterson Air Force Base (WPAFB) to test their role in an NDMS response during the Operation Ultimate Caduceus Exercise from 26 April through 30 April 2021.

The drill's purpose was for NDMS to partner with healthcare facilities to ensure a network exists to provide care for American citizens and/or military casualties within an area impacted by a natural, man-made disaster, military health emergency, or other public health emergency when additional or complex care is unavailable. The Department of Health and Human Services (HHS), through NDMS, is the lead federal agency for definitive care through a coordinated partnership with the Departments of Homeland Security (DHS), Veterans Affairs (VA), and Defense. In the event of a public health emergency, NDMS, through 65 VA and Department of Defense (DOD) Federal Coordinating Centers (FCCs), manages the medical evacuation from areas impacted by a disaster to designated reception facilities within the NDMS health care facility network.

A nationwide network of over 1,900 civilian hospital partners provides definitive care for NDMS federal patients. The NDMS Definitive Care Reimbursement Program reimburses institutions and practitioners who participate and provide care to NDMS federal patients. Ohio healthcare coalitions support the NDMS mission with 109 certified NDMS hospitals. The COTS regions contain seven certified NDMS hospitals, all located in Franklin County: Mount Carmel East, Mount Carmel St. Ann's, Nationwide Children's Hospital, OhioHealth

Doctors Hospital, OhioHealth Grant Medical Center, OhioHealth Riverside Methodist Hospital, and The Ohio State University (OSU) Wexner Medical Center.

Ohio NDMS hospitals participate in bimonthly bed availability reporting drills and real-world events using the state-wide SurgeNet system. For the first time, they had the opportunity through SOCC to upgrade to a multi-state military patient movement exercise. The scenario depicted a military conflict. Once patients arrived at WPAFB, they were then transported (simulated) to the Ohio NDMS hospitals. WPAFB, COTS, and the hospitals' Surge Operations Call Center worked together to load balance incoming victims from the NDMS response. This process allowed patients to be placed efficiently in the most appropriate hospital.

A Hot Wash and After-Action Report was written following the NDMS exercise that detailed successes and a few opportunities for improvement. The SOCC was mobilised and response-ready within just a few minutes after activation. Utilising a WebEx format, hospital transfer centres could communicate and load balance patients between the health systems. The WPAFB patient report spreadsheet provided essential information that allowed the SOCC to place the patient in the appropriate facility and bed type. In all, 76 patients were placed in Columbus hospitals experiencing a high patient census. Sharing patient information between the air force base and the hospitals was initially loosely conducted; however, the process was streamlined and became more proficient by the end of the exercise. Additional exercises will be created and facilitated by the NDMS program at WPAFB.

The Operation Ultimate Caduceus Exercise was a success and truly tested the SOCC operations in a large MCI event involving NDMS. It evaluated the intricacies that will allow for precise improvement to the

newly developed SOCC plans and procedures. It also enhanced networking between agencies to prepare for the next exercise and/or response. In addition, WPAFB and the hospitals were also able to test the OHTrac patient tracking system, a state-wide system used for family reunification. Refer to NDMS and Ohio Health-care Coalitions for more information (U.S. Department of Health and Human Services 2019; Ohio Department of Health 2019).

This exercise's timing was a perfect endeavour following the recent COVID-19 response, which provided a unique opportunity to test the new SOCC. Creation of the SOCC in early April for Zone 2 included COTS regions 4, 7, and 8 of the Office of the Assistant Secretary for Preparedness and Response (ASPR) grant recipients **(Figure 1).**

Figure 1. COTS Preparedness Regions

System Planning

The adult hospital systems (Mount Carmel, OSU, and OhioHealth) in Columbus worked together to develop a 1,100-bed field hospital or Alternate Care Site (ACS) located at the Greater Columbus Convention Center for hospital transfer of low acuity stable adult COVID-19 patients. This ACS has since been demobilised and can be re-activated if needed. A huge part of that

collaboration led to the establishment of a Command-and-Control Center or a Joint Transfer Center to coordinate the movement of patients across Zone 2, later named the SOCC.

While the ACS did not meet the predetermined triggers for activation during the peak of the COVID-19 response, the SOCC was mobilised to manage transfer calls and can be re-activated within minutes, as necessary, for real-world events and/or drills. Additional planning has since been facilitated by COTS, with the Franklin County adult hospitals and Nationwide Children's Hospital, to further develop the SOCC as a best practice to incorporate into pre-planned events such as the Arnold Sports Festival, Red White & Boom (RWB), and no-notice mass casualty incidents (MCI). The importance of the SOCC's participation in no-notice events is to load balance patients being transported from the scene to a hospital or transferred in from a rural county hospital.

To quickly develop a seamless SOCC deployment process across the three main Central Ohio adult healthcare systems while simultaneously communicating to all key stakeholders and educating associates and providers, the team utilised lean methodology tools and concepts (i.e., process flow maps, stand work, rapid-cycle tests of change, and scripting) for managing the design and workflows.

In partnership with COTS, the SOCC project team consisted of transfer centre, information technology (IT), information systems (IS), information security, systems analyst, enterprise project management office (EPMO), marketing/communications, telecommunications, user experience (UX), and physician team members from Mount Carmel Health Systems, The Ohio State Wexner Medical Center, and OhioHealth. The team worked together to develop a unique, collaborative multi-health system COVID-19 triage transfer line within two
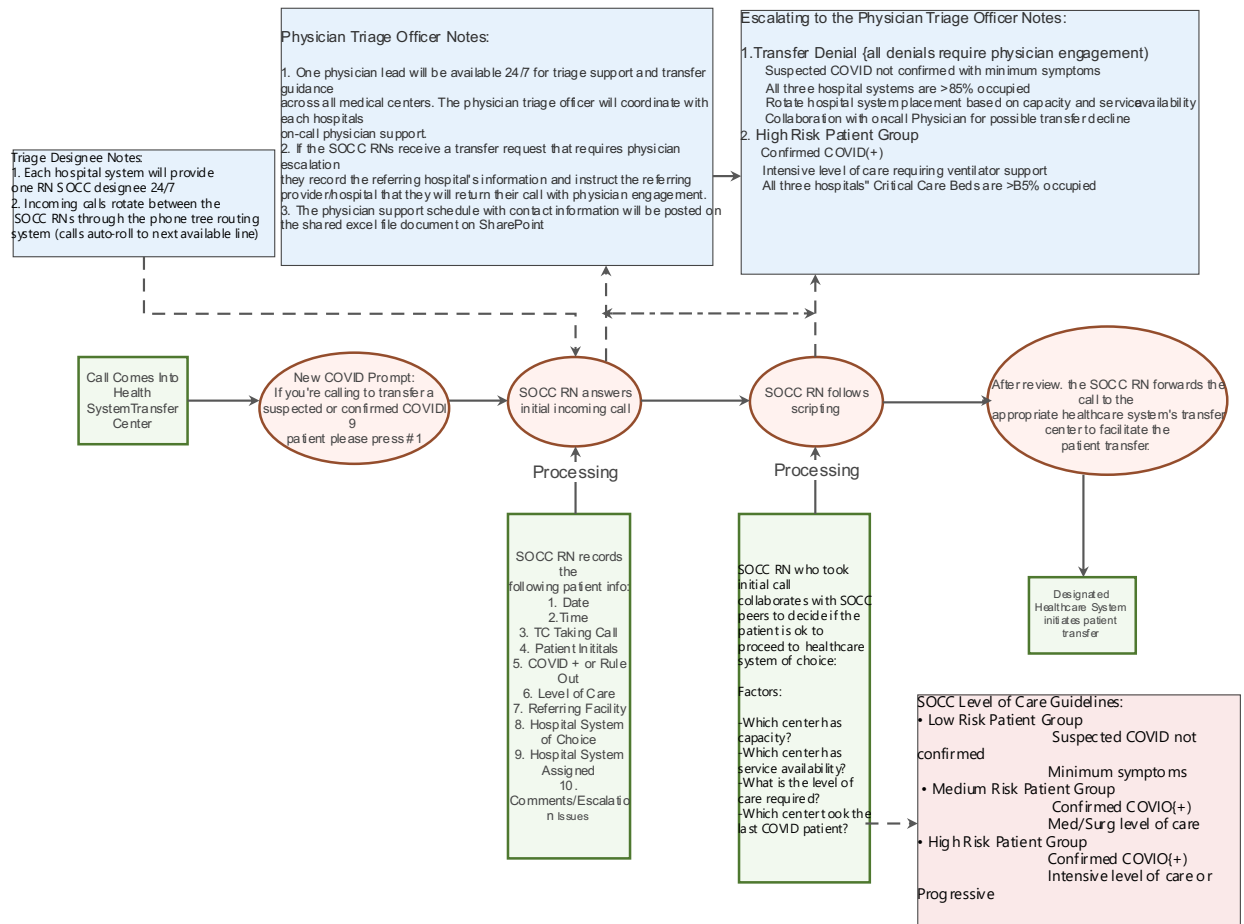
Figure 2. Surge Operations Command Center Process Flow

weeks, which did not disrupt normal referral/transfer processes on the front end for referring providers. All the new processes and workflows for the SOCC were intentionally designed for 'backstage' execution to avoid confusion and frustration in referring providers/facilities and unnecessary rework of the individual healthcare system's normal transfer workflows.

In collaboration with the transfer centres, the IT and telecommunications teams changed the automated messaging for all inbound calls into each of the three transfer centres in Central Ohio to state 'if you are calling to transfer a suspected or confirmed COVID-19 patient, please press 1.' The call was then routed behind the scenes, via a call tree process, to a team of RNs

comprised of one RN from each of the three main adult healthcare systems in Central Ohio covering the SOCC 24/7. The three RNs interacted with audio and video connectivity via a live WebEx. This provided the opportunity for real-time collaboration to review capacity and ensure COVID-19 patient transfers were balanced across Central Ohio. Figures 2 and 3 represent two examples of process flow maps for the SOCC workflows.

To further streamline processes and keep messaging consistent for all referring providers and care sites, scripting was developed for the SOCC RNs. Two different scripts were created based on capacity levels. Figure 4 is an example of the scripting utilised by the SOCC RNs. Along with scripting, standard work was created to help identify required daily tasks for the SOCC team (Figure 5) and expectations for shift reports between the RNs from the three healthcare systems.
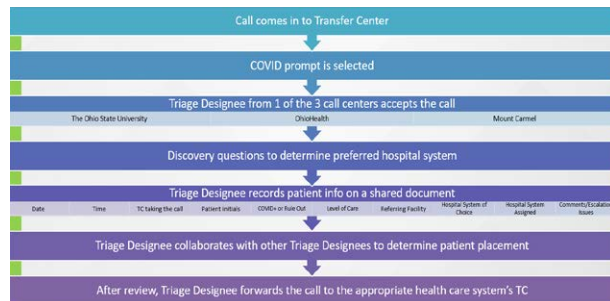
Figure 3. Surge Operations Command Center Process Flow

SCRIPTING FOR GO-LIVE

'Hello, this is (your name). You have reached the Central Ohio Covid-19 Hospital Transfer Line.'
'Which Hospital System are you wanting to transfer to?'
'One moment while I transfer you to (Hospital System of Choice).'

SCRIPTING WHEN WE SWITCH TO SURGE PROCESS

'Hello, this is (your name). You have reached the Central Ohio Covid-19 Hospital Transfer Line.'
'Which Hospital System are you wanting to transfer to?'
'Please know we will try to place your patient in your preferred hospital; however, due to capacity demands, this may not be possible.'
'I'm actively collaborating with the other transfer centres' in Central Ohio to ensure we find the best placement for your patient.'

Figure 4. Scripting Utilised by SOCC RNs

Go-Live

The teams were ready for Go-Live on 20 April 2020, and the inbound messaging was turned on in all three systems at 7 a.m. that day. A shared spreadsheet was developed that allowed each triage nurse to document the call, referral hospital, level of care, and the system to which the patient was assigned. This shared document supported the triage nurses in decision-making regarding patient assignment when patients needed to transfer to a care site outside of their healthcare system of choice.

Placement decisions were based on capacity and equitable distribution of COVID+ patients. It was deemed appropriate to transfer patients to any of the three health systems regardless of the original request, with two exceptions: transplant patients were sent to The Ohio State Wexner Medical Center only, and active cancer patients and pregnant patients were sent to the facility of the patient's choice. There was an on-call Triage Physician available for any issues, concerns, or questions at all times. Each system took turns assigning the on-call Triage Physician. Our experience was such that this physician's expertise was needed

very infrequently to assist with assignments.

The collaboration between these three hospital systems was impressive; the triage nurses quickly came to know each other and their working environments. It was soon decided that the three triage nurses could communicate through written statements in the chatbox, and it was unnecessary to keep the audible communication open 24/7. At the beginning of each shift, reports were managed by verbal communication, including reviewing each system's capacity.

Given that data are drivers of all innovation, we committed to keeping the Central Ohio COVID-19 Hospital Transfer Line data as pure as possible through our shared documents. Figure 6 shows the dashboard developed and shared weekly with the system administrators.

Figure 5. Required daily tasks for SOCC team

Unanticipated Benefits

On 1 May 2020, The Ohio State Wexner Medical Center experienced a phone and integrated healthcare

information system (IHIS) outage, preventing the transfer centre from receiving external calls. The internal phone system remained intact during this outage. Since all calls were being routed and answered by any of the three system hospitals, Mount Carmel and OhioHealth could receive calls meant for Ohio State. The calls were then 'transferred' back into Ohio State without difficulty. This day was the highest call volume for the SOCC since the original go-live day. Thus, the SOCC provided a great unintended benefit for Ohio State and allowed the continued flow of all patients
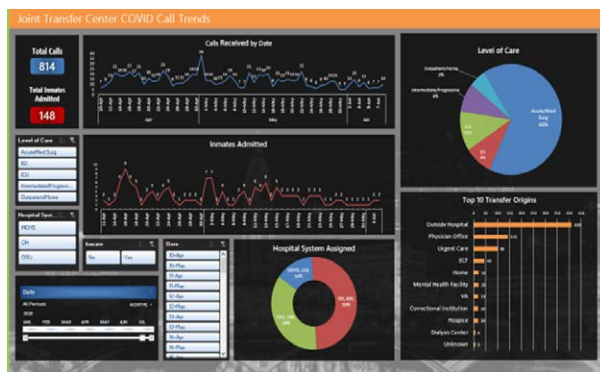
Figure 6. Data sharing

into the healthcare system.

At the beginning of this endeavour, all state inmates were being admitted to The Ohio State Wexner Medical Center related to contractual agreements. The system quickly became saturated with the inmate population, while the total capacity of COVID+ patients increased alarmingly. The ODRC began collaborating and planning visits to the OhioHealth and Mount Carmel Health systems to identify designated units for state inmates. In mid-May 2020, there was a large surge of inmates

admitted to Ohio State, which rapidly expanded the areas within their hospital to accommodate this patient population. Given concerns that the number of inmates would exceed this extended capacity, ODRC visited Mount Carmel Health and an OhioHealth hospital to identify inpatient units that could accommodate inmates. A plan was developed for correctional officers to be deployed to these sites; the hospitals were prepared to admit inmates. Fortunately, the inmate surge subsided before Ohio State exceeded capacity; however, the other health systems were prepared to help at any time if needed.

Our Public Health Systems began to collaborate with the Extended Care Facilities (ECFs) in the surrounding areas to ensure adequate testing, isolation practices, and safe processes for transfer into one of our three systems for care of the COVID+ patients. Public Health also began working closely with our three systems during this time to ensure the appropriate transfer of recovered COVID+ patients back to the ECFs upon discharge from the hospital. Columbus Public Health and Franklin County Public Health joined our daily surge calls and became a part of our collaborative team. Each healthcare system was assigned a group of ECFs to partner with, and the health departments partnered to provide guidance. We arranged for a personal protective equipment cache that could be supplied to ECFs as needed, and there were discussions around strategies to cohort discharged COVID patients within the ECFs to ensure the safety of all residents and staff. This support allowed the ECFs to bring their residents back to their facilities which positively impacted capacity within the hospitals.

Current State
The SOCC was deactivated on 10 June 2020, as the

increasing numbers of COVID+ patients stabilised, and the systems believed they could resume COVID+ normal practices. It was tested at this time to see if the Transfer Line could be re-activated within a two-hour time frame in case an emergency-type situation required it. The test was successful.

Future State
Out of this collaboration, the SOCC was developed as an integral part of the emergency system for the surrounding Columbus area. SOCC's vision is to activate the call centre within 60 minutes of an emergency involving the community and/or surrounding areas. As we looked to enhance SOCC' effectiveness, Nationwide Children's Hospital has become a functioning member of the call centre.

As previously discussed, the SOCC was successfully utilised in the Operation Ultimate Caduceus Exercise. We continue strengthening our relationships through monthly meetings, planning future drills, and our continued conversations as a collaborative group.

Lessons Learned
This experience's most valuable lesson was that three major competing healthcare systems could collaborate to protect their community in a designated region. Before creating the SOCC Mount Carmel, OhioHealth, and The Ohio State Wexner Medical Center had never collaborated on a joint venture of this magnitude.

Thankfully, we never reached a surge level which necessitated diverting patients from their hospital of choice. On 20 June 2020, the decision was made to discontinue the 24/7 SOCC process. Before placing this process on hold, we consulted with our IT and telecommunications team to develop a plan to quickly re-activate the SOCC if needed. We determined that,

if necessary, the entire process could be re-activated within one hour. In mid-October 2020, we entered another COVID patient surge which vastly exceeded patient numbers in the spring. The SOCC was re-activated until the volume of COVID admissions began to decrease. Although the SOCC is now deactivated, we continue to have a monthly call to check-in, share information, or discuss issues within the zone.

One of this process's many benefits, which cannot go unmentioned, was the relationship building and collaboration between the three health systems and COTS. The healthcare systems, who always viewed one another as competitors, now consider ourselves partners who work together to serve our communities and patients. Senior leadership, physicians, IT, telecommunications, and the transfer centre leadership teams continue to collaborate and reach out to discuss the long-term pandemic-related issues (i.e., visitor restrictions, vaccination strategies, capacity). We also collaborate on topics unrelated to COVID-19 and are always ready and willing to discuss issues as they arise.

The value provided by the SOCC and collaboration among our health systems has many potential advantages for use beyond the pandemic. We have partnered with COTS to develop a plan to use the SOCC during planned emergency drills and true no-notice emergency situations. We will use the planned drills to re-activate the process and keep our team members competent. This process was an undertaking that required a vast number of people and resources to make the concept a successful process in a short timeframe. It is exciting that this effort, which started as a short-term process related to one issue, will continue to serve our patients, communities, and healthcare systems for years to come.

Conflict of Interest

None. ■

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Telehealth Platforms: The Foundation for Digital Transformation

An overview of the role of digital transformation in the healthcare space, particularly the adoption of telehealth solutions during the pandemic and an outlook of the future of telehealth solutions and the momentum of digitalisation in healthcare.

☑ Key Points

- During the COVID-19 pandemic, digital transformation efforts in healthcare have accelerated, especially in the telehealth sphere.

- Remote patient monitoring is here to stay, and the idea of keeping tabs on patients at home is an important transition in healthcare.

- Digital transformation is also the path to improving the flow of information, increasing patient adherence, reducing the cost of care and improving productivity.

- The next evolution would be to build algorithms around artificial intelligence and deliver that information to augment clinicians to achieve better diagnosis and identify best practices and pathways.

- Healthcare is now better positioned to harness technology to deliver better, quicker, less expensive care.
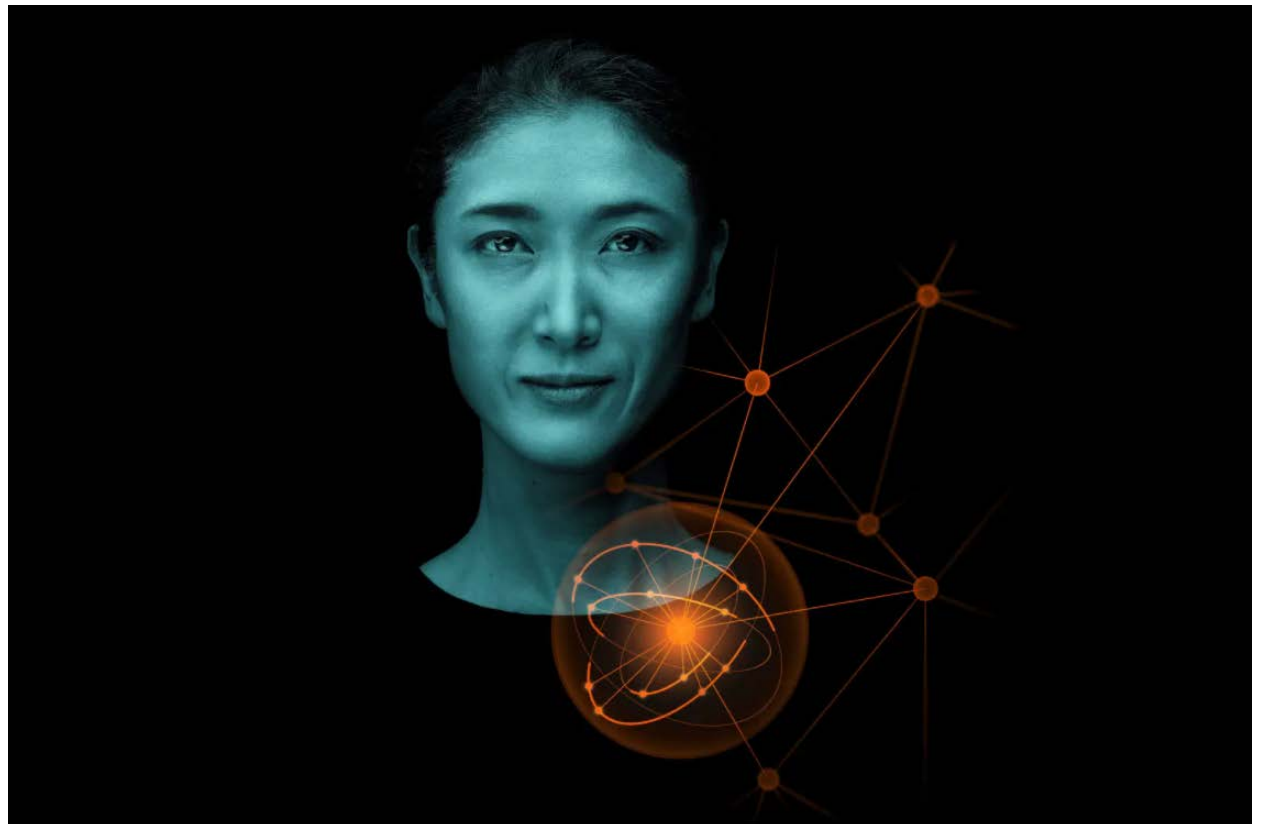
Digital Transformation in the Healthcare Space

The primary goal of digital transformation in healthcare is to facilitate the adoption of a patient-focused approach where healthcare providers streamline their operations, better understand patient needs and build loyalty and trust to offer a better healthcare experience.

The digital transformation of healthcare is a logical transition. Today, the use of video and audio to connect with patients and connect patients to specialists is a reality. Also, workforce and staffing challenges, whether nurses or doctors, continue to be an issue in healthcare. There is a huge need for additional manpower. Utilising technology to be in more places simultaneously is one of the biggest benefits of digital transformation. In particular, during the last 18 months, as the world struggled with the COVID-19 pandemic, digital transformation efforts in healthcare have accelerated, especially in the telehealth sphere.

COVID-19 put a spotlight on telehealth technologies and remote patient monitoring. The need to reduce potential virus exposure in patients and healthcare providers alike pushed clinicians to adopt this method. The use of video and two-way video/two-way audio into the patient bed spaces allowed the reduction of personal protective equipment (PPE). Therefore, nurses or doctors didn't need to don PPE to go in and have a quick conversation with the patient. Instead, they could do it remotely from a monitoring station or phone. That gave a whole level of comfort and a lot less anxiety or stress about entering into a patient's bed space who may be suffering from coronavirus. In addition, there was an increase in both provider willingness and consumer willingness to use telehealth. Finally, the regulatory changes that came into play were adapted very quickly to accommodate the telemedicine/telehealth situation.

The Benefits and Challenges of Digital Transformation in Healthcare

Digital transformation has accelerated everywhere during the pandemic, although the healthcare sector has had some specific constraints that make this transformation different from other industries. First, the level of regulation regarding technology and how it is utilised within the patient setting differs in healthcare. Video is a powerful tool, but with privacy concerns, there is strict guidance that healthcare providers need to follow. Therefore, the challenge in healthcare is to apply technology within these regulations, help regulators understand what technology is capable of doing and implementing that technology responsibly. It is also about developing the right kind of partnerships with technology providers who offer telehealth solutions. In other words, technology partners, clinicians and regulatory authorities have to work together to pave the way for digital transformation in healthcare.

The pandemic has clearly shown the benefits of telehealth. Remote patient monitoring is here to stay, and the idea of keeping tabs on patients at home, not only from a visit but also devices that will give vital information back to the caregiver, is an important transition in healthcare. Digital transformation is also the path to improving the flow of information, increasing patient adherence, reducing the cost of care and improving productivity. All this can be achieved while the patient is at home.

An important element of digital transformation is the use of healthcare data. The data generated while using technology to provide care is a valuable asset for clinicians. The goal is to collect data acquired through healthcare organisations and bring it back into a central database, thus allowing clinicians to use this data to their advantage. With the increase in the use of remote patient monitoring devices, the challenge is to take data, aggregate it into a patient-centric record, and serve it up to clinicians so that it gives them better insights into how to treat that patient in the best possible way.

The next evolution would be to build algorithms around artificial intelligence and become a partner to clinicians as they diagnose and treat patients in real-time. Building algorithms around AI and delivering that information will augment what the clinician is trying to achieve, not only in the diagnosis, but in the treatment of patients and in identifying best practices and pathways. This will require technology providers to partner

Utilising technology to be in more places simultaneously is one of the biggest benefits of digital transformation

with clinicians to help them make more informed, better decisions. Today, there is inexpensive technology that can allow the collection of a large amount of data. Healthcare organisations can use this data to provide a better patient experience. This will allow the realisation of a more patient-focused approach where it's not just about the outcomes, although those are very important, but also about the quality of care and the patient experience.

There has been a quick evolution of space and innovation beyond the virtual urgent care convenience in recent months. These innovations around virtual longitudinal care and enabling care at the home and remote patient monitoring, and investment in this digital front are all coming to be adopted and accepted by the medical community, not only from the physician but from the patient. This acceptance will continue to grow. It will help clinicians and providers, as they stretch their resources, to become more attentive and be able to do more with less.

When the world is out of the pandemic, the ability to decide which patients will be seen first based on the remote monitoring solutions data that has been acquired can be a huge benefit. Clinicians would be able to build their rounds based on the data. This can be beneficial, both to the caregivers, because they will know exactly what they're going into and why, and also for the patients. There's the obvious benefit that people who need to be seen sooner will be seen sooner. As we move forward, these innovations will continue to be of great value, especially because the world continues to be an uncertain place. Having these systems in place will be extremely valuable, no matter what comes next.

The world is also seeing the utilisation of 5G in the private networking space in connecting very rural, very remote locations. There has been a tremendous amount of success there in improving quality and equity of care. Even if it is a rural area or a rural setting, patients can receive the same level of care utilising new technologies.

The pandemic has driven mass production and a huge increase in different organisations building sensors, for example. There's now a wide range of sensors on the market that it's driving the price down of hardware, allowing the solutions to be accessible to a lot more people. This is the ultimate goal – to be able to offer advanced solutions to as many people as possible that can benefit from them and to have better patient outcomes, better patient experiences, and better experiences for the workers themselves. Healthcare is now better positioned to harness technology to deliver better, quicker, less expensive care. ■

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Autonomous Delivery of Medical Material Through Drones in a Future Pandemic

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An overview of the logistic challenges during the pandemic, the use of drones to trigger logistic advancements both in normal operational conditions and in emergency situations, and the new set of possibilities introduced by autonomous drones to reduce legacy vulnerabilities of healthcare systems.

Key Points

- COVID-19 highlighted the need for improvement in existing logistic methods for the transport of biological samples.

- The drastic restrictions of the movement of people and vehicles implemented to reduce the chances of contagion caused unexpected criticalities in blood donation.

- COVID-19 diagnosis was often slowed down by the uneven workload of the laboratories that read the swabs, causing delay in the communication of the diagnosis to patients.

- A drone-based delivery system could connect mobile clinics and analysis laboratories with hospitals to avoid unnecessary direct contacts and speed up the transport.

- The role of drone systems for the transport of biological samples plays a pivotal role. However, the technological development of drone systems has to be carefully monitored.

A valuable lesson learned during the COVID-19 pandemic is that the existing logistic methods for the transport of biological samples need to be reengineered. In the months during which draconian non-pharmaceutical interventions were implemented worldwide to contain the diffusion of the virus, the disruption of many delivery chains might have been less severe if unmanned aerial vehicles, or drones, had been available to enable efficient and contact-free delivery of medical goods such as blood supplies, organs for transplants, and healthcare products.

The drastic restrictions of the movement of people and vehicles implemented to reduce the chances of contagion caused unexpected criticalities in blood donation. A reduction of blood donors was observed due to the inability of the donors to leave home during the shutdowns. If a drone service had been available, the blood might have been collected directly at the home of the donors by a nurse and the blood samples might have been sent to the hospital by using an automatic and safe delivery system via drones.

Moreover, during the pandemic, strict policies were introduced to reduce as much as possible the entrance of healthy individuals into hospitals in which the circulation of the virus was rampant. These policies had a negative impact on blood donations, too. If blood collection centres had been established in safe areas outside the hospitals, the logistics might have benefitted from sending blood samples to the collecting centre by means of drones.

Another lesson learned concerns the COVID-19 diagnosis, that was often slowed down by the uneven workload of the laboratories that read the swabs, causing delay in the communication of the diagnosis to patients. This in turn resulted in unnecessary quarantine and loss of working days when a negative result was delayed. Drones might have been employed to efficiently balance the workload by preferentially distributing the swabs to the less active reading centres, thus avoiding backlogs.

Basic Features of a Drone System

In general, a distinct advantage made possible by drones is the improvement of service in remote locations or sparsely populated areas (e.g. islands, mountain villages, etc.). In fact, a drone-based delivery system allows to connect mobile clinics and analysis laboratories with hospitals, to avoid unnecessary direct contacts between people, and to speed up the transport by reducing the time by 80% at a negligible cost for the single delivery.

A drone delivery system can be used in any place, at any time and it works in densely populated urban areas as well as in sparsely populated locations. Drones have the advantage of low overhead costs and are a potential way around traffic delays, the unavailability of passable roads, and when roads are non-existent for large

parts of the year.

However, drones can be used in the transport of potentially lifesaving goods only if there is a guarantee that they do not adversely affect the quality of the payload (Amukele 2019). Therefore, any concern about maintaining the original quality of the payload throughout the duration of the flight must be addressed very carefully, to persuade all stakeholders that drones are indeed a reliable asset for the improvement of healthcare organisational models.

The key component of the drone system is the smart capsule, a container that is primarily designed to ensure preservation of the payload (Amicone et al. 2021). The design of the capsule must be flexible and modular, in order to allow to transport any medical product (e.g., blood bags, organs, drugs, test samples). The main features of the capsule are the following:

- High mechanical resistance, ensured by the choice of polyurethane material that is available off-the-shelf and can be manufactured according to high-quality standards based on the design of the device. Some parts of the capsule can be manufactured out of metal (aluminum, steel) for structural reasons.
- Autonomous flight control, without need for trained ground pilots.
- Ability to fit professional drones compliant with given technical requirements (e.g., 10 kg load capacity, 60 km/h minimum speed, water and wind proof).
- Compliance with the continuous evolution of drones, thanks to a dedicated adjustable interface.

- GPS/GSM/3G/4G connectivity that allows to control and modify the flight according to flight authorisation requirements. The connectivity also guarantees the recovery of the active control by drone operators in case of emergency.
- Temperature and humidity sensors for real-time monitoring and control of storing conditions and quality of the medical freight, as prescribed by blood delivery regulations.

Within the capsule, a certified UN3373 container must be equipped with temperature stabilisers that contribute to maintaining the right temperature. The

temperature stabilisers are cooled in order to reach a suitable temperature (4 °C, 22 °C, -25 °C) before being inserted, together with the medical material, in the UN3373 container before every flight. Their action in addition to the thermal-insulated material of the capsule make temperature stabilisation possible for

JARUS guidelines (2019).

Future Challenges
The COVID-19 pandemic unearthed several criticalities in our healthcare systems that had been underestimated for years: from poor stock management of

- Thermal and mechanical improvements by using finite element method (FEM) simulations and suitable crash tests.
- Autonomous reaction of the drone-system to undesired events in case of an emergency by further deploying AI inside the control loop in order

A drone delivery system can be used in any place, at any time and it works in densely populated urban areas as well as in sparsely populated locations

about three hours, which is a more than suitable time for one delivery mission.

In the target application (delivery of highly valuable and perishable medical goods), the capsule must allow the continuous tracking of the payload: to this aim the role of Artificial Intelligence (AI) is crucial. The on-board control intelligence must be able to take over the control of the flying vehicles it is mounted on, or to make it redundant, thereby guaranteeing double insurance for successful mission completion, allowing the capsule to make autonomous decisions about distances, route changes, emergency manoeuvres, and landings. Moreover, AI makes it possible to meet the strict regulations of drone flight in urban scenarios by reducing the overall risk of operations through mandatory specific operation risk assessment, according to

personal protective equipment and insufficient preparedness in intensive care units, to supply chain issues and logistical bottlenecks.

The best way to be prepared to face new healthcare challenges such as a future pandemic is to rethink the current practices and optimise workflows to introduce resilience in the system.

In this context, the role of drone systems for the transport of biological samples plays a pivotal role. However, the technological development of drone systems has to be carefully monitored with particular attention to:

- Safety aspects, including cybersecurity criticalities with implementation of effective countermeasures to prevent the drone system from being tampered with by malicious users (i.e., hackers).

to implement suitable strategies for risk mitigation in case of emergency.
- Labelling for unequivocal identification of the drone system in the medical environment.

In conclusion, the use of drones for healthcare applications holds the promise to trigger logistic advancements both in normal operational conditions and in emergency situations, in which the new set of possibilities introduced by autonomous drones may reduce some legacy vulnerabilities of our healthcare systems.

Conflict of Interest
Giuseppe Tortora is founder and co-owner of ABzero (www.abzero.it), a startup company producing a smart capsule for blood delivery through drones. ◼

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The Challenges of Being a Locum GP Post COVID-19

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Healthcare education experts at Arora Medical Education explore whether becoming a locum general practitioner (GP) remains a worthwhile career trajectory in a post-pandemic world.

Key Points

- Since 2017, the number of general practitioners working as locums has increased significantly.

- Locum GPs face numerous challenges including

- financial uncertainty and isolation. These challenges were exacerbated by COVID-19.

- In this article, we explore the challenges faced by

- locum GPs over the course of the pandemic, and question whether a career as a locum still has benefits in a post-pandemic world.

Over the last decade, the number of licensed doctors working as locums has increased dramatically. It is estimated that 1 in 5 UK doctors currently work in a locum capacity. With such a significant presence, it is evident that locum doctors occupy an integral role in both the NHS and private medical sector. As the UK emerges from the pandemic, however, many locum doctors, and locum general practitioners, in particular, feel neglected by the healthcare industry.

The rapid transmission of COVID-19 challenged the NHS like never before. As cases increased and hospital admissions soared, much media and think tank analysis naturally focused on hospitals and emergency care facilities. Reports on the unique difficulties faced by locum GPs were far less common.

A popular career trajectory for newly qualified doctors and older general practitioners alike, working as a locum GP can promote a higher degree of autonomy and a healthier work-life balance. Being a locum, however, can be extremely challenging, particularly during a pandemic. Uncertainty surrounding regular income, absence of employment benefits and lack of patient continuity, can make the role of a locum GP extremely stressful. For many, the pandemic only exacerbated these challenges.

Coping With Financial Uncertainty

As the COVID-19 crisis worsened, the NHS began to employ emergency strategies to manage increasing hospital admissions. Doctors, nurses and other healthcare professionals were redeployed, non-essential services were postponed, and annual leave was cancelled. These crucial provisions prevented the NHS from being overwhelmed, but caused much financial uncertainty for locum practitioners, including locum GPs.

Suddenly, there was a reduction in elective work, with rotas being combined. There were fewer rota gaps in secondary care and, crucially for locum GPs, unfilled sessions in primary care. With annual leave for many contracted practitioners cancelled or postponed, fewer GP practices needed locum staff members. A 2020 survey suggested that almost 70% of GPs would offer less locum work over the subsequent few months than before the pandemic. In May, it was reported that some locum GPs had been forced to claim benefits after struggling to find work.

The financial uncertainty experienced by locum GPs

was exacerbated by the fact that many of them were recently qualified, and consequently had little financial resilience. As unsalaried employees, locum workers are not entitled to employment benefits, only meagre

Isolation and Exclusion - An Integral Part of Being a Locum?
A recent report from the Society of Occupational Medicine suggested that many doctors, both in the private

shifts without notice and without being charged a fee. Although NHS England later clarified this, many felt amendments were slow.

Working as a locum GP can promote a higher degree of autonomy and a healthier work-life balance

statutory sick pay, meaning that for some, mandatory self-isolation after testing positive for COVID-19 was devastating.

Risking Personal Health to Practice Medicine
Research conducted by the Health Foundation indicates that at least 8% of GPs were at high risk of COVID-19. In March 2020, as the country went into lockdown, GP practices shifted to offering appointments online. NHS England were insistent, however, that GP practices continue to offer face to face consultations where clinically necessary. A career as a locum is particularly popular with newly qualified doctors and the older demographic. Many longer serving GPs wishing to reduce their workload decide to practice as locums, as an unsalaried role offers increased flexibility and shorter hours. In 2017, 25% of doctors 70 or over were locum. Many locums are from overseas. Both demographics are at higher risk of complications associated with contracting COVID-19.

   As unsalaried employees, locum GPs often have no access to sick pay. Many of those in high risk groups were unable to shield, as the potential loss in financial earnings was too great. Some locum doctors sought lower risk positions, such as remote triage and administration, but such positions were often difficult to find. Locum GPs, therefore, like other key workers across the globe, were forced to risk their health on a daily basis.

sector and the NHS, are struggling with their mental health. Between 30-40% of doctors had experienced burnout and work related stress. The report indicated that GPs were more vulnerable to work related stress, anxiety and depression than the majority of specialised doctors. A 2021 survey by the BMA, meanwhile, demonstrated that the COVID-19 pandemic had contributed to a significant decline in mental health for many GPs, with nearly half reporting an increase in stress and a deterioration in general mental wellbeing.

   According to the British Journal of General Practice, strong team support in general practice is a prerequisite for individual GP resilience. Locum GPs are often new to a practice, only remaining there for just a few weeks, days, or even a single shift. As such, many lack the opportunity to build a supportive network of colleagues. This, coupled with an absence of patient continuity, can result in feelings of isolation. Computing and administration systems vary depending on the Clinical Commissioning Group. Locum GPs must successfully transition between these, learning complex new skills quickly. For many, this stress was exacerbated by working remotely.

   Many within the locum profession felt abandoned by NHS leaders and support groups. There was a clause in the locum bank framework, for example, which would have enabled GP practices to cancel locum

Being a Locum GP in a Post-pandemic World: A Sensible Career Trajectory?
Locum GPs face a great number of challenges, which were only exacerbated by the pandemic. For many practitioners, however, becoming a locum remains a worthwhile career trajectory. Practising as a locum offers increased flexibility, variety, and potentially a higher income.

   For newly qualified medical practitioners, working as a locum can be particularly advantageous, as it provides many opportunities to network with other practitioners and experience different medical conditions. For older general practitioners, becoming a locum may be the perfect way to increase autonomy and independence while decreasing working commitment.

   The COVID-19 pandemic presented unprecedented challenges to the NHS, and strategists and leaders did a fantastic job at preventing the service from being overwhelmed. In the future, however, a greater effort should be made to highlight the challenges faced by locum GPs and offer support when needed. Locum GPs are an integral part of our National Health Service and played an integral role in running the CCAS service. It is vital that it should be valued as such.

Conflict of Interest
None. ■

The Importance of Syncope Assessment, Diagnosis and Management

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Professor Michele Brignole is the the coordinator of the Faint & Fall programme at the IRCCS Istituto Auxologico, Milan, Italy. He was formerly the Director of the Department of Cardiology of Ospedali del Tigullio, Lavagna, Italy. Prof Brignole's main fields of research are diagnosis, pathophysiology, therapy of syncope and rhythm disturbances and catheter ablation of arrhythmias. He served as the chairman of the Guidelines on Syncope of the European Society of Cardiology (versions 2001, 2004, 2018) and chairman of the Guidelines on Cardiac Pacing and Cardiac Resynchronization Therapy of the European Society of Cardiology (version 2013). HealthManagement.org spoke to Prof Brignole on the importance of accurate syncope diagnosis and effective treatment and management strategies for this condition.

Key Points

- Syncope is a frequent problem with nearly 40 to 50% of adults having experienced it once in their lives.

- While syncope is a benign condition in the majority of the patients, even benign syncope can have severe consequences in elderly patients.

- To date, the treatment of syncope is not very effective because it has not been personalised to the mechanism of the individual patients.

- These are the two mechanisms of non-cardiac syncope: hypotension and/or bradycardia.

- The prerequieste for the effective treatment of syncope is to determine the mechanism first and then treat accordingly.

Why is syncope an important topic, and how has awareness for syncope changed over the last few years?

Syncope is an important topic for two reasons. First, it is very frequent, and approximately 40% to 50% of adults have experienced a syncope episode once in their lives. Second, syncope has been perceived as a benign condition due to the high frequency. This is true for most patients with syncope who have a benign phenomenon that requires minimum attention and medical assistance. However, it is important to recognise that even benign syncope can have severe consequences due to falls and secondary trauma, fractures, intracranial haemorrhage and even death. In addition, syncope can alter a patient's quality of life. This is especially true in older patients.

What does a typical syncope patient look like?

It is hard to define a typical syncope patient and the features and characteristics because it is a heterogeneous condition. It is better to try and understand the mechanism of syncope and the risk for a syncope patient to develop serious consequences. In recent years, the focus has changed from looking at syncope

as a marker of sudden death to seeing it as a predictor of severe trauma and poor quality of life. Very few patients of syncope are at risk of sudden death due to syncope, but a vast majority of patients at an advanced age are at risk of severe consequences.

spontaneous syncope using electrocardiographic monitoring and documenting blood pressure. However, it can be difficult to measure blood pressure at the time of an episode. Electrocardiographic monitoring often requires the implantation of a loop recorder that cannot

Where can a syncope patient turn to when they have the problem of fainting?
For the last 30 years, my colleagues and I have tried to write guidelines and editorials, do research, organise educational programmes and practical meetings, have

Syncope is different from other diseases.. in fact, syncope is not a disease, it is a symptom

What are the challenges of diagnosing and managing syncope?
Older patients with syncope are at risk of secondary trauma. However, protecting these patients from the life-threatening consequences of this secondary trauma is not enough. It is equally important to take action to prevent the recurrence of syncope. This requires aetiological diagnosis and a diagnostic workup to determine the true mechanism of syncope. This is essential to initiate specific and effective treatment. To date, the treatment of syncope is not very effective because it has not been personalised to the mechanism of the individual patients. This is the challenge that must be overcome in the next few years.

What diagnostic tools do you consider important for the proper diagnosis of syncope?
It is important to diagnose the mechanism of syncope rather than aetiology. It is also important to document what happens at the time of a syncope episode. This would involve knowing the blood pressure and the heart rate at the time of a syncope episode in order to determine the mechanism.

The ideal diagnostic test is to document the

be performed in every patient. An alternative solution is to provoke syncope artificially in a laboratory in order to understand its mechanism. Cardiovascular autonomic testing, namely active standing test, carotid sinus massage, tilt table test, vasovagal manoeuvres, and 24-hour ambulatory blood pressure monitoring (ABPM) can be useful in this situation.

What are the international standards in assessing syncope?
The guidelines from the European Society of Cardiology (ESC) are very useful. I was the chairman of the last version of this guideline published in 2018, and I would encourage those interested to refer to these guidelines because they have recommendations for the management of syncope. These guidelines also include a practical section explaining what to do and how to manage a patient with syncope. There are also other guidelines from the American Heart Association (AHA) and the American College of Cardiology (ACC). There are excellent guidelines from the U.K. and national guidelines used in many countries in Europe, Japan and other regions. Clinicians can use any guidelines they prefer, but the important thing is to follow them when managing syncope patients.

face-to-face discussions with doctors etc. Unfortunately, the results of this effort are not what we enthusiastically expected. The major reason for this is that syncope is different from other diseases. In fact, syncope is not a disease. It is a symptom, and the symptom could be due to a different disease, and the disease could fall under the expertise of a different specialty. It is important to understand that some forms of syncope are neurological, some cardiological, some arrhythmic, and some due to blood pressure. There isn't one expert who can deal with all these characteristics. Even if there was such an expert, they still don't have the right instruments and tools to reach an accurate diagnosis. There is always something that we cannot do or some test that we cannot perform.

This situation leads us to conclude that the only way to treat syncope efficiently is to prevent its recurrence. In other words, the failure to treat syncope is a syncope recurrence, and the efficacy of syncope treatment is that there is no syncope recurrence. And in order to prevent syncope recurrence, it is important to establish dedicated facilities where syncope experts can do their job and are supported by the right equipment and tools, the right structure and the right personnel. I strongly believe that creating a specialised structure can successfully

prevent recurring syncope in a large majority of syncope patients. If we cannot prevent recurrence, we have failed.

What are the treatment options after a syncope diagnosis?

The treatment of syncope cannot be guided by aetiology alone. It needs to be guided by aetiology plus the knowledge of the mechanism. For example, it is critical to know if an individual patient fainted because their blood pressure fell to a very low value or their heart stopped beating. These are the two mechanisms of any non-cardiac syncope. The prerequisite for the effective treatment of syncope is to determine the mechanism first and then treat it accordingly. For example, if syncope is due to lower blood pressure, the treatment should be focused on increasing the blood pressure. Conversely, if syncope is due to bradycardia, the treatment should be focused on increasing the heartbeat. This is the only way to achieve a high success rate in syncope patients. Otherwise, most patients will continue to have a recurrence, and many of these will suffer from serious fractures and other serious consequences resulting in disabilities and even death.

What message would you pass on to syncope patients?

The vast majority of syncope is benign. Almost all syncopes occurring in young adults (< 40-50 years of age) in the absence of comorbidities or structural disease are benign. These patients have a very low risk of trauma secondary to syncope. Even those in the minority among this patient group who may be at risk of trauma can be easily identified and treated. Therefore, most syncope patients do not need to be worried about their condition and can lead normal lives with education, preventive measures and reassurance. They don't need any sophisticated investigation or assessment in a syncope unit.

They can be easily treated by a general practitioner, cardiologist, neurologist or an internist. However, the very opposite is true for syncope in elderly patients. Syncope in elderly patients can be unpredictable. This patient segment is at a high risk of severe consequences in the event of a syncope episode, irrespective of the aetiology of syncope. Therefore, these patients should be referred to a syncope unit and evaluated carefully until the exact mechanism is established and treatment is initiated.

What do you think is needed for a more effective syncope assessment?

My interest is to have tools that will be able to document blood pressure and heart rate at the time of syncope. Also, the use of remote technology and artificial intelligence could be utilised to improve syncope assessment. At this time, it is very difficult and very rare to be able to measure blood pressure at the time of syncope. Measurement of blood pressure a few minutes after the end of a syncope episode is not useful. Therefore, if I had the option to ask the industry for one thing in the future, it would be to have a device that can measure blood pressure at the time of syncope. This is my most important requirement.■

Governance & Leadership

Pharmaceutical Development Trends and Their Impact on Healthcare Policy Planning and Delivery

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A look into the impetus behind pharmaceutical development trends and how healthcare policymakers and payers should adapt to emerging new treatments and considerations for a managed approach to adoption.

Key Points

- Policymakers and payers must plan for healthcare delivery and services within cash-constrained budgets while also accounting for beneficial medical innovations.

- The pharmaceutical industry tends to develop

therapies in clinical areas of high unmet needs, specialised care, or ones requiring complex manufacture. Such innovations may come with a price premium that could add stress on cash-limited health budgets.

- To prepare for upcoming pharmaceutical trends and developments, healthcare policy planners should maintain a dialogue with pharma to maintain situational awareness.

Healthcare remains a costly enterprise. Healthcare either may be funded by governments (through taxation income), by health Insurance providers underwritten by governments, or by a combination of these. Capitation-based fees for consultation and a capped contribution to drug costs may also be included. Additional 'private', 'out-of-pocket', or 'self-funded' funding models exist outside this structure and are rarely considered in the context of pharmaceutical development.

The stresses and strains burdening healthcare systems

arise through many factors. These factors pressure healthcare budgets exacerbating funding issues and furthering the strain on healthcare.

These factors inter alia include:
- Longer life expectancy
- Higher incidence of chronic conditions like diabetes
- More medical screening across diverse disease areas
  - Screening obligates healthcare to treat patients who may not have presented for treatment and

need ongoing surveillance. Surveillance of disease progression for treatment has a cost. The strategy of 'wait-and-see' only avoids the drug cost.
- Advances in:
  - Imaging and diagnostics through sophisticated and costly technologies
  - Surgery through new equipment, like robotics for hip replacement
  - Therapeutics

- Diversification into 'digital' services
  - These include virtual consultations, virtual coaching in surgical techniques by skilled surgeons training remote surgeons, virtual access to a senior clinician for advice, management plans, and treatment proposals.
- Development of algorithms that drive management frameworks based on evidence and best practices
  - These may lead to AI developments and implementation.

These factors increase the challenge for healthcare professionals planning and delivering services within cash-constrained healthcare systems. In the past, healthcare systems were (mainly) inward-looking, planning and delivering services irrespective of pharmaceutical innovations and developments going on around them.

The life sciences and pharmaceutical industries comprised an external influence promoting the uptake of new therapeutics, devices, expensive imaging systems, and novel interventions. Healthcare budgets could quickly become overwhelmed if every clinician adopted every new asset launched into the market.

Thus, the need to consider healthcare evolved from a perspective of 'setting priorities', specifically termed to avoid using the 'R word' – Rationing. When is rationing not rationing? The answer for healthcare planners is when it's 'setting priorities'.

'Setting priorities' can be integrated into the early-stage planning before any asset receives regulatory approval. In the past, regulatory approval was used as a defensive wall, blocking the adoption of expensive new treatments. This strategy was intended to keep healthcare expenditures within cash-constrained budgets and negate the life science and pharmaceutical industry's powerful promotional and marketing forces.

How Can Healthcare Become Better at Planning and Delivering Healthcare or Optimise its Planning?

Healthcare policy planners require a fundamental shift away from internally focused dialogues and discussions.

My suggestion is for healthcare policy planners to take on a greater external focus – to be aware of and cognisant of the life science and pharmaceutical industry's direction. This might be akin to forming healthcare providers/pharma partnerships to have earlier awareness of new developments before they surprise budget committees. And let's face it, who likes surprises anyway?

And how do we react to surprises? We tend to be defensive, precautionary, and apply a set of brakes to slow down the adoption of new products and technologies, which causes the pharmaceutical industry to push even harder to adopt new treatments through driving much bigger marketing spending and vocal promotion.

Suppose healthcare planners and providers develop a constant view of the landscape and the horizon of the pharma industry. In that case, they may gain a better situational awareness that helps in the healthcare planning and delivery for today and tomorrow. I liken this to a pilot using a radar mechanism to create awareness of potential issues along the way.

What are the Pharmaceutical Development Trends?

To answer this, one needs to see where pharma 'was' and where it is 'going'.

Where pharma 'was', put simply, the industry was focused on two main types of conditions:

1. Lucrative chronic disease areas like hypertension, asthma, diabetes, dyslipidaemia, etc.
2. Acute conditions like infections, dermatology, etc.

Where is it Going?

The pharmaceutical industry changes the trajectory for its R&D as diseases and pathological processes are better understood. We now know of immunologically-driven conditions, conditions resulting from gene defects or gene absences, and other new pathologies. There's a need to shift from empirical treatments to a more personalised healthcare agenda where a patient's treatment is tailored based on genetic markers, as found in breast cancer, to determine the optimal treatments.

It is hoped that this greater understanding shifts us away from a metaphorical Arnold Schwarzenegger in the movie 'The Terminator', with his Austrian accent and 'Uzi 9 millimetre' spraying everything with therapeutic

bullets in the hope that one or more hits the disease. The therapeutic approach in a personalised healthcare plan shifts toward that of a pharmaceutical sniper's rifle: shooting one shot that hits the target.

One example might be a breast cancer patient treated with hormonal manipulation but whose tumour is not

so, they risk litigation from the innovators for copyright and patent breach. One result of this litigation is that they are paid off to delay the launch of the generic.

Healthcare planners should look at the innovation landscape of the first (R&D) group of pharma companies.

Often drugs that fulfil the first aim may have no result on survival – thus leading to an unmet need – a need to increase survival. There are many areas of medicine with unmet needs. These are just two examples. Clearly, for a pharma company to succeed, fulfilling unmet needs is high on the selection register for which

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As users of innovation, it pays to be engaged with these pharma partners (to understand) where best practice and evidence are shifting. Forewarned is forearmed

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hormonally-dependent [oestrogen-receptor negative]. This may result in the tumour progressing and metastasising.

Adopting a gene-based treatment (the single shot, single bullet from the medical sniper) in this personalised healthcare plan would be the treatment of choice, rather the routine standard-of-care which calls for hormonal manipulation.

The pharmaceutical industry is now divided into two basic camps:
1. Innovator R&D-based companies, who spend and take risks to discover, develop, and commercialise new treatments and breakthroughs
2. Generic drug companies, who do not spend and take those risks; 96% of R&D fails to deliver a new product due to failure across one of the development stages

This second group of generic drug companies are sustained by copying the originator R&D and undercutting the innovator. They can wait for patent expiry and copy the products cheaply (thus avoiding development costs and risks). Or they can challenge innovators' patents to make generic copies early. In doing

The focus for Big Pharma R&D will revolve around the following:
1. Clinical areas of high unmet needs
2. Products with a complexity factor in their manufacture

Let me explore these further.

High Unmet Need

Simply put, clinical areas of high unmet needs are where no medical treatment exists.

For example, orphan diseases and rare disease areas are where R&D does not prioritise new development because of such low global patient numbers. Return-on-Investment and development risks make these commercially non-viable for some companies.

But there can also be unmet needs in areas with many treatments, like oncology.

Many cancer treatments may fulfil one aim of treatment. This could be cancer tumour size reduction, reversal, or arresting growth.

But as people with cancers inevitably die from the disease or complications, another treatment aim could be to increase survival time and reduce mortality.

assets to invest and which to cease development. Pharmaceutical companies can charge a premium when they fulfil an unmet need as the candidate offers clinical benefits over-and-above current treatment. Ideally, these change the direction of disease and outcomes rather than simply managing the conditions. Hence, Big Pharma R&D has a focus on unmet needs.

Move into Specialised Care

The pharmaceutical industry sees the healthcare audience as Primary Care and Specialist 'Secondary' Care. The first point of contact for a patient is primary care. In the UK, primary care consists of the NHS's General Practitioners (GPs), of which there are approximately 52,000 in the UK in 2020 (Statista 2021). That figure has increased from 39,000 in the year 2000 to 52,000 in two decades. As a frontline service, the GP acts as prescriber and gatekeeper for services and products in the NHS. For marketing purposes, that is a large group to target.

GP prescriptions tend to be categorised as 'high volume/high margin'. So, each GP might only raise twelve prescriptions a month for a new antihypertensive

treatment. However, the value of prescription sales becomes big when enough GPs are convinced to make these prescriptions by a large number of representatives in the salesforce.

This model's downside is that, as medicine becomes more specialised and personalised, the GP relies on experts in the hospital to direct and guide him on best treatments. The UK has around 124,000 hospital doctors spread across all specialities. But splice that figure by speciality, and there are around 1,500 consultant-grade clinical and medical oncologists employed by 62 cancer centres in the UK in 2019 (The Royal College of Radiologists 2019).

Oncology is an area where (1) treatment is determined by a specialist in the secondary care setting, and (2) the cost of drugs is high. We can call the model 'low volume/high margin'. If a treatment cycle costs $3,000 per patient, the number of patients on an antihypertensive treatment at $10/month to generate $3,000 is considerable. Furthermore, many of the primary care products have lost patents. For an R&D company, they see a fraction of the new opportunities in primary care – the bulk going to cheap copycat generics.

Unsurprisingly, pharma is moving into the less crowded specialist care setting with high priced products and biologics reflecting the R&D investment that has gone into them. Healthcare planners and providers must be cognisant of this as a potential source of pressure on their budgets. But earlier surveillance and dialogue with the industry can enable them to plan for the managed uptake of new drugs in the personalised and specialised care agenda.

Move into Complexity of Manufacture

In a bid to exploit the patent life to the fullest and beyond its expiry date, planners and healthcare professionals need to be aware that pressure on their budgets may not decrease as much at the patent expiry of expensive specialist care products. This may be due to the complexity of the manufacture and formulation technique in some of these products.

Examples may include a specialised dedicated aseptic plant to manufacture just one line of product to prevent cross-contamination. Or it could be a formulation such as a sustained-release system that is not easy to copy.

Many high-end cancer treatments are biologics and not easy to copy by generic companies that make the copycat product – termed a 'biosimilar', not a 'generic'. The choice of biosimilars tends to be small, and the prices may still be high but less than the innovator drug.

Conclusion

The message for healthcare planners and delivery is to engage early with pharma to understand their trajectory. And then to consider how one might manage to adopt these in a controlled manner rather than with knee-jerk defensive stances and being caught by surprise.

There are areas within medicine where for a planner for healthcare services, it is quite possible to 'rob Peter to pay Paul' within the current budget where there are clear outcomes and impacts across a large group of patients. As users of innovation, it pays to be engaged with these pharma partners and know where best practices and evidence are shifting. Forewarned is forearmed.

Conflict of Interest

None. The author is not a director or board member of any life science company and has not received any sponsorship from any private or government body to write and publish this article. This article is the author's own independent work sharing his experience and personal thoughts and opinions. Other viewpoints also exist to the themes covered. ∎

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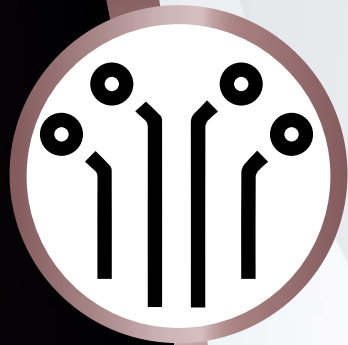
Data Management Challenges in Healthcare That Need to be Addressed to Improve Efficiency

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An overview of data management challenges that can help improve efficiency, compliance, data security and interoperability in healthcare.

✓ Key Points

- Every industry is striving to control and harness the power of data and healthcare is no exception.

- The Health Insurance Portability and Accountability Act (HIPAA), the HIPAA Security Rule and the HIPAA Privacy Rule have established national standards for the protection of electronic health information.

- It is critical for healthcare systems to execute robust data security solutions to help guarantee compliance.

- To integrate interoperability within their system, healthcare organisations need to streamline the data management process and make sure patient

information is stored in a crisp, simplified and easily retrievable manner.

- The Healthcare Information and Management Systems Society (HIMSS) defines six technical controls and six operational controls to ensure data protection.

Today, one of the rudimentary questions that the universal wave of digitisation seeks to answer is how to optimise the use of data in order to amplify operational performance and create greater value in the process of doing so,

According to the recent "Harnessing the power of data in Health" report by Stanford Medicine, systematic data management will continue to benefit healthcare in more than one way.

While data management has been bringing about essential transformations in healthcare, like in the case of every other innovation, it does not come without its unique set of challenges.

Here are some of the most common healthcare data management challenges that need to be addressed to improve efficiency on the provider's part:

Adhering to Compliance and Regulations

The Health Insurance Portability and Accountability Act (HIPAA) enacted in 1996, and the HIPAA Security Rule and the HIPAA Privacy Rule issued by the Department of Health and Human Services (HHS) thereafter, established national standards for the protection of health information, and specific electronic health information in particular.

Failing to abide by these rules can cost healthcare

organisations hefty monetary penalties, and even subject them to criminal charges at times.

As per latest statistical data available at hand, 2018 was a record-breaker in terms of the total penalty amounts paid. The Office for Civil Rights (OCR), a part of the HHS which facilitates compliance activities, received $28,683,400 in financial penalties in 2018. The mean financial penalty was å$2,607,582.

Some of the most commonly occurring HIPAA violations today are:

- Lack of a proper risk analysis and management process within a healthcare organisation.

- Failing to safeguard PHI (Protected Health Information) on personal or portable devices.
- Downloading or trying to gain access to ePHI through unauthorised devices.

organisations' willingness to share information. There are several issues that arise when healthcare organisations look to make their data management systems interoperable.

For one, the amount of data to be retrieved and

organisation must secure health information. The Healthcare Information and Management Systems Society (HIMSS) defines six technical controls to minimise security risks in its Healthcare security + Compliance Guide:

Healthcare data security legislation and best practices require robust physical security and compliance measures to be incorporated by healthcare organisations

- Prying on healthcare records.
- Releasing information to an unauthorised individual.
- Improper disposal of PHI.

Effective and regular staff training is vital to avoid HIPAA violations. Train your staff to be careful with PHI, and share it only with those authorised to know. If you have a HIPAA-compliant software, there are guidelines for that too that must be followed.

It doesn't matter if violations are the result of substandard human behaviour, gossip, insider or outsider hacking, or a mere human error. It is critical for healthcare systems to execute robust data security solutions to help guarantee compliance.

Making Data Interoperable

In order for data to be most utilitarian to any industry, it needs to furnish consistent value and should be shared amongst people, organisations, and systems. This forms the very foundation of interoperability.

"Data interoperability in healthcare streamlines patients' records from different electronic healthcare systems, allows patients to have absolute control over what information can be shared to whom, and simultaneously facilitates both innovation as well as research," says Andrew Kaluza, CEO, TraceTheBody.com.

However, being one of the persevering challenges of the healthcare industry, data interoperability is not only difficult to achieve on the technical front, it also requires a consolidated structure of functions, as well as

managed in hospitals on a regular basis is abundant, which makes the need for proper electronic record-keeping a prerequisite. When it comes to individual practitioners or office-based physicians, there is an inefficiency in proper record-keeping.

To overcome this persistent challenge and smoothly integrate interoperability within their system, healthcare organisations need to streamline the data management process and make sure that patient information is stored in a crisp, simplified and easily retrievable manner. This can only be done by syncing technology with manpower.

Providing Optimal Data Security

The healthcare industry operates enormous data assets which include protected health information and confidential data such as identification proofs among other things. This data is that slice of the pie which attracts cyber threats.

"Shadow IT and ransomware are only a part of the various issues the healthcare industry is currently facing. This is exactly why data security is one of the topmost priorities of providers across the globe right now," says Sameer Jafri, President and COO of Avive Solutions.

The healthcare industry is expected to spend around $65 billion on cybersecurity between 2017 and 2021. Healthcare data security legislation and best practices require robust physical security and compliance measures to be incorporated by healthcare organisations.

To be able to focus on its core business, a healthcare

- Anti-malware software
- Data loss prevention software
- Two-factor authentication software
- Patch management software
- Disc encryption software
- Logging and monitoring software

Technical measures alone cannot guarantee complete data protection. A healthcare organisation also needs to have operational controls in place. The HIMSS report reveals six such controls:

- A security and compliance oversight committee
- Formal security assessment processes
- A security incident response plan
- Ongoing user awareness and training
- An information classification system
- Security policies

Lastly, improving efficiency through data management is really all about adopting a strategic approach whereby the three aspects of compliance, interoperability and data security are effectively addressed.

It is also crucial to comprehend the role of governments' support via an encouraging yet comprehensive legislation infrastructure, which allows the industry to manage and utilise data in ways that will yield the most value for patients.

Conflict of Interest

None. ■

Medical
Imaging

EFRS, the Future of Radiography and Informatics

Charlotte Beardmore I Executive Director Professional Policy at the Society and College of Radiographers I Immediate Past President of the European Federation of Radiographer Societies I London, England, UK

Charlotte Beardmore, the Executive Director of Professional Policy for the Society and College of Radiographers, was appointed President of the European Federation of Radiographer Societies (EFRS) and is now serving as Immediate Past President. Charlotte has served on the EFRS board for a number of years. In an interview with HealthManagement.org, Charlotte discusses the future of radiography and describes ERFS's strategy for meeting the changing needs of radiographers.

Key Points

- The EFRS works with multiple societies to raise the profile of the radiography profession, support radiographers in their practice, develop their education, and improve patient services. These collaborations can influence care policy at the European level.

- In the future, radiographers will continue to have a key role in the imaging practice, be the professionals who interact directly with patients in imaging, and integrate and collaborate more with care teams across the patients' pathway of care.

- COVID-19 has forced the profession to become more flexible and collaborate more with wider health care professionals and teams to meet increased demand in a timely way.

- Demand for imaging services will continue to increase. Radiographers can adapt and transform the way they work, with excellent communication skills, significant scientific knowledge (understanding of imaging and AI technologies, biology, capturing and using data), whilst always ensuring that patient safety and personalised care remains at the heart of radiographic practice.

As the Immediate Past President of the European Federation of Radiographer Societies (EFRS), can you expand on how the EFRS can address the needs of radiographers?
The European Federation of Radiographer Societies' role is as a Federation, members being National Societies of Radiographers, with affiliated educational institutions. The EFRS represents over 105,000 radiographers working in medical imaging, nuclear medicine, and radiotherapy – all key areas of practice for radiographers. It's an umbrella organisation that supports radiographers. The Federation leads work over and above that of the individual member national societies. The EFRS also has an educational wing and works closely with educational institutions that provide radiography education across Europe.

The EFRS defines the entry-level degree requirements for the radiography profession across Europe and has

published a benchmark document at Level 6 (EFRS 2018), defining the skills competence and behaviours for the profession. The purpose of the document is to serve as a point of reference and benchmark for educational institutions, employers, and professional bodies. The benchmark documents also support the profession's development to work at an advanced and doctoral level. The EFRS has developed a Level 7 Masters level benchmark document (EFRS 2017) and is working now on a Level 8 doctoral level document. Hence, supporting

large scientific programme where radiographers worldwide share their research. It is pleasing to share that the congress programme continues to grow, supporting collaboration and sharing of best practices.

Can you elaborate on the partnership between EuSoMII and EFRS?
It's been a very positive partnership to set up. A memorandum of understanding was set up and promoted widely across the member organisations. Goals for

intelligence and new technologies will require research together with the wider professional imaging team. The EFRS believes that the collaboration with EuSOMII will offer a fantastic opportunity for joint research into emerging technologies.

Could you expand on how the EFRS can influence European policy decisions?
The EFRS has worked towards setting the European benchmark standards for the profession in Europe to

Education is a priority for the EFRS

education standards for the radiography profession is a key part of the organisation's work.

The organisation is also committed to developing guidance to help continue to grow and develop services for patients. This is achieved through collaboration with others who work within clinical imaging, like the European Society of Medical Imaging Informatics (EuSoMII), the European Society of Radiology (ESR), and the European Federation of Organisations for Medical Physics (EFOMP). Collaborations with physicists, radiologists, and oncologists are hugely important. EFRS also works closely with the International Society of Radiographers and Radiological Technologists (ISRRT), the international body for radiographers.

The EFRS also continues to promote the importance of evidence-based practice – supporting research is a key objective. The EFRS has recently established an expert research committee to lead and promote the research activity for the profession. The EFRS continues to support the excellent work of the EFRS research hub, which links with the ECR congress. The EFRS annual congress is within the annual ECR congress. There is a

improving the profession's education and training and providing Continuing Professional Development (CPD) opportunities to radiographers were also shared.

There are discussions on setting up an informatics committee for radiographers and running joint webinars. The EFRS has already launched a fantastic webinar series supporting CPD for radiographers. Therefore, collaborations on a series of webinars with EuSoMII would be very welcome. The EFRS also has a joint conference session at ECR in 2022 with EuSoMII, which we're looking forward to; this offers another excellent opportunity to promote our collaboration and talk and explore the informatics developments in imaging.

Education is a priority for the EFRS. Working with EuSoMII to develop education and training standards in informatics is an important goal and something we are keen to explore. The possibility of a European Diploma in informatics is exciting, so the EFRS looks forward to meeting to discuss this further.

As mentioned, radiography research is a priority. Radiology practice is developing, and the impact of artificial

allow the free movement of labour. Radiographers have key roles leading and contributing to the informatics requirements within imaging services. The development of an informatics diploma, recognised Europe-wide, would be an option to consider. The possibility of this supporting movement across Europe within informatics roles would be exciting. This could also support radiography career progression within the informatics field.

Imaging informatics Is revolutionising radiography. What specific impact is it having on radiographers?
Informatics impacts all of our lives – how we work together, interface, and connect. For radiographers, in particular, the pace of change is increasing. It is important to understand how informatics can help offer a streamlined care package to the patient that is more personalised. As a profession, the EFRS is keen to support radiographers' development within informatics. Understanding the required skills will help support the development of education and training to support higher levels of practice within informatics.

Working with strategic partners will help identify areas

for research across informatics. The EFRS is keen to ensure that patients are also engaged with all research areas within imaging services, so services are developed to respond to patients' needs.

the pandemic. The use of simulation tools became ever more important.

During this pandemic, radiographers have learned to become more adaptable and flexible. Students have

together and encourage and demonstrate the benefits that technology could bring for everybody. Imaging is core to nearly every single pathway in a hospital.

Streamlining care and improving services for patients

Radiographers in imaging have been at the frontline throughout the pandemic

How are the responsibilities of the radiographers changing?
Radiographers are the professional group who care for patients during their imaging examinations. Patients will ask radiographers about their examination, the safety, and the next steps in their pathway of care. Radiographers explain that to patients and reassure them.

Do you see their workflow changing at all?
Yes, the advancements in technologies, informatics and AI will drive change across services. Radiographers should be at the forefront of change, working as key professionals within the imaging team, ensuring safety and implementing evidence-based standards within the imaging service for patients.

How has the COVID-19 pandemic affected the field?
COVID-19 has had a huge impact on everyone. Radiographers in imaging have been at the frontline throughout the pandemic. In many countries, the work of imaging services became mostly focused on chest imaging, so radiographers from other specialist areas were often called back to work within chest imaging. Equally, education providers had to respond and change their provision rapidly to support online learning. It was essential that the development of the pipeline of the future workforce continued despite the challenges of

had to accelerate their training and complete it much more quickly to become part of the workforce and help manage the patient surge. The COVID-19 pandemic has made all of us look at things differently – to explore how teams work most effectively to share intelligence. It has forced us to rethink practice and how we can maximise the learning from the pandemic. I believe that all the imaging workforce (radiographers, radiologists, and physicists in imaging) have proven to be flexible and committed during these challenging times.

How can informatics help teams come together and collaborate better?
In many ways, the rapid use of online meetings has really helped. Technology is fantastic. It enables better collaboration and much more rapid sharing of information. But in imaging departments, much more can be done with modern informatics capabilities. How the imaging profession can influence the industry to research and work together with professionals to develop those technologies in a patient-centred manner is extremely important. Collaboration with industry is really important when talking about technology, artificial intelligence, and new equipment in services. Having that user input into that development is important too. Meeting industry partners to discuss the development of different equipment and technology is important. It is not efficient to work in silos. The key is to work

is always a goal.

Is the EFRS playing a direct role in helping companies gather the right evidence they need to develop their products?
This is an important priority for the EFRS. As mentioned earlier, an EFRS expert research committee has been established to lead and support radiographer research. This committee is considering how best to build these stronger links with the industry. The committee also processes requests for research across Europe, so linking with industry is a priority in terms of influencing product development.

What new directions do you expect the field to take within the next five years?
The EFRS is soon to publish a document defining the future of the radiography profession, requirements for radiographic practice, radiographic education and radiographic research. Comprehensive research has been undertaken, through a Delphi methodology, with stakeholders. The purpose is to help ensure the profession is positioned to respond to the changing environment.

How is the imaging informatics field pushing personalised medicine forward?
Some of it's around the industry now. If patients had an imaging examination, could they automatically get

the results without going back to the radiologist or back to the GP? Could they automatically access that information? Can they go to a centre where all of their

support for postgraduate skills development will be important. A clear career pathway with underpinning education and training at advanced levels for infor-

importance of radiographers being lead researchers within their area of practice. This is important in supporting improved outcomes for patients.

Imaging is core to nearly every single pathway in a hospital

imaging could be done at once very efficiently, rather than separately going for CT, MR, or chest x-ray? How is that collated together with other diagnostic information, like their genetic profile?

At the moment, the system takes various steps. Patients undergo imaging, genetic testing, blood tests, and heart monitoring. Are there any apps out there that can help them manage some of that and gather that information much more readily? And how does their genetic profile influence disease, etc.? Genetics will play a huge part in the future. How that links with imaging examinations becomes integral. How packages of all the diagnostics come together is more important than working in diagnostics pathology. How can it all come together to deliver much more focused care for patients, enabling them to move on to their treatment or be discharged from the service because they're fit? There's a much greater role for how informatics can influence the monitoring of healthcare. It's hard to predict exactly what the future holds, but it's key that informatics will play a critical part.

How do you expect that imaging informatics will affect the demand and employment of radiographers?
As imaging informatics is key to imaging services,

matics will be important and help support and retain the valuable radiographer resource within this clinical field.

What else do you think is important for the future of the radiographer profession?
Another area that is important for the future of the profession and the students within the service is how to best support them. Relating to the pandemic, some of them have had tough journeys, where they haven't been able to access the clinical placements. There is a huge opportunity to develop simulation to support student education and to think about how technological developments can help support learning. It is important to think about safely implementing simulation within the education and training of practitioners so that they can develop their skills rapidly in a different setting. Augmenting that with the clinical experience in the imaging department is essential. Thinking about the future of education and how to develop programmes that best suit and respond to that requirement is important. Simulation certainly has a big potential.

One of the other areas of development will be around doctoral-level education and training for radiographers. This has also been discussed with EuSoMII and the

The EFRS is developing an Education Qualifications Framework (EQF) Level 8. That's a new framework that will be developed over the coming year to support doctoral-level education and practice across Europe for radiographers.

How has participation at the 2021 EuSoMII Conference contributed to your goals?
It's great. The collaboration was set up last year. One of the goals in taking part in the annual meeting was to share the activities of the EFRS. There is a shared commitment to the development of informatics skills. EuSoMII is really keen to support the development of a diploma in informatics. The EFRS looks forward to meeting with EuSoMII to start to explore this. This would support higher levels of practice for radiographers working within informatics, and we look forward to this exciting opportunity and our collaboration with EuSoMII.

Conflict of Interest
None. ■

Watch the full interview here.

REFERENCES

EFRS (2017) EFRS Benchmark Document for EQF Level 7 (Master Degree). Available from https://www.efrs.eu/publications

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