Adopting Innovation and Technologies in Healthcare

Part 2: The impact of technology on care delivery processes to improve efficiency and outcomes

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In early 2019 the International Hospital Federation formed the first ever Young Executive Leaders group which had the purpose of engaging young healthcare leaders from around the world in identifying future needs in the provision of healthcare. This blog summarizes one of the sub-groups’ report on The Care Delivery Process, in which we discuss how innovation and technology can affect the process by which we provide care including telemedicine, the importance of measurement and organizational adaptability at all stages of technological maturity.

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The majority of our group’s work on the topic of telemedicine occurred prior to the COVID-19 pandemic. Our world has changed significantly and COVID-19 has encouraged the rapid and focused implementation of virtual care strategies in many countries. Our reflections on the state of telemedicine around the world including the related legislative environments are based on pre-COVID-19 policies; however, the perspectives, strategies and case studies presented remain relevant in post-COVID-19 world. We are hopeful that to the extent progress has been made to further encourage the adoption and appropriate funding of telemedicine around the world, that these advancements are maintained going forward.

Our discussions and research converged on three themes of how innovative technology in healthcare can change and improve processes and structures, generate efficiencies and ultimately improve patient outcomes, including:

1. **Telemedicine**: The use of telemedicine to drive creative care delivery processes and where to start.
2. **Measurement**: The importance of measurement in technology implementations, understanding cost and funding methodologies.
3. **Adaptability**: Adapting and innovating today by leveraging your electronic health record and other technologies, regardless of their maturity level, to improve process.

Our report encompasses the reflections of our group members, cases studies (annexes) from our organizations and countries and citations from related articles and studies.
1. TELEMEDICINE

Hypothesis
Telemedicine presents an incredible opportunity for healthcare, contributing to improved access to care, improved patient outcomes, improved hospital efficiency and lower costs across a patient’s cycle of care for both provider organizations and patients. This opportunity has been underscored by the COVID-19 pandemic.

Reflections
As our group began discussing telemedicine it quickly became apparent that the level of telemedicine maturity varied considerably across our group. In some countries, employers, health care insurance providers and health care organizations began to collaborate and experiment with telemedicine several years ago. Employers saw an opportunity to generate efficiencies while improving outcomes. Although many reimbursement/coverage environments did not incentivize telemedicine, there was still a drive to invest in and expand telemedicine. The opportunities for efficiency, including lower episodic costs and lower cycle of care costs were significant; revenue growth was not the only driver. These countries are now much further along in their telemedicine journey.

Countries with health systems more heavily supported by public funds are just beginning to explore and invest in telemedicine (e.g. Canada, France, Portugal, Taiwan, Hong Kong) as these systems, already facing resource constraints, provide less opportunity for risk-taking (investment) to achieve gains. Many of us have seen or experienced barriers to implementing telemedicine strategies because of funding methodologies that incentivize in-person care and do not effectively support or recognize virtual care strategies.

We quickly realized that telemedicine would be an area rich for discussion and learning across our group.

Summary – Regarding Utilization of Telemedicine
Are the funding models supporting your organization creating barriers to leveraging technology to support the most effective patient care pathways? Our discussions and research suggest that the implementation of telemedicine strategies, in some countries, is being hampered by the funding models in place.

Advocacy with your funder(s), collaboration between your health system partners, and taking risk to demonstrate the benefits of telemedicine to funders and health care organizations can help to eliminate the incentive barriers amongst organizations.

The ability to invest in technology to support a telemedicine strategy could be severely hampered by a funding environment that does not equitably recognize telemedicine. In the
next section, we discuss some of our reflections on strategies to implement a successful telemedicine strategy, and how best to leverage technology when you face implementation barriers.

**Summary – Regarding Implementing Telemedicine Strategies**

Technology is moving at a fast pace. Patients are beginning to expect the integration of technology in many other areas of their lives. Our health care models and funders need to move to align with this expectation. As young leaders, the onus is on all of us to continue pushing for this change for our patients, ensuring we are delivering the right care, in the right way, at the right time.

The potential benefits of telemedicine are significant for health systems, funders, individual providers and patients.

1. Implementing telemedicine pilots to build a case for support is critical in areas with unsupportive funding environments.

2. Keeping it simple early on can help avoid the upfront investment being the barrier to implementing a successful telemedicine strategy

3. Identifying the clinical roles you can insert around a patient and physicians can help improve patient navigation and overall efficiency in the system.

Our industry will be pushed in this direction by the expectations of patients. The strategies above can help ensure your strategy is successful despite the many barriers telemedicine currently faces globally. In countries where the COVID-19 pandemic has led to the rapid adoption of telemedicine strategies, we are hopeful this momentum will be maintained.

**2. MEASUREMENT**

**Hypothesis**

As a group, we all agreed that measurement in health care is important. This assertion is intuitively obvious; however, we all shared experiences where a project wasn’t as effective as it could have been. Measurement, whether it was project milestones, key performance indicators or baseline and future state assessments, should have been prioritized. Measurement in healthcare can be improved.

**Reflections**

We discussed measurement in three contexts:
1. Measurement of baseline and future states prior to a technology implementation, such as an EHR.

2. The measurement of clinical processes to truly understand cost, utilizing techniques such as time-based activity-based costing to evaluate costs in detail, while also considering the need to evaluate cost across a patient’s cycle of care and not isolated to one clinical service or organization.

3. Achieving sufficient measurement of clinical, financial and other data to inform effective funding methodologies that can incentivize optimal technology and care pathway decisions across the cycle of care.

**Summary – Measurement of a Technology Implementation**

Measurement can and should be improved in healthcare. It does not always need to be an arduous exercise; it simply needs to be prioritized.

In the busy and complex environment that is healthcare, we can all, at times, become distracted from measurement and simply push forward towards what we perceive to be a desired future state, leaving us unable to measure our results even when we feel that we have achieved what we set out to do.

This is a simple message. It is intuitively obvious. But the fact that we all continue to experience initiatives that lack appropriate measurement in healthcare means that it is a message worth sharing.

**Summary – Measurement to understand cost**

Many of us have had experience engaging in strategies to improve the accuracy of clinical expenses reported within a case costing initiative. The more accurate the analysis and the lower the reliance on allocations, the easier it becomes to engage clinical teams in a conversation about performance improvement, both clinically and financially. Technology plays an integral role in improving the accuracy and timeliness of information for decision-making.

Dedicated resources are needed to achieve these outcomes and investing in interface capabilities to bring systems and their unique data sets together (like supply chain and the electronic health record) can significantly enhance clinical decision-making, sometimes in real-time. The hospitals our group represents span HIMSS levels from 1 through 7 and yet all of our hospitals were pursuing some form of advancement in this area. Every hospital can and should be looking to make investments to enhance their measurement capabilities, regardless of where they are in their EHR journey.

**Summary – Measurement to Support Effective Funding Methods**
If you’re looking to break down silos between organizations and drive efficiencies across that full cycle of care, in our experience, gaining access to the largest set of clinical, financial and other data will unleash your ability to implement novel funding models.

Following the money will often lead you to the richest sources of this information.

3. ADAPTABILITY – ANYONE CAN INNOVATE

Throughout this report we have highlighted several case studies or organizations that are innovating with technology in healthcare. What is so interesting (but also maybe obvious) is that the examples we have shared in this report are occurring in hospitals or health systems at vastly different levels of technological advancement. Some hospitals have a fully interconnected EMR, in some cases with full interoperability across several hospitals. Others are just beginning their journey towards an electronic medical record and the data collection, measurement and decision support opportunities that come with it in support of patient care.

In an industry as complex as healthcare, working in organizations as complex as a hospital, it can be easy to feel helpless to move things forward when the perceived barrier is a gap in technology like a fully interconnected EHR.

Our reflections as a group have provided us with many examples reinforcing that you can and should leverage technology in small and big ways, no matter what perceived challenges you may face and no matter how early your organization is in its EHR journey.

It is also important as an organization undertakes a technology project that it is viewed first as a clinical transformation opportunity to improve patient outcomes and generate efficiencies across the patient’s full cycle of care. The underlying benefits to the patient and clinical operations (like reduced errors, alerts leading to improved and timeline treatment, reduced patient length of stay etc.) will be the key drivers of financial benefit for all stakeholders.

Beginning a technology project with a main goal of cost reduction can distort the thinking and decision-making of a project team. A primary goal of cost reduction can actually reduce the financial benefits that can be realized across the patient’s full cycle of care, particularly if the cost reduction goal is contained to one program or one organization within a more care pathway involving multiple care providers and organizations.

Ensuring that it is clinical leaders that are acting as the executive sponsors of these foundational projects (versus your finance, IT or health information management leadership teams) can help ensure this mindset is maintained. If your funding models allow you to capture,
share or realize benefits across a patient’s full cycle of care, the ability to maintain this mindset, putting the patient first, is further enhanced.

What can you do today to further your organization leveraging technology? You don’t need to wait for a fully interconnected EMR. Leverage what you have today. Big or small, you have the power to improve process, positively impact both patient care and efficiency, while moving your organization further along its technology journey.

Artificial Intelligence (AI) and Virtual Reality (VR) will play a significant role in the delivery of health care in the future. At the outset of our journey as part of the Young Executive Leaders Initiative, we intended to discuss AI and VR in more detail, but ultimately, we elected not to. All of our experiences with AI and VR were too new or completely lacking.

A key conclusion for our group is that the education and exposure to AI and VR technologies will be critical for young leaders as we assume more senior health care leadership roles. We will be afforded with the opportunity to guide future implementations of AI and VR technologies in our organizations. To do so, we will need the tools, experience and training to make the right AI and VR decisions to harness the power and benefits of these technologies for our organizations and our patients.

Younger generations are less likely to be satisfied with the status quo (both as a patient and those working in health care) and the pace of change expected by our younger generations is accelerating every day. Those expectations are already beginning to be felt in health care. As young health care leaders, we share this expectation. We should be able to influence positive change in our organizations. We should be looking for the opportunities to innovate with the technology we currently have at our disposal, but we should also be looking for what we don’t have today, but need to improve patient care.

Despite the many challenges we face in health care, our work together has reinforced to us that the future is bright. The passion that everyone working in health care carries with them every day will continue to move us forward and our ability to leverage technology will only accelerate our progress towards improving the lives of the patients that we serve.
Annex 1: Implementing Telemedicine Strategies – Case Studies

St. Joseph’s Health Care London (Canada) – Geriatric Ambulatory Access Team

In 2018, St. Joseph’s Health Care London (St. Joseph’s), in London, Ontario created the Geriatric Ambulatory Access Team (GAAT). St. Joseph’s had recently been identified as the lead agency to coordinate the planning, implementation and evaluation of services for the frail elderly for London and the surrounding region to improve access and flow of referrals to specialists in geriatrics, eliminate duplication in the system and streamline patient/family navigation through early engagement.

The GAAT strategy sought to support increased access and flow for frail elderly patients who may need to access geriatric medicine and geriatric mental health outpatient services. Delays in accessing specialty care, inappropriate referrals and an overall lack of understanding of the specialty services by referring physicians were all issues that the GAAT strategy hoped to improve. The GAAT strategy adopted a principle of “no wrong door” ensuring that the strategy was patient- and family-centred, ensuring all referring physicians would find the right care for their patients.

Once a referral was made to GAAT, nurses would conduct an extensive telephone interview with the patient and family members. This call (or calls, if required) is used to determine the appropriate care pathway for the patient, including both geriatric medicine and mental health specialties. If a referral to specialty care is deemed unnecessary, it creates an opportunity to educate the referring physician as to the reasons for the GAAT’s decision both for their current patient and for future situations where a referral may be considered.

Financially, the GAAT strategy faced a barrier. Although all stakeholders were supportive of building a comprehensive in-take and triage team for specialty geriatric care, there was insufficient funding available to support the strategy directly and the funding environment was not supportive of telemedicine visits. The GAAT leadership team was able to identify funding available for growing mental health consultations within another program that fit with the mandate of the GAAT strategy and successfully advocated to the Ontario Ministry of Health for recognition of telemedicine consultations at episodic rates equal to in-person consultations.
This allowed funding to increase as the GAAT strategy expanded and created the necessary seed funding to establish the team.

The GAAT strategy reinforces several of the principles we have discussed above, including taking a creative approach to existing reimbursement policies, starting low-tech (there was virtually no upfront technology investment required given telephones were being used), directly influencing the care pathway of patients and creating a feedback loop to the referring physicians improving education and understanding of the system to further enhance system navigation by all stakeholders.

The ability for a frail elderly patient to engage with the GAAT via telephone also presents significant benefits to the patient as the cost of transportation to the hospital, the cost of care givers attending with the patient and risks that such travel presents to the patient are all avoided.

**Intermountain Healthcare (United States) – Newborn Critical Care Telehealth Program**

The Newborn Critical Care Telehealth Program was initially implemented at Intermountain Healthcare in 2013 to extend access to neonatal specialists. Days after the program went live in Cedar City, Piper (a baby girl born four weeks early with a collapsed lung and no Neonatologist onsite) was born and was able to get the care she needed. TeleHealth allows neonatologists from the four Intermountain trauma facilities to connect with babies like Piper who are born with complications and collaborate with bedside staff on their care. In some cases preventing future complications and allowing these babies to stay closer to their home and families. Now the program is operational in every hospital across the Intermountain system, and it continues to expand to partner facilities. On average, neonatologists currently help support the care of one baby every day. As of August of 2017, this program experienced 619 clinical encounters, more than 60 avoided transfers, and an estimated $1,800,000 in savings because of this program.

**University of Mississippi Medical Center (United States) – Telehealth Strategy**

In 1999, there was only one top-tier hospital in Mississippi, the University of Mississippi Medical Center (UMMC) in Jackson, Mississippi. In addition to UMMC, Mississippi had 99 acute care hospitals, with three-quarters based in rural areas, that had no medical specialists on staff, performed no surgeries, lacked labor and delivery units, many lacked the imaging equipment to diagnose emergent conditions and none had a ventilator. Patients requiring serious emergency care were frequently transported to UMMC, an expensive and risky solution. As a result, UMMC was dealing with overcrowding in their trauma center due to the flow of rural patients to their facility.
UMMC sought to create capacity in regional hospitals to improve patient care, reduce the overcrowding in their facility and create efficiencies for the hospitals and patients. With a state-funded telehealth initiative highly unlikely, UMMC pushed forward with a pilot project to link the trauma team to the care teams in the rural hospitals, linking UMMS to the hospital through TV screens. The hospital was able to leverage its state discount with local telecom providers to secure dedicated T1 lines, which at the time was the most reliable but most expensive type of telecommunication connection. To help empower those involved and overcome skeptics, UMMC also built a comprehensive telehealth curriculum taught by UMMC medical specialists for nurse practitioners in rural hospitals, helping build trust and consistency in the way in which care would be delivered.

This strategy allowed rural hospitals to care for their patients in more situations, avoiding costly patient transfers. The cost of receiving care in the rural hospital was about half that of the cost to the patient if they had to travel to UMMC. This arrangement also contributed to increased revenues for the rural hospitals as they began caring for more of the patients coming through their doors. UMMC also saw a revenue increase as they charged a monthly “availability fee” to the rural hospitals based on the estimated number of remote consultation hours that would be required of UMMC specialists.

The pilot began with 3 rural hospitals in 2003 and expanded to 17 hospitals over the next 10 years and now provides over 35 specialty services at more than 200 hospitals and service centres, including schools and prisons, throughout Mississippi.

This is a great example of bottom-up innovation, leveraging some of the strategies we have mentioned above. They started small, took a creative approach to leverage existing reimbursement policies, leveraged available technology (in this case they were able to use more advanced technology with access to discounted pricing) and invested in telehealth specific training to overcome the knowledge barriers and gain buy-in from key stakeholders.

Annex 2: Measurement of a Technology Implementation – Case Studies

Intermountain Health Care (United States) – EMR Implementation
Throughout a three-year period (2015 through 2017), Intermountain Healthcare implemented a complete Electronic Health Record (EHR) across the enterprise of 23 hospitals, 150 clinics, and within the revenue cycle process. This undertaking required multiple “go-lives” by region in order to scale, utilize shared resources, and allow for lessons learned to be implemented throughout each phase of this massive project. The importance of baseline measurements along with end-of-implementation indicators were key to the success of each implementation phase along with closure for those being trained and utilizing the product. This closure came
through tracking and measurement of key ‘use metrics’ for individuals and groups. These metrics were used to identify comfort level of users before moving from implementation phase to optimization phase.

Some of the key indicators for success of the EHR implementation included:

- Percent of staff (caregivers) and providers having completed in-class user training along with individual coaching
- Percent of physician orders being entered through the POE (Physician Order Entry) system within the EHR
- Providers average time (average order time, average chart review time, average documentation time, etc.) spent in the EMR
- Number of super users “at the elbow” of caregivers to help support safety and quality of continued care during the initial phases of implementation

These metrics were utilized throughout each implementation and became more and more important with each phase or ‘go-live’ of implementation throughout the enterprise. During the second implementation (in a 6-phase implementation), where 3 urban hospitals went live on the EHR, we identified that 100% of the 684 providers received classroom training prior to actual go-live. This provided for an improved base-knowledge, confidence in the system, and willingness to utilize the system as go-live occurred. 100% of the providers also received individual coaching to answer specific questions on their concerns with the new EHR. This allowed for more confidence in using the system, decreased implementation costs, short period of time for decreased efficiency, and overall improved adoption of the system.

Five weeks after implementation the average time spent in the EHR improved by 45%, improving from 25:55 minutes to 14:18 minutes over the 5-week period. This allowed leaders to identify the level of comfort and familiarity with the system and at what point additional support resources were no longer needed. It was learned however that 8 weeks after implementation the average time spent in the EHR actually increased by about 1 minute, which we learned was a positive sign of providers experimenting and identifying additional optimization tools and resources as they became more familiar with the system.

**University Hospital, Nancy (France) – Delivery of Medical Reports**

In 2019, University Hospital, Nancy sought to reduce the time it took to produce and deliver medical reports to patients and community providers, while also improving documentation quality. Until the launch of this project, medical reports were being completed through dictation by providers and transcription by medical secretaries.
Measurement was prioritized in this project and baseline metrics were captured to effectively measure performance improvements achieved by the project. This included identifying the average delay from discharge to the release of the related medical reports to the patient and community providers.

Dragon Medical Direct (Nuance) was selected as the desired solution and an IT strategy was developed to assemble licensing and training plans.

Measurement indicators relating to the project in Nancy included:

- Physician time saved by eliminating the need for a physician to complete dictations at the end of the day as dictations are completed directly into the patient electronic medical record in real time.

- A reduction in errors in dictated notes as a result of physicians completing their review of a dictation in real time.

- Total encounter times grew by 2 to 5 minutes as physicians completed dictations in real time, but this increase was more than offset by the time saved by eliminating the steps of validating a transcription afterwards, when the details of the patient encounter are less fresh in the physician's mind.

- Medical secretaries were spending on average 10 minutes per medical report transcription which would be eliminated with the implementation of Dragon medical, allowing them to focus on other priorities as the hospital faces growing patient demands.

- Faster discharge of patients; real-time dictation allowed patients to leave with their own medical reports and their community providers received their patient’s medical reports significantly faster.

As an example, the vascular medicine unit had, on average, 100 to 150 medical reports in progress and not yet complete on any given day either awaiting transcription or validation by the dictating physician – reports that were not yet in the hands of the patient’s community health providers. After implementation of Dragon Medical Direct, reports were being issued immediately upon discharge, with a measured 0-hour delay post-discharge before patients and community providers received the related medical reports.

The project in Nancy had the goal of improving quality and efficiency. It was successful in achieving these objectives, supported and validated by indicator measurement using data available in the electronic health record and leveraging new speech recognition technology that had become available.
Cascais Hospital (Portugal) – Femoral Fracture Mortality Rates

In 2015, Cascais Hospital in Portugal identified a concerning trend of worsening mortality rates for patients with femoral fractures (PFF) who were candidates for surgical treatments. Mortality rates for these patients averaged 3% in 2012, but had increased to 8% in 2015.

International studies demonstrated correlation between early surgery (24h - 48h) and in-hospital mortality. Using analytics, it was possible to identify the average time for all phases from door-to-surgery (total 80 hours) and only 50% of these patients were undergoing surgery in less than 48 hours at Cascais Hospital, as recommended by international guidelines.

A strategy was launched to decrease the door-to-surgery average time to less than 48 hours, creating a “Fast Track” for these patients.

1. Using analytics, it was possible to design the process from the patient’s entrance up until surgery, implementing the necessary changes to remove bottlenecks, implementing actions such as triage automatic alerts/algorithms or pre-op protocols/order sets, which required agreements between orthopedics and anesthesia.

2. As a result, a remarkable number of patients (79%) have their surgery in less than 48 hours, resulting in an incredible drop in the in-hospital mortality rate, from 8% to near 2% which translates to 35 potentially avoidable deaths from in 2016 through 2017.

3. The most recent results for 2019 year-to-date show continuing improvement, with a mortality rate near 0%. An additional outcome that was not contemplated as part of the project was the decrease in average length of stay of these patients from 11 days to approximately 4 days.

Annex 3: Measurement to Understand Cost – Case studies

Clinical Product Information Optimization (CPIO) Project at St. Joseph’s Health Care London (St. Joseph’s) and London Health Sciences Centre (LHSC)

To help improve the specificity and timeliness of clinical and financial data at St. Joseph’s and LHSC in London, Ontario Canada, the Clinical Product Information Optimization (CPIO) program was implemented in 2019. CPIO involves implementing point-of-use scanning in all operating rooms and surgical suites throughout all hospital sites in London, Ontario, creating a live interface of supply chain and clinical data during a surgical case. The clinical team can see a detailed costing of the supplies used during the case, allowing for real-time decision making. Once scanned, the cost of the item about to be used is displayed and the surgical
team has the opportunity to remove the item and pick a different item if the displayed cost appears unreasonable for the clinical requirements of the case.

The data captured through the scanning of individual medical supplies consumed also greatly enhances the accuracy of case costing exercises undertaken retrospectively as previous case costing approaches relied on standard surgical tray preferences and the assumption that all items on the tray (and nothing else outside of the tray) were being consumed.

The data is timely (real-time), the data is accurate (nobody can debate if something was used if they are scanning it as a team during the case) and there is no need to continuously update broad brush assumptions and allocations as part of retrospective case costing analyses. This project also has the distinct benefit of not only increasing the accuracy of costing for an individual case, but also enabling the comparison of costing between patients, between physicians and as this initiative is implemented more broadly, between hospitals. The Ontario Ministry of Health is shadowing the CPIO project to support implementation at other hospitals in the future to enable province-wide data collection and analysis.

The data produced by the CPIO project will also help contribute to the standardization of surgical methods which will support further efficiencies and improved patient outcomes. Further, having such a detailed database of supplies used for each individual surgical case can greatly improve patient safety considerations in the event of a product alert or recall.

Both St. Joseph’s and LHSC are only just beginning their journey to a fully interconnected electronic health record (both are at a HIMSS level 1), yet the investment in the CPIO strategy is achieving some measurement outcomes that some HIMSS Level 7 hospitals are not yet realizing, by integrating clinical and supply chain data in real time. The CPIO case study is a powerful example that demonstrates that technological innovation is possible no matter where a hospital is on its EMR journey and organizations should continue pursuing the integration of data sets when their combination can improve decision-making.

**Empiric Health at Intermountain Healthcare**
In 2017 Intermountain Healthcare launched an independent company called Empiric Health which offers a revolutionary program to enable evidenced-based medicine. Empiric Health is a technology-enabled services organization that addresses variation in healthcare costs and outcomes for both clinicians and health system administrators. Clinicians from Intermountain’s Surgical Services Clinical Program built the software to help understand how variations in the way surgical procedures are performed—from supply utilization to staffing—impact patient outcomes and overall cost of care. The product uses actual clinical and patient outcomes data, structured according to patent-pending, physician-approved groupings to ensure accuracy.
When variation is identified, clinicians are engaged either individually or at a service line level to discuss the best way to deliver care.

To date, the program has created operational efficiencies resulting in more than $90M in savings for Intermountain and its patients, including reducing supply costs and length of stay. This product has now been deployed at other institutions such as Loma Linda University Health in California and is being offered to other institutions around the nation. It will continue to assist providers in their care of patients to ensure the best outcomes while also considering the lowest possible costs.

**Annex 4: New funding models in our countries**

**Ontario (Canada) Health Teams and Bundled Care Funding Models**

In 2019, the Province of Ontario initiated a transition to “Ontario Health Teams” (OHT) that will introduce funding models to manage patient populations and disease specialties across multiple organizations, requiring collaboration across the patient’s continuum of care. Bundled payment structures were also launched in 2019 ahead of the Ontario Health Team transition, focusing first on Hip and Knee surgeries and rehabilitation.

St. Joseph’s and London Health Sciences Centre’s OHT application has been selected by the Province as one of the first OHT’s to be formed which is expected to allow for measurement/investment across the care continuum. Robert Kaplan and Michael Porter’s 2011 study[1] highlighted the ability to measure cost across the cycle of care, across multiple organizations, as a key enabler to identify true and sustained cost efficiencies in our health care systems.

London hospitals employ a centralized and shared supply chain infrastructure. Accurate costing of the complete patient journey/continuum will be a far more accessible goal with the CPIO project recently implemented in London (Annex 3).

**Intermountain (United States) Acute Care Shared-Risk Models**

Within the shared risk models of Medicare (federal government funded insurer) and SelectHealth (Intermountain-owned private insurer) Intermountain acute care hospitals receive payment for given services and take on the risk for total cost of care. If savings are actualized the hospital shares the cost savings with other providers involved in the given episode of care.

Measurement across the patient’s full continuum of care is critical in evaluating both the cost per case and the patient’s outcomes, allowing for the realization of a risk-based funding model.

**Chronic Kidney Disease Funding (France)**
Historically, bundled care payment models have not been in place in France; however, just recently on October 1, 2019, the French government implemented a funding model to support health care facilities in the care of patients with Chronic Kidney Disease (CKD) with annual payments per patient ranging from 270 and 757 euros depending on the clinical presentation of the patient.

The funding will be institution-based and not necessarily span across multiple provider organizations, but that may occur in some situations. The intent of the funding is to support several components of care for patients experiencing CKD while also providing a single point of contact for the patient. The care funded by this model will demand a multi-professional team organized by the institution receiving the funding.

The components of the patient’s cycle of CKD care that must be provided to earn the funding provided include:

1. Consultations by nephrologists
2. Interventions and consultations with paramedical and social-educational clinicians (therapeutic education, dietician consult, psychologist, social worker consultation etc.)
3. Coordination of the patient’s care by an “ad hoc” nurse, or “nurse navigator”

This funding model is being implemented for institutions supporting at least 220 adult patients experiencing CKD based on data submitted to regional health agencies. Although this funding model is currently focused on funding based on volumes, the integration of quality indicators is planned for the coming years.

France is beginning a journey that is a blend of episodic and bundled-based funding.

Public-Private Partnerships (Portugal)

There are several studies describing and enhancing the Management Structure of Portuguese National Hospitals. Similar to what has happened in other sectors, although not that common, some public-private partnerships (PPP) were created for the construction and management of Portuguese hospitals within the National Healthcare Service (NHS). For example, the Cascais Hospital allowed Portuguese and foreign private entities to invest and operate healthcare infrastructures and facilities in Portugal, reducing public spending in new hospitals and improving the service and management levels of the Portuguese healthcare system. It promoted new ways of sharing risk for healthcare care investments, new management experiences and an emphasis on measurement to understand cost.

Although the investment and operation of these hospitals was undertaken by a private partner, NHS beneficiaries maintained the same access rights and privileges to clinical services as in
any other public hospital. On the other hand, PPP also had a positive impact on the running of the NHS by providing a benchmark for the operation of public hospitals.

Independent studies from the Portuguese Court of Auditors show that the PPP model did not add costs to the NHS.\textsuperscript{iv} Compared to the public standard, there was a reduction of current expenditure. Cascais Hospital management, as one example, saved the Portuguese Government €17.5 million per year. Cascais Hospital management was able to achieve cost savings of 24\% compared to the average cost per standard patient in Portugal.

The experience in Portugal highlights the value of prioritizing measurement and the cost savings that can be realized.