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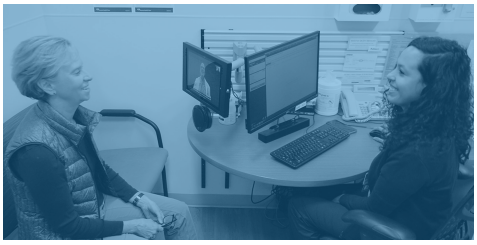

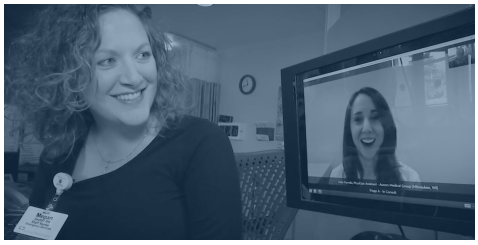

A Sensible Strategy for Managing Virtual Health Initiatives Across the Health System

INTRODUCTION & PURPOSE

United States health systems have faced increasing stress over many years but are now dealing with unique intense challenges resulting from the COVID-19 pandemic. The industry has responded in part by markedly increasing the use of virtual health technologies. This trend has improved access to care for many, while simultaneously decreasing exposure risks for patients and staff.

Given the financial stress placed on health systems during the pandemic, controlling costs has become paramount. And given the enormous investment made in their physical facilities, health systems must now determine how to simultaneously improve patient confidence to return to the facilities and improve productivity and efficiency of care processes in these facilities, in order to survive.

The breadth of use cases that can be addressed by virtual technologies expands almost daily. And at the same time health systems are re-thinking their strategy for deploying virtual technology in order to decrease costs and complexity while still realizing the potential benefits. This white paper describes options and provides suggestions for the design of a sensible health system strategy for managing virtual health initiatives, with a focus on in-facility care.

CORE TOPICS

Current vs. Future State of Virtual Health

Execution Plans & Workflows

Costs and Benefits of Virtual Health

ABOUT THE AUTHOR

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Current State of Virtual Health

The COVID-19 pandemic has caused many health systems to revise their priorities. Now the focus seems to be 1.) keep patients and staff safe, 2.) help patients regain confidence to return to their health care providers and, perhaps most importantly, 3.) save costs.

Historically, telehealth solutions have been implemented for direct to consumer advice lines and urgent care, or for once-in-a-while consults with specialists, with the most common example being consultation with neurologists for emergency evaluation of patients suffering from a stroke.

More recently the use of telehealth has massively expanded. An annual review of the telehealth landscape has been published by Grant Chamberlain, former board chair of the American Telemedicine Association, and colleagues from Ziegler.[1] In this document the authors identify hundreds of companies providing telehealth products and services. At a high level they categorize the telehealth industry into four main groups: 1. Consumer Health and Wellness, 2. Targeted Disease States, 3. Workflow-Based Solutions, and 4. Caring in Place (including In Home Monitoring). Separate sectors identified include Behavioral Health, Social Resources and Integration/Access Tools.

With labor representing the majority of overall hospital operating costs, significant excess costs result from staff performing non-value-added work. McManus, et al estimate 20-30% waste in the healthcare system.[2] Time motion studies indicate up to 14% waste for time in transit to see patients.[3] Emergency physicians in large departments walk over 7000 steps in a typical shift [4], and med-surg nurses have been shown to walk almost five miles.[5]

TOP HEALTH SYSTEM PRIORITIES DURING COVID-19

1. **Keep Patients & Staff Safe**
2. **Help Patients Regain Confidence**
3. **Minimize Costs**

CORE TELEHEALTH CATEGORIES

- Consumer Health & Wellness
- Targeted Disease States
- Workflow-Based Solutions
- Caring in Place (Home Monitoring)

WASTED TIME & OPERATING COSTS:

20-30%
Wasted Staff Costs Across System

14%
Waste Time in Transit to Facilities

7,000
Steps in Typical Emergency Physician Shift

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Current State of Virtual Health (cont'd)

Previous studies of inpatient encounters have shown a typical hospitalized patient has 100 entries into their rooms per day, with a mean time in the room of 3 minutes, and 55% involving no touching of the patient or body fluids.[6] The efficiency gained by performing many of these interactions through remote technology is expected to be significant.

In this age of COVID-19 health care workers are at significantly increased risk of morbidity and mortality. To date over 600 health care workers have died from COVID19 infections.[7] New virtual care workflows represent a huge potential for decreasing exposure risk by using innovative technology. The use of a new integrated on-site and virtual care model has recently been described as "ePPE" because it decreases the need for face-to-face encounters between patients and staff for every part of the care process.[8]

The tremendous range of potential use cases and the number of companies addressing them creates a significant challenge for health system planners. While there may be a tendency to seek a simple solution that fulfills all use cases, Ziegler states "given the wide variety of applications virtual care has for expanding access to care, improving its quality and reducing its cost, it should not be pigeonholed or underestimated, it is not a sidecar to delivery of care". The report continues "Sector leaders are beginning to emerge… there is still boundless potential for innovation and growth".

Given the widespread ongoing innovation, breadth of use cases and potential impact, a premature commitment to a single vendor and an over-simple solution based on an expectation that it will fulfill all needs is likely to lead to mediocre or degraded performance across all service lines.

INPATIENT CARE BY THE NUMBERS

100
Avg. Daily Entries into Hospitalized Patient Room

3 min.
Average Duration of Room Visits

55%
Room Visits Involving No Touching

"Given the wide variety of applications virtual care has for expanding access to care, improving its quality and reducing its cost, it should not be pigeonholed or under-estimated, it is not a sidecar to delivery of care".

Direct-to-Consumer vs. In-Facility Virtual Health

The most impactful distinction between virtual health categories is between the one-to-one consumer solutions and the complex, workflow-enabled in-facility solutions (e.g. teletriage on right).

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Desired Future State of Virtual Health

So how should health systems develop a strategy going forward? A reasonable start is defining a desired future state, and then creating a plan for how to get to this state over time.

Clearly, health systems are looking for ways to significantly decrease healthcare delivery costs. Leaders in the industry are realizing delivery costs can be decreased by 20% or more while maintaining or improving service levels by seamlessly integrating virtual and on-site resources into existing clinical workflows across multiple facilities. Location of many resources thereby becomes far less relevant than it has been in the past. This allows organizations to optimally leverage resources and deploy a "system approach" across the organization to optimize patient flow.

A careful review of healthcare workflows, and how they can be redesigned or augmented by incorporating virtual care, is a great place to start. Health care providers should be engaged to get input based on their experiences and to identify specific problems. Specifically, those that have an ability to envision new ways of doing business are needed, as the problem of "learned helplessness" must be overcome. After decades of the healthcare industry simply adding more people at more cost to solve problems, a new vision of decreased labor costs through improved application of technology is required.

In most domains, the existing process and workflow can be broken down into a series of discrete steps. The planning group can then systematically examine these component steps and determine if they can be accomplished in a better, faster, cheaper way by utilizing remote virtual resources. Use of virtual resources can reduce non-value-added work (for example traveling from room to room or floor to floor in a large facility). When the remote resources service multiple facilities simultaneously, an additional load-balancing effect can be achieved across facilities that is not possible with only on-site personnel.

It is expected that the relaxation of the regulatory environment associated with COVID-19 will be reversed in the next year. As a result, systems in the future will need to be fully vetted for security and HIPAA compliance. Future systems will need to be purposely designed and built for secure enterprise-class performance, as health care providers will demand trust as well as dependability and speed in the user experience in order to meet the needs of high-volume patient flows.

VIRTUAL HEALTH IMPACT ON CARE DELIVERY COSTS

20%+

Decrease in Care Delivery Costs by Integrating On-Site and Remote Resources

MORE STAFF IS NOT THE SOLUTION

After decades of the healthcare industry simply adding more people at more cost to solve problems, a new vision of decreased labor costs through improved application of technology is required.

IN-PERSON VS. REMOTE RESOURCES

When the remote resources service multiple facilities simultaneously, an additional load-balancing effect can be achieved across facilities that is not possible with only on-site personnel.

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Desired Future State of Virtual Health (cont'd)

Understandably, there is interest in decreasing the number of overall vendor partners to simplify administration and help control costs. However, the large number of companies claiming to solve all problems should cause health systems to take pause. Once the target domains are identified and prioritized, potential costs and benefits can be defined. It will be important to critically examine those vendors that have demonstrated proven results for the priority use cases, and their ability to address other adjacent domains with the same technology, while not expecting a one-size-fits-all approach for all virtual care.

The vision for in-facility care is that every treatment room includes a "two-way video portal" which can be used to access multiple virtual resources. In many cases, the care processes performed every day by nurses, doctors, and ancillary staff can be executed faster and at lower cost using virtual technology. As hardware becomes increasingly commoditized, and video management technology becomes more ubiquitous and inexpensive, it is the design and management of efficient clinical workflows that will become the differentiator for health systems.

Recommended components of a successful facility-based strategy include:

1. ***Program Planning / Implementation*** – this includes initial consulting and engagement around patient flow design, prioritization of use cases, identification of key metrics and success factors.
2. ***Ongoing Flow Optimization / Management*** – An ongoing evaluation and quality improvement plan should be implemented to ensure success of new care models.
3. ***Use-Case-Optimized Hardware*** – depending on the use case, simple generic tablet computers and commoditized options may be more than adequate, while other use cases may include requirements for more specialized equipment.
4. ***Acute Care Workflow Engine*** – this software needs to be capable of supporting multiple users across multiple locations, for a wide variety of use cases. The workflows the engine needs to support can be complex, including routing of remote consults based on attributes of patient, requestor and responder. Queue management across facilities, with escalation paths and ancillary communication options must be adequately addressed.
5. ***EHR Integration*** – enormous investments have already been made in electronic health records, and the virtual care programs should complement EHR functionality.
6. ***Virtual Task Management and Automated Interventions*** – While virtual visits with physicians, nurses and ancillary staff can be far more efficient than performing every task with on-site personnel, further efficiencies can be gained by augmenting these virtual visits with intelligent automated interventions. Specific examples include notifying the inpatient bed managers of the need for an inpatient bed for an emergency department patient at the time of triage instead of waiting for the work-up to be completed, or notifying a charge nurse of an unusual delay in delivering and acting upon lab results that impact a patient disposition.

Costs & Benefits

A virtual health program should be able to both generate incremental revenue and save significant costs by decreasing non-value-added work by staff. A typical 40,000 annual visit emergency department (ED) has 1000 patients leave without being seen each year due to long waiting times. Using virtual health to improve processes and reduce this number in half results in $500,000 in annual incremental revenue. This same ED spends about $70 per emergency department patient in nurse and tech staffing costs, representing $2.8 million annually. A 10% improvement through improved patient flow and staff productivity, yields $280,000 in annual cost reductions. Similar savings are available to the physician group that staffs the department.

Extension of similar savings to observation units and inpatient floors provides a long-term opportunity for millions of dollars of annual staff cost savings and incremental revenue for each hospital. As health system planners prioritize their virtual health system investments, it is important to concentrate on the overall return on investment rather than direct program cost alone. Benefits can exceed direct costs many fold, particularly for use cases involving high volumes of patients.

Additional revenue loss occurs when patients avoid care in order to reduce their exposure to COVID19. This stress on healthcare systems worsens as significant costs are incurred when clinical staff become infected with COVID19. Despite diligent efforts to utilize best practices, nationwide over 600 health care workers have died from COVID19 infections. An Avalere analysis of Medicare fee-for-service hospital stay claims with associated COVID19 diagnoses has found that total US healthcare system costs for hospitalizations due to COVID19 could range from $9.6 B to $16.9B in 2020.[9] Each healthcare worker that is hospitalized can be expected to result in about $40,000 in costs. Appropriately reducing unnecessary physical contact points between patients and providers can reduce the risk of transmission for both groups, helping patients feel safer and more comfortable accessing healthcare services, ensuring provider risk is reduced, and enhancing health system revenue while reducing costs.

40K VISIT/YEAR ED BY THE NUMBERS

1,000
Patients Leave Without Being Seen ($1M Loss)

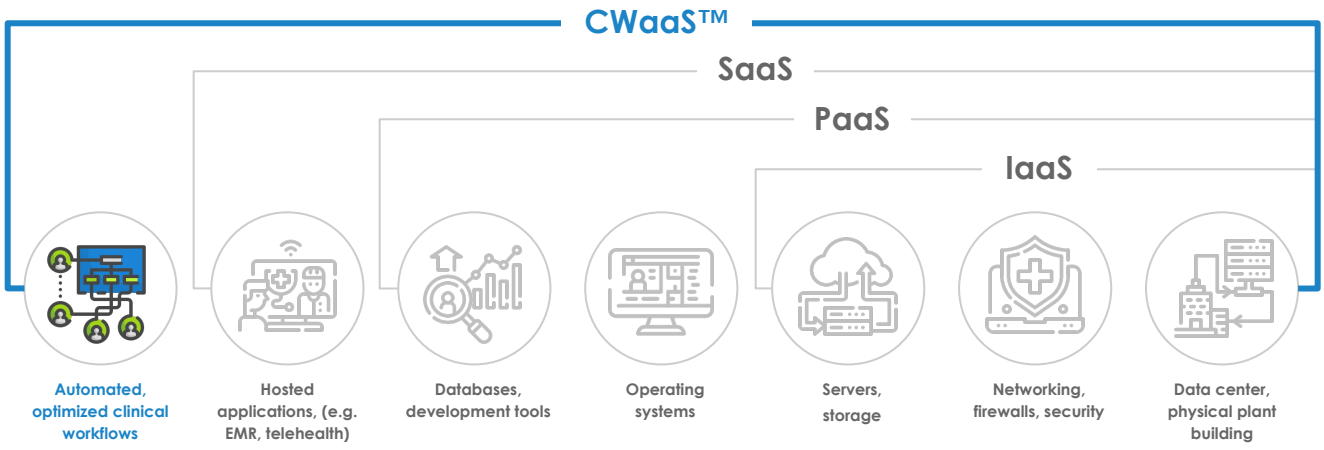
$70
Per Patient Nurse & Tech Cost ($2.8M/year)

$780K
Annual Savings on Both Costs if Virtual Health Used

Execution Plan

Organizations have been doing virtual consults for many years for some purposes. And video technology available today has more recently allowed for inexpensive pilot use of video consults for a wider variety of use cases. In response to COVID-19, significant experimentation has occurred under the umbrella of a relaxed regulatory environment, including deploying business conference call systems not intended for health care use. However, health systems are realizing that a more carefully designed approach will be needed for the long term. Rolling out a scalable and comprehensive virtual care program for hundreds of thousands of visits per year spanning multiple facilities, providers, specialties, and uses cases requires systems specifically designed for the setting in which they will be used. The needs of a dynamic acute care setting differ from those of outpatient settings dominated by scheduled appointments. In-hospital settings clearly require workflow design and transformation services beyond basic video technology.

Below is a diagram displaying the spectrum of technology needs for health systems, with Clinical Workflow as a Service™ (CWaaS™) supporting the effectiveness of telehealth and other programs.



A reasonable approach, as chosen by several market leading health systems, is to choose a small group of strategic vendors with proven results and complementary capabilities to address the wide range of potential virtual care use cases, while prioritizing several key opportunity areas that correspond in part to the Ziegler sector identification described above. These areas include:

1. **Simple Workflows and Scheduled Visits** – An effective program for this category requires technology that can provide or link to a registration and scheduling program, and when offered directly to consumers, should be compatible with the many hardware form factors that consumers may choose to utilize.
2. **In-Facility Workflows** – These workflows often have more complex requirements, including the ability to manage queues, routing consult requests based on multiple attributes of patient, requestor and or responder, ability to simultaneously service multiple facilities, handle escalation paths, and careful integration with existing electronic health record systems.
3. **Special Situations** – These workflows tend to apply to specific medical specialties and their requirements for special hardware enhancements, for example the ability to view patient retinas during a remote ophthalmology consult.

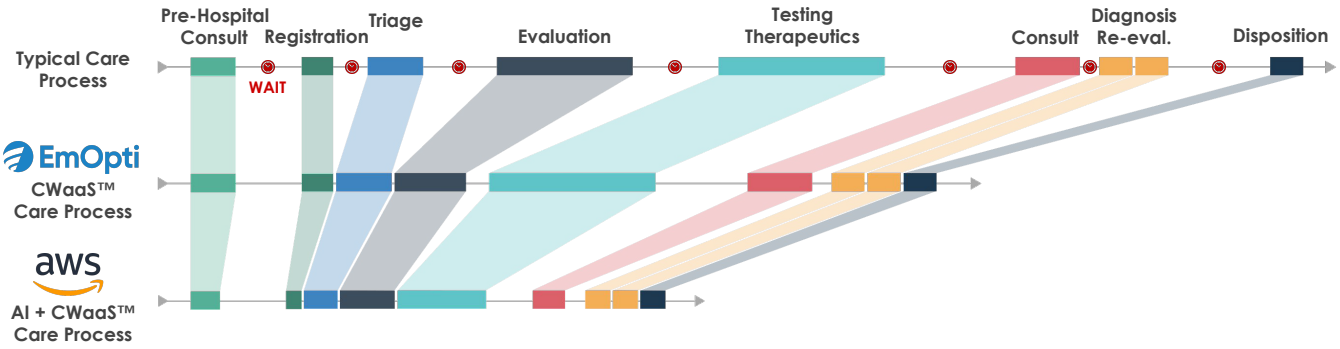
Execution Plan (cont'd)

The example below shows how EmOpti's remote care application designed specifically for in-facility workflows can transform and optimize a frustrating workflow into a streamlined, semi-automated one. To take it a step further, the partnership between EmOpti and Amazon Web Services (AWS) opens up virtually endless opportunities for maximizing the automation of the care process via artificial intelligence and many other service add-ons with AWS.

It may seem obvious, but it is worth stating that use cases that incorporate workflow-based virtual health technology as part of the everyday care process for every patient will have more impact than use cases that involve occasional use for special situations. And prioritizing partnership with vendors that have proven ability to support high volume everyday use cases can be a reasonable approach to pursuing a "system approach" to virtual care.

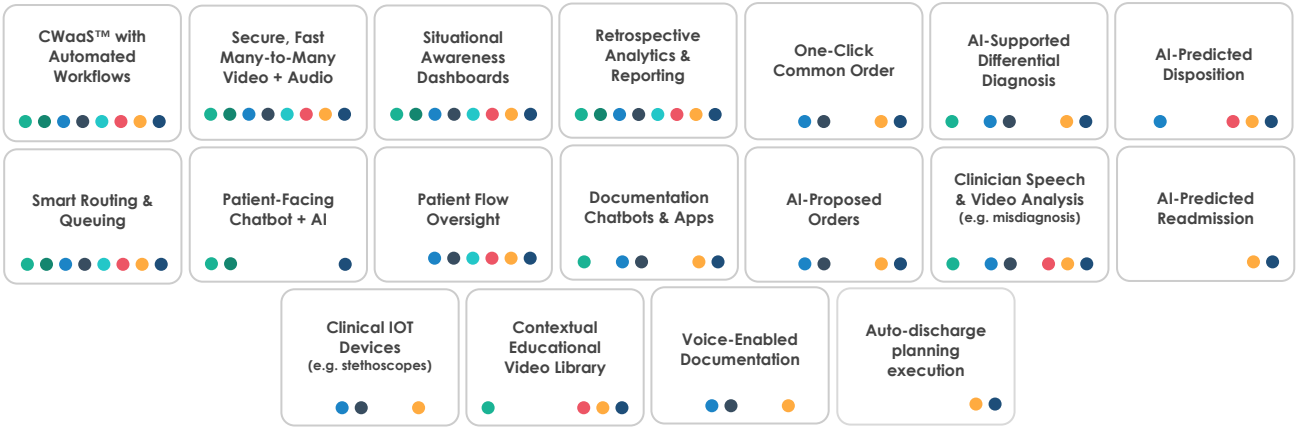
How Automated Workflows Improve In-Facility Care Process

The typical care process is a frustrating, unsafe sequence of care events broken up by long waits. With EmOpti's CWaaS™ technology, many wait times are reduced or eliminated. By integrating a suite of AWS artificial intelligence and automation services, the care events themselves are optimized, improving efficiency and safety.



REMOTE PROVIDER PERFORMANCE OPTIMIZATION

EmOpti offers a variety of tools to enable remote providers to achieve high efficiency while maintaining or improving quality of care delivered at each stage in the care process timeline.



Execution Plan (cont'd)

As a health system develops its execution plan for a virtual care program, dividing the telehealth market into the four core segments helps manage costs and complexity without compromising clinical impact.

If your health systems have specialty care needs (e.g. telestroke, telepsychiatry), you may want to consider the many options for Targeted Disease Telehealth. However, these solutions are niche applications that often rely on expensive hardware (e.g. carts, smart devices) with low volume usage.

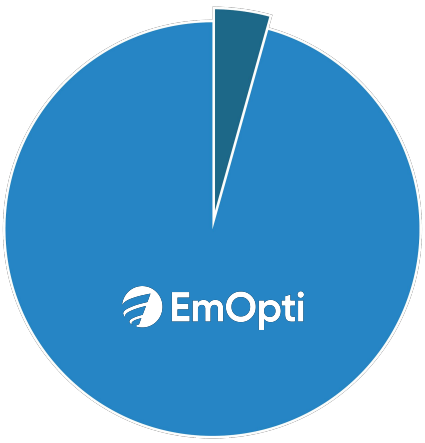
Similarly, Home Monitoring Telehealth is another area with many options, but only make up a small sliver of the telehealth landscape. Home monitoring often involves integration with devices, data analysis, dashboards and alerts with less reliance on routine face-to-face telehealth interactions.

The higher volume telehealth segments that are essential to building an effective virtual care program include (1) In-Hospital Workflow-Based Telehealth and (2) At-Home Consumer Health Telehealth. These require very different functionalities and one should not be used to address the other. For In-Hospital Workflow-Based Telehealth, EmOpti won innovation awards from ACEP and AHA and remains one of the only options with years of proven financial and clinical effectiveness. When EmOpti is paired with one of the many Consumer Health Telehealth Solutions (e.g. Teladoc, AmWell, many others), deploying a modern enterprise-wide virtual care program results in improved patient engagement and improved efficiency of operations.

In-Hospital vs. At-Home Telehealth

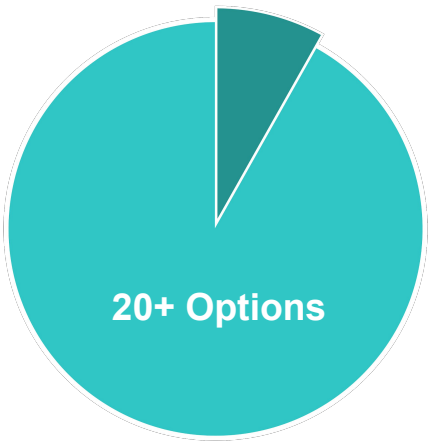
Below is a breakdown of the volume of encounters via the four core telehealth segments. These proportions are approximate and meant to illustrate the vast difference in usage across each segment.

IN-HOSPITAL TELEHEALTH SEGMENTS



- **Workflow-Based Telehealth** (e.g. Teletriage, Virtual Rounding)
- **Targeted Disease Telehealth** (e.g. Telepsych, Telestroke)

AT-HOME TELEHEALTH SEGMENTS



- **Consumer Health Telehealth** (e.g. At-Home Primary Care Consults)
- **Home Monitoring Telehealth** (e.g. Post-Care Virtual Checkups)

Summary

As health systems adjust to the new world of COVID and post-COVID, a future that includes innovative use of new technologies will be required. The core goals of reducing costs, improving patient confidence, and protecting staff lead to a vision of every patient care area including a video "portal" that enables new care models that combine on-site and virtual care in acute care facilities.

By distilling telehealth needs down to the two core high volume segments, (1) In-Hospital Workflow-Based Telehealth and (2) At-Home Consumer Health Telehealth, achieving the optimal clinical and financial impact from telehealth is feasible. By leveraging existing resources to be more effectively utilized and scaled across groups of hospitals, organizations can move from the current fixed capacity model for each individual facility to a "system approach". From there, variable capacity can adjust to meet the variable demand - both at the facility level and across the health system. This model allows health care systems to manage system capacity in near real time across multiple locations, decrease labor costs, protect staff and patients from safety risk, and improve clinical metrics at all patient volume levels.

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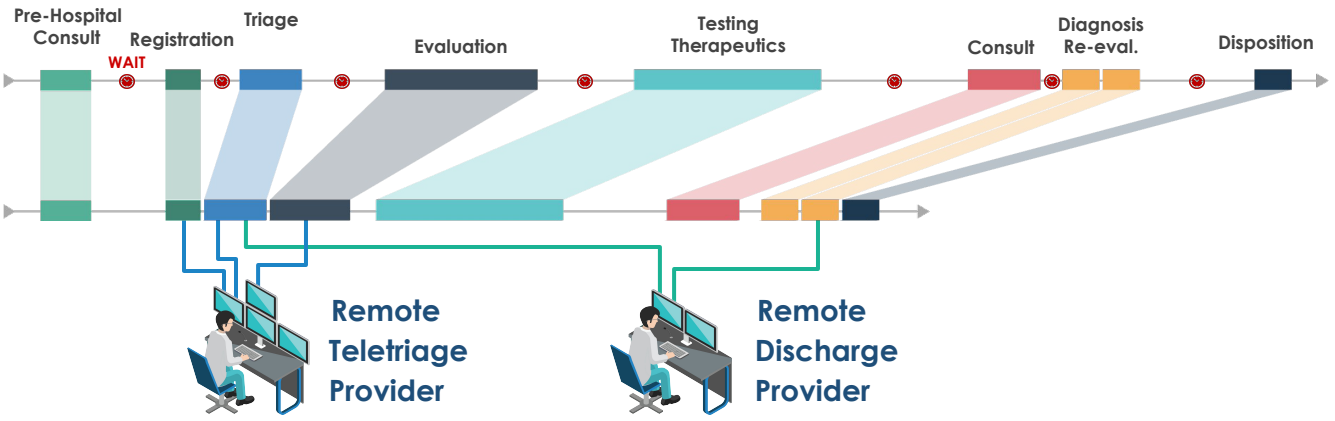
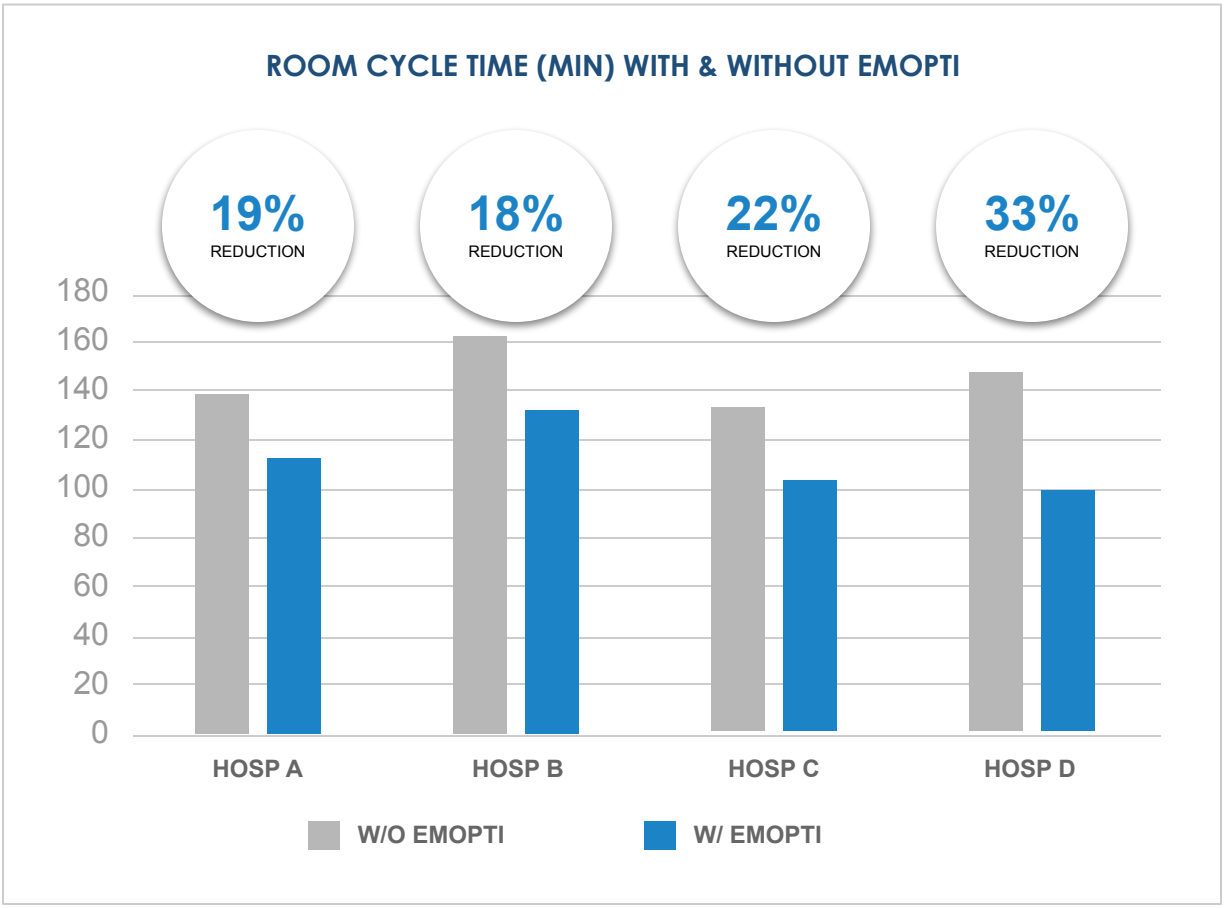
STAGES OF TRADITIONAL CARE PROCESS

STAGES OF CARE PROCESS WITH EMOPTI CWAAS™




ROOM CYCLE TIME (MIN) WITH & WITHOUT EMOPTI
19%
REDUCTION
18%
REDUCTION
22%
REDUCTION
33%
REDUCTION
180
160
140
120
100
80
60
40
20
0
HOSP A
HOSP B
HOSP C
HOSP D
W/O EMOPTI
W/ EMOPTI