# EmOpti Solution Guide
Update 8-3-2021

## Purpose

This document provides answers to questions commonly asked by potential EmOpti customers considering a remote emergency intake program.

## Contents

EmOpti provides technology that delivers improved performance in acute care facilities by integrating remote resources and on-site resources to create new care models with improved productivity.  This results in on-site labor cost savings while at the same time delivering better clinical results, and the approach can be used for multiple use cases across multiple service lines.  The approach is more relevant than ever in the COVID/post-COVID environment.
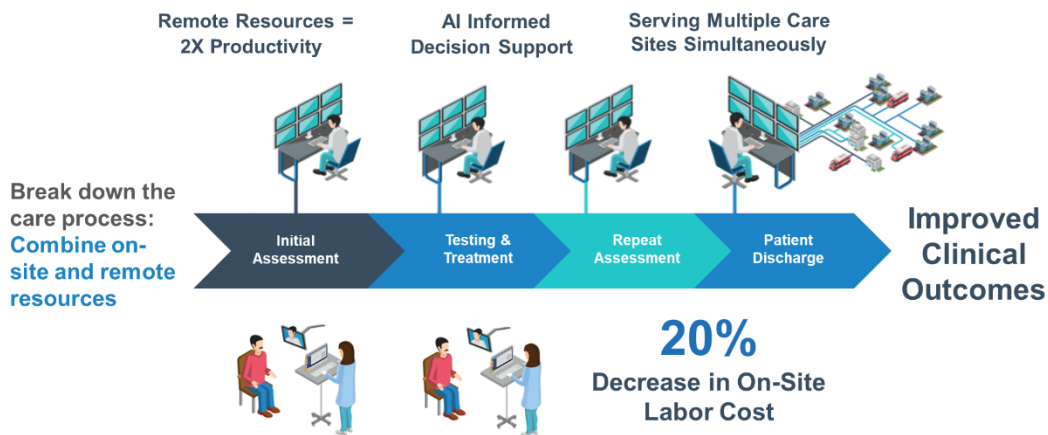


# 1. What results can be expected with an EmOpti remote emergency intake (tele-triage) program?

A remote intake program for emergency department patients is a proven use case showing how a new care model based on a combination of remote and on-site resources can deliver performance and cost efficiencies that exceed the results seen with traditional models that utilize on-site personnel only, and at the same time reducing exposure risk.

EmOpti is the market leader for this use case.  EmOpti technology is used by existing clinical staff. The solution includes:  1.) a fast, secure video system, 2.) a patent pending Clinical Workflow as a Service™ system, 3.) a Management and Configuration system, and 4.) an Analytics and Dashboarding system.

## 1.1. Clinical Throughput Metrics

The primary metric impacted by this use case is the amount of time patients wait to be seen by a licensed clinician, either a physician or Advanced Practice Clinician (APC), after arriving in the emergency department.  This is commonly referred to as "Door to Doc (D2D)" or "**Door to Provider (D2P)**" time.  The target when an EmOpti solution is utilized is to reduce the mean D2P time to 12 minutes or less.  A heat map of D2P time at a hospital comparing patients with and without an EmOpti triage consult is depicted on the next page.

## All Patients (Median)

| | With EmOpti | | | | | | | Without EmOpti | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sun | Mon | Tue | Wed | Thu | Fri | Sat | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
| 0 | | | | | | | | 41 | 135 | 56 | 53 | 15 | 83 | 80 |
| 1 | | | | | | | | 60 | 96 | 33 | 124 | 48 | 123 | 30 |
| 2 | | | | | | | | 34 | 68 | 22 | 183 | 19 | 30 | 141 |
| 3 | | | | | | | | 40 | 40 | 23 | 64 | 55 | 129 | 15 |
| 4 | | | | | | | | 21 | 51 | 68 | 49 | 89 | 195 | 45 |
| 5 | | | | | | | | 36 | 48 | 54 | 33 | 93 | 41 | 67 |
| 6 | | | | | | | | 26 | 23 | 44 | 45 | 55 | 42 | 70 |
| 7 | | | | | | | | 26 | 25 | 29 | 34 | 38 | 24 | 49 |
| 8 | | | | | | | 106 | 19 | 35 | 32 | 22 | 33 | 31 | 42 |
| 9 | | 24 | | 12 | 31 | 10 | 16 | 27 | 38 | 22 | 41 | 48 | 31 | 38 |
| 10 | 11 | 17 | 9 | 14 | 28 | 11 | 20 | 27 | 43 | 15 | 34 | 18 | 24 | 27 |
| 11 | 11 | 19 | 8 | 16 | 15 | 13 | 23 | 23 | 23 | 12 | 22 | 23 | 10 | 21 |
| 12 | 16 | 13 | 8 | 10 | 20 | 14 | 10 | 24 | 17 | 7 | 11 | 50 | 26 | 27 |
| 13 | 22 | 25 | 14 | 7 | 15 | 13 | 14 | 55 | 30 | 6 | 12 | 11 | 11 | 32 |
| 14 | 26 | 17 | 11 | 9 | 14 | 16 | 12 | 45 | 25 | 15 | 17 | 46 | 20 | 47 |
| 15 | 13 | 11 | 12 | 12 | 26 | 12 | 11 | 33 | 122 | 14 | 20 | 19 | 23 | 40 |
| 16 | 10 | 10 | 11 | 10 | 20 | 13 | 10 | 36 | 16 | 20 | 20 | 26 | 15 | 56 |
| 17 | 11 | 12 | 11 | 10 | 11 | 8 | 8 | 21 | 17 | 10 | 13 | 15 | 30 | 30 |
| 18 | 10 | 10 | 9 | 12 | 15 | 12 | 10 | 37 | 49 | 15 | 22 | 9 | 32 | 18 |
| 19 | 15 | 12 | 11 | 11 | 12 | 13 | 14 | 28 | 83 | 44 | 29 | 22 | 51 | 29 |
| 20 | | | | | | | | 53 | 63 | 76 | 66 | 40 | 52 | 30 |
| 21 | | | | | | | | 33 | 82 | 35 | 63 | 69 | 50 | 31 |
| 22 | | | | | | | | 16 | 52 | 66 | 80 | 121 | 79 | 26 |
| 23 | | | | | | | | 43 | 100 | 89 | 56 | 31 | 93 | 49 |

The improvement in D2P time has been shown to be sustained over time and over a range of patient census changes, staff changes and other variables. An example showing a decrease from 40 minutes to 17 minutes is shown below:
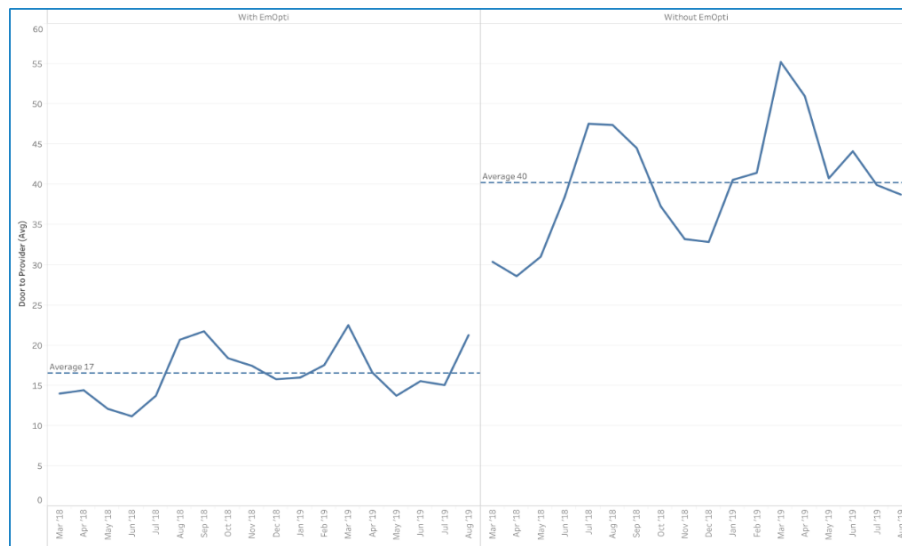
D2P time has been shown to be closely linked to the **Left Without Being Seen (LWBS)** metric that is tracked as part of the Medicare quality scoring system for hospitals. This metric is expressed as a percentage of overall patients arriving for care who depart the emergency department before being seen by a licensed clinician. The national average is 2.5% per the ED Benchmarking Alliance. But the metric varies significantly across facilities, and by hour of the day and day of the week at individual facilities.

EmOpti remote intake programs have consistently resulted in improvements in LWBS rates. Example results from a 50,000 annual visit department have been published in peer reviewed literature.

Before and after rates from a series of hospitals are depicted below.

| Facility | Census | LWBS Rate Results |
|---|---|---|
| Hosp A | 41,000 | Decreased 55% |
| Hosp B | 35,000 | Decreased 39% |
| Hosp C | 61,000 | No Improvement |
| Hosp D | 65,000 | Decreased 27% |
| Hosp E | 71,000 | Decreased 38% |
| Hosp F | 40,000 | Decreased 51% |
| Hosp G | 31,000 | Decreased 32% |
| Hosp H | 36,000 | Decreased 58% |
| Hosp I | 48,000 | Decreased 28% |
| Hosp J | 92,000 | Decreased 50% |

Treatment Room Cycle Time is the average length of time a patient stays in one of the emergency department's main treatment rooms (as opposed to a waiting room or other area in the department). The number of available treatment rooms becomes a limiting factor on patient throughput when they all become filled, creating a roadblock for new patients to receive care. The common practice of boarding patients in the emergency department while they wait to be admitted results in a decrease in available treatment rooms.

Expanding the emergency department physical plant can increase the number of rooms but is very expensive, averaging $400 per square foot, and as high as $1200 per square foot in New York city. Reducing the treatment room cycle time increases the number of available rooms. EmOpti intake programs have consistently shown decreases in room cycle times across a variety of hospital sizes, including low volume emergency departments. A series of graphical displays of the impact follow.

Hospital A – 65,000 annual visits



Room Cycle Time Reduction = 19%

Hospital B – 40,000 annual visits



Room Cycle Time Reduction = 18%

Hospital C – 22,000 annual visits



Room Cycle Time Reduction = 22%

Hospital D – 14,000 annual visits

Room Cycle Time Reduction = 33%
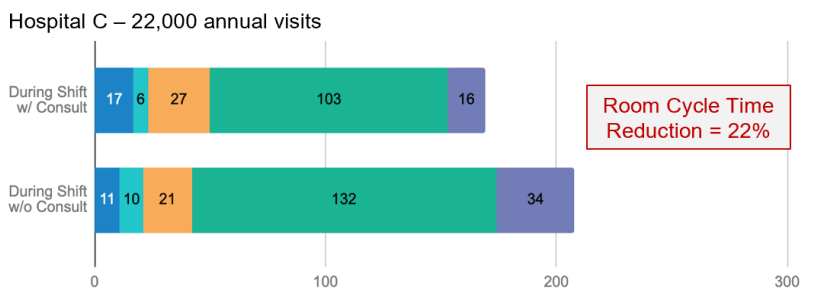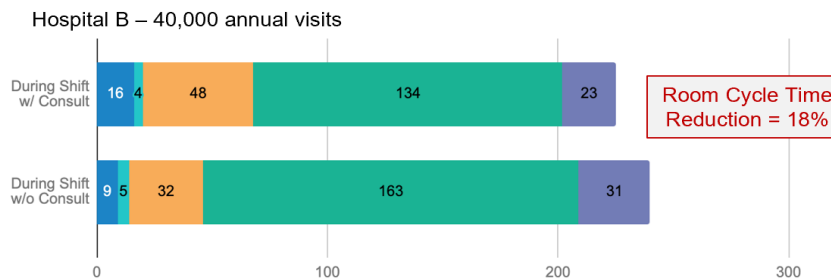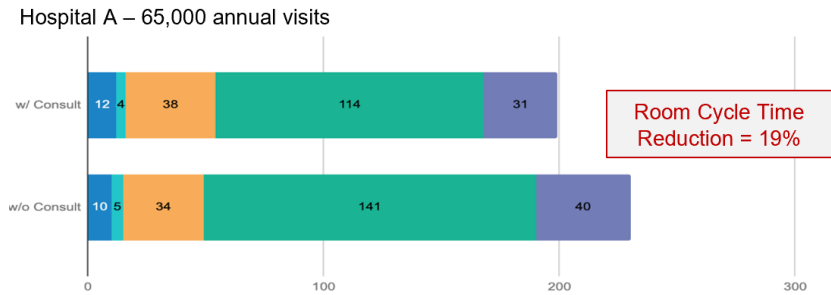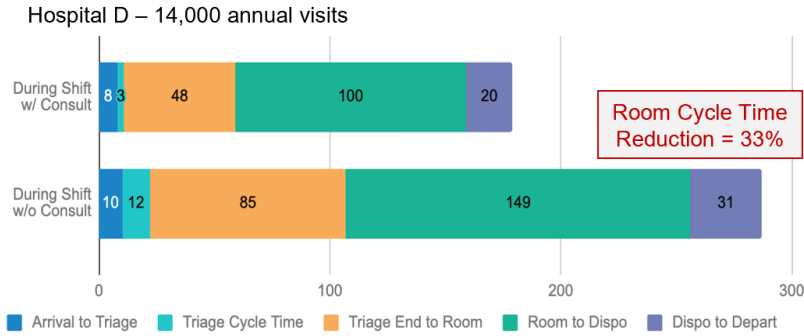
These graphics show how smaller emergency departments, which may not have a significant problem with overall LWBS, often have limited number of rooms and a limited capability to respond to patient surges. At busy times of day, or when surges occur, they can see significant benefit with a remote intake program.

### 1.2. Patient Satisfaction Metrics

EmOpti nurses have carried out 1:1 exit interviews with over 80 patients after they received remote triage consultations and found 98% of them appreciated the interaction and would recommend it to others. The positive feedback was consistent across all age groups. Standardized survey techniques such as those provided by Press Ganey have also shown consistent improvement. At Thomas Jefferson University's Methodist hospital, in the calendar quarter that included deployment of an EmOpti remote triage process the Press Ganey scores improved from the 25th percentile to the 85th percentile.



PRESS GANEY®    25th to 85th percentile in one quarter

Overall Mean Scores      Emergency Department

| Standard Scores | Jan '17 - Mar '17 | | Apr '17 - Jun '17 | | Jul '17 - Sep '17 | | Oct '17 - Dec '17 | |
|---|---|---|---|---|---|---|---|---|
| | Score | n | Score | n | Score | n | Score | n |
| Overall | 85.5 ▼ | 264 | 82.6 ▼ | 184 | 83.5 ▲ | 201 | 87.2 ▲ | 109 |
| Arrival | 85.1 ▲ | 264 | 80.3 ▼ | 184 | 82.3 ▲ | 201 | 88.2 ▲ | 108 |
| Nurses | 86.7 ▼ | 264 | 84.0 ▼ | 184 | 84.6 ▲ | 201 | 89.6 ▲ | 109 |
| Doctors | 86.5 ▼ | 264 | 84.5 ▼ | 183 | 83.3 ▼ | 198 | 87.9 ▲ | 107 |
| Tests | 88.2 ▼ | 208 | 87.4 ▼ | 154 | 85.7 ▼ | 166 | 88.0 ▲ | 92 |
| Family or Friends | 85.1 ▼ | 153 | 84.3 ▼ | 120 | 84.3 | 116 | 88.0 ▲ | 76 |
| Overall Assessment | 84.9 ▼ | 256 | 79.5 ▼ | 181 | 81.2 ▲ | 196 | 85.3 ▲ | 107 |
| Personal Issues | 82.3 ▲ | 262 | 78.7 ▼ | 183 | 80.4 ▲ | 199 | 84.4 ▲ | 109 |
| Personal/Insurance Info | 85.8 ▼ | 260 | 83.8 ▼ | 184 | 86.8 ▲ | 197 | 88.0 ▲ | 107 |

*Displayed by Date of Service*      **EmOpti Go Live 9/30**

### 1.3. Clinician Satisfaction and Productivity Metrics

Feedback from clinicians has also been consistently positive. In a study published by Joshi, et al in Academic Emergency Medicine, a survey was performed of providers that had worked as remote clinicians for a two-hospital emergency intake process. Fourteen of fifteen responding

clinicians responded positively that "tele-intake allows me to add value to my patient's ED experience. And thirteen of fifteen agreed that "compared to in-person intake, tele-intake gives me the same ability to appropriately evaluate and initiate care for patients. For the receiving on-site physicians that provided care after a partner had provided a remote triage consult, 19/22 agreed that tele-intake gave their patients a better experience and 19/22 agreed that tele-intake did not get in the way of their ability to care for their patient.

Clinicians prefer to work in environments where they feel productive, and clinician productivity has been shown to be far higher with the EmOpti solution. Unlike the experience with alternative technology options, the EmOpti solution is specifically designed for speed in busy emergency departments. Most on-site provider-in-triage programs show a maximum of 8-10 patient intake consults can be provided by a single clinician per hour. Use of alternative technologies show a similar maximum, or even lower number. However, users of the EmOpti solution show a consistent throughput of 16 patients per hour, with peak levels as high as 25 patients per hour. This is demonstrated in the graph below, showing a typical day with a single coverage remote clinician providing consults to three departments between 8:00am and 10:00pm. On this day a total of 234 consults were successfully completed.
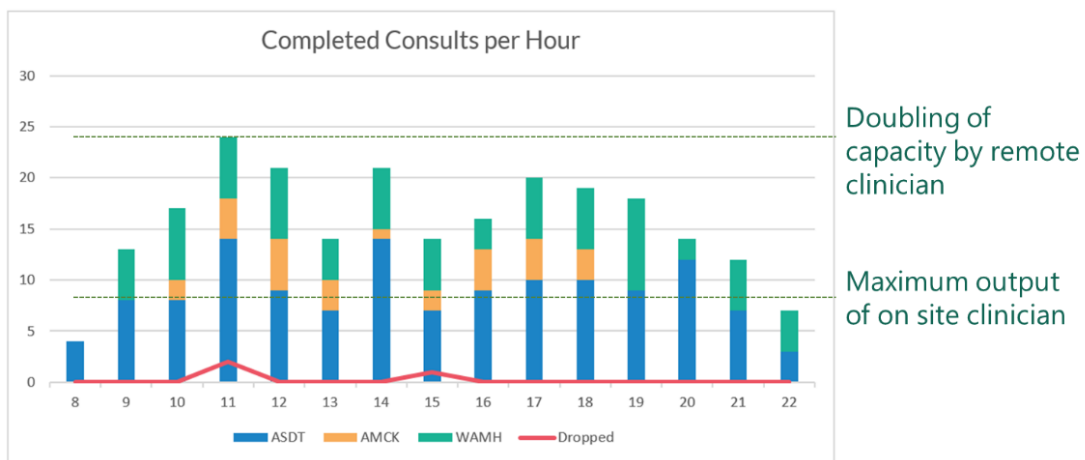


### 1.4. Financial Metrics

EmOpti develops a forward looking financial proforma model for each customer based on actual results realized at other health systems. The results seen and the model revolve around two main components –

1. *Decreased wait time, which results in decreased Left Without Being Seen (LWBS), creating incremental revenue.*
        Since the main components of cost in emergency departments are the amortized capital costs associated with building expensive treatment rooms and the labor costs of staffing those rooms, adding incremental patients without adding staff or rooms yields $800-1000 per patient, plus additional inpatient margin for the proportion of additional patients that end up getting admitted. In multiple facilities the EmOpti intake program has been shown to reduce LWBS to

about half of the level seen before the program. It is simple math to multiply LWBS reduction x census x $ per patient to define the financial benefit.

2. *Improving productivity, resulting in decreased treatment room cycle time, reducing labor costs.*

EmOpti customers have consistently seen 18-32% decrease in room cycle time with a remote intake program across hospitals of all patient census levels. This can yield savings in two ways – either cut on-site staffing by 15-20% or allow census to increase year over year without adding additional on-site staff.  Because staff cuts can be difficult, most program choose an approach where the associated staff savings are realized as a three year ramp up as patient census continues to increase. Typical hospital staff costs for nurses/techs are between $60-80 per emergency patient. The math is again straightforward to multiply x census increase to define labor savings associated with an increase in census when no increase in staff or rooms are needed to accommodate the higher volume.

A typical proforma model for a twelve-hospital deployment servicing 425,000 combined annual visits is depicted below.

| Project Investment | | Amount | 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|---|---|
| | Implementation and Integration | $ 30,000 | $ 30,000 | $ - | $ - | $ - | $ - |
| | Site hardware (one time, three year refresh) | $ 126,000 | $ 63,000 | $ - | $ - | $ 63,000 | $ - |
| | Remote clinician hardware (one time, three year refresh) | $ 28,000 | $ 14,000 | $ - | $ - | $ 14,000 | $ - |
| | **Total Investment** | **$ 184,000** | $ 107,000 | $ - | $ - | $ 77,000 | $ - |
| | | | | | | | |
| **Operating Costs (OpEx)** | | | | | | | |
| | Remote Provider Clinician Costs (% shift from on-site TBD) | TBD | $ - | $ - | $ - | $ - | $ - |
| | EmOpti usage and support fee | | $ 214,843 | $ 644,529 | $ 644,529 | $ 644,529 | $ 644,529 |
| | **Total Operating Costs** | | $ 214,843 | $ 644,529 | $ 644,529 | $ 644,529 | $ 644,529 |
| | | | | | | | |
| **Project Benefit** | | | | | | | |
| | Reduced patients that leave without being seen (LWBS) | TBD | $ 1,396,137 | $ 4,188,412 | $ 4,188,412 | $ 4,188,412 | $ 4,188,412 |
| | Improved safety / risk reduction | TBD | $ - | $ - | $ - | $ - | $ - |
| | Inpatient volume increase | 15% admit rate | $ 1,047,103 | $ 3,141,309 | $ 3,141,309 | $ 3,141,309 | $ 3,141,309 |
| | Decreasing backend nursing and tech cost per visit | 10% over 3 yrs | $ 268,554 | $ 1,611,323 | $ 2,416,984 | $ 3,222,645 | $ 3,222,645 |
| | Increased volume from improved reputation / pt experience | TBD | $ - | $ - | $ - | $ - | $ - |
| | Decreased capital cost of adding new treatment rooms | TBD | $ - | $ - | $ - | $ - | $ - |
| | Increases to CMS reimbursement based on metric improvement | TBD | $ - | $ - | $ - | $ - | $ - |
| | **Total Benefit** | | $ 2,711,794 | $ 8,941,044 | $ 9,746,705 | $ 10,552,366 | $ 10,552,366 |

| | | 2020 | 2021 | 2022 | 2023 | 2024 |
|---|---|---|---|---|---|---|
| **Annual Net Benefit** | $ | 2,389,951 | $ 8,296,515 | $ 9,102,176 | $ 9,830,837 | $ 9,907,837 |
| **Cumulative Net Benefit** | $ | 2,389,951 | $ 10,686,466 | $ 19,788,641 | $ 29,619,478 | $ 39,527,315 |

| NPV | $ 31,290,232 |
|---|---|
| IRR | 1501% |
| Payback | 0.04 |
| 5 yr ROI | 1428% |

## 1.5.    Technology Solution Performance Metrics

The EmOpti solution has been designed to provide high volume consult routing and queueing in complex environments.  The solution allows for many patient facing devices to be controlled by a single nurse or other requestor, many requests to be generated from many rooms, and correct routing of those requests to many consult responders.  The routing rules may vary based on attributes of patients, requesting personnel, requesting facility or location, and responder capabilities.  Multiple responding clinicians can be on duty working in parallel or through a broadcast crowd-sourcing approach.  Using a Clinical Workflow as a Service™ powered by

Amazon Web Services (AWS) approach allows the technology to be rapidly configured to match the requirements of multiple use cases.

The EmOpti solution is hosted in HIPAA compliant secure AWS redundant data centers and incorporates over 60 different AWS service components.  This approach has enabled EmOpti to deliver enterprise class performance with unsurpassed reliability and scalability, as required to service large volume patient flows and demanding health care environments.

The security of the system has been scrutinized by multiple customer groups and independent third-party testing agencies.  System maintenance tasks are managed by a series of convenient graphical user interfaces.  Overall end user availability has been 99.995+% over multiple years of service and hundreds of thousands of successful remote video consultations.

### 1.6      Decreasing Exposure Risk to Improve Patient and Staff Safety

The COVID19 pandemic has shifted health system priorities.  Not only is controlling costs vitally important given the financial challenges, but health systems must help patients regain confidence to return to health facilities, and when they do return both patients and providers must be kept safe.  The EmOpti solution can be used for very effective care models that decrease exposure risk.  For example, virtual triage assessments, and virtual discharge of low acuity patients, can occur in tents before patients even enter the health care facility.  In hospitals that are utilizing "hot" and "cold" zones to separate higher and low risk patients, the same EmOpti technology can be used for "virtual rounding" to care for patients in the hot zone with a decreased number of high risk person to person interactions, and with the added benefit of saving PPE supplies.

## 2. What are the potential implementation challenges?

### 2.1.      HIT Resources

The EmOpti solution has been designed to minimize impact on busy health system IT staff. Experience has shown that the deployment of an initial 3-4 hospital EmOpti emergency intake solutions requires about 40 total hours of hospital IT time, split between security and network engineers, hardware procurement personnel, and general project support.  However, these health system IT personnel are almost always challenged to keep up with all the demands on their time, and as a result they tend to be reticent to take on new projects.  They must continually prioritize tasks, and so senior administrative support is essential to move forward even for a "light lift" project like an EmOpti solution deployment.

### 2.2.      Nursing Attitudes

Like almost all personnel groups, nursing attitudes fall in categories that correspond to a bell curve, ranging from excitement about the opportunities available from innovation to burn out and resistance to change.  Emergency nurses can be conservative and skeptical, as their training

and experience suggest this type of attitude is necessary in order to successfully deal with difficult patient care situations.  Education is therefore key, as nurses are generally data driven people and, in the end, they want what is best for the patients they serve.

Nurses that do not have experience with an on-site provider in triage program may be concerned that a remote emergency intake program may cause undue delay in their triage process or otherwise threaten their autonomy.  EmOpti solution users have shown in multiple facilities that this is not the case. The result is a collaboration between remote clinicians and on-site triage nurses, an opportunity for nurses to act as an advocate of the patient presenting the case to the remote clinician, and ultimately more rapid patient flow. Nurses that have experience with provider in triage often report frustration with the interruptions that can occur when an on-site clinician barges into the room in the middle of their triage data collection.  With a remote program this is avoided as the nurse has control over the interaction and the timing of the request for a remote clinician consult.

### 2.3.    Departmental Geography Matters

Emergency departments come in many different sizes, shapes and structures.  And the patient care workflows that are implemented can also vary significantly.  But a core process of assessment – testing/triage – reassessment – disposition decision – discharge is common to all. Early in the solution deployment process EmOpti personnel work closely with clinical and administrative teams to define the patient flow process for each department and determine how to optimize results using a remote intake approach based on their department's physical plant design.

A key lesson learned from other users is the importance of moving patients into some type of internal waiting room or task area or vertical care area after they have received their remote provider in triage consultation.  If orders are entered and the patients are returned to the front lobby or waiting area and order execution is delayed, the expected improvement in LWBS rate may not be realized. The opportunities for a new patient flow model must be explored with an understanding of the constraints of the physical plant and the internal geography of the department.

### 2.4.    Getting Orders Executed with a New Care Model

Actualizing new patient flow into an internal waiting area or task area and ensuring that radiology and lab technicians and other personnel promptly execute orders in such an environment is a key success factor for remote provider in triage programs.  This is another concept where education is key.  Some persons new to the remote provider in triage concept will conclude that additional staff are needed for this purpose.  However, the total volume of testing and treatment tasks that are required does not change, only the timing is affected. Whether the patient is cared for immediately or after waiting several hours they generally receive the same tests and treatment.  So, evaluating staffing patterns and timing, in order to optimize response to peak arrival times, becomes a very valuable part of the program planning.
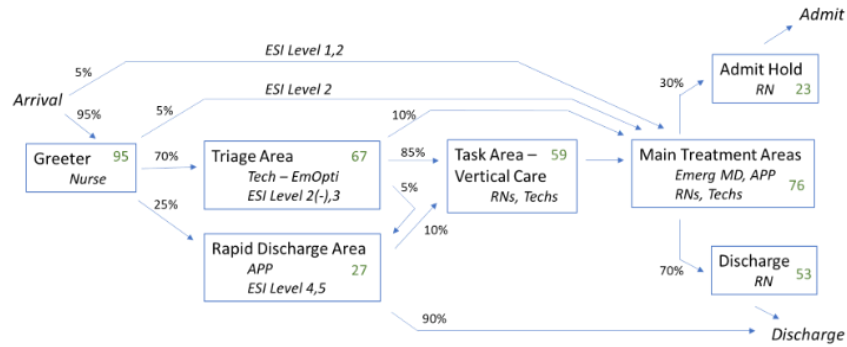
## 2.5. Performance of Remote Clinicians

Education and scripting are important components in optimizing performance of remote clinicians, both for physicians and for advanced practice clinicians (APCs).  The best remote providers are generally those that have considerable previous emergency medicine experience, display an aptitude for rapid development of rapport with patients, and who order a reasonable number of tests and treatments.  These skills easily map from on-site environments to a remote consult process.  Because EmOpti programs generally utilize remote clinical staff that are recruited from the existing groups of clinicians servicing the on-site facilities, clinicians whether remote or on-site are always working with their partners and a sense of collegiality contributes to successful results.

It is recommended that oversight of the remote emergency intake process be included in ongoing quality improvement programs, and especially in the early phases of deployment, regular QI meetings are held to review the remote intake results and implement suggested improvements.  Published data from Booker, et al in the Journal of Emergency Medicine has shown that a successful remote intake program yields the same diagnostic accuracy of initial orders as an on-site provider in triage program.

**American Journal of Emergency Medicine**

**JA Izzo, MD**
MedStar Health

**Study Overview:** Concludes that diagnostic accuracy from remote intake physician is consistent with in-person intake physician

| | Second physician orders | | | | p-Value |
| --- | --- | --- | --- | --- | --- |
| | In-person encounters | | Tele-intake encounters | | |
| | Order totals | Mean/Enc | Order totals | Mean/Enc | |
| CT | 982 (51.7) | 0.149 | 953 (54.0) | 0.157 | 0.179 |
| X-ray | 771 (23.1) | 0.117 | 664 (21.4) | 0.110 | 0.130 |
| Lab | 3360 (16.0) | 0.511 | 3276 (15.2) | 0.541 | 0.250 |
| MRI | 150 (72.5) | 0.023 | 142 (79.8) | 0.023 | 0.600 |
| Pharmacy | 8072 (58.1) | 1.227 | 6989 (55.5) | 1.153 | 0.007 |
| Ultrasound | 211 (49.2) | 0.032 | 205 (55.3) | 0.034 | 0.469 |
| Total | 13,546 | 2.060 | 12,229 | 2.018 | 0.245 |

| | Discontinued orders | | | | p-Value |
| --- | --- | --- | --- | --- | --- |
| | In-person encounters | | Tele-intake encounters | | |
| | Order totals | Mean/Enc | Order totals | Mean/Enc | |
| CT | 27 | 0.004 | 23 | 0.004 | 0.768 |
| X-ray | 24 | 0.004 | 37 | 0.006 | 0.061 |
| Lab | 64 | 0.010 | 92 | 0.015 | 0.102 |
| MRI | 1 | <0.001 | 0 | 0.000 | 0.337 |
| Pharmacy | 63 | 0.010 | 95 | 0.016 | 0.002 |
| Ultrasound | 3 | <0.001 | 7 | 0.001 | 0.163 |
| Total | 182 | 0.028 | 254 | 0.042 | 0.001 |

Izzo, JA et al, Diagnostic accuracy of a rapid telemedicine encounter in the Emergency Department, American Journal of Emergency Medicine (2018), https://doi.org/10.1016/j.ajem.2018.08.022

### 2.6. Importance of Routine Use

Successful EmOpti programs have demonstrated an improved ability to respond to patient surges in busy emergency departments, essentially allowing high volume days to "feel like" low volume days.



Door-to-Discharge on High & Low Volume Days With and Without Teletriage
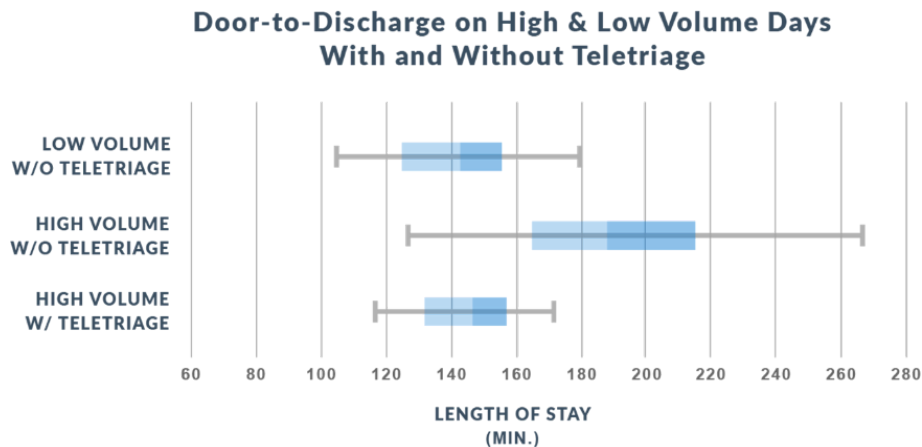
It is important to note the best practice recommendation is to use the system on a routine basis during the busy parts of each day, generally corresponding to the day shift and the afternoon/evening shift.  Emergency department volumes vary tremendously, sometimes up to +/- 50% on any given day from the expected median number of arrivals.  While some of these variations are predictable, many others are not, creating a significant challenge in planning for needed resources.

When busy days or patient surges occur, it is difficult to adjust to new care models on the fly. But if a remote intake process is in place routinely during the times when surges are most likely to occur, the additional capacity that is enabled by the remote intake process provides a better ability for the department to respond successfully, maintaining high quality safe patient care.

## 3. How to overcome health system administration challenges?

### 3.1. Balancing Priorities

Health system administrators are faced with a very difficult job.  The market is becoming increasingly competitive, and there will be winners and losers.  Demand for services continues to increase and the supply of traditional resources is not keeping pace.  Downward revenue pressures continue.  To survive and thrive healthcare delivery organizations must deliver more and better services at a lower cost.

At the same time consolidation in the industry continues at an unprecedented pace, so administrators continually juggle priorities. If they are in the middle of a merger with another health system, or in the middle of a large electronic medical record deployment, an emergency department remote intake program, despite all its benefits, may not break into the top of the priority list.

### 3.2.    Difficulty Linking Costs and Benefits and Understanding ROI

Administrators are further challenged by legacy health financial systems. True activity- based costing systems are rare, and as a result many are pressured to manage lists of costs without clear linkages to the financial benefits that may be attributable to those costs.

A specific example is determining the incremental revenue that will be realized when the emergency department LWBS rate is decreased. Emergency department managers and directors may only have access to financial numbers associated with nursing or physician level of service charges and collections, and may not have insight to lab, radiology or other ancillary charges and collections attributable to emergency patients. They may have mistaken perceptions about payor mix and the variable associated collection rates. Careful analysis is needed to truly understand the impact.

### 3.3.    We Can Build It Ourselves / Desire for Vendor Consolidation

A common, and understandable, response to a suggestion for a new program is questioning if the same results can be obtained with a solution that is build internally, or perhaps built using a technology that has already been purchased for a different purpose. Hospital administrators and IT executives are often seeking ways to consolidate and simplify their affiliated vendor lists, with the belief that this is required to successfully manage their vendor relationships.

However, in the case of an emergency intake solution, those that have chosen to pursue internal home-built solutions have repeatedly failed to deliver the type of performance available from an EmOpti solution deployment. EmOpti has invested millions of dollars in technology development to create a system that is highly optimized for a demanding emergency medicine environment. Speed and capacity for high volume consults is paramount in this specialty.

Emergency clinicians are expensive resources, and improving productivity is a key goal. As described in the expected results Section 1. Above, EmOpti technology consistently delivers on this goal.

Given a financial benefit that often exceeds $100,000 per month for a health system, delays in deploying an EmOpti solution to try other inferior solutions creates very high opportunity cost. Perhaps a quote from an EmOpti customer sums up this consideration:

*Do we ask vascular surgeons to use an orthopedic surgical set to do aorta repairs? Then why are we asking our emergency docs to use a system designed for an entirely different purpose and crossing our fingers and hoping patients don't die as a result?*

### 3.4. Regulatory and Billing Issues

When considering a remote emergency intake process, concerns sometimes arise about the Emergency Medical Treatment and Labor Act (EMTALA) that requires emergency providers to complete a Medical Screening Exam (MSE) and or regulations that impact billing for emergency services.

EmOpti has created a separate white paper, informed by national industry experts, that discusses these issues in detail. In summary, a remote emergency intake process can be designed that fully complies with the applicable regulations in these areas.

### 3.5. Physician Group Issues

When deploying a remote emergency intake care model, the support of the emergency physicians is critical. The highest cost component of a remote triage program is the professional staffing of the remote provider station(s), typically about 65% of the overall program costs. With the correct technology choices, this cost can be completely mitigated by the overall staff savings that occurs with improved patient throughput, and by the incremental professional fees captured by reducing the left without being seen rate. In other words, staff can be shifted

from on-site locations to the remote consultation roles and the improved productivity more than makes up for the decrease in on-site staffing.

About one-third of emergency physicians now work for groups that are partially or wholly owned by hospitals, or directly as hospital employees. The other two-thirds work for physician groups that independently contract with hospitals to provide professional staff coverage for the emergency departments. In many larger multi-hospital health systems, more than one physician group is retained to staff the various emergency departments. When this occurs, it need not be a barrier to deploying a remote intake model that services multiple hospitals. The most common solution is for the health system to cover the cost of the needed hardware and software, and for the physician groups to provide staffing of the remote consultation roles on a pro-rata basis consistent with the proportionate benefit received (generally using annual census as a proxy for determining relative benefits among hospitals).

EmOpti experts can provide guidance to help health systems and physician groups arrive at approaches that create mutual benefits when these circumstances occur.

### 3.6. Desire for Innovation vs Concern About Risk

Just as various personnel groups follow a bell curve of attitudes about innovation and change, so do health systems themselves fall along various points of a similar curve. Health systems in general tend to be conservative, and given the many different priorities faced by health system leaders, innovation can sometimes be deemed less important that taking care of other pressing issues, particularly around regulatory, safety and financial concerns.

In the end, many decisions must be made that balance benefits and risk. As detailed above, the expected benefits of a remote emergency intake process are broad based – including benefits for patients, providers, improved clinical outcomes and a powerful financial return on investment.

While any change in care model entails some risk, it is important to also consider the risks of not making the change.  In this case the chief risk of pursuing the same old emergency care processes are risks to patient safety.  Every year anecdotal reports occur about patients that die in emergency department waiting rooms before being seen by a licensed clinician.  It is a dirty secret in the industry that critical safety events due to delays in care occur far more often than anyone involved in the specialty would like to admit.  In a large-scale study involving almost one million patient visits across 187 hospitals, patients admitted on days with high ED crowding showed longer lengths of stay and increased costs, and **5% greater odds of inpatient death**\*.

*\*Sun BC, Hsia RY, Weiss RE et al. Effect of Emergency Department Crowding on Outcomes of Admitted Patients. Ann Emerg Med. 2013; 61(6): 605–611.*

This solution guide shows how a remote emergency intake process can decrease delays in patient care, decrease crowding, and reduce this patient risk.  For this reason, it can be argued that this is one innovation that should be pursued by health systems with a wide range of aptitudes for change.


# 4.  What other use cases can EmOpti address?

### 4.1.    Emergency Medicine Use Cases

Given the general desire for vendor consolidation among health systems, it is reasonable to ask if EmOpti technology can be utilized for use cases beyond remote oversight of emergency department intake.  The answer is clearly yes. EmOpti Clinical Workflow as a Service technology has been utilized for several other use cases in emergency medicine and its adjacencies. In the emergency department these use cases include:

> Rapid discharge solution for low acuity cases
> Patient flow coordination for improved exception detection
> Admit prediction to help reduce boarding
> Remote scribe services to assist with documentation
> Virtual rounding to decrease exposure risk

### 4.2.    Other Acute Care Service Lines

Other use cases that may involve care provided in emergency departments or in other acute care locations are also available.  In each of these instances EmOpti devotes the same care and detail to the workflow of the personnel so that the end result is improved patient flow and productivity.  Specific examples include:

Language interpretation via individual consults or as part of a three-party remote consult.
Behavioral health consults, for both EM crisis intervention or inpatient consults
Urgent care consults with EM and other specialists, including peds, ortho and cardiology

EmOpti has also created a virtual hospitalist medicine solution, including rapid virtual rounding to enhance early discharges, and ad hoc consults with physicians, discharge planners and social services to improve patient flow.

### 4.3. Long Term Strategic Planning

The general concept of combining on-site and remote resources holds potential benefits for multiple specialties.  During the first half of 2020 EmOpti led a strategic planning process with customer hospital systems, clinicians representing multiple specialties, academic industrial engineers, and senior executives from the health tech and health insurance sectors, to further delineate the potential benefits and help prioritize areas where the health delivery system can be improved by this approach.  Interested parties are encouraged to contact EmOpti for further information.