For more than a decade, Mercy has been focused on reinventing health care delivery with an intentional redesign of the care model.

Mercy has defined telehealth to be a fundamental part of this care model redesign and core to our ability to sustain the mission of the Sisters of Mercy. To that end, Mercy leadership has made a significant commitment to the infrastructure, workflows, people resources and information system architecture in order to create the platform upon which to build on this new model of care. This has been an deliberate strategy supported by the board of directors and structured proactively by our health system management team. Highpoints of the strategy include:

• Centralization of leadership and business processes and the creation of an operating company in place of a federation of 30+ hospitals.
• Full integration of physicians across the ministry including close to 100% employment of the primary care delivery network.
• Full implementation of the complete suite of the electronic health system (Epic), including inpatient, post acute and ambulatory (physician) services.
• Tier 3 data center supporting the information system and data demands of the organization with capacity to manage 4 to 5 systems Mercy’s size.
• Centralized case management and care management, allowing for a standardized and efficient approach to population management.
• Centralized research department with ability to coordinate research sites in all communities, representing a one-source research opportunity including millions of medical records.
• Telehealth as an integral strategy with full implementation of eICU, telestroke and a myriad of other telehealth initiatives in various stages of implementation and development including the construction of the only virtual care center in the world.
Introduction

Telehealth in its broad sense has recently become the topic of conversation in most of the C-suites of health care systems across the country. While there is no consensus as to the best strategy on how to utilize telehealth, it has been viewed by many health care experts to represent a technologic solution for the issues that American health care is facing regarding the value equation – cost and quality. It is also the case that while the technology continues to gain sophistication, the ability to integrate telehealth into the care delivery models and workflows that are presently in place has represented a roadblock to its widespread adoption. In the absence of clarity, confusion has prevailed with a myriad of software, hardware and programmatic solutions that while individually represent significant innovation collectively fail to provide a total solution to a telehealth strategy. Adding to this confused landscape is the very real crisis around payment reform and the revenue ambiguity. Health care is moving from a utilization-driven economy (represented by fee for service) to a value-driven economy (represented by population management). However, it has been and will be a very chaotic transition for health care leaders as the revenue incentives of the two models are diametrically opposed.
Telehealth at its core is a population management tool and thus will significantly augment clinical value by providing increased access, centralized and continuous monitoring, and data-driven decision support. Early studies have also shown that within an environment of shared savings models, it will increase revenue through a combination of increased provider efficiencies (leading to larger patient populations managed per provider) and decreased utilization of services (through a combination of clinical improvements and less costly access alternatives used by patients).

In 2006 Mercy began its journey into telehealth by helping to pioneer the eICU. Despite the absence of a defined revenue stream, Mercy leadership elected to implement this technology in all of its hospital-based ICUs across the four states that Mercy serves. The clinical quality results as well as the utilization decreases were remarkable when this centralized 24/7 “eyes” on the patient were implemented.

At the heart of this clinical transformation is the ability to provide exceptional care with limited resources. By leveraging technology and decision support software, Mercy is able to provide a clinical service at a scale that is 20 times as efficient as traditional ICU care with intensivists, and at the same time achieve clinical results that are better than most ICUs who have full-time intensivists programs and all ICUs without intensivists.

From this experience it became evident that centralized monitoring with video support, decision support software and data aggregation/analysis was a service model which:

- Provided a higher level of clinical quality
- Lowered cost through decreased utilization of services
- Benefited from scale – it is cheaper to buy the service from a large provider than it is to build the service
- Augmented care delivery in all aspects of the care model
  - High intensity in patient environments
  - Low intensity in patient environments
  - Ambulatory care
  - Post acute care
  - In the home (particularly with home monitoring)
- Could be a very profitable service providing clinical and cost value to health care providers at all levels

At the core of this delivery model is that telehealth, which has the potential to provide 24/7 access to care, apply standard of care models to all communities and do so in a cost-effective fashion. Telehealth, essentially by moving electrons instead of bodies, breaks down the traditional silos of medical care delivery, removing the tremendous variation in care delivery and cost.
Since the implementation and maturation of the eICU Mercy has developed a suite of services that expanded the original high intensity Safewatch model:

**Telestroke**
Delivered through the use of two-way video technology, the telestroke program connects stroke patients in seven Mercy communities with a board-certified neurologist who in conjunction with the local emergency physician, determines whether tPA should be administered to the patient. "Time is Brain" an adage that is widely accepted throughout the neurology community, and timely administration of “clot busting” medication has universally led to better outcomes and lower cost for patients experiencing this devastating event.

- Mercy increased its administration of tPA in six measured hospitals from 35 in 2011 to 127 in 2013

**Telesepsis**
Through the use of data aggregation, work flow changes and central monitoring, Mercy has created a “virtual” sepsis unit where all patients admitted to an inpatient facility are categorized by risk for sepsis and then followed for early changes indicating the onset of this severe condition. The result has been rewarding, with a decrease in morbidity and mortality for severe sepsis and septic shock by over 50% with an inherent positive impact on length of stay and cost. Mercy knows that a patient is septic in the emergency department before the physician does.
eSNF (Skilled Nursing Facilities)
Utilizing a portable telehealth unit, Mercy is applying its eICU technology to the SNF environment. This allows for physicians to remotely “lay eyes” on their patients preventing unnecessary trips to the emergency department. Long term it will also allow specialists to have follow-up visits with their patients without having to go through the transport issues that patients encounter today. The single largest cause of readmission is secondary infection regardless of the original discharge diagnosis. Utilizing the virtual sepsis program, Mercy will make an impact on readmission through the early identification and treatment of these patients within their recovery environment.

Health Manager Services (Centralized Case and Care Management)
Mercy has centralized its medical management services which represents the medical manager portion of virtual care. Using an integrated approach to medical management and leveraging home monitoring, telemedicine through the EHR and telephonic technology, the medical manager team has made a remarkable impact on utilization and clinical outcomes for a defined population through direct contracting. This department encompasses disease management, case management, Nurse on Call and utilization management.

- Decreasing heart failure readmission Rates 25% below the national mean
- Disease management has had a 24:1 PMPM payback for one customer
- 10% LOS reductions
- 109% improvement in diabetic control
- 27% increase in colorectal screening
- 11 to 15% increase in generic use and a 23% decrease in imaging of all types

SPARC (Centralized Event Monitoring)
Mercy has centralized its event monitoring capabilities, allowing monitoring alerts to be triaged by a single source, increasing the specificity of the alerts and removing the false positive alerts which were complicating nursing care on cardiac monitored floors. Essentially, nurses were receiving > 200 alerts a shift of which 95% were false positive. SPARC has decreased this to 4 to 8 per shift, allowing nurses to spend more time on patient care.

eAcute
Mercy has extended the eICU concept into its general medical surgical floors. The monitoring and video technology which has been developed between Mercy and Philips is much less expensive while retaining significant functionality. This will allow nurses to manage a larger population of patients as many of the patient needs can be handled via telehealth, including monitoring agitation (a multimillion dollar cost for medium to large facilities), medication compliance and care plan implementation/compliance. This will have significant impact on facilities that don’t have hospitalist programs and will allow for hospitalists to manage a larger patient population and essentially “visit” patients remotely.

Home Monitoring
Utilizing exceptionally versatile monitoring technology and central monitoring workflows, Mercy is now providing 24/7 monitoring of its most critically ill and highest risk ambulatory patients. When there are identified issues, Mercy is able to mobilize its care management team and/or notify the attending physician, depending on the care path workflow. As home technology continues to improve, the population being served will broaden.

Specialty Consultative Model
Through Mercy’s telehealth backbone, the health system has broadened the availability of specialty care to its communities in a number of areas including:

- Child psychiatry
- Pediatric asthma care
- Genetic counseling
- Perinatology
- Neurology (pediatric and adult)
- Cardiology
- Headache care
- Prenatal education
This has allowed patients to remain in their communities and still receive the specialty services needed. It also has allowed physicians to create outreach models in a much more efficient fashion.

**Store and Forward Images**
This is a well-known model within the health care industry, particularly with radiologic imaging to which Mercy has added:

- Pediatric EEGs
- Cardiac Echo's (pediatric and adult)
- EKGs
- Fetal ultrasounds

**eVisits through Mercy's PHR (electronic health record)**
Mercy has > 500,000 patients on the MyMercy platform which gives patients secure internet connectivity to their health care providers. They are able to remotely communicate with their provider teams with questions, make their own appointments, receive and store personal clinical information and receive clinical management for issues through e-visits.

**Telepharmacy**
Mercy is utilizing increased pharmacist capacity and redistributing pharmacists through telemedicine to facilities that cannot afford full time clinical pharmacists.

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### Mercy Telehealth Services Tomorrow

The list to the right represents the future of Mercy's telehealth program through the virtual care center and the Mercy telehealth team, we are evolving into the ambulatory and home space with the following programs.

**Primary Care on Demand**
Utilizing a combination of nurses, APNs and physicians, this service provides 24/7 coverage through telehealth or asynchronously through eVisits allowing for increased access, support of the primary care network and overall decrease in emergency and acute care visits.

**Emergency Department (ED) Support Model**
Moderate to small facilities, particularly in rural service areas, struggle with specialty support for their ED patients. This is particularly true with behavior health, neurology (including stroke), trauma, pediatrics and cardiology. Mobile carts with peripherals (including ultrasound) would be available in the ED. The clinical model would be similar to telestroke in that the specialist would be on call with the virtual call center acting as the triaging center and routing the video consultation to the appropriate specialist.

**Virtual Units**
By routing patient data to a central unit and screening for disease states, in conjunction with resulting clinical intervention workflows created, Mercy was able to significantly impact morbidity and mortality of severe sepsis and septic shock by an over 50% decrease. The number one cause for readmission from the SNF and home is infection. Placing all of these patients in a virtual unit could have a significant impact on readmissions as well. Further development of virtual units could entail COPD, clostridia prevention, anticoagulation and CHF. These units are not limited to the inpatient setting as they can easily be deployed in the outpatient, home and post acute care settings.

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### Future Services

- Primary Care on Demand
- Emergency Department Support Model
- Virtual Disease Units
- Specialty care on demand: the virtual medical group
- Mercy Prime
- Extensions of primary care
- e-Palliative care – e-Hospice
- “Snow bird” care (travel care)
- Case care management of the 5-10%
- “Fit bit” monitoring for the well
**Readmission Prevention**
The virtual units would assist in this, however, an intensive analytic review for the causes for readmission should be an ongoing evaluation, allowing for new programs to develop.

**Specialty Care on Demand**
This virtual medical group would allow patients to stay in their communities, particularly when follow-up visits occur or cognitive services are required. This would be particularly advantageous to those receiving rehab cares in a post acute setting.

**Mercy Prime**
An extension of the existing EHR would be on a subscription level, giving the patient more functionality including free e-visits, fast track scheduling and video/image transmission. This would particularly benefit the health system if patients were in a shared savings model and might be given to patients for free as a perk for enrolling these models.

**Extensions of Primary Care**
This is an entire primary care strategy but would be represented by utilizing advanced practitioners in worksites, convenient care clinics, schools and senior centers (including senior living centers). All of these “extensions” would be linked to a medical home and supported by telehealth in order to provide continuity of care and maintain the patient/physician relationship.

**“Snow Bird” Care (Travel Care)**
This service would allow for connectivity for those who spend extended periods of time away from their hometown. It would include connecting with the provider that they utilize in the secondary location and placing them on the telehealth network. A similar model could be extended to “travel care” allowing for the many patients who use cruise lines or co-workers of businesses that have multiple locations within the U.S. or globally.

**E-Palliative Care and e-hospice**
Bringing this specialty to more individuals and maintaining patients in their homes and communities as long as possible should decrease emergency and acute care visits. Because of their chronicity there may be some overlap between this program, case management and the virtual disease units. Some countries have initiated the “hospital in a home” model through traditional acute care models. Telehealth would significantly lower the costs of these models.

**Case Care Management of the 5-10%**
Through the use of analytics developed in virtual disease models, the care management team would be able to triage and assign case management to follow predicted high utilizers of virtual care. This would be utilized regardless of their payment incentives and would allow for the most efficient use of case management. Additionally these managers could make many of their “home visits” through telehealth further increasing their efficiencies.

**“Fit Bit” Monitoring for the Well**
This service would leverage “wearables for the well” to monitor and report on their health.

This essentially is the roadmap for virtual care based on the technology and the care information available today. However, this roadmap will change as technology changes. Bio-markers, implantable sensors, improvement in portability and sensitivity of technology will alter the trajectory and adoption of virtual care. The underlying foundation of the patient/provider relationship will remain, but the delivery model will change driven by economics and technology. It is Mercy’s intention to remain on the cutting edge of this disruptive evolution, allowing the mission of the Sisters, who were the original innovators, to continue into the next century.
Biographies

Thomas Hale, MD PhD is Executive Medical Director for Mercy’s Telehealth Services and Innovation, a position he assumed in June 2009.

In this role, Dr. Hale is leading the development of new ways to effectively and efficiently deliver health care to Mercy communities, large and small. This new care model combines people and technology to extend Mercy’s reach and services beyond the walls of doctors’ offices, hospital campuses and other traditional facilities.

Under the leadership of telehealth services Mercy has established increased access to primary and specialty care allowing patients to receive their health care in their local communities. Utilizing this new model of care delivery Mercy has stabilized the health in local communities at a time when many community health facilities have closed removing access to healthcare for the community residents.

Prior to being named to his current position, Dr. Hale maintained a patient practice for 23 years and served as president of Mercy Medical Group for 15 years. He and other area physicians established this integrated primary care group in association with Mercy in 1994. In 2009 Mercy Medical Group was named the 2nd most successful integrated physician group behind the Geisinger Clinic. Today, this group is part of Mercy Clinic that includes 1,900 Mercy primary and specialty care physicians who serve patients across four states.

Dr. Hale served as the physician leader for mercy’s implementation of a fully integrated electronic health record system covering more than 30 hospitals and 600 ambulatory sites.

Presently Mercy telehealth services is building the infrastructure and business case for Mercy’s Virtual Care center which is anticipated to begin operations in January of 2014. The world’s first virtual care center will open in May of 2015.

Dr. Hale holds a Ph.D. in pharmacology from Saint Louis University. He attended the University of Missouri-Columbia Medical School. He completed his internal medicine internship and residency at Mercy Hospital St. Louis. In 2011, he earned a Master’s degree in medical informatics from Northwestern University.

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Alan Scarrow, MD, JD is the President of Mercy Clinic in the Springfield Communities. Dr. Scarrow, a neurosurgeon, has practiced at Mercy for ten years and has served in various leadership roles including: Chairman of Neurosurgery Section, Chairman of Neuroscience Operating Group, Medical Director of Mercy’s Radiosurgery Center, and Medical Director of Mercy Spine Center.

Dr. Scarrow received his medical education from Case Western Reserve University School of Medicine, Cleveland, Ohio. He also holds a Doctor of Jurisprudence (JD) from Case Western Reserve University School of Law and a Bachelor of Science Degree in Electrical Engineering from the University of Nebraska.

He completed his Neurosurgery Residency in 2003 at the University of Pittsburgh after doing a Surgical Internship at University Hospitals of Cleveland. In addition, he completed a one year Congress of Neurological Surgeons (CNS) Public Policy Fellowship in Washington D.C. He has served on the Executive Committee of the CNS since 2005 and is currently the organization’s Secretary.

Dr. Scarrow and his wife Meera, an OB/GYN at Mercy Springfield, have three children and enjoy spending their free time on their organic farm.

About Mercy’s Clinic, North Central Community

Mercy Clinic’s are a physician led medical group of approximately 550 physicians and 150 mid-level providers practicing in 42 communities in a 25,000 square mile area in Missouri, Arkansas and Kansas. This includes over 200 clinical offices in 68 facilities. Mercy Clinic has close to an equal number of primary care and specialty physicians covering all major specialties with emphasis on cardiology, pediatric subspecialties, orthopedics/sports medicine, urology, neurosurgery, oncology and radiology. Mercy Clinic is nationally respected as a Top Ten Clinic in patient satisfaction and is part of Mercy Health System which is recognized as one of the Top Integrated Health Systems in the country.