Nebraska Hospital's Quality Improvement

"Quest for Excellence" Award

Alegent Health

12809 West Dodge Road

Omaha, Nebraska 68154

The Implementation of eFocus (eICU®):

Harnessing Technology to Improve the Care and Safety of ICU Patients

Criteria 1 – Leadership/Planning/Human Resources

Criteria 2 – Patient and/or Community Focus

Criteria 3 – Process Management/Organizational Performance Results

Angela Ward, Quality and Ancillary Services Executive

Angela.Ward@alegent.org

(402) 715-4760 (Office)

(402) 715-4818 (Fax)

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Alegent Health (AH) is the largest not-for-profit, faith-based healthcare system in Nebraska and southwestern Iowa with nine acute care hospitals, more than 100 sites of service, over 1300 physicians on its medical staff and more than 9000 employees. AH is making healthcare better with an exceptional commitment to quality and by providing patient focused care for the body, mind, and spirit of every person. AH is sponsored by Catholic Health Initiatives and Immanuel Health Systems.

AH made a strong commitment to quality which was solidified with the bold and visionary strategic plan unveiled in March, 2005 under the leadership of Wayne Sensor, CEO of AH. It is with this plan – the Quality Revolution – that AH has impacted the quality of health care, set itself apart as a leader and has reached new levels of service. At the heart of that strategic plan is a bold Vision statement that raises the bar to: *Achieve world-class leadership in compassionate, faith-based health services that measurably enriches the lives of families we serve through an exceptional commitment to quality.* This intense commitment to quality and focus on the strategic priorities has led AH to look for innovative ways to deliver healthcare that is safe, timely, efficient, effective, equitable, and patient centered.

With the Vision statement as its guiding principle AH has risen to the challenge of being an innovation leader in changing the delivery of health care. Redesigning systems to achieve long-term sustainability depends on the ability to optimize the capabilities of all members of the health care team, capitalize on information technology, integrate clinical decision making support tools, and rebuild processes of clinical care delivery. Historically, care delivery, information management, and decision making were bedside activities. However, with the complexity of care increasing and the proportional numbers of clinicians decreasing-in critical physician areas, nursing, and pharmacy-the quality of care over time will continue to erode

unless health care delivery is redesigned. This realization is what led AH to embark on the project that will be discussed here, **The Implementation of eFocus (eICU®): Harnessing Technology to Improve the Care and Safety of ICU Patients.**

AH is the first health care system in the area to employ eICU® technology, which works through sophisticated telemedicine technology, early warning software and electronic monitoring to connect the off-site eFocus Monitoring Center (eICU®) directly to the ICU bedside team. This was approved as a 3 phase project with multiple stages to each phase. Phase one is the implementation of eFocus at the 5 metro campuses which is the part of the project that will be highlighted in this application. Phase two is implementation of the ePharmacy which centralizes IV services for the 5 metro hospitals along with implementation of eFocus at the regional hospitals, and Phase 3 is bringing the eHospital strategy to the Critical Access Hospitals (CAH).

Overview: AH recognized that the ideal state was to have intensivist led care in all ICUs. AH implemented on-site intensivist coverage 24/7 of 48 beds at Immanuel Medical Center and Bergan Mercy Medical Center . Given the # of intensivists within the group they were only able to staff the two facilities leaving the other campuses without coverage. There are 86 ICU beds in the metro facilities and > 90 ICU beds in the system, which meant almost one half of these beds were without intensivist coverage. This represented an unsatisfactory gap in the delivery of care to these ICU patients and AH went in search of a way to eliminate this gap.

Unfortunately, there is a severe shortage of intensivists. They are physicians with advanced certification training and experience in critical care who have typically completed a fellowship in critical care after serving a residency in internal medicine, pulmonary medicine anesthesia, or surgery. Less than 6,000 are actively practicing in the United States, leaving less than 15% of ICUs in the U.S. receiving dedicated intensivist care. With the aging population, it is expected

that we will experience a greater strain on resources in the future. Remote intensivist management was validated for feasibility and effectiveness in numerous studies showing that intensivist involvement in the care of ICU patients leads to double-digit improvement in patient outcomes (see supplemental pages). The numbers are pretty astounding. The impact these types of outcomes could make for AH and its patients made it a win-win situation to pursue.

Benefits for AH patients mean that every ICU bed in the system would have intensivist coverage increasing the likelihood that patient outcomes would be positive and safe. Benefits to AH are many fold. Reduction in length of stay means increased bed turnover and potential revenue gains. Decreased mortality is a significant statistical marker for world class care which supports the AH Vision. Harnessing technology to improve the care and safety of AH patients is exciting, particularly when AH knows it will help save lives and quickly return people to health.

The implementation of eFocus impacts not only patient outcomes and resource management of AH, but the intensivists, nurses, families, and communities are all stakeholders in this project. As alluded to earlier AH is in the process of implementing an ePharmacy which will centralize the IV functions of the system. This will free up the on-site pharmacists to assist nursing in the medication reconciliation process, adding a layer of safety for AH patients, and giving nursing more time at the bedside. The ePharmacy will also provide pharmacist coverage for the regionals and CAHs which at this time rely heavily on the retail pharmacist in the community.

The affect of this project on stakeholders is immense. Intensivists can now cover all metro AH facilities 24/7. A doctor could be at Lakeside Hospital and another patient that he saw earlier at Bergan Mercy Medical Center may be unstable and require an intervention. While he's rounding at Lakeside the physician at eFocus can interact instantly with the bedside team at Bergan Mercy and intervene, potentially saving a life.

Families also appreciate the assurance that eFocus provides them – knowing that their loved one is being monitored 24/7 by a team of highly skilled, board-certified, critical care physicians, and experienced critical care nurses. When a patient is admitted into the ICU, the patient data is entered into the system including admitting diagnosis, level of illness and care plan. The eFocus care team then watches each patient's vital signs and clinical results on computer monitors connected via secure data lines to allow early intervention when required. Two way communication and a special high resolution camera and video screen in each ICU room allow the eFocus team to see and interact with patients, the ICU staff, and families. This real-time interaction between both care teams allows the staff to collaborate and develop the best treatment plan, and the families feel empowered by being involved in the decision making process. The ability to interact with the eFocus team has also alleviated the bedside staff's perception of "being watched" to a real patient-focused teamwork atmosphere that is HIPAA[1] compliant.

The eFocus nurses have a global perspective, separate from bedside distractions, that allows them to quickly and objectively identify changes in the condition of the patient. eFocus is staffed with seasoned nurses who work rotating shifts between the hospital ICUs and the eFocus facility. They are able to expand their careers in a less physically taxing environment, yet utilize their skills to support graduate nurses with their expertise and critical thinking skills that have been sharpened through years of critical care experience. If a patient crashes, these experienced nurses jointly assist the bedside staff, instantaneously deploying some of the system's best resources. The high resolution cameras utilized by eFocus can be remotely controlled to focus on any aspect in the room. If there are questions or concerns the eFocus nurses can check in and see if the visual assessment matches what the data is telling them. The ICU nurse can communicate to the eFocus staff to monitor their other patients if necessary.

[1] HIPAA: Healthcare Insurance Portability and Accountability Act

With the expansion of eFocus and ePharmacy to the regional hospitals and CAHs, the return on investment (ROI) for those communities is expected to be huge. Not only will it add an extra layer of assurance for patients and families it is expected to be economically advantageous for the communities. The CAH facilities will be able to admit higher risk patients instead of transporting them to another facility for a higher level of care. AH expects to see a decrease in mortality rates and an increase in best practice outcomes with early diagnoses and interventions from intensivists monitoring patients around the clock. Surgeons will feel more comfortable with the resources available in these smaller facilities, and the expectation is that they will perform a wider range of procedures there, keeping both the patient and the financial impact of that care in the community.

Methods: There has been discussion in the overview about how the Mission, Vision, and Quality Revolution drive the successes at AH through leadership and an intense focus on quality, and how this project affects AH patients and the communities it serves. The other categories of criteria that this application has to address should be evident as the method that was utilized to implement this project is described and results are shown. Planning and leadership were key components to the success of this project. Initially a project plan was developed. A Steering Committee was formed with stakeholders from all campuses, IT, nursing and physician representation, and VISICU representatives. Involving representatives and leadership from all campuses allowed the establishment of buy-in across the organization for a project of this scope. From the beginning there was support for the program from senior management with Dr. Fred Hosler, Chief Medical Officer and Senior Vice President of AH, leading the Steering Committee. He was the Senior Initiating Sponsor as well as Chairman of the eFocus Steering Committee. Dr. Guillermo Huerta, Medical Director of the eFocus Program has also been key to its success.

A Core Planning and Implementation Team was created with accountability for evaluating and monitoring the project scope, removing obstacles, reporting to governing bodies, providing work team tools, facilitating work teams, maintaining a motivating environment, and escalating decisions up the governance structure. Six work-teams, each having a chair and special focus, were developed which reported to this team. They focused on issues related to Building Coordination, Communications, Technology, Interface, Clinical Process, and Education and Training (see supporting documents).

On Nov. 29th, 2006, VISICU, Inc. and AH publicly announced plans to implement VISICU's eICU® Program in the summer of 2007 as part of AH's ongoing quality initiative. The timeline for the project was approximately eight months. By the time this announcement was made several steps had already been completed: initial project plan completion, the development of eFocus work teams, the purchase of equipment, and the determination of a site for the eFocus facility at 169th and Frances Street, in close proximity to Lakeside Hospital.

A Clinical Process Design Decision Accelerator (DA) was held in early March, 07. Its main intent was to discuss current processes within the ICUs and to then develop future processes for eFocus. Just briefly, a DA is a process modeled after similar processes in companies leading the world in new ideas. It engages stakeholders, encourages collaboration, and establishes roadmaps in a short time frame of 1-3 days. Stakeholders immerse themselves in the topic and engage in innovative thinking and consensus building in a facility dedicated specifically to support that process. Front line staff is included to ascertain the current processes directly from them, instead of only an administrative perspective. Their opinions are invaluable in designing new processes and critically evaluating existing ones. AH leadership recognizes this and positively supports ongoing participation so schedules and staffing are arranged to accommodate front line

participation. The DA proved to be an invaluable step in the process because there was a realization by all involved that "critical care is critical care". No matter the nuances of each facility in the system one common workflow can be developed.

As the project progressed Human Resources was called upon to assist with their expertise on staffing eFocus. A job description for the eFocus Operations Director and nursing positions were drafted and posted. A staffing model from VISICU which called for 12 physicians and 9 nursing FTEs to fully staff the eFocus Monitoring Facility was used as a guide. Two full-time nursing positions were posted both internally and externally. Additionally, 2.3 part-time and 2.6 part-time nursing FTEs were posted internally. The part-time positions were expected to rotate between eFocus and the campus ICUs, and approximately 50% of the staff works rotating shifts. The intensivist physician group at the time had 9 physicians and Dr. Huerta, the eFocus Medical Director, planned to add a 10^{th} physician to ideally cover all shifts. eFocus gained respect and credibility quickly because AH chose to build upon previously established relationships by hiring a mix of familiar nurses and a well-respected physician team – an invaluable decision.

Risks for the project at this time were related to the staffing availability of both physicians and nurses, being fully staffed by June/July of 2007, and building completion. AH initially learned that the building process could be held up by the city for up to six weeks subject to review of the space plans; however, the architect felt that was probably an overstatement, so AH continued on with initiating ICU room equipment installations, and loading of the eCareManager™ Software from VISICU.

The eCareManager™ system responds to all of the challenges put forth by the Institute of Medicine (IOM) which has been at the forefront of highlighting medical errors and quality of care problems, and calling for health system redesign. The IOM noted six challenges of redesign

imperatives in the health system and the VISICU system is uniquely suited to answer that call by enabling the continuous review of patient information by the eICU® staff and providing consistent clinical oversight that is remarkably absent from most of the health care system.

Progression was on schedule and eFocus was first launched in July 2007 at Bergan Mercy and Immanuel Medical Centers 48-ICU beds. Initially the campus ICU nurses were somewhat apprehensive about having someone "looking over their shoulder" but these issues resolved themselves as they realized the benefit of having that additional support. The second stage of the implementation occurred at Lakeside and Midlands Hospital in the fall of 2007 adding an additional 20 beds to the eICU® monitoring capability. The third stage of this project implementation occurred in January, 2008 when this new state-of-the-art technology went live at Mercy Hospital in Council Bluffs, Iowa. With the additional 18 beds the staff at eFocus was monitoring a total of 86 beds, **almost double** what the intensivists were previously able to cover.

The 2nd and 3rd phase of this evolving project are in the works. Construction has begun for the ePharmacy, a grant proposal has been submitted for federal funds to supplement monies contributed by AH and the regional facilities for implementation of the eFocus Program, and communication has begun to bring the eHospital strategy to the CAH hospitals. In this model we can bring the expert services of the AH eHospital Hub intensivists, pharmacists, and critical care nurses-who are trained to diagnose, treat, and manage trauma and critically ill patients-to patients and medical professionals at six CAH fixed-site end-users. This model makes first class pharmacy, emergency, and critical healthcare available to thousands of Iowa and Nebraska rural residents who utilize the medical services of CAHs that currently average only 18% pharmacist coverage and that have no ICU facilities or on-staff critical care personnel.

The success of this eFocus Program implementation is measured by the indicators of ICU

mortality and length of stay (LOS), and hospital mortality and LOS. The eCareManager™ system stores data in a relational database and reports can be distributed that include AH data alone, or AH data compared against the other facilities in the database. The system also shows risk adjusted data which calculates the predicted LOS and mortality against the actual data for low, medium, and high risk patients. The APACHE IV algorithms are used to define the predicted mortality risk for individual ICU patients using chronic health status information, severity of illness on ICU admission, age, prior length of stay, and ICU admission diagnosis. APACHE is a registered trademark of Cerner Corporation.

Results: The supplemental pages show AH results and the phenomenal progress that has been made in the short time since the implementation of eFocus. AH expected to achieve similar results as published studies (a 20-27% decrease in mortality). AH is meeting and exceeding the bar, and has almost doubled intensivist coverage for its ICUs (see supplemental pages).

Lessons Learned: The initial cost of this implementation would be a barrier for many organizations, and it has slowed down the ability for AH to expand eFocus and ePharmacy to the regional facilities. Other barriers encountered were: building issues, overcoming the perception that each facility needed its own workflow, staffing issues-both physician and nursing, and the nurses' perception that "big brother" was watching. Initially the short timeline for the project was thought to be a barrier and it turned out to be an asset. The team remained focused and it capitalized on the momentum that was created.

Changes that would be implemented if doing again: lease/buy more building space for expansion, implement Soarian Critical Care before eFocus-not simultaneously, have a more robust recruitment strategy for both nurses and physicians, and gather APACHE baseline data sooner.

Things that would definitely be done again are: the DA process, the additional $200,000 to purchase 2-way video to create an interactive environment that dispelled the "big brother" issue, hiring an Operations Director (OD) and Medical Director from inside the system for credibility, and implementing at the larger facilities first so that problems can be identified early.

AH has the capability to temporarily transform any site with network connectivity into a critical care location by using the eCareMobile™ unit which is a mobile version of the eCareManager™ System. The device incorporates eCareManager™ remote care tools (eLert™ button, microphone, speakers, and camera) and a laptop that provides full access to eCareManager™ patient care tools on an Ergotron mobile cart with a rechargeable battery. This option would be available in the case of a disaster and/or a large influx of critical patients.

Critical care is a complex, non-linear system. As such, it requires systematic redundancy, and rapid and effective feedback control which eCareManager™ and the eICU® model provide. Application of these principles to the critical care model is necessary to reduce medical errors and provide the kind of patient safety that is needed. Our previous model of ICU care was unsustainable and it created two distinct levels of care - a level with intensivist led care, and a level without or with limited intensivist care. The eICU® model for ICU care allows for better use of valuable resources – more bed coverage with fewer intensivists, and expansion of the careers of experienced ICU nurses. A system wide critical care committee has been established to oversee the evolution and expansion of the technology and process for future sustainability. This project is expected to pay for itself by decreasing mortality and length of stay which in turn will increase bed turnover and generate revenue. It is offsetting fixed cost by utilizing core people to monitor Alegent's own facilities. The capability of taking this program outside of Alegent Health and to generate future revenue also exists.

CAP GEMINI ERNST & YOUNG

EXECUTIVE SUMMARY
Cap Gemini Ernst & Young Analysis of the VISICU eVantage™ Program at Sentara Healthcare

Cap Gemini Ernst & Young performed a detailed analysis of the clinical and financial performance of the two Sentara Norfolk General Hospital (SNGH) ICUs implementing the VISICU eVantage™ system. The study covered more than 600 patients discharged from SNGH during the first half of 2001, with outcomes compared to those for the 12 months prior to program implementation. The GICU is a 10-bed general medical ICU and the VICU is a 6-bed surgical ICU, predominantly occupied by vascular surgery patients.

MAJOR CLINICAL RESULTS OF THE PROGRAM INCLUDE:

- 25% reduction in hospital mortality rate for the ICU population
- 17% decrease in both ICU and floor length of stay (LOS)
- No change in severity of illness, as assessed using the APACHE™ scoring system (Apache Medical, McLean, VA)
- 20% increase in ICU cases as a result of capacity created by shortening ICU LOS

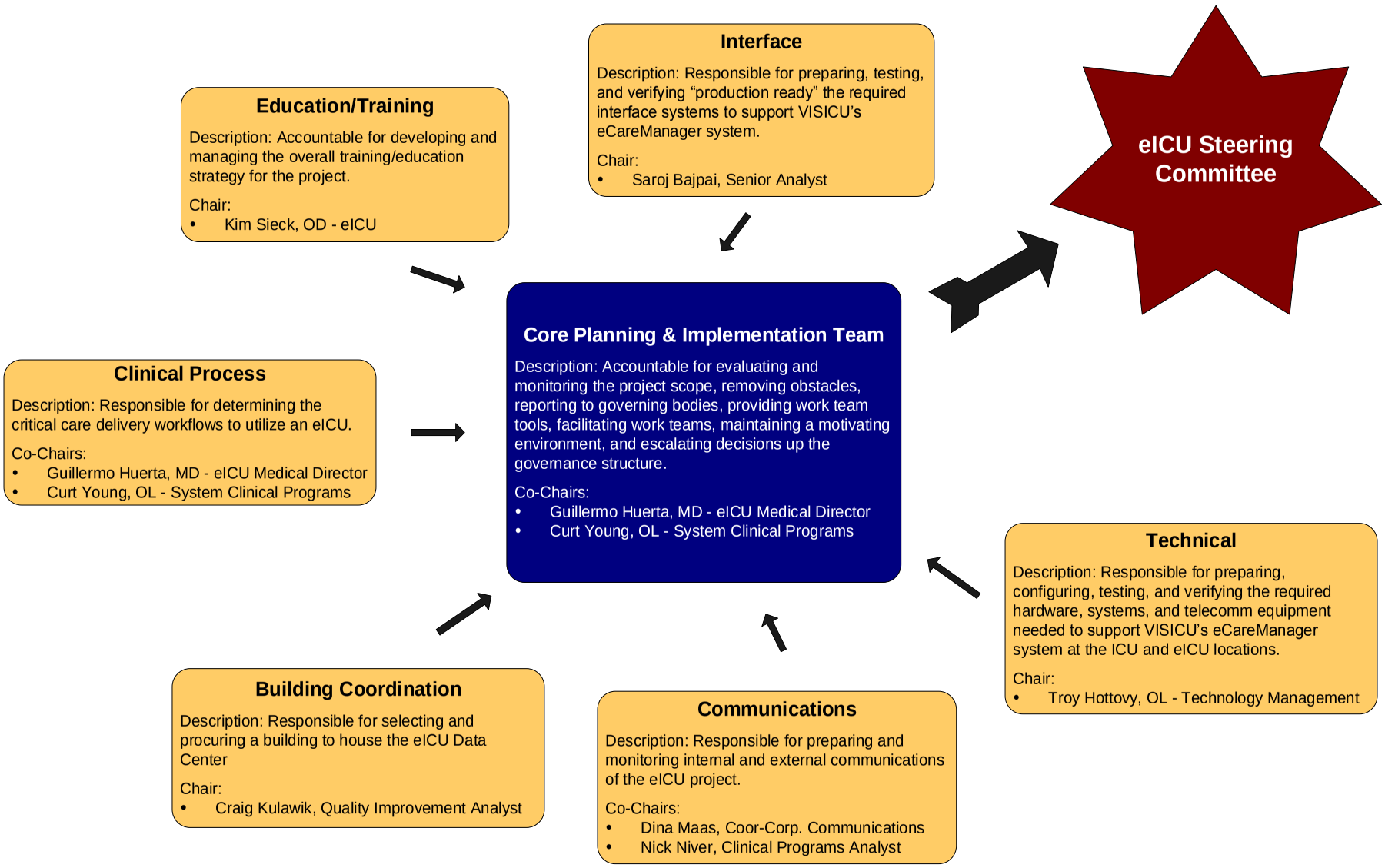
	Hospital Mortality	ICU LOS	Floor LOS	Increase in ICU Patients
GICU	-28%	-16%	-9%	+19%
VICU	-21%	-17%	-24%	+21%

MAJOR FINANCIAL FINDINGS INCLUDE:

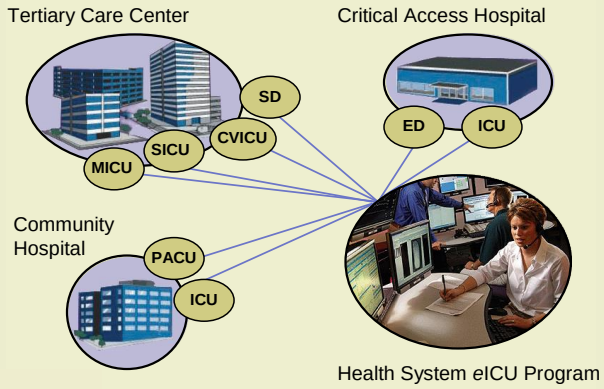
- 26% reduction in hospital costs for ICU patients, resulting from
  - 17% decrease in LOS (both ICU and floor)
  - 15% decrease in daily costs of ICU care, attributable to:
    - 4% decrease in nursing worked hours per patient day
    - 18% decrease in ancillary costs (pharmacy, supplies, therapies, labs, etc.)
- $2,150 per patient financial benefit attributable to lower costs, after adjusting for revenue loss in 'fee-for-service' and 'per-diem' patients
- $460,000 increase in gross monthly revenue due to additional ICU cases. This generated $274,000 margin contribution, monthly
- ***$3,000,000 annualized net financial benefit for the 2 ICUs (16 beds) after subtracting all program costs***

	Per-case Net Savings Attributable to LOS Reduction	Per-case Net Savings Attributable to Daily Cost Reduction	Total Per-case Savings	Annualized Contribution from New Cases*
GICU	$750	$1,030	$1,780	$820,000
VICU	$1,900	$650	$2,555	$820,000

* $820,000 represents a 50% reduction of actual contribution margin to account for likely accommodation of some new cases if capacity not created. Contribution = incremental revenue minus variable costs.


Education/Training
Description: Accountable for developing and managing the overall training/education strategy for the project.
Chair:
• Kim Sieck, OD - eICU
Interface
Description: Responsible for preparing, testing, and verifying "production ready" the required interface systems to support VISICU's eCareManager system.
Chair:
• Saroj Bajpai, Senior Analyst
eICU Steering Committee
Clinical Process
Description: Responsible for determining the critical care delivery workflows to utilize an eICU.
Co-Chairs:
• Guillermo Huerta, MD - eICU Medical Director
• Curt Young, OL - System Clinical Programs
Core Planning & Implementation Team
Description: Accountable for evaluating and monitoring the project scope, removing obstacles, reporting to governing bodies, providing work team tools, facilitating work teams, maintaining a motivating environment, and escalating decisions up the governance structure.
Co-Chairs:
• Guillermo Huerta, MD - eICU Medical Director
• Curt Young, OL - System Clinical Programs
Technical
Description: Responsible for preparing, configuring, testing, and verifying the required hardware, systems, and telecomm equipment needed to support VISICU's eCareManager system at the ICU and eICU locations.
Chair:
• Troy Hottovy, OL - Technology Management
Building Coordination
Description: Responsible for selecting and procuring a building to house the eICU Data Center
Chair:
• Craig Kulawik, Quality Improvement Analyst
Communications
Description: Responsible for preparing and monitoring internal and external communications of the eICU project.
Co-Chairs:
• Dina Maas, Coor-Corp. Communications
• Nick Niver, Clinical Programs Analyst

*e*ICU® Program – A New Model of Care



Virtual Presence

*e*CareManager™ System

Virtual Presence & Population Management

Multi-Professional Coordination

Smart Alert® Prompts

Standardizing Care

eFocus is the strategy of using the eICU® technology that is provided to Alegent Health by the vendor VISICU. It is the Alegent Health name and trademark for the program.

Alegent Health is looking at the concept of an eHospital (virtual hospital) which would include the eICU®, ePharmacy, eInfection Control, eResearch, eTelemetry, and eCase Management.

eICU® Services

- 24/7 Intensivist and Critical Care nursing monitoring and consultation
- Automated clinical decision support
- Alerts identifying at-risk patients
- Goal setting for high-risk populations
- Best practices and evidence based recommendations

ePharmacy Services

- Order verification
- Automated drug dispensing machines
- Clinical decision support
- Pharmacokinetics
- Virtual P&T Committee

eInfection Control Services

- Identification of patients at-risk for hospital associated infections
- Antibiotic sensitivity surveillance
- Detection of infection clusters and outbreaks

eCase Management Services

- Daily multidisciplinary rounds
- Patient placement

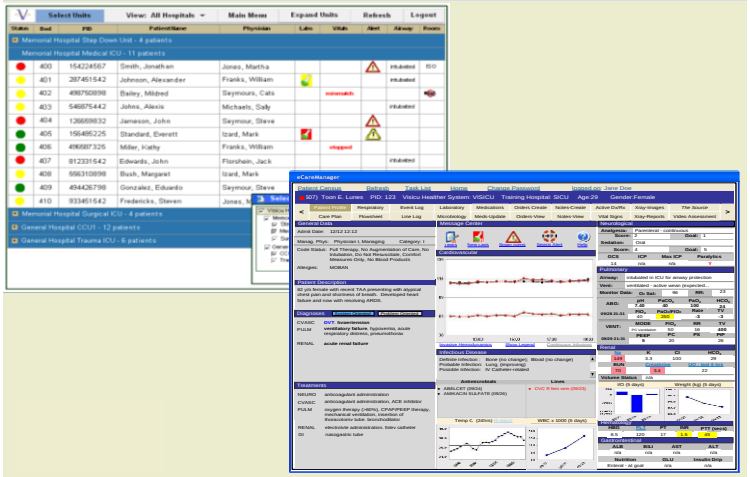
eResearch Services

- Screen for protocol inclusions

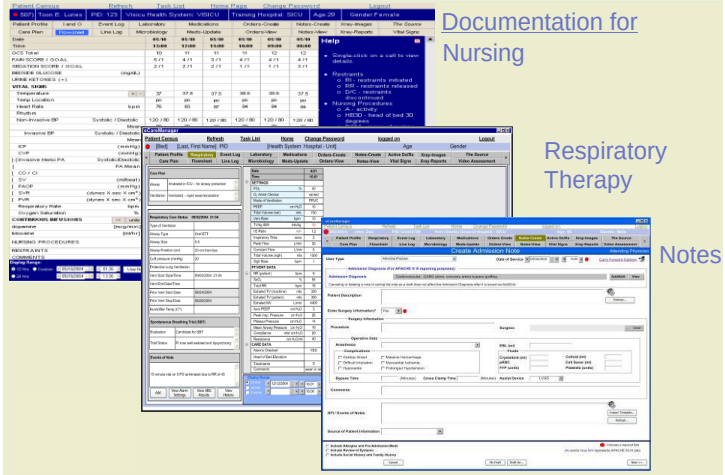
eTelemetry Services

- To be determined

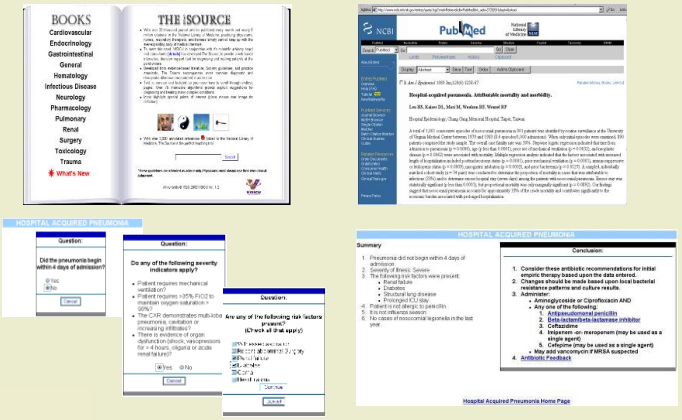
Population Management – Data Synthesis



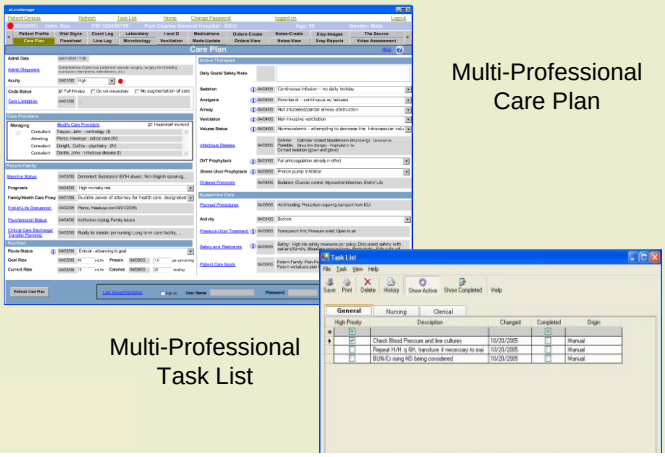
Multi-Professional Coordination



Standardizing Care - The Source

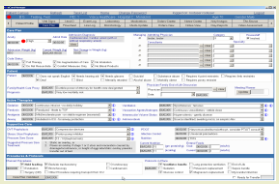


Multi-Professional Coordination



Hardwiring Standards into Daily Care

Care Planning & Coordination

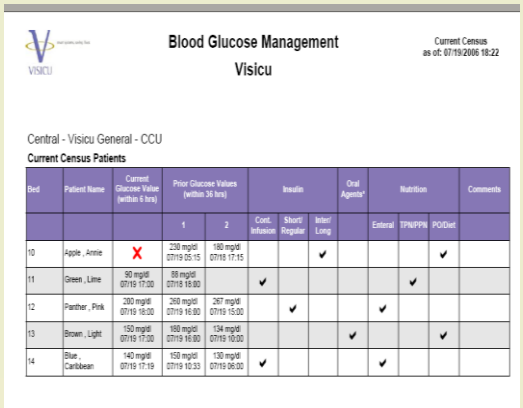


Daily Management

Smart Alert® Prompts

The Source - Decision Support

Standardizing Care - Daily Management



Bed	Patient Name	Current Glucose Value (within 6 hrs)	Prior Glucose Values (within 36 hrs)		Insulin			Oral Agents*	Nutrition			Comments
			1	2	Cont. Infusion	Short/ Regular	Inter/ Long		Enteral	TPN/PPN	PO/Diet	
10	Apple , Annie	X	230 mg/dl 07/19 05:15	180 mg/dl 07/18 17:15			✔				✔	
11	Green , Lime	90 mg/dl 07/19 17:00	88 mg/dl 07/18 18:00		✔					✔		
12	Panther , Pink	280 mg/dl 07/19 18:00	260 mg/dl 07/19 16:00	267 mg/dl 07/19 15:00		✔			✔			
13	Brown , Light	150 mg/dl 07/19 17:00	160 mg/dl 07/19 16:00	134 mg/dl 07/19 10:00			✔				✔	
14	Blue , Caribbean	140 mg/dl 07/19 17:19	150 mg/dl 07/19 10:33	130 mg/dl 07/19 06:00	✔				✔			

eCareManager™ Tools for Success

Comparsion of Q3 2007 Data Across Campuses

Measure	BMMC	IMC	LKS	MDL	Mercy	System
ICU LOS (Days)						
Actual LOS	3.83	3.34	1.57	0.92		3.03
Predicted LOS	4.3	5	3.93	4.56		4.48
Ratio	0.89	0.67	0.4	0.2		0.68
Low Risk Ratio	0.7	0.55	0.31	0.27		0.68
Med. Risk Ratio	1.05	0.76	0.58	0.81		0.66
High Risk Ratio	0.5	1.02	0	0		0.45
ICU Mortality						
Actual Deaths	5 (3.6%)	7 (5.2%)	0 (0.0%)	0 (0.0%)		50 (5.1%)
Predicted Deaths	8.6 (6.3%)	11.6 (8.6%)	0.5 (4.7%)	0.6 (10.0%)		68.3 (7.0%)
Ratio	0.58	0.61	0	0		0.73
Hospital LOS (Days)						
Actual LOS	9.17	7.66	2.93	3.95		7.63
Predicted LOS	10.95	11.48	8.9	12.82		10.26
Ratio	0.84	0.67	0.33	0.31		0.74
Hospital Mortality						
Actual Deaths	12 (9.0%)	9 (6.9%)	1 (9.1%)	1 (16.7%)		90 (9.8%)
Predicted Deaths	14.9 (11.1%)	20.5 (15.7%)	1.0 (9.4%)	1.3 (22.3%)		116.5 (12.6%)
Ratio	0.8	0.44	0.97	0.75		0.77
Low Risk Ratio	0.39	0.31	0	0		0.56
Med. Risk Ratio	0.93	0.44	1.52	0.81		0.78
High Risk Ratio	0	0.53	0	0		0.98
Ventilator Days						
Actual Average Vent Days	3.58	3.87	1.63	0.64		3.82
Average Predicted Vent Days	2.53	3.96	2.31	2.04		3.3
Ratio	1.42	0.98	0.71	0.31		1.16

Comparsion of Q4 2007 Data Across Campuses

Measure	BMMC	IMC	LKS	MDL	Mercy	System
ICU LOS (Days)						
Actual LOS	3.08	3.75	2.75	2.05		3.03
Predicted LOS	4.39	5.14	4.09	4.12		4.48
Ratio	0.7	0.73	0.67	0.5		0.68
Low Risk Ratio	0.73	0.79	0.67	0.44		0.68
Med. Risk Ratio	0.66	0.69	0.64	2.92		0.66
High Risk Ratio	1.25	0.39	0.34	0.09		0.45
ICU Mortality						
Actual Deaths	22 (6.5%)	17 (6.3%)	9 (3.9%)	2 (1.4%)		50 (5.1%)
Predicted Deaths	19.7 (5.8%)	28.3 (10.4%)	11.9 (5.2%)	8.5 (6.0%)		68.3 (7.0%)
Ratio	1.12	0.6	0.76	0.24		0.73
Hospital LOS (Days)						
Actual LOS	8.68	9.28	5.83	5.1		7.63
Predicted LOS	10.76	11.68	8.73	9.04		10.26
Ratio	0.81	0.79	0.67	0.56		0.74
Hospital Mortality						
Actual Deaths	36 (11.1%)	30 (12.1%)	15 (7.1%)	9 (6.4%)		90 (9.8%)
Predicted Deaths	36.4 (11.3%)	40.8 (16.5%)	22.3 (10.5%)	17.1 (12.2%)		116.5 (12.6%)
Ratio	0.99	0.74	0.67	0.53		0.77
Low Risk Ratio	0.65	0.4	0.81	0.27		0.56
Med. Risk Ratio	1.07	0.76	0.55	0.45		0.78
High Risk Ratio	1.16	0.84	1.12	1.34		0.98
Ventilator Days						
Actual Average Vent Days	3.37	4.78	3.37	2.96		3.82
Average Predicted Vent Days	2.75	3.91	3.31	3.43		3.3
Ratio	1.23	1.22	1.02	0.86		1.16