<table>
<thead>
<tr>
<th>Service</th>
<th>2012</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital Admissions</td>
<td>19,753</td>
<td>18,897</td>
</tr>
<tr>
<td>Hospital, Behavioral Health &amp; Rehabilitation Inpatient Days</td>
<td>92,742</td>
<td>87,542</td>
</tr>
<tr>
<td>Visits to Emergency Department</td>
<td>49,718</td>
<td>48,709</td>
</tr>
<tr>
<td>Surgery Cases</td>
<td>7,150</td>
<td>6,939</td>
</tr>
<tr>
<td>Baby Deliveries</td>
<td>2,328</td>
<td>2,231</td>
</tr>
<tr>
<td>Hospital Beds</td>
<td>417</td>
<td>417</td>
</tr>
<tr>
<td>Long-term Care Resident Beds</td>
<td>48</td>
<td>48</td>
</tr>
</tbody>
</table>
• Clinic Visits Performed per Year: 23,000
• Diagnostic Angiograms: 1,600
• PCI: 720 (778 DES, 247 BMS)
• CV Surgery: 325
• Carotid Artery Stents: 85
• Peripheral Interventions: 220
• Implantable Defibrillators: 175
FACILITY STATISTICS

- SIXTY-FIVE PRIMARY PCIs FOR STEMI IN 2014
- ONE HUNDRED TRANSFER STEMIs IN 2014
- FIVE INTERVENTIONAL CARDIOLOGISTS
- BACK TO BACK PLATINUM AWARDS FROM THE ACTION REGISTRY
- SILVER AWARD FROM MISSION LIFELINE IN 2013
- TWO STATE OF THE ART CATHETERIZATION LABS AND A NEW HYBRID LAB FOR TAVR AND CABG/STENT CASES, ENDOGRAFTS ETC
13 Member Cardiology Practice / 8 Mid-Level Practitioners:

- Interventional Cardiology
- Electrophysiology
- CV Surgery
- Peripheral Vascular
- Endovascular
- Nuclear Diagnostic Lab
- Peripheral Diagnostic Lab
SOUTH DAKOTA MISSION LIFELINE

- BEGAN IN 2010
- Leona M. and Harry B. Helmsley Charitable Trust
- Statewide STEMI Protocol
- 7 PCI PERFORMING HOSPITALS IN STATE
CHALLENGES

- NOT UNIQUE TO SD
- SOUTH DAKOTA IS A LARGE STATE WITH FEW PEOPLE (POP. DENSITY 11 people/sq.mile)
- THERE ARE TWO LARGE POPULATION CENTERS SEPARATED BY 350 MILES
- MANY HOSPITALS IN BETWEEN DID NOT FARE WELL IN THE 1970’s
- MANY ARE NOW JUST ED TYPE FACILITIES WITH LIMITED RESOURCES
CHALLENGES

- 85% OF SD 132 AMBULANCE SERVICES ARE VOLUNTEER STAFFED
- ONLY 13% OF 52 HOSPITALS PERFORM PCI
- TRANSPORT DISTANCES CAN EXCEED 150 MILES
- STEMI IS ON THE INCREASE AS THE POPULATION AGES
- DUE TO THE RURAL NATURE OF SD IT IS A LARGELY FIBRINOLYTIC STATE (41% vrs 6% nationwide)
- TIMELY TRANSPORTATION TO A PCI CENTER IS PARAMOUNT (90% received fibrinolytics)
SIMILARITIES

- Nebraska is a large state with 77,354 square miles.
- Large population centers are all in the east.
- 1,200,000 people live east of Grand Island, with 680,000 in the west.
- Large spaces in the west with declining and aging population.
- Largely like SD, it is a fibrinolytic state (in the west).
- Transportation to a PCI center can be geographically and climatically challenging.
MISSION LIFELINE - NEBASKA STEMI GUIDELINES

- REMARKABLY SIMILAR TO SD
- BASED ON FDA APPROVED MEDICATIONS, DOSES AND INDICATIONS, EVIDENCE-BASED
- BASED ON GWTG AHA GUIDELINES, YET FLEXIBLE ENOUGH TO GIVE SOME LEEWAY UNDER CIRCUMSTANCES
- ARE GUIDELINES!
WHAT HAVE WE LEARNED?

- PATIENTS WITH CP FREQUENTLY CALL EMS
- THE MAJORITY DO NOT HAVE ACS (Acute Coronary Syndrome)
- ONLY 5% OF CP IN THE ED IS ACS
- EVEN PATIENTS WITH CAD WHO UNDERWENT PCI OR CABG AND PARTICIPATED IN CARDIAC REHAB DID NOT PRESENT ANY FASTER TO THE ED (missed opportunity)
WHAT HAVE WE LEARNED?

- REVIEW YOUR DATA
- LEARN WHAT WORKS FOR YOUR PARTICULAR SITE AND RECEIVING HOSPITAL TO IMPROVE YOUR CARE
- IMPORTANT TO SHARE INFORMATION (Feedback) TO THE OUTLYING SITES
- EACH PERSON IN THE LINK IS IMPORTANT (VSA, TOYOTA MODEL)
- WE HAVE A EMS CONFERENCE WITH CARDIOLOGY, CATH FILMS ETC.
WHAT HAVE WE LEARNED?

- OUR PATIENTS ARE OLDER THAN THE NATIONAL AVG. 44% WERE MEDICARE
- OUR PATIENTS ARE TOUGH!! 50% LONGER PRESENTATION TIMES TO FMC (First Medical Contact)
- PATIENT EDUCATION IS AN IMPORTANT COMPONENT OF THE SUCCESS OF YOUR SYSTEMS
- SIGNIFICANTLY MORE OF OUR PATIENTS DROVE THEMSELVES OR WERE BROUGHT BY POV (Privately owned Vehicle) THAN NATIONWIDE (47% vrs. 36%)
- SPOUSES ARE IMPORTANT!!
WHAT HAVE WE LEARNED?

- NO MATTER HOW CLOSE THE FACILITY, IT ALWAYS TAKES LONGER THAN YOU THINK!!
- ANYTHING GREATER THAN 30 MINUTES AWAY GETS THROMBOLYSIS
- THROMBOLYSIS DOESN’T ALWAYS WORK ?60%
- UPFRONT DAPT (Dual antiplatelet therapy) WORKS AND RARELY INTERFERES WITH POST MI CARE i.e. CABG. ONLY 6% OF OUR STEMI PATIENTS REQUIRED SURGERY DURING THEIR INITIAL HOSPITALIZATION (8% FOR THE NATION)
WHAT HAVE WE LEARNED?

- FALLOUTS ARE IMPORTANT LEARNING TOOLS
- ANY FALLOUT MAKES A BIG DIFFERENCE
- 65 STEMI’s, IF WE HAVE THREE FALLOUTS YOU ARE SUCCESSFUL 95.4% OF THE TIME
- MANY SYSTEMS ARE VERY, VERY GOOD AND YOU MAY FIND TO START, YOU ARE AVERAGE
- NOBODY LIKES TO BE AVERAGE
RADIAL APPROACH HAS BEEN A GAME-CHANGER

- APPROXIMATELY 70% OF OUR CATHS ARE RADIAL ARTERY (Wrist) NOT FEMORAL
- LOWER RISK OF BLEEDING
- LOWER MORTALITY WITH LESS BLEEDING AND LESS TRANSFUSIONS AND POSSIBLY LESS AKI
- BECAUSE BLEEDING RISK IS LOW WHATEVER ANTICOAGULATION THAT WORKS IS GOLDEN
- WE HAVE BEEN A LAB THAT PREDOMINATELY USES ANGIOMAX (Bivalrudin) BUT IS ASSOCIATED WITH A HIGHER RISK OF STENT THROMBOSIS UNLESS DAPT IS USED
STEMI TREATMENT IN THE CATH LAB

- EVOLVING WITH EACH NEW JOURNAL ARTICLE
- THROMBECTOMY WHICH USED TO BE ALL THE RAGE, STILL HELPFUL, MAY BE THE BEST TOOL FOR SOME CASES BUT NOT NECESSARILY SUPERIOR
- ANGIOJET vs. ASPIRATION THROMBECTOMY, NO SIGNIFICANT CHANGE IN MI SIZE OR MORTALITY
- DES (Drug-Eluting Stents) APPEAR TO BE SUPERIOR IN THE LONG RUN Vrs. BMS (Bare Metal Stents)
STEMI TREATMENT IN THE CATH LAB

- MOST APPROPRIATE AND COST EFFECTIVE ANTI-PLATELET STRATEGIES ARE ALWAYS EVOLVING BOTH IN THE LAB AND FOR YEARS AFTERWARD
- CONTROVERSIAL ANTI-TROMBOTIC THERAPIES WITH HEPARIN (With and Without IV Anti-platelet therapy) vrs. BIVALRUDIN
- NEWER GENERATIONAL STENTS AND POSSIBLY BIOABSORBABLE STENTS ON THE HORIZON
- MULTIVESSEL vrs. CULPRIT VESSEL STENTING IN PATIENTS WITH MULTI-VESEL DISEASE
PRAMI

- PREVENTIVE REVASCULARIZATION IN ACUTE MYOCARDIAL INFARCTION TRIAL
- PCI OF CULPRIT VESSEL ONLY Vrs. PREVENTIVE PCI OF OTHER LESIONS WITH 50% OR GREATER STENOSIS
- SMALL, JUST 465 PATIENTS
- COMBINED RATE OF CARDIAC DEATH, NONFATAL MI, REFRACTORY ANGINA REDUCED BY 65%
- MORTALITY AT 23 MONTHS MV-PCI 1.7% vrs CULPRIT ONLY 4.3%
SHOCK TRIAL

- MULTIVESSEL STENTING OF CULPRIT vs ALL APPROACHABLE VESSELS IN HEMODYNAMICALLY UNSTABLE PATIENTS NOT STABALIZED WITH CULPRIT PCI ONLY AT THE TIME OF PRIMARY PCI

- CULPRIT VESSEL THERAPY ALONE HAD SUPERIOR ONE YEAR SURVIVAL (55% vs 20%)
RECENT AND ONGOING STUDIES

- HORIZONS-AMI
- CvLPRIT TRIAL
- AND STUDIES THAT COMBINED THESE TRIALS LOOKING AT THE HARD DATA SHOW THAT LIKELY SOME COMBINATION OF MV-PCI, EITHER AT THE TIME OF PRIMARY PCI OR STAGED DURING THE INCIDENT HOSPITALIZATION vs AT THE SAME SETTING OR EVEN WITHIN THE FIRST 30 DAYS STILL NEED FURTHER INVESTIGATION
- FAME I, AND FAME II, SWISSI II, COMPLETE TRIAL
OTHER CONSIDERATIONS

- AVERAGE STEMI STAY IS 3 DAYS
- 75-80% OF COST IS ON DAY ONE
- BIVALRUDIN, INTEGRELIN, AND CATH LAB TIME AND STENTS ARE ALL VERY EXPENSIVE. SHOULD WE BE MAXIMIZING THE BENEFIT OF THIS DAY AS LONG AS IT IS SAFE?
- MINIMIZE LENGTH OF DAPT
- MANY NOT COMPLIANT WITH RETURN OR WITH DURATION OF DAPT
CONCLUSIONS

- PRIMARY PCI IN A TIMELY FASHION HAS CHANGED OUTCOMES OF ALL ASPECTS OF STEMI CARE
- ONGOING STUDIES WE HOPE WILL CLEARLY DELINEATE WHAT THE BEST AND SAFEST STRATEGIES ARE FOR DAPT, ANTI-THROMBOTIC THERAPY, CULPRIT, vrs MV-PCI IN ONE SETTING OR A STAGED APPROACH EITHER BEFORE DISCHARGE OR IN THE NEXT 30 DAYS
CONCLUSIONS

- EXPEDITED PCI OR FACILITATED PCI, FOLLOWING THROMBOLYSIS SAVES LIVES AND MUSCLE AND IMPROVES MORTALITY
- SYSTEMS OF CARE ARE NECESSARY, WITH THE USE OF STANDARDIZED PROTOCOLS SO WE CAN MAKE SURE THAT OPPORTUNITIES FOR IMPROVING PATIENT OUTCOMES WILL NOT BE MISSED
- DATA FROM MISSION LIFELINE WILL ALLOW YOUR FACILITIES TO COMPARE THEMSELVES TO THE BEST TO IMPROVE YOUR OVERALL SCORES AND OUTCOMES FOR YOUR PATIENTS
Building a Statewide ST-Elevation Myocardial Infarction System of Care in a Rural State: The South Dakota Mission: Lifeline Initiative

Tomasz S. Stys, MD, Sanford Health, Michael Hibbard, MD, Avera Heart Hospital, Drew Purdy, MD, Rapid City Regional Hospital, Gary Myers, MS, NREMT, Michelle Schanott, MBA, American Heart Association, Midwest Affiliate

Background

Several factors can impede the timely delivery of optimal care to STEMI patients, particularly in rural states such as South Dakota, which has 6 counties covering nearly 76,000 square miles. Five of the seven percutaneous coronary intervention (PCI)-capable facilities are located in two communities and travel times between hospitals can exceed 200 miles. Only 13% of the 53 hospitals perform percutaneous Coronary Intervention (PCI). These rural areas are heavily dependent upon volunteer ambulance services and the capabilities of the small (non-PCI or CAH) hospitals to receive and transfer the STEMI patient in a timely manner. Approximately 85% of South Dakota’s 128 ambulance services are staffed by volunteers. Rural states are typically regarded as having less optimal care for ST-Elevated Myocardial Infarction (STEMI) patients. Systems of care development for critical patients has historically been more successful in improving patient care in rural areas, including South Dakota. While the larger hospital systems are in competition for patients, collaboration at the local level can be very impactful to patient outcomes.

Methods

Mission: Lifeline® is a strategic initiative to save lives and reduce disability by improving emergency readiness and response to heart attack patients by creating STEMI systems of care. Resources were leveraged and stakeholders brought together to build a STEMI system of care in South Dakota. Emergency Medical Service (EMS) agencies and hospitals were supported with equipment, technology and education. EMS, hospitals and state partners formed a task force, championed by physician leadership from all 7 PCI centers. A statewide STEMI guideline was developed, approved, and disseminated in 2013. Interventional cardiology champions from each of the 7 PCI centers met and collaborated on a single statewide guideline for referring hospitals. This guideline was then shared for comment across the state, engaging hospital and physician associations, the state Department of Health, and rural providers. Each PCI-capable hospital was asked to participate in data collection through ACTION Registry®-GWTG™. Critical Access Hospitals and non-PCI-capable facilities participated in STEMI education which included ways to improve time critical processes and transfer protocols. Review of the data with the statewide task force and best practice sharing became the standard for South Dakota cardiac care.

Results

- Median Time FMC to Primary PCI (direct) – improved from 88 minutes Q4 2012 to 75 minutes Q2 2014
- Median Length of Stay at Referral Facility – improved from 103 minutes Q4 2012 to 97 minutes Q2 2014
- Number of Pre-hospital ECG Transmissions more than tripled from 2011 to 2014
- South Dakota STEMI patients treated for reperfusion has increased and exceeds the national percentages
- South Dakota Overall Mortality Rate has dropped and is lower than the national percentages

Conclusions

Through coordination of resources and stakeholders, a rural state can build a STEMI system of care that matches and exceeds more populated areas that have additional resources. Through statewide collaboration, education, data collection and review, South Dakota will continue to build a STEMI system that is improving outcomes for patients.

Disclosures:

Tomasz P. Stys, MD, F.A.C.C. Nothing to disclose.
Michael D. Hibbard, M.D., F.A.C.C. Nothing to disclose.
Drew A. Purdy, MD, F.A.C.C. Nothing to disclose.
Gary Myers Nothing to disclose.
Michelle C. Gardner Nothing to disclose.
CONCLUSIONS

WE ARE ALL NATURALLY COMPETITIVE AND THIS WILL DRIVE IMPROVEMENTS IN OUR SYSTEMS TO IMPROVE THE QUALITY OF LIFE FOR NEBRASKANS.