# HEALTH SCIENCES SOUTH CAROLINA

**Update to:**
**NC Task Force On Serious Illness Care**

**Friday, July 12, 2019**

# DISCUSSION ITEMS

- **Introduction**
- **Who Is HSSC?**
  - Clinical Data Warehouse (CDW) on FHIR
- **Effective Solutions to Address Care Communication Challenges**
  - What Is Health Information Exchange (HIE)?
  - Carolina eHealth Alliance (CeHA) & Others
- **How Would These Tools Support Serious Illness Care?**
- **Next Steps?**
- **Q&A**

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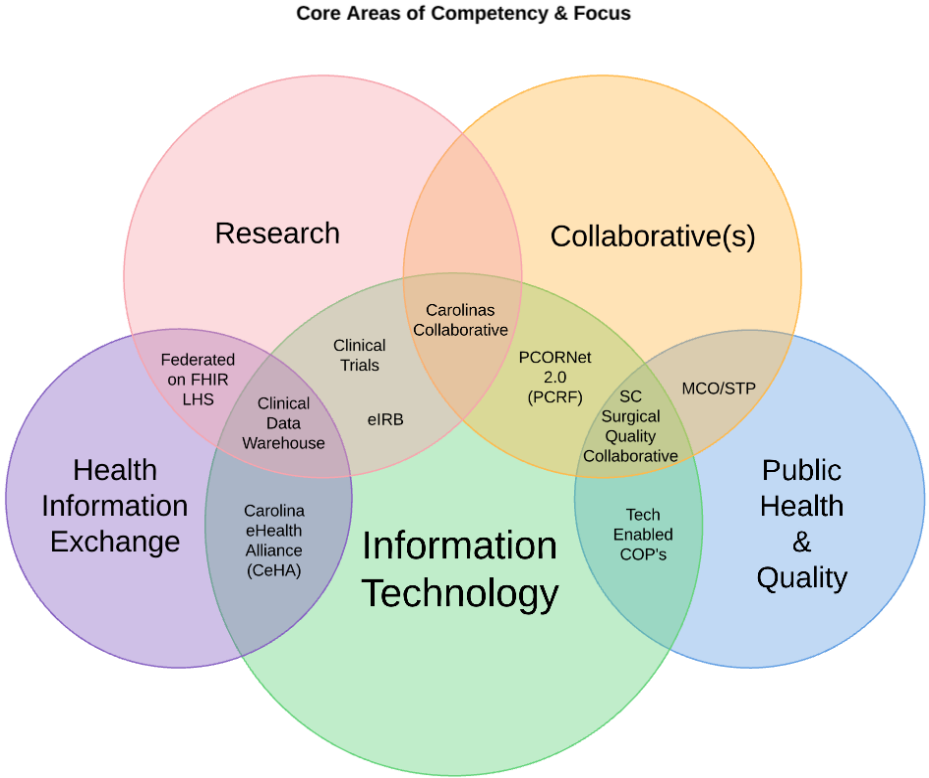
# WHO IS HSSC?

# HEALTH SCIENCES SOUTH CAROLINA

Established in 2004 as a nonprofit 501(c)(3), HSSC is a unique and inclusive public-private partnership and consortium of Health Systems and Universities committed to transforming South Carolina's public health and economic well-being by supporting clinical research, quality improvement, population health and learning health systems.

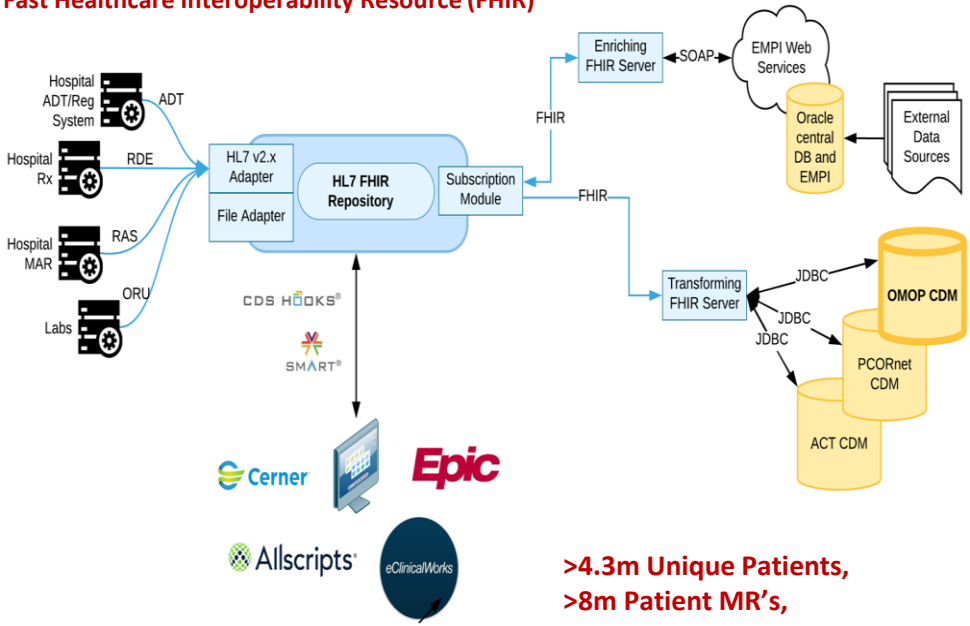


# CLINICAL DATA WAREHOUSE:

# HSSC'S HYBRID/FEDERATED LEARNING HEALTH SYSTEM PLATFORM

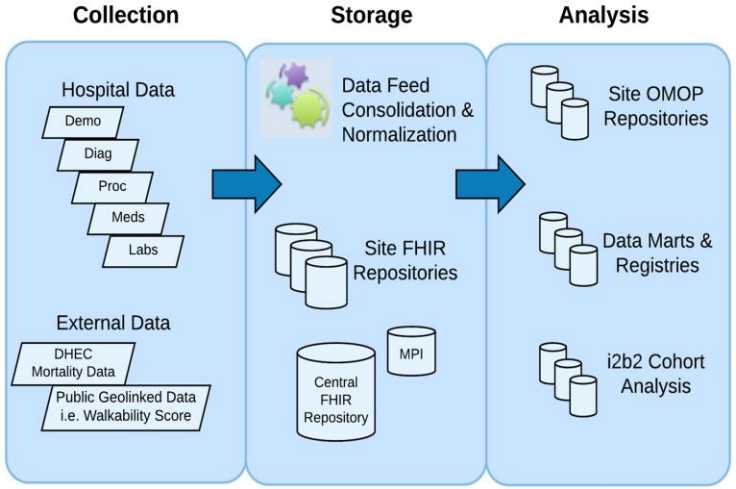
# CLINICAL DATA WAREHOUSE: HSSC ENRICHES YOUR DATA FOR INTEROPERABILITY, ANALYTICS, AND RESEARCH

**Fast Healthcare Interoperability Resource (FHIR)**

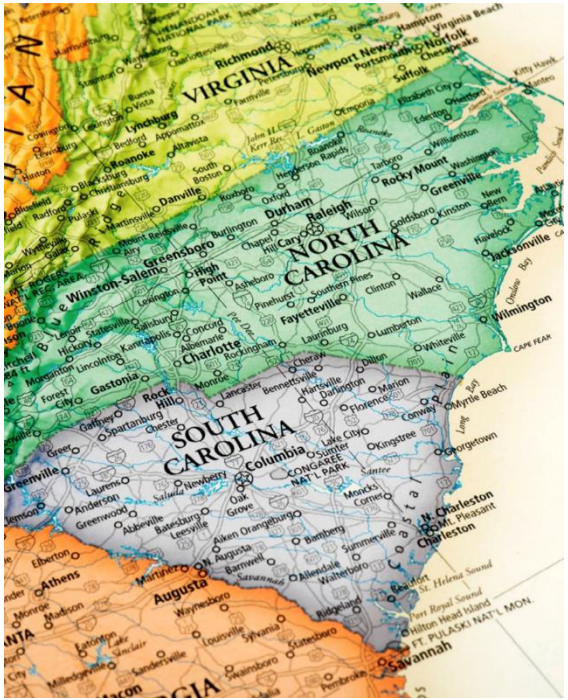



**>4.3m Unique Patients,**
**>8m Patient MR's,**
**>50m Patient Visits…**

## FEDERATED ON FHIR: A SINGLE ARCHITECTURE FOR POP HEALTH, RESEARCH AND ANALYTICS

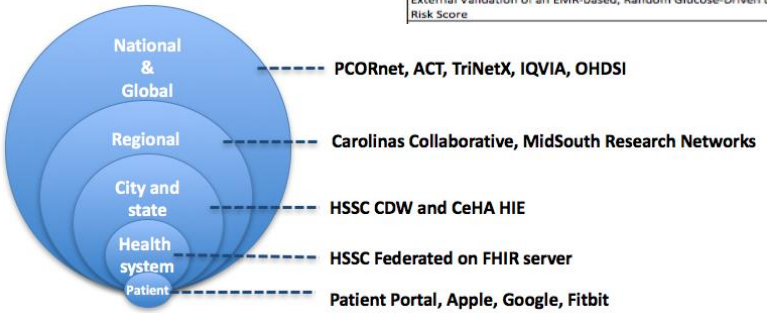


# Our Warehouse Supports Multi-State Research Network Efforts




## HSSC CONNECTS ITS MEMBERS TO THE WORLD FOR RESEARCH

| Study Title |
|---|
| Study of Specialty Referral for Health Disparity Populations Living with HIV |
| A multicentre international randomized parallel group double-blind placebo-controlled clinical trial of empagliflozin once daily to assess cardio-renal outcomes in patients with chronic kidney disease (EMPA-KIDNEY) |
| ADAPTABLE: Patient Centered Outcomes Research Institute: Coronary Heart Disease Study |
| ADVANCEing the Development of Natural Language Processing Algorithms to Identify Transgender Patients in the Electronic Medical Records of the Mid-South CDRN and the ADVANCE PCORNet Networks |
| The project description: Study of a medication in pediatric and adult population in common conditions: Asthma and Chronic Idiopathic Urticaria (CIU). |
| Optimizing Pharmacotherapy for Bipolar Youth |
| Bronchiectasis Disease Severity and prevalence of pseudomonas colonziation |
| Comparative Effectiveness Randomized Trial to Improve Stroke Care Delivery: C3FIT: Coordinated, Collaborative, Comprehensive, Family-based, Integrated, and Technology-enabled Care |
| Cancer CRG Rapid Cycle Research Project Site Capability |
| Harnessing PCORnet to Study Comparative Effectiveness and Safety of Biologic Therapies |
| The CORECAP Study (Comparative Outpatient oRal therapy Evaluation in Community Acquired Pneumonia) study |
| Comparison of Oral anticoagulants for extended VEnous Thromboembolism (COVET) |
| Employing a Fitness-for-use data catalog Framework to Enhance Curation of EHR data sets for clinical Research (EFFECtoR) |
| Use of Fast Healthcare Interoperability Resource (FHIR) Systems to Maintain Data Linkages Across Systems in PCORnet Studies |
| External Validation of an EMR-based, Random Glucose-Driven Diabetes Risk Score |
| Health Systems Innovation Pilot |
| INfluenza Vaccine to Effectively Stop Cardio Thoracic Events and Decompensated heart failure (INVESTED) PROTOCOL |
| Limited Interaction Targeted Epidemiology (LITE) to Advance HIV Prevention |
| Lung Cancer Screening: Implementation Quality and Adherence |
| Identifying and Validating Interstitial Lung Disease and Malignancies in RA Patients |
| Comparative Effectiveness of Selected MS Disease-Modifying Therapies (DMTs) on Symptoms of High Priority to People with MS |
| Comparing the Effectiveness of MS DMT Prescribing and Switching Strategies in a Real World Patient Cohort |
| PATHWAYS TO DIAGNOSIS (P2D): A COMPARATIVE EFFECTIVENESS TRIAL |
| Prevention of Hip Fracture in Patients with Parkinson's Disease |
| Provider Characteristics, Referral Patterns and Cardiovascular Health Outcomes in People Living with HIV |
| PCORnet-Pfizer Lupus Colloboration |
| Prescription Monitoring Programs, Patterns of Opioid Pain Reliever Prescribing, and the Incidence of Opioid Dependence, Overdose and Overdose-Deaths |
| PROVIDE-HF: Patient Reported Outcomes inVestigation following Initiation of Drug therapy with Entresto (Valsartan/Sacubitril) in Heart Failure |
| Racial Disparities in Endometrial Cancer: The Role of Diagnostic Care Pathways |
| RofLumilast or Azithromycin to preveNt COPD Exacerbations (RELIANCE) |
| Operative versus Non-Operative Treatment for Atraumatic Rotator Cuff Tears: A Multicenter Randomized Controlled Pragmatic Trial |
| Statistical Methods and Designs for Improved Estimation by Incorporating Validation Data into Electronic Health Record Studies |
| Management Strategies for Treatment-Resistant Depression |



# RECENT COLLABORATIVE RESEARCH PROJECT EXAMPLES

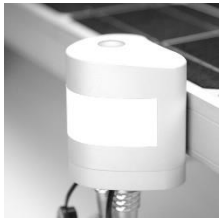
**Daubert, Melissa**, Duke University
**Urrutia, Rachel**, UNC Chapel Hill
Project Title: Optimizing Postpartum Cardiovascular Care in Women with Hypertensive Disorders of Pregnancy

**Ranapurwala, Shabbar**, UNC Chapel Hill
**Wu, Li-Tzy**, Duke University
**Korte, Jeffrey**, Medical University of South Carolina
**Wolfson, Mark**, Wake Forest University
Project Title: Measuring Opioid Use Disorders in Secondary Electronic Health Records Data

**Goodwin, Andrew**, Medical University of South Carolina
**Simpson, Annie**, Medical University of South Carolina
**Bice, Thomas**, UNC Chapel Hill
**Files, D. Clark**, Wake Forest University
**Topaloglu, Umit**, Wake Forest University
Project Title: Development and validation of a multi-center ventilator dependent respiratory failure (VDRF) computable phenotype to facilitate lung protective ventilation research

**Tailor, Tina**, Duke University
**Henderson, Louise**, UNC Chapel Hill
**Chiles, Caroline**, Wake Forest University
Project Title: Detection of Coronary Artery Calcification in the Lung Cancer Screening Population: Clinical Implications for Cardiovascular Risk Stratification and Statin Pharmacotherapy

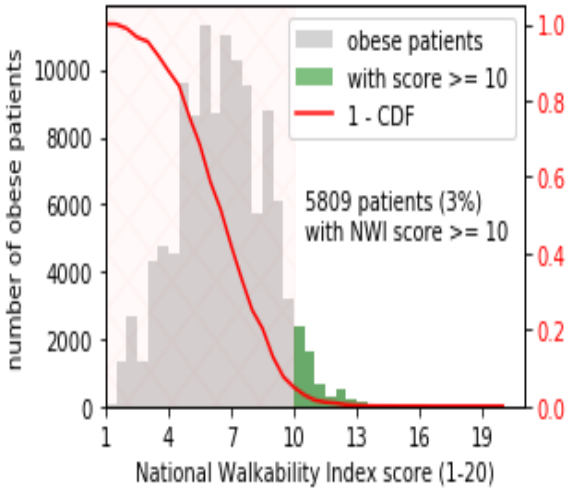
# HSSC'S NEW AWARD WINNING "FEDERATED ON FHIR" PLATFORM EXTENDS ABILITY WELL BEYOND TRADITIONAL RESEARCH, HOWEVER:



## DATA ENRICHMENT EXAMPLES:

- Mortality
- Readmissions from DHEC
- Geocoding
- Social Determinants from public sources
  - Income level, walk scores, air pollution levels
- Individual financial and social data from LexisNexis

**WE ENRICH YOUR DATA SUPPORTING ENHANCED INTEROPERABILITY, ANALYTICS AND RESEARCH.**




Pediatric obesity calculator example.

# HSSC'S NEW AWARD WINNING FEDERATED ON FHIR PLATFORM

healthcare informatics

## Health Sciences South Carolina Wins 'Best in Show' at FHIR Applications Roundtable

**By David Raths**

At the HL7 FHIR Applications Roundtable held in New Orleans in December, Health Sciences South Carolina (HSSC) was voted Best in Show for its clinical data repository for South Carolina hospitals.


Fast Healthcare Interoperability Resource (FHIR)

Healthcare IT News TOPICS

## Health Sciences South Carolina lights up a FHIR-based clinical data repository

Tech initiative enables hospitals across the Carolinas to build apps that merge patient records.

By Bill Siwicki | July 05, 2018 | 02:18 PM

healthcare informatics

## Rethinking the Multi-Institution Clinical Data Repository

**By David Raths**

Last month I wrote a short news item about how Health Sciences South Carolina (HSSC) won Best in Show at the FHIR Connectathon in New Orleans for its clinical data repository for South Carolina hospitals. Last week I had the chance to interview HSSC executives in more detail about this effort. The evolution in approach at HSSC may signal a sea change in how large clinical data repositories work.

HL7 INTERNATIONAL

# Effective Solutions to Address Communication Challenges for Serious Illness Care:

# Leverage Existing Data Exchange Networks, including Health Information Exchanges

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# WHAT IS A HEALTH INFORMATION EXCHANGE (HIE)?

# WHAT IS A HEALTH INFORMATION EXCHANGE?

**What is HIE?**
Electronic health information exchange (HIE) allows doctors, nurses, pharmacists, other health care providers, and patients to appropriately access and securely share a patient's vital medical information electronically—improving the speed, quality, safety, and cost of patient care.

# WHAT IS A HEALTH INFORMATION EXCHANGE?

We know that appropriate, timely sharing of vital patient information can better inform decision making at the point of care and allow providers to help:

- Avoid readmissions,
- Avoid medication errors,
- Improve diagnoses,
- Decrease duplicate testing.

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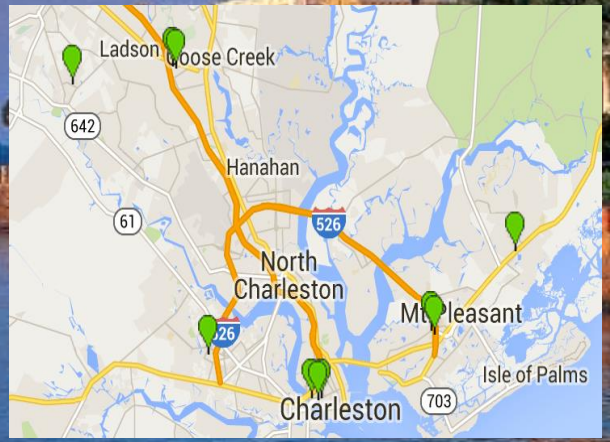
# HOW DOES HSSC KNOW THIS TO BE TRUE?

# …BECAUSE BEYOND NATIONAL DEMONSTRATION, WE HAVE SEEN THE VALUE FIRST HAND THROUGH OPERATING ONE OF THE LARGEST EXCHANGES IN SOUTH CAROLINA.

# Introducing Carolina e-Health Alliance (CeHA)

**Hospital/ED exchange, established in 2008-2010, to enhance the quality of care and reduce costs.**





**HIE's lower costs for the healthcare region benefiting ALL providers.**

# CRUCIAL PATIENT DATA
# WHEN YOU NEED IT, WHERE YOU NEED IT…

## CeHA Houses the Most Critical of Data Sets:

- Facility “Admission, Discharge, Transfer” (ADT) Information,
- Medications, Allergies & Problems,
- Diagnostics such as:
  - Radiology/Imaging Reports,
  - Laboratory,
  - Microbiology and
  - Pathology Results.
- Transcribed Reports including Discharge Summaries / ED Records.

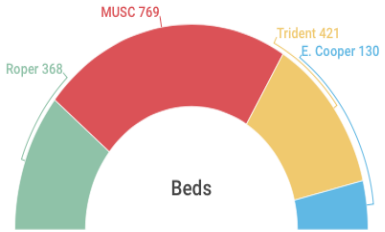
# Carolina e-Health Alliance (CeHA)

**What is HIE?**
Electronic health information exchange (HIE) allows doctors, nurses, pharmacists, other health care providers, and patients to appropriately access and securely share a patient's vital medical information electronically—improving the speed, quality, safety, and cost of patient care.

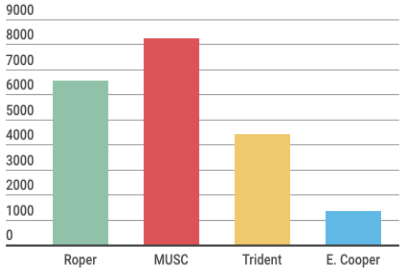
## CeHA Network Size

| Hospital Bed Count (Est.) | Avg Hosp Pat Volume Per Month | Average ED Logins Per Month |
|---|---|---|
| 1688 | 20,544 | 1,494 |

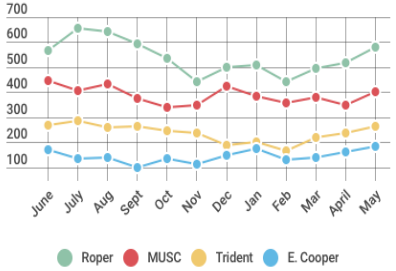
Hospital Beds




Avg. Hosp Pat Volume Per Month




ED Logins Per Month



# CeHA Demonstrated Impact and Value

| | |
|---|---|
| **Improved Quality** | • MUSC researchers demonstrated avoided duplicative testing, admissions and consults in 35% of patients with data in CeHA.<br>• 87% of study participants stated that the quality of care delivered to their patients had been improved (MUSC).<br>• Odds of admission were 27% lower when the HIE was accessed (Frisse).<br>• Impact of a health information exchange (HIE) in terms of reduced lifetime attributable risk (LAR) of cancer resulting from avoided radiographic studies in the emergency department (ED) 1/1100w, 1/1600m (when info present in CeHA).<br>• Cut repeat "same CT" 1yr incidence in ½ for Head, Abd and Chest CT (~26% to 13%). |
| **Lower Cost** | • Avoided tests and admissions yielded actual savings of $220,000 (n=100 pts) in 3mo.<br>  • Extrapolated to the 4 systems in CeHA (ED's), $11 million in cost avoidance in 1 year.<br>• Average of $2,768.00/pt avoided when data is in CeHA (all of the hospital systems). |
| **Improved Efficiency** | • Median workup time saved for ED patients with clinical information in CeHA was 95 minutes.<br>• A 45% reduction in mean ED length of stay (LOS) for discharged ED patients and a 25% reduction in the ED LOS for admitted ED patients. Dec Labor and bricks/mortar.<br>• Predictive models help EP's know "when to log-on" to CeHA. |
| **Better Population Health (Care Coordination)** | • Frequent ED users characterized in a REGION, 15% of patients are MSU's.<br>• MSU's were slightly more likely to be commercial > self pay insurance.<br>• MSU's are more likely to be young (62%).<br>• 62% of Multi-System patients are Super Users (>4visits/year).<br>  • Equally likely to have commercial Ins or Self Pay |

# Carolina e-Health Alliance (CeHA)

AHANews.com

AHANews Electronic Edition
Get your electronic edition of AHA News online.
(Click to read AHA News newspaper stories)
Get AHANewsNow e-mailed to you
AHA Online Store

AHANewsNow The Daily Report for Health Care Executives

Study finds HIE reduces ED costs while improving quality of care

October 14, 2013

Having access to data from a health information exchange reduced Medicare-allowable charges for 11 hospital emergency departments in South Carolina by an average $1,947 per patient over a 12-month period, according t a study presented today at the annual meeting of the American College of Emergency Physicians in Seattle. The finding is based on a survey of clinicians who cared for a sample of 532 patients who had information available i the HIE. Most of the cost savings were due to avoided radiology studies and hospital admissions. More than 80% of the clinicians reported improved quality of care and time savings, with an average time savings of 105 minute per patient. The study did not consider the cost of sustaining the HIE, which is currently supported by the hospitals. "Sustainability is the number one problem we all face," said study author Christine Carr, M.D., emergency services medical director at the Medical University of South Carolina in Charleston. She is currently working on a larger study that will look at both HIE costs and savings.

The Post and Courier

**Carolina eHealth Alliance saves more than $1 million over one year**

Lauren Sausser Email Twitter Posted: Monday, October 14, 2013 1:44 p.m.

An electronic exchange that allows emergency room doctors at different hospitals in the tri-county region to share patient information saved more than $1 million in unnecessary admissions and redundant procedures over 12 months, a 2013 study shows.

The Medical University of South Carolina will present findings from the study at an assembly of the American College of Emergency Physicians in Seattle on Tuesday.


The Carolina eHealth Alliance, first launched with grant money by MUSC and Roper St. Francis Healthcare two years ago, now includes all four Lowcountry hospital systems.

"We knew intuitively that sharing information between otherwise siloed hospital systems would reduce redundant testing, imaging, CT scans, X-rays, medication prescriptions, admissions," said Dr.

Healthcare IT News

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PA eHEALTH PARTNERSHIP AUTHORITY

**ACEP National Press Release for the Seattle Scientific Assembly 2013: CeHA 1st Place Winner**

**The Impact of a Health Information Exchange on Resource Use and Medicare-Allowable Charges at *Eleven Emergency Departments* Operated by *Four Major Hospital Systems* in a Midsized Southeastern City: An Observational Study using Clinician Estimates**

FierceHealthIT NEWS TOPICS ANALYSIS FEATU

Topics: Health Information Technology

**HIE saves more than $1 million in patient charges for emergency care**

October 15, 2013 | By Ashley Gold

SHARE Email 18 Tweet 8 Share 0 Like

Provider access to data via a health information exchange improved emergency care quality and saved more than $1 million in patient charges--nearly $2,000 per patient--according to research presented this week at the annual meeting of the American College of Emergency Physicians in Seattle.

Over a 12-month period beginning in Feb. 2012, an HIE for emergency patients resulted in savings from avoiding these types of services, for a sample of 532 patients out of 325,740 patient encounters:

A SERVICE OF THE CALIFORNIA HEALTHCARE FOUNDATION

iHealthBeat

**Health Information Exchange Saved $2K per ED Patient, Study Finds**

Tuesday, October 15, 2013

Physicians' access to a health information exchange saved more than $1 million in emergency care costs over a one-year period, according to a study released Monday by the American College of Emergency Physicians, *Healthcare IT News* reports.

The average savings -- based on Medicare-allowable charges -- amounted to nearly $2,000 per patient.

Beginning in February 2012, ACEP researchers tracked for one year the care of 532 patients at 11 emergency departments in South Carolina, all of whom had data available through a health information exchange. In addition, health care providers who treated the patients completed a survey.

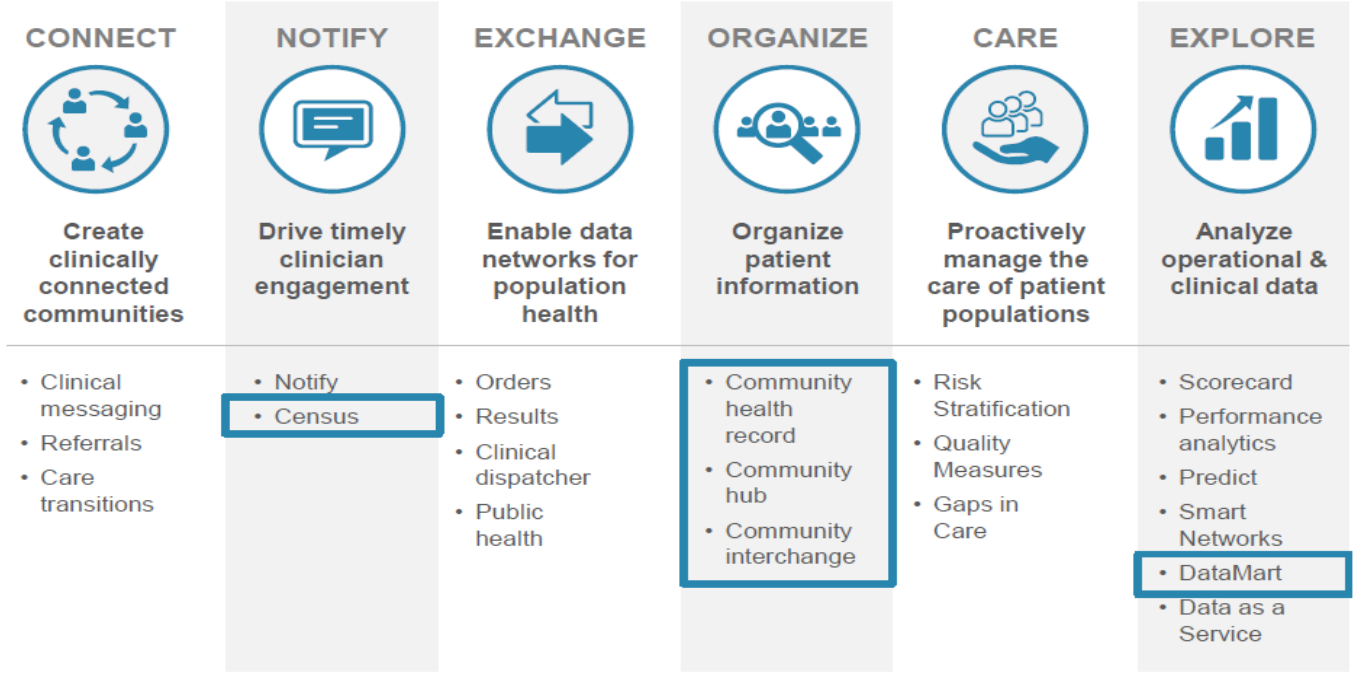
Christine Carr -- a physician at the Medical University of South Carolina and study author -- said that 89% of participants said the use of the health information exchange resulted in improved quality of patient care and 82% said it saved time, reporting a mean time savings of 105 minutes per patient.

According to the study, access to a health information exchange helped clinicians avoid:

- Laboratory or microbiology services for 187 patients, saving $2,073;
- Radiology services for 298 patients, saving $476,840;

# OUR PLATFORM CAN BE EASILY EXPANDED TO OTHER NUMEROUS USE CASES SUPPORTING CLINICAL CARE AS NEEDED…

**Activated features of the HSSC/CeHA implementation are boxed in blue.**




## INCLUDING SERIOUS ILLNESS CARE…

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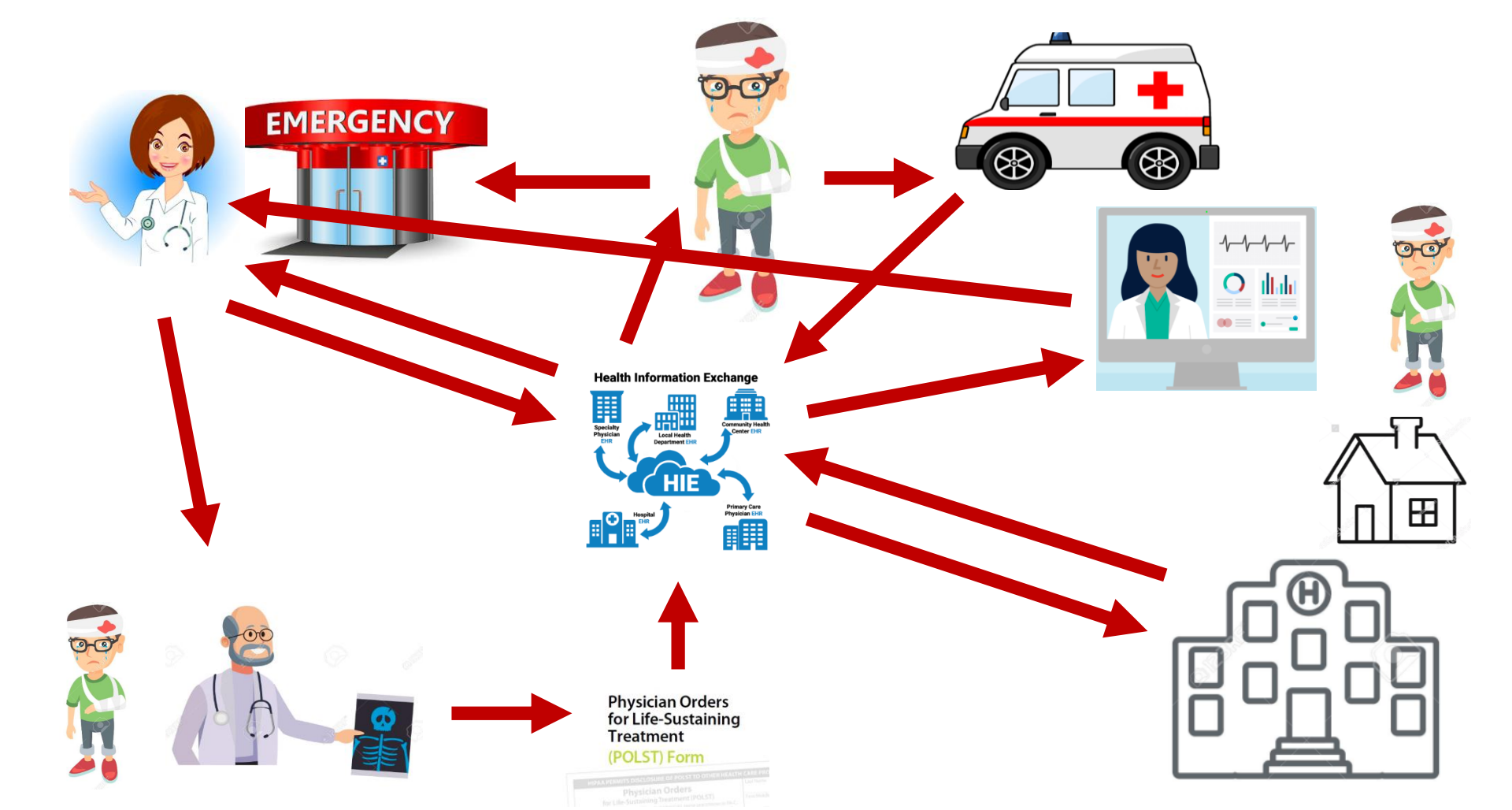
# HOW WOULD THESE TOOLS SUPPORT SERIOUS ILLNESS CARE?


EMERGENCY
Health Information Exchange
Specialty Physician EHR
Local Health Department EHR
Community Health Center EHR
HIE
Hospital EHR
Primary Care Physician EHR
Physician Orders for Life-Sustaining Treatment
(POLST) Form

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# NEXT STEPS?

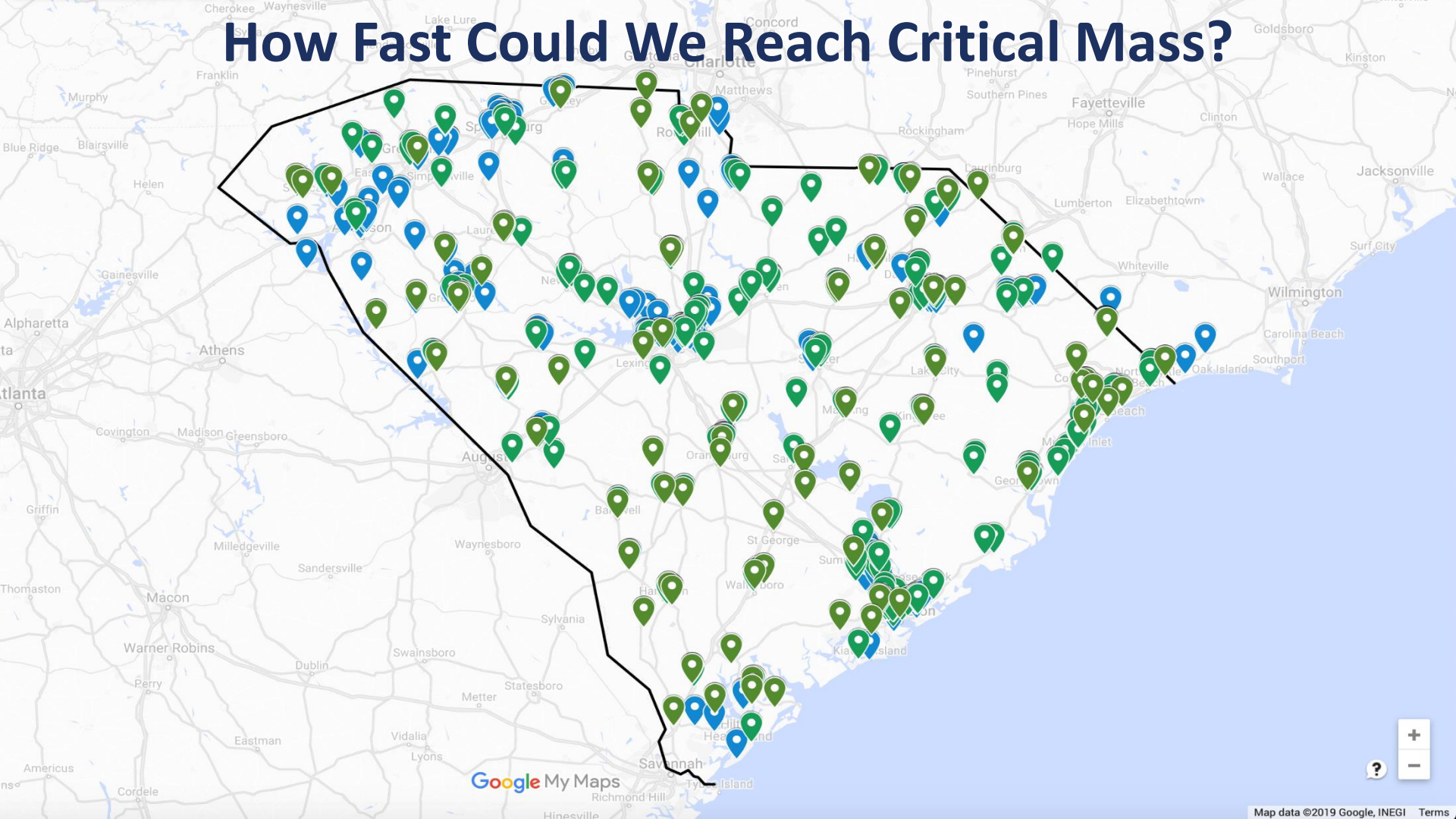
# NEXT STEPS?

## Develop a Phased Approach to Design, Connectivity and Rollout

**Key Steps Might Look Like The Following (Very High Level):**

- **Connect MMH to HSSC (Followed By Other Partners As Necessary)**
- **Pilot (Connect with First Exchange, CeHA for example)**
- **Connect Other Existing Exchanges Across the Carolinas**
- **Connect Hospitals, Emergency Departments, Providers, Agencies, First Responders, etc. Not Currently Using Any Exchange)**
- **Throughout, Connect Patients**
- **Throughout, Support Necessary Public Policy Development**
- **Iterate Along the Way!**

# How Fast Could We Reach Critical Mass?



@HSSCtweets

@HealthSciencesSouthCarolina

@HealthSciencesSouthCarolina

www.HealthSciencesSC.org

# QUESTIONS?

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# APPENDIX:
# OTHER PROGRAM OPPORTUNITIES FOR MULTI-STATE COLLABORATION

VALUE CREATION


Nimble

SOUTH CAROLINA SURGICAL QUALITY COLLABORATIVE

Supported by a Grant From: South Carolina FOUNDATION

# SOUTH CAROLINA SURGICAL QUALITY COLLABORATIVE (SCSQC)

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SCHA South Carolina Hospital Association

SOUTH CAROLINA SURGICAL QUALITY COLLABORATIVE

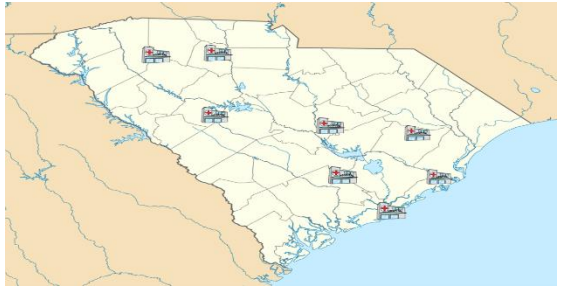
# SOUTH CAROLINA SURGICAL QUALITY COLLABORATIVE (SCSQC)

- **Vision:**
  - SC will deliver the most highly reliable, evidence-based, patient-centered surgical care at the lowest cost in the nation.
- **Mission:**
  - Convene a collaborative of highly engaged surgical leaders in partnership with statewide organizations and establish standards and infrastructure as a key component of a model learning healthcare system.
- **Goal:**
  - Target high volume, high risk, general surgical procedures to decrease complications and mortality, while lowering costs and decreasing health disparities in SC.

# SQSQC: WHAT DO THE OUTCOMES LOOK LIKE?
## (THROUGH MID-2018)

Across
8 Hospitals,
142 OR's,
>91,000 cases…

| Hospital | Beds | Operating Rooms | Annual Cases |
|---|---|---|---|
| Easley | 109 | 5 | 4,054 |
| Spartanburg | 381 | 24 | 16,689 |
| Self - Greenwood | 358 | 13 | 6,500 |
| Kershaw Health - Camden | 121 | 7 | 3,400 |
| McLeod Health - Florence | 461 | 30 | 19,594 |
| Regional Med - Orangeburg | 286 | 9 | 5,528 |
| MUSC | 709 | 40 | 28,466 |
| Tidelands - Georgetown | 267 | 14 | 7,200 |



Morbidity went from 8.76% to 7.9% = 10% relative reduction

Mortality went from 1.82% to 1.59% = 13% relative reduction

Length of stay (mean) went from 3.75 to 3.58 = 05% relative reduction

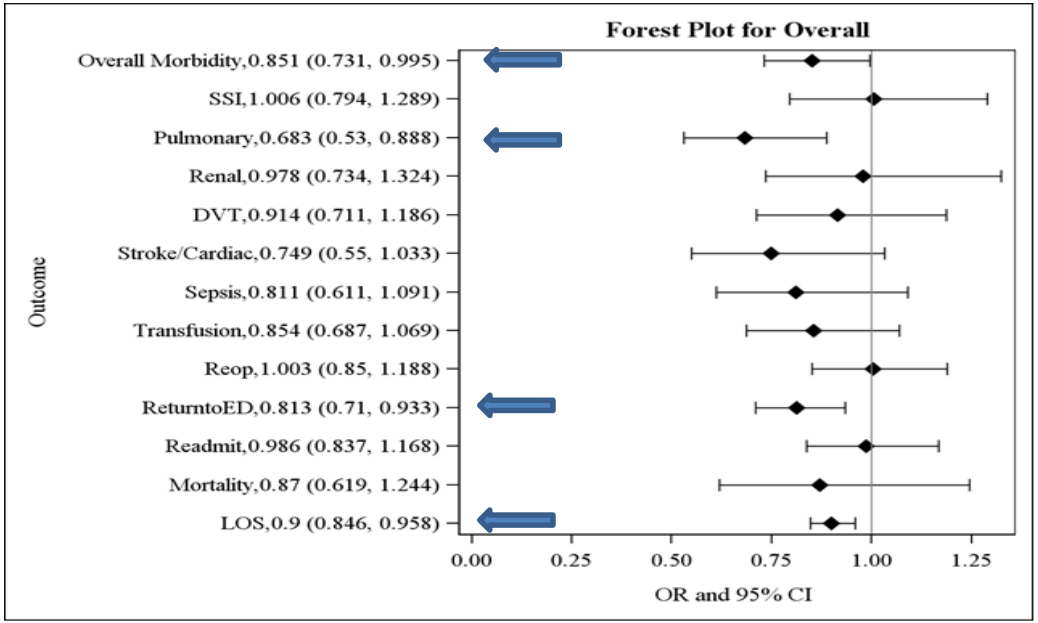
Return to ED went from 9.84% to 8.32% = 15% relative reduction

Reoperation went from 6.74% to 6.28% = 07% relative reduction

# SCSQC: WHAT DO THE OUTCOMES LOOK LIKE?

## Multivariable Analysis

(Controlling for multiple factors – LEFT of the line, indicates POSITIVE results)

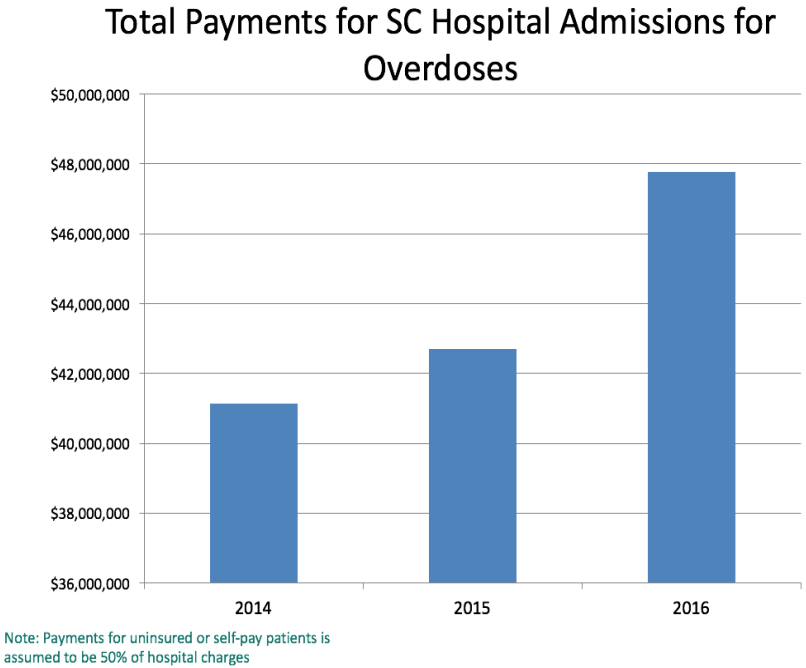



**Annualized Impact Estimates from Avoided Hospital Days, Complications & Readmissions: $20,244,802 (including 33 Estimated Avoided Deaths)**

*Based upon national cost data. SC specific data being obtained from RFA presently and will be applied.

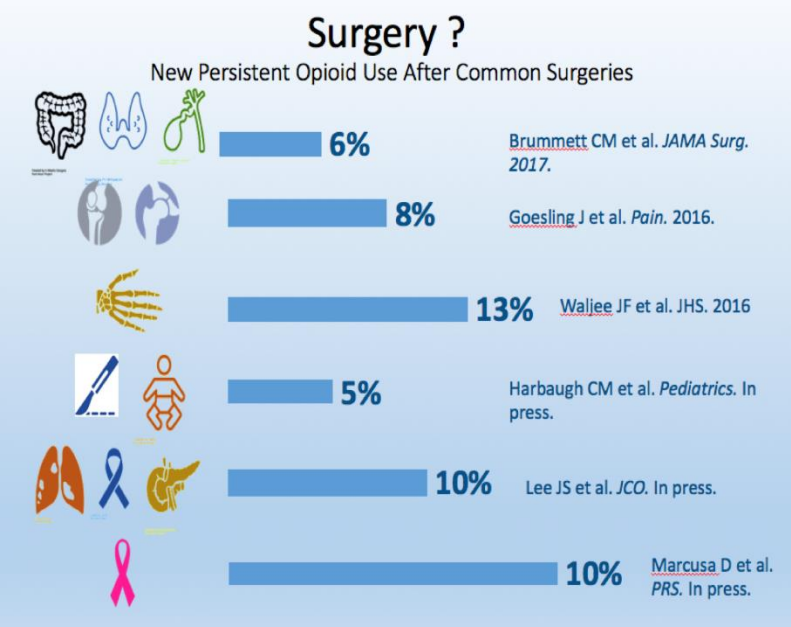
# Next Focus: The Surgeon's Role in the Opioid Epidemic…

- SC is 23rd in per capita overdose deaths
- More opioid deaths in SC than heroin, cocaine, and methamphetamine combined
- 701 drug overdose deaths in 2015
- SC population = 4,900,000
- Opioid prescriptions in 2016 = 4,641,302




Note: Payments for uninsured or self-pay patients is assumed to be 50% of hospital charges

# Next Focus: The Surgeon's Role in the Opioid Epidemic…




## Prescribing Patterns

- Higher amounts of initial opioid exposure (higher dose, duration) is associated with greater risk of long-term use and greater risk of overdose,
- Are we prescribing intelligently?
- Prescribe only when necessary, lowest effective dose, and the shortest duration possible.

Sha A, MMWR 2017; 66:265

***New chronic opioid use can be considered *the* most common complication after elective surgery!**