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
WHO IS HSSC?
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

Collection

Storage

Analysis

Hospital Data

Data Feed Consolidation & Normalization

Site FHIR Repositories

Site OMOP Repositories

Proc

Data Marts & Registries

Meds

i2b2 Cohort Analysis

Labs

External Data

DHEC Mortality Data

Public Geolinked Data

i.e. Walkability Score

Central FHIR Repository

CONFIDENTIAL – DO NOT DISSEminate
Our Warehouse Supports Multi-State Research Network Efforts

HSSC Connects Its Members to the World for Research
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

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

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

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

Good health made possible.
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

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.

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

Leverage Existing Data Exchange Networks, including Health Information Exchanges
WHAT IS A HEALTH INFORMATION EXCHANGE (HIE)?
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.
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.
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 Demonstrated Impact and Value

### Improved Quality
- MUSC researchers demonstrated avoided duplicative testing, admissions and consults in 35% of patients with data in CeHA.
- 87% of study participants stated that the quality of care delivered to their patients had been improved (MUSC).
- Odds of admission were 27% lower when the HIE was accessed (Frisse).
- 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).
- Cut repeat “same CT” 1yr incidence in \(\frac{1}{2}\) for Head, Abd and Chest CT (~26% to 13%).

### Lower Cost
- Avoided tests and admissions yielded actual savings of $220,000 \((n=100\text{ pts})\) in 3mo.
  - Extrapolated to the 4 systems in CeHA (ED’s), $11 million in cost avoidance in 1 year.
  - 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.
- 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.
- 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.
- MSU’s were slightly more likely to be commercial > self pay insurance.
- MSU’s are more likely to be young (62%).
- 62% of Multi-System patients are Super Users (>4visits/year).
  - Equally likely to have commercial Ins or Self Pay.

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

CONNECT
- Create clinically connected communities
  - Clinical messaging
  - Referrals
  - Care transitions

NOTIFY
- Drive timely clinician engagement

EXCHANGE
- Enable data networks for population health

ORGANIZE
- Organize patient information
  - Community health record
  - Community hub
  - Community interchange

CARE
- Proactively manage the care of patient populations
  - Risk Stratification
  - Quality Measures
  - Gaps in Care

EXPLORE
- Analyze operational & clinical data
  - Scorecard
  - Performance analytics
  - Predict
  - Smart Networks
  - DataMart
  - Data as a Service

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

INCLUDING SERIOUS ILLNESS CARE...
HOW WOULD THESE TOOLS SUPPORT SERIOUS ILLNESS CARE?
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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?
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APPENDIX: OTHER PROGRAM OPPORTUNITIES FOR MULTI-STATE COLLABORATION
SOUTH CAROLINA SURGICAL QUALITY COLLABORATIVE (SCSQC)
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)

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

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

![Total Payments for SC Hospital Admissions for Overdoses](chart)

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!