CRISP Update on Health Information Exchange in Maryland and the Region

Data Access for Research

Johns Hopkins University CHSOR/CPHIT Seminar

26 September 2017

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Agenda

• Introduction
• Historical perspective on health information exchange
• CRISP background
• CRISP core services, regional presence and future directions
• CRISP’s role in addressing the opiate crisis
• CRISP Research Initiative
• Discussion
Hard to define . . . But I know it when I see it!

- Single push messages
- Intra-organizational
- Vendor specific inter-organizational
- Function specific, multi-vendor
- Regional or affiliation based HIE
- Statewide HIE
- Nationwide Health Information Exchange (NwHIN) or eHealth Exchange
The future is already here – it’s just not very evenly distributed.

– William Gibson
CRISP background
CRISP is a non-profit health information exchange (HIE) serving Maryland, the District of Columbia, West Virginia and the region.

**Our Vision**
To advance health and wellness by deploying health information technology solutions adopted through cooperation and collaboration.

**Our Mission**
We will enable and support the healthcare community of Maryland and our region to appropriately and securely share data in order to facilitate care, reduce costs, and improve health outcomes.

**Our Guiding Principles**
1. Begin with a manageable scope and remain incremental.
2. Create opportunities to cooperate even while participating healthcare organizations still compete in other ways.
3. Affirm that competition and market-mechanisms spur innovation and improvement.
4. Promote and enable consumers’ control over their own health information.
5. Use best practices and standards.
6. Serve our region’s entire healthcare community.
CRISP’s Service Area

Chesapeake Regional Health Information System for our Patients

- Infrastructure for WVHIN
- via DHIN
- State-Designated HIE
- via Virginia Connect

Locations:
- West Virginia
- District of Columbia
- Maryland
- Virginia
- Delaware
Governance

MARYLAND HEALTH CARE COMMISSION
Agency designated by Governor to develop the health information exchange, with oversight of CRISP’s use of funds, and regulatory authority over Maryland HIEs.

HEALTH SERVICES COST REVIEW COMMISSION
Hospital all-payer rate setting system, providing funding the exchange and utilizing services of the population health utility.

MHCC POLICY BOARD
Sets broad policy governing HIE in Maryland. Strong consumer/public representation. Policy Board decisions are enforced through the MHCC, which has regulatory authority over HIEs.

CRISP BOARD OF DIRECTORS
Responsible for governance of the exchange organization itself.

CRISP GOVERNANCE STRUCTURE

CRISP ADVISORY BOARD

Clinical Committee
Finance Committee
Technology Committee
Privacy & Security Committee
Reporting & Analytics Committee

CRISP STAFF
Responsible for leadership and daily operations of CRISP. This includes leading the implementation of HIE technology, statewide outreach, and administrative functions.

HHS ONC/CMS
Federal agency funding REC and partially funding HIE through DHMH.

KEY
Funding/Authorization
Recommendation/Coordination

Technology Committee
Clinical Committee
Finance Committee
Privacy & Security Committee
Reporting & Analytics Committee
Original agreement signed in 1977 with Medicare that ‘waives’ standard principles of reimbursement at hospitals

Allows Maryland (HSCRC) to set the rates hospitals charge

All payors – Medicare, Medicaid, private insurers, and the self-insured – pay the same rate per service, per hospital
Statewide plan to move the delivery system towards the goals of effective and efficient prevention, care management, and coordination

- Implement care redesign and population health approaches in an effort to reduce potentially avoidable utilization and improve quality
- Use innovative tools to facilitate care transformation

Steps for transformation:
1. All-Payer Model Global Budget
2. Care Redesign Amendment
3. Progression Plan/Phase 2 of the All-Payer Model
Maryland’s hospitals have committed to:

- Saving Medicare $330 million over five years
- Limiting per capita annual growth of hospital inpatient and outpatient costs to 3.58%
- Capping growth of all Medicare spending to the national average
- Lowering the state's 30-day hospital readmission rate for Medicare beneficiaries
- Reducing hospital-acquired conditions by 30% over a five-year period

If the state fails to meet its targets... bad things happen:

- Hospitals face financial penalties
- Maryland could lose its authority to set targets
- Maryland could lose its Medicare rate-setting exemption
Delivery system moves towards higher levels of patient-centered prevention and care management

Care redesign programs and population health approaches are implemented to create cooperation and alignment across the continuum of providers

- Improve quality
- Reduce potentially avoidable utilization – (1% reduction = $18m)

Build on Investments and Successes

- GBR
- Amendment to Waiver
  - Complex and Chronic Improvement Program (CCIP)
  - Hospital Care Improvement Program (HCIP)
Care Redesign under the All Payer Model

• The State recently received federal approval for an Amendment to the All Payer Model. This Amendment, calls on hospitals to engage in Care Redesign initiatives.

• Starting in CY 2017, hospitals can choose to participate either or both of two new Care Redesign Programs: the Hospital Care Improvement Program (HCIP) and the Complex and Chronic Care Improvement Program (CCIP).

• Participation in these programs will enable hospitals to access identifiable Medicare data, provide care coordination resources to non-hospital providers and potentially pay incentives to non-hospital providers.
CRISP receives inbound data feeds from many provider organizations across the region, including all acute care hospitals in Maryland, D.C., and soon West Virginia. This powers CRISP services, putting clinical information in the hands of those with treatment and care coordination responsibilities.

<table>
<thead>
<tr>
<th>Data source or attribute</th>
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</thead>
<tbody>
<tr>
<td>Live hospitals</td>
<td>106: 48 in MD, 9 in DC, 29 in WV (via WVHIN), 6 in DE (via DHIN), 17 in VA (via Connect VA), 1 in OH</td>
</tr>
<tr>
<td>Long-term and post-acute care facilities</td>
<td>134</td>
</tr>
<tr>
<td>Standalone labs and radiology centers</td>
<td>3 Lab 13 Rad</td>
</tr>
<tr>
<td>Unique patients in our index</td>
<td>+17.6 million</td>
</tr>
<tr>
<td>Patient searches</td>
<td>&gt; 208,000/month (125K found)</td>
</tr>
<tr>
<td>Encounter alerts sent</td>
<td>&gt; 2.3 million / month</td>
</tr>
<tr>
<td>PDMP Accesses</td>
<td>112,373</td>
</tr>
<tr>
<td>Provider Orgs using ENS or Query Portal</td>
<td>1,350</td>
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</tbody>
</table>

**Clinical Data Feeds**

- 285

- ADT 17,194,303/m
- Laboratory Reports 3,615,545/m
- Radiology Reports 651,131/m
- Transcribed Reports 818,352/m
CRISP Key Performance Indicators – 2017

Monthly Queries

- Monthly Manual Queries
- Automated PDMP Queries
- ULP
## Participating Organizations (www.crisphealth.org)

### Connected Providers

![Connected Providers](image)

#### Health Information Exchange Participants as of 7/19/2017

For the Excel version of our below list of Connected Providers, please click here.

<table>
<thead>
<tr>
<th>Sources of Data</th>
<th>Identifier</th>
<th>Encounter Information</th>
<th>Lab Results</th>
<th>Radiology Reports</th>
<th>Electronic Reports</th>
<th>CCDA Documents</th>
<th>Image Exchange</th>
<th>ENS Admit Reason</th>
<th>ENS Discharge Disposition</th>
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<td>Maryland Hospitals</td>
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<tr>
<td>Anne Arundel Medical Center</td>
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<tr>
<td>Atlantic General Hospital</td>
<td>AGH</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<td>✓</td>
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<tr>
<td>Baltimore Washington Medical Center</td>
<td>UMMS_BWMC</td>
<td>✓</td>
<td>Apr.14</td>
<td>Jan.14</td>
<td>Sep.14</td>
<td>Apr.16</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Calvert Memorial Hospital</td>
<td>CMH</td>
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<td>✓</td>
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<tr>
<td>Carroll Hospital Center</td>
<td>CHC</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td>Doctor's Community Hospital</td>
<td>DCH</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<td>✓</td>
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<tr>
<td>Fort Washington Medical Center</td>
<td>FYMC</td>
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<td>Sep.12</td>
<td>Sep.13</td>
<td>Dec.13</td>
<td>Jun.15</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Frederick Memorial Hospital</td>
<td>FMH</td>
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<td></td>
<td>✓</td>
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<tr>
<td>Greater Baltimore Medical Center</td>
<td>GBMC</td>
<td>✓</td>
<td>Nov.12</td>
<td>Sep.12</td>
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<tr>
<td>Johns Hopkins Bayview Medical Center</td>
<td>JHH_BVW</td>
<td>✓</td>
<td>Mar.17</td>
<td>Jun.12</td>
<td>Jul.12</td>
<td>Jul.15</td>
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<tr>
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<tr>
<td>Laurel Regional Hospital</td>
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<tr>
<td>McCrady Memorial Hospital</td>
<td>MCMH</td>
<td>✓</td>
<td>Aug.12</td>
<td>N.A.</td>
<td>N.A.</td>
<td>N.A.</td>
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</tr>
<tr>
<td>MedStar Franklin Square Hospital Center</td>
<td>MEDSTAR_FSSH</td>
<td>✓</td>
<td>Jun.12</td>
<td>Jun.12</td>
<td>Nov.12</td>
<td>Nov.12</td>
<td>✓</td>
<td>✓</td>
<td>◼</td>
</tr>
<tr>
<td>MedStar Good Samaritan Hospital</td>
<td>MEDSTAR_GSH</td>
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<td>Jun.12</td>
<td>Jun.12</td>
<td>Nov.12</td>
<td>Nov.12</td>
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<tr>
<td>MedStar Harbor Hospital</td>
<td>MEDSTAR_HHC</td>
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<td></td>
<td>✓</td>
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</tbody>
</table>
CRISP core services, regional presence and future directions
CRISP currently receives information pertaining to ER visits and inpatient admissions in real-time from acute care hospitals in Maryland, DC, Delaware and the region:

- All 48 Maryland acute care hospitals
- 9 D.C. acute care hospitals
- 6 Delaware acute care hospitals
- 17 Virginia acute care hospitals
- 29 West Virginia acute care hospitals
- 1 Ohio acute care hospital
- Almost 2/3 of Long Term Care Sites in Maryland

CRISP has the ability to communicate this information, in the form of real time hospitalization alerts to SNFs, care coordinators, PCPs, and others responsible for care.
How Does ENS Work?

1. A resident goes to the hospital

2. At registration the hospital asks the resident for basic information (name, DOB, etc.) and the reason for the visit. The registrar enters that information into an Electronic Medical Record.

3. When the registrar has completed entering the information, and pushes ‘save’, a copy of that information is immediately sent to CRISP.

4. A facility who has submitted a resident panel to CRISP that includes this resident receives a real-time or batch notification that the resident has been to the hospital.

5. The facilities that submitted resident panels to CRISP may also consult ENS Prompt for the resident’s discharge disposition and location, and the Patient Care Overview for important details about the resident’s prior hospitalizations and care coordination activities.
“I just received a transfer from the hospital and I didn’t receive all the clinical information I need, how can I get the complete medical record?”

CRISP collects and stores medical data from facilities, communities, hospitals, ambulatory services, and others who have chosen to join CRISP. Through a secure portal participants are able to view their patients’ medical data.

Clinical Query Portal
Searching Patients
Clinical Query Portal

Other Details:
- Recent encounter events
- Patient demographics
- Lab & radiology results
- List of chronic conditions
- 6 most recent hospital encounters
  - Medical Record #
  - Account #
  - Admit Date
  - Discharge Date
  - Visit Type
- Coded Information for Visit
  - APRDRG code/description
  - Diagnosis codes (primary/secondary)/Descriptions
Viewing Patient Information: Patient Care Overview

Rollins, Jenny K  | Female | 12/20/1978 (38 yrs) | Community ID: 3344223 |
2985 Oxford Court, Columbus, MD 39701

| Organizations Subscribed to this Patient via CRISP's Encounter Notification Service |
|----------|---------------------------|
| No patients found |

<table>
<thead>
<tr>
<th>Care Alerts</th>
<th>Date</th>
<th>Alert</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sender: University of Maryland Medical Center</td>
<td>2016-08-18</td>
<td>9/18/2015 3:19 PM KK</td>
</tr>
<tr>
<td>Usual presenting history: Intoxicated, exhibiting loud negative mood, with or without SI. His usual pattern is to self present to ED, typically with high BAC. For treatment of severe depression, SI. After an event that precipitated heavy alcohol intake. With rest food in the ED, even prior to evaluation, he often reports more positive mood and less from depressive symptomatology. SI and subsequently his requests discharge from ED. Even if he initially undergoes evaluation and considers placement, will the often request discharge prior to placement.</td>
<td></td>
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</tr>
<tr>
<td>Violence/suicidality propensity: History of arrest for armed robbery/assault/possession with intent. Most recent event of violence noted to be 4 years ago.</td>
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<tr>
<td>Atypical presentation features or indicators for hospitalization: If it differs significantly from what described above.</td>
<td></td>
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</tr>
<tr>
<td>Collaborative/Community resources: Long history of mental health problems. Contact information:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other key notes/Recommendations: Allow patient to voice his own. Don't rush placement as he will often change his mind about admission. He self presents and can be discharged with improved mood/symptom presentation.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Copyright © 2017 Mirth Corporation. All rights reserved | Mirth Results | 03/25/2017 19:59:23AM EDT | About
CRISP ULP – Patient Search

- User performs patient search by entering Name and Date of Birth
• Additional information (such as address) is available for the Prescribers and Pharmacies
• Total count of Prescribers and Pharmacies is tallied for loaded data
Evolving HIE Strategy

Visit Us (again & again)
- Portal
- ENS
- CRS

Single Sign On
- No extra clicks
- No passwords to remember

Unified Landing Page
- One-stop shopping
- Role-based access

Embedded Services
- In-Context Notifications
- Web Services
- Workflow sensitive
- Transparent to user

Learning Health System
- Virtuous cycle
- Data informs patient care and future insights
1. The support of research is a valuable but secondary component of CRISP’s mission to share data to facilitate care, reduce costs, and improve health outcomes. CRISP will support research efforts so long as they do not detract from its primary mission.

2. CRISP will contribute to the learning health system by making CRISP-mediated data available to researchers who are participants in CRISP through a well-governed request submission, review, approval, and audit process.

3. CRISP will not replicate services which are available through participating organizations or agencies or serve as a method for bypassing institutional processes for addressing data needs of researchers.

4. CRISP will assess fees to research data requestors in a cost recovery manner in order to cover its actual direct and indirect costs.
5. CRISP will inform patients and their caregivers of the use cases under which their data may be made available for research purposes.

6. CRISP will maintain a public record of its data disclosures for research through regular publication on its website.

7. CRISP will partner with participating researchers to receive feedback on data and service quality and incorporate research results into CRISP offerings.

8. CRISP will periodically evaluate the value of expanding its ability to deliver data in support of research and will seek input from the research community on optimal methods for delivering data in a manner that can support research related to improving care delivery, reducing costs, and improving health outcomes.
CRISP Research Initiative Progress To Date

4/20/2016
Research approved as a new permitted purpose under CRISP Participation Agreement

6/20/2016
State regulatory framework supporting the use of HIE data for research goes into effect

8/10/2016
CRISP Research Subcommittee meets for the first time

11/8/2016
First use case approved – Patient-Consented, IRB-Approved Research

11/28/2016
First research study approved: JHU ALIVE

3/8/2017
2nd use case approved - Combining CRISP Data with HSCRC Case Mix Data for Research

8/31/2017
Four research projects live and using CRISP data
CRISP Research Subcommittee

• Dr. Christopher Chute (Chair) – Bloomberg Distinguished Professor of Health Informatics at Johns Hopkins University
• Dr. Robert S. Rudin – Information Scientist, RAND
• Dr. Kate Tracy – Associate Professor and Director of Clinical Translational Research and Informatics Center at the University of Maryland School of Medicine
• Dr. Neil Weissman – President of the MedStar Health Research Institute
• Patient / consumer representative – TBD
CRISP Research Initiative – Data Use Agreement

Approved by Research Subcommittee and Clinical Advisory Board

Extensive legal review by legal counsel of participating organizations (particularly JHU)
For approved uses under two approved use cases:

• Patient-Consented, IRB-Approved Research
  • Multi-Ethnic Study of Atherosclerosis (JHU MESA)
  • Navigation Services to Avoid Rehospitalization (NavSTAR)
  • AIDS Linked to the IntraVenous Experience (JHU ALIVE)

• Combining CRISP Data with HSCRC Case Mix Data for Research
  • Utilizing the B’FRIEND data and platform to develop and test a predictive risk models for falls in elder adults (B’FRIEND)
Utilizing the B’FRIEND data and platform to develop and test a predictive risk models for falls in elder adults (B’FRIEND)

Approval Date: 8 March 2017
Principal Investigator: Hadi Kharrazi
Organizational Sponsor: Johns Hopkins University / Johns Hopkins Center for Public Health IT
Use Case: Combining CRISP Patient Identifiers and Geocoding Data with HSCRC Case Mix Data for Research
CRISP Data Requested: HSCRC Case Mix Data enhanced with anonymized CRISP IDs and census block group level geocodes

Summary: Using the HSCRC case mix data, the investigators are developing and validating spatiotemporal risk prediction trajectory models to predict elder falls. The investigators will examine geographical information system (GIS) data sources for completeness, accuracy and timeliness and develop hot-spotting algorithm using GIS triangulation and predictive modeling. Analysis will utilize Poisson and Bernoulli distribution models to identify hotspots and we will customize methodology using ArcGIS, SaTScan and R software packages. They will develop and evaluate a falls risk score with new and external data to improve current methodology and risk prediction scores. The research involves a large anonymized population health dataset. Sample size varies from each year depending on the number of Baltimore residents who receive care at a hospital. The average number of inpatient hospital visits for Baltimore in 2013 has been about 103,000 and outpatient visits have been over 1.3 million. The team will validate the identification of falls among older adults comparing information from HSCRC and MHCC using statistical means. They will merge external datasets that are publicly available to include in development of a risk score. Using the merged data sets, they will develop and validate the risk scores through logistic regression.
Summary: The Multi-Ethnic Study of Atherosclerosis (MESA) is a study of the characteristics of subclinical cardiovascular disease (disease detected non-invasively before it has produced clinical signs and symptoms) and the risk factors that predict progression to clinically overt cardiovascular disease or progression of the subclinical disease. MESA is funded by NIH with some additional supplemental funding by EPA and foundations. MESA researchers recruited a diverse, population-based sample of 6,814 asymptomatic men and women aged 45-84 from six field centers across the United States in 2000-2002. Approximately 38% of the recruited participants are white, 28% African-American, 22% Hispanic, and 12% Asian. The first examination took place over two years, from July 2000-July 2002. It was followed by four examination periods that were 17-20 months in length, and a sixth exam which started in September 2016. At 9 to 12 month intervals, participants or a family member are contacted to inquire about outpatient visits, hospital admissions, and deaths. Self-reported diagnoses are verified using medical records of outpatient visits and hospitalizations. For deaths, interviews with the next of kin and death certificates help to identify cause of death. Two physicians from the MESA mortality and morbidity review committee independently adjudicated all events using blinded records. There are over 1000 published manuscripts including MESA data. For more information see https://www.mesa-nhlbi.org
Navigation Services to Avoid Rehospitalization (NavSTAR)

Approval Date: 28 February 2017
Principal Investigator: Christopher Welsh / Jan Gryczynski
Organizational Sponsor: University of Maryland Medical System / Friends Research Institute, Inc.
Use Case: IRB-Approved, Patient-Consented Research
CRISP Data Requested: Query Portal and ENS access for consented patients

Summary: Substance use disorders (SUD) are strongly associated with repeat hospital admissions. A major contributor to rehospitalization for individuals with SUD is lack of adherence to hospital post-discharge plans for outpatient medical care and substance abuse treatment. Several factors influence such non-adherence for this population. These include difficulty navigating systems of care, concrete barriers to treatment entry (e.g., lack of health insurance and transportation), and low motivation for medical and/or substance abuse treatment. The goal of the Navigation Services To Avoid Rehospitalization (NavSTAR) research project is to assess the value of care navigation services delivered to hospital patients with SUDs. NavSTAR will employ evidence-based patient navigation and motivational intervention strategies initiated during hospitalization and continued for three months post-discharge. Navigators will work closely with patients to increase motivation and resolve barriers to entering appropriate outpatient medical and substance abuse treatment services. This two-arm randomized controlled trial (RCT) will evaluate NavSTAR for patients hospitalized for medical/surgical problems who have a comorbid substance use disorder. Adult hospital patients with a SUD for opiates, cocaine, or alcohol (N=420) will be randomly assigned to NavSTAR or treatment as usual (TAU). Research follow-ups will be conducted at 3-, 6-, and 12-months post-discharge. This RCT will examine the effectiveness, cost-effectiveness, and cost-benefits of NavSTAR for the primary outcome of rehospitalization, as well as other important medical and substance use outcomes.
Summary: The AIDS Linked to the IntraVenous Experience (ALIVE) Study uses a prospective, observational cohort design to follow persons 18 years of age or older with a history of injecting drugs in Baltimore. Since inception in 1988, ALIVE has followed participants systematically with study visits every 6 months and with comprehensive evaluation including both nurse and interviewer-administered as well as computerized questionnaires, a focused clinical examination and collection of blood samples. The primary objectives of the study include characterization of the incidence and risk factors for blood borne infections, the natural history of injection drug use, the natural and treated course of HIV infection and the impact of coinfection and comorbidities in the setting of HIV. Since inception, >5000 persons have been enrolled into the study. Currently in follow-up, we have ~1,100 active participants including both HIV-infected (~30%) and HIV uninfected (70%) persons to allow appropriate comparisons and evaluation of HIV-specific effects. ALIVE is one study supported by two grants from the National Institute on Drug Abuse – ALIVE I and ALIVE II which follows the HIV-infected and HIV-uninfected participants, respectively. All subjects are initially enrolled into the ALIVE-2 study which covers the basic study protocol. HIV infected persons also provide informed consent for ALIVE-1.
Determine if ENS adoption is associated with a decrease in 30-day readmissions and post-ED care utilization

Data:
• Inpatient admission/readmission and ED care utilization information for Maryland (2012 to 2016)
• Patient diagnosis and demographic information
• Indicator for patient enrollment in ENS panel

Overview:
• Evaluates ENS impact on readmissions and post-ED care
• Compares the “ENS population” to the “Non-ENS population”
  • 30-day readmissions
  • Post ED care utilization
• Will focus on individuals with ambulatory care sensitive conditions
• “Of all hospital admissions, what percent generates a notification?”
• May be done with a sample of the data
ED “Ghosts”

• Evaluate what happens to patients who leave the ED without being seen - need 4-5 different variables (patients who leave without being seen and others who are seen)

• Interested in what happens with these patients - where do they go after they leave? Do they go home? Do they go to another ED?

• Current papers are limited in their effectiveness - He thinks they are underreporting the actual outcomes.

• Initially did a quality improvement project: Got a list of patients who left without being seen, then tracked to see where they went after that. Most didn't go anywhere; others returned to UMMC; some went elsewhere.
Diabetes Pathway versus boot camp in October 2017, adding another 300 participants to the ones we accrued in the pilot phase.

Can we reduce the risk for ED visits and hospitalizations in our intervention at 30 days and 90 days from baseline?

To ensure that we are capturing accurately all utilization data for the 400 participants and 1200 matched controls, we will need CRISP to pull this information for us.