Leveraging EHRs and HIEs for Hepatitis C Surveillance, Prevention and Management:

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University of Massachusetts Medical School

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Leveraging EHRs and HIEs for Hepatitis C Surveillance, Prevention and Management:

Exploring ways that public health departments may utilize these resources

NASTAD & University of Massachusetts Medical School
October 31, 2017

Audio by phone: 1 877 369 0926 (Toll Free)
Webinar ID: 921-559-291
Emerging Opportunities for Public Health and Health Systems Data

- NASTAD’s Health Systems Integration program includes a focus area on health systems data and opportunities for public health programs to use that data to improve HIV and hepatitis surveillance and programs.

| Claims data (Medicaid, Medicare, commercial insurance, All-Payer Claims Databases) | Encounter data (Electronic Health Records, Health Information Exchanges) |

**Connections: Health Informatics to Improved HIV Outcomes**

**Financing HIV Prevention Services**

Collaboration and innovation between Public Health and Medicaid Agencies.
The Webinar Series & Technical Resources

- NASTAD partnered with informatics experts at the University of Massachusetts Medical School to create a webinar and technical resource series focused on health systems data opportunities for hepatitis C programs
  - Querying Claim Databases for HCV Testing and Treatment
    - With accompanying technical resource
  - Data Sharing Agreements 101: What Hepatitis Programs Need to Know
    - With accompanying technical resource
  - Leveraging EHRs and HIEs for Hepatitis C Surveillance, Prevention and Management: Exploring Ways that Public Health Departments May Utilize These Resources
Agenda

1. **Introduction from NASTAD**

2. **Mass HLway**: Overview of the Massachusetts statewide HIE

3. **HealthInfoNet**: How the Maine HIE provides population health services, including supporting the surveillance, prevention & management of chronic diseases

4. **Examples of public health departments using data from EHRs or HIEs for Hepatitis C surveillance and programs:**
   - New York City Department of Health and Mental Hygiene
   - Public Health - Seattle & King County

5. **Open discussion**: Ways that public health departments may leverage EHRs and HIEs for Hepatitis C surveillance, prevention and management

6. **Conclusion**
The Mass HIway:
Overview of the Massachusetts statewide HIE

Michael Chin, MD

Senior Policy Analyst, MassHealth
Assistant Professor, University of Massachusetts Medical School
Pre-webinar Survey

- 28 respondents, from 22 locations

- Are you using electronic health record (EHR) or health information (HIE) exchange data for your hepatitis program?
  - 33% yes
  - 29% no
  - 38% not sure

- How do you use these data?
  - Funded providers pull data to give to the state health department but do not pull from EHR directly.
  - Just recently received access to an HIE but have not started using these data yet.
  - Use HIE to find data missing in surveillance, but this happens infrequently on a case by case basis.

- What questions do you have?
  - Does funding exist to support integration?
  - How to interface EMR to surveillance systems
  - Strategies to support enhancement of EHRs, and utilization of data for CQI.
  - How do states get more access to RHIOs and HIEs so they can support local health departments in their state? Currently this access is not available at the state level but only at the local level.
**Health Information Exchange (HIE)**

- **Health Information Exchange (HIE) is used both as a noun and as a verb:**
  - **As a verb:** HIE is the sharing of health-related information between two or more organizations
  - **As a noun:** an HIE is the organization that facilitates the exchange of health-related information between two or more organizations

- **HIEs vary in many ways:**
  - **Architecture:**
    - **Centralized:** Patient data is collected and stored in a centralized repository that the HIE controls
    - **Federated (decentralized):** Patient data is not stored by the HIE (independent databases allow for data sharing)
    - **Hybrid**
  - **Geographical reach:** state-wide vs. regional vs. local
  - **Function:** secure messaging, electronic lab reporting, public health reporting, care summary exchange, e-prescribing, event notifications, predictive analytics, etc.
  - **Consent:** no consent, opt-in, opt-out, opt-in with restrictions, opt-out with exceptions
  - **Applicable legislation:** State laws may enable an HIE and specify their architecture, function &/or consent
  - **Funding:** federal & state government, insurers, provider

**Sources:**
- ONC webpage, “What is HIE?”
- HIMSS webpage, “FAQ: Health Information Exchange (HIE)”
- Wikipedia page, “Health information exchange”
Mass HIway Timeline

- **Nov 2011**: EHS Requests CMS Funding for HIE
- **Feb 2012**: Orion Selected as HIE Vendor
- **Jun 2012**: Mass HIway Direct Messaging Launched
- **Oct 2012**: DPH Syndromic, Immunizations and Reportable Lab Results Launched on HIway
- **Jan 2014**: First HISP Connected to Mass HIway
- **May 2014**: Regulations promulgated that clarify statutory requirement for providers to connect to HIway
- **May 2015**: Mass HIway Interagency Working Group formed and begins strategic review of HIway services
- **Apr 2013**: Mass HIway Relationship Listing Service Launched
- **May 2017**: CMS Approves Funding

**Timeline:**
- 2011
- 2012
- 2013
- 2014
- 2015
- 2017
The Mass HIway is the statewide, state-sponsored Health Information Exchange (HIE) operated by the Executive Office of Health and Human Services (EOHHS).

- **Mission:** The mission of the Mass HIway is to enable health information exchange by health care providers and other Mass HIway Users regardless of affiliation, location or differences in technology.

- **The Mass HIway has two core functions:**
  - **Function #1 – HIway Direct Messaging:**
    i.e., a secure method of sending a transmission from one Mass HIway User to another, where the HIway does not use, analyze or share information in the transmissions
  - **Function #2 – HIway-Sponsored Services:**
    i.e., services such as the forthcoming state-wide Event Notification Service (ENS), where the HIway may use, analyze, and/or share the minimal amount of information necessary to conduct the service, on behalf of HIway Participants

- **The Mass HIway does not currently function as a clinical data repository**

- **The Mass HIway provides health information exchange across the state:**
  - Over 1,000 HIway Participants, including organizations across the care continuum (including hospitals from 60+ organizations, ambulatory providers, long-term care facilities)
13 Month HIway Transaction Activity

7,894,635 Transactions* exchanged in July (06/21/2017 to 07/20/2017**)
158,342,312 Total Transactions* exchanged inception to date

* Note: Includes all transactions over Mass HIway, both production and test
** Note: Reporting cycle is through the 20th of each month.

Source: August 2017 HIT Council presentation
### Care Continuum

<table>
<thead>
<tr>
<th>Hospitals</th>
<th>Ambulatory</th>
<th>Long-Term, Post-Acute &amp; Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>Approximately 80 organizations</td>
<td>More than 850 organizations/providers</td>
<td>Over 170 organizations</td>
</tr>
<tr>
<td>• Mix of large networks and medical centers to single-site community hospitals</td>
<td>• Primary care providers and specialists across a broad range of medical services</td>
<td>Range of services and organization types including:</td>
</tr>
<tr>
<td></td>
<td>• Health centers and clinics providing medical, emotional, behavioral, and additional social services</td>
<td>• Area Agency on Aging (AAA)</td>
</tr>
<tr>
<td></td>
<td>• Urgent care and minute clinics</td>
<td>• Aging Service Access Point (ASAP)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Behavioral Health</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Skilled Nursing Facilities (SNF)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Nursing homes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Inpatient Rehabilitation Facilities (IRF)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Home health, palliative care, and hospice</td>
</tr>
</tbody>
</table>

**Note:** 15+ orgs such as Labs, Payers, Imaging Centers, business associates etc.
An interactive participant map of all Mass HIway Participants is updated monthly, and is available on the Mass HIway website.

Find the map at the Mass HIway website (www.masshiway.net). Under the Resources drop-down menu, select Participant List. The map is maintained in partnership with the Massachusetts eHealth Institute (MeHI).
Providing multiple connectivity options has supported **broad participation in the Mass HIway**. The Mass HIway currently works with more than 44 EHR vendors, 23 HISPs, and 7 integration engines, through **13 deployment variations**.
## Use Cases for HIway Direct Messaging

<table>
<thead>
<tr>
<th>Use Case Categories</th>
<th>Example Use Cases</th>
</tr>
</thead>
</table>
| **Provider-to-Provider Communications** | • Hospital sends a discharge summary to a Skilled Nursing Facility (SNF) or Long Term/Post Acute Care (LTPAC) facility  
• Primary Care Provider (PCP) sends a referral notice to a specialist  
• Specialist sends consult notes & updated medications list to patient’s PCP  
• Hospital ED requests a patient’s medical record from a PCP  
• PCP sends a CCD or C-CDA with Problems, Allergies, Medications, and Immunizations (PAMI) to a Hospital caring for their patient |
| **Payer Case Management**             | • ACO sends quality metrics to a payer  
• Provider sends lab results to a payer  
• Provider sends claims data to payer |
| **Quality Reporting**                 | • Provider sends clinical data to Business Associate for quality metrics analysis  
• Provider sends quality metrics to Business Associate for report preparation |
| **Public Health Reporting**           | • **Provider sends to DPH:**  
  o Massachusetts Immunization Information System (MIIS)  
  o Syndromic Surveillance (SS)  
  o Opioid Treatment Program (OTP)  
  o Childhood Lead Paint Poison Prevention Program (CLPPP)  

• **Provider sends to other agencies:**  
  o Occupational Lead Poisoning Registry (Adult Lead)  
  o Children’s Behavioral Health Initiative (CBHI) |
HealthInfoNet

How the Maine HIE provides population health services, including supporting the surveillance, prevention & management of chronic diseases

October 31, 2017
Who Is HealthInfoNet?

MISSION: To deliver trusted health information exchange services that help the healthcare community create lasting system-wide improvements in the value of patient care.

• Nationally recognized as one of the leading statewide Health Information Exchanges (HIEs) in the country
  – 98% of Maine residents have some data in the HIE
  – Expanding **connectivity** to pharmacies, social service agencies, public health, etc.
  – Expanding **services** to other states
  – One of the first HIEs to provide the Veteran’s Administration has direct access to the HIE Portal

• An independent Maine-based **non-profit** health information services organization incorporated in 2006

• Board of Directors comprised of statewide community leaders

• Trusted convener with strong community support
# HIE Connections

<table>
<thead>
<tr>
<th>Category</th>
<th>Count</th>
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<tbody>
<tr>
<td>Acute Care Hospitals</td>
<td>18</td>
</tr>
<tr>
<td>Critical Access Hospitals</td>
<td>16</td>
</tr>
<tr>
<td>Mental Health Hospitals</td>
<td>1</td>
</tr>
<tr>
<td>Ambulatory Providers</td>
<td>464</td>
</tr>
<tr>
<td>Behavioral Health</td>
<td>142</td>
</tr>
<tr>
<td>FQHCs</td>
<td>68</td>
</tr>
<tr>
<td>Post-Acute Care</td>
<td>46</td>
</tr>
<tr>
<td>VA Locations</td>
<td>12</td>
</tr>
<tr>
<td>Labs</td>
<td>4</td>
</tr>
<tr>
<td>Health Systems</td>
<td>5</td>
</tr>
<tr>
<td>Emergency Medical Service</td>
<td>3</td>
</tr>
<tr>
<td>Pharmacies</td>
<td>2</td>
</tr>
<tr>
<td>Payers</td>
<td>1</td>
</tr>
</tbody>
</table>
Data Acquisition and QA

- HL7 v.2.x data acquired from EHRs and reference laboratories in “near” real time
  - Chief complaint and event of care information is received in seconds
  - Coding data (final dx/px) received 12-36 hrs
- Batch Medicaid eligibility and claims files received via SFTP monthly
- Prescription medication data received from Surescripts
- All data processed through interface engine and then through a language terminology engine for discrete data elements
  - Validation process and user acceptance testing (UAT) conducted with ALL sites at initial onboard and subsequently annual
  - Automatic QA for data type, format and site data volume at each site through interface engine and SQL database volume reporting
  - Sites address errors identified in sources systems – HIN does not change data received

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Health Information Exchange

Clinical Portal

• Connections to electronic health record systems across the state of Maine
• Aggregated and standardized patient level clinical, encounter and diagnostic coding data
• Central resource for accessing patient specific information to support coordination of care and treatment decisions.
Data in HIE Clinical Portal

- Patient Identifier, demographics & PCP (*registration data*)
- Encounter/Visit History
- Laboratory and Microbiology Results
- Vital signs (*new data*)
- Radiology Reports
- Adverse Reactions/Allergies
- Medication History from Pharmacies & Medicaid Claims
- Diagnosis/Conditions/Problems (primary and secondary)
- Immunizations
- Documents (Discharge summaries, office notes, reports, etc.)
- Continuity of Care Documents (CCD)
Notification Services

• Near real-time notifications via e-mail and daily reports
• Specific events of care such as admission to the hospital or emergency room, discharge from the hospital or emergency room, discharge from skilled nursing facilities, etc.
• *Reports* pushed to the provider related to specific event of care.
Automated Laboratory Reporting

- Notifies Maine CDC (Public Health Department) on hospitals and reference labs behalf

- Specific lab results indicating the existence of one of seventy two diseases mandated for reporting
Syndromic Surveillance

Continuous reporting of events of care where the chief complaint indicates possible disease or condition that requires review/intervention by the Maine CDC
Reporting and Analytics

- Near real-time tool to enhance proactive clinical care management to address risk and improve clinical outcomes
- Provides client analysis of statewide market share and volume information along with population level predictive analytics
- Public health measure tool to allow for real-time assessment of diabetes and hypertension
- Medicaid utilization reporting tool to support Medicaid care management and ED utilization
Patient History

Risk Model Development

1000s of Patient Features

- Age
- Gender
- Geography
- Income
- Education
- Race
- Diagnoses
- Procedures
- Chronic conditions
- Visit and admission history
- Outpatient medications
- Vital signs
- Lab orders and results
- Radiology orders
- Social characteristics
- Behavioral characteristics

Multivariate Statistical Modeling – Decision Tree Analysis

Machine Learning

Patient Risk of Event or Outcome

Available Risk Models

Population Risk Models (predicts future 12 months)
- Predicted future cost
- Risk of inpatient admission
- Risk of emergency dept (ED) visit
- Risk of diabetes
- Risk of stroke
- Risk of AMI
- Risk of hypertension
- Risk of mortality

Event Based Risk Models (predicts future 30 days)
- Risk of 30 day readmission
- Risk of 30 day ED re-visit
St. Joseph Healthcare HIE Analytics Case Study Results

Compared to the state-adjusted rates

15.0% reduction in emergency room visits
4.2% reduction in admissions
12.1% reduction in inpatient days
9.5% reduction in 30-day ED return rate
13.0% reduction in 30-day readmissions
5.0% reduction in cost per person

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Maine CDC Statewide Quality Measures Dashboard

**NQF 59: Comprehensive Diabetes Care: Hemoglobin A1c or Fasting Plasma Glucose Measure Ending 2016-10-14**

<table>
<thead>
<tr>
<th>Measure Name</th>
<th>Population</th>
<th>Numerator</th>
<th>Denominator</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>NQF 59: Comprehensive Diabetes Care: Hemoglobin A1c or Fasting Plasma Glucose</td>
<td>36010</td>
<td>9329</td>
<td>29871</td>
<td>32.34</td>
</tr>
<tr>
<td>Normal HbA1c (A1C &lt; 5.7 or FPG 80-126mg/dL)</td>
<td>36010</td>
<td>9329</td>
<td>29871</td>
<td>6.10</td>
</tr>
<tr>
<td>Pre-Diabetes (A1C 5.7-6.3 or FPG 100-125mg/dL)</td>
<td>76010</td>
<td>2515</td>
<td>29871</td>
<td>16.45</td>
</tr>
<tr>
<td>Diabetes Good Control (A1C 6.4-8.9 or FPG 170-199mg/dL)</td>
<td>26600</td>
<td>13836</td>
<td>29871</td>
<td>43.62</td>
</tr>
<tr>
<td>Diabetes Poor Control (A1C &gt;9.0 or FPG &gt;250mg/dL)</td>
<td>26600</td>
<td>4483</td>
<td>29871</td>
<td>17.04</td>
</tr>
<tr>
<td>HbA1c and FPG not Available</td>
<td>26600</td>
<td>5346</td>
<td>29871</td>
<td>17.9</td>
</tr>
</tbody>
</table>

**Measure Sub-Categories**

- Diabetes Good Control
  - A1C < 5.7 or FPG < 100mg/dL
- Diabetes Poor Control
  - A1C > 9.0 or FPG > 250mg/dL
- HbA1c and FPG not Available

**Measure Trend**

- Measure Percent vs Date
- Measure Trend Chart

**Overview**

The percentage of patients 16-75 years of age with diabetes (type 1 and type 2) whose most recent HbA1c levels during the measurement year was greater than 6.0% (poor control), or missing an HbA1c result, whose most recent Fasting Plasma Glucose (FPG) is greater than 200 mg/dl, or who was missing both results, or if neither an HbA1c nor an FPG test was not done during the measurement year.

**Initial Population**

Total patients aged 16 to 75 during the measure year who had a diagnosis of diabetes at the selected site(s) at any time.

**Denominator**

Patients 16-75 years of age by the end of the measurement year who had a diagnosis of diabetes (type 1 or type 2) during the measurement year or the year prior to the measurement year.

**Numerator**

Patients whose most recent HbA1c level is greater than 6.0%, or if the HbA1c result is missing, whose most recent Fasting Plasma Glucose (FPG) is greater than 200 mg/dl, or who is missing both results, or if neither an HbA1c or an FPG test was not done during the measurement year. If the outcome is an out of range result of an HbA1c test, indicating poor control of diabetes. Poor control puts the individual at risk for complications including renal failure, blindness, and neurologic damage. There is no need for risk adjustment for this intermediate outcome measure.

**Exclusions (optional)**

- Exclude patients who did not have a diagnosis of diabetes, in any setting, during the measurement year or the year prior to the measurement year.
MaineCare (Medicaid) Emergency Department Reporting
Key Statistics

• **562,348** Maine residents had encounter and clinical content added to the exchange in the past 12 months

• **98%** of all Maine residents have clinical information in the exchange

• **16.5 million** inbound messages received per month

• **85,000** patients are accessed each month by clinical users of the exchange

• **45,000** real time notifications of patient encounter activity generated each month

• **500,000** automated laboratory results and syndromic surveillance messages sent to Maine CDC each month

• **3,500** unique users are accessing the portal each month
Public Health Messages Last 12 mos.

Message Forwarded to the CDC by Type
Last 12 Months

Aug-16: 252,289 (Lab 60,279, Syndromic Surveillance 192,010)
Sep-16: 227,817 (Lab 58,134, Syndromic Surveillance 169,683)
Oct-16: 227,817 (Lab 59,390, Syndromic Surveillance 168,427)
Nov-16: 216,263 (Lab 58,519, Syndromic Surveillance 157,744)
Dec-16: 224,491 (Lab 57,566, Syndromic Surveillance 166,925)
Jan-17: 227,930 (Lab 69,273, Syndromic Surveillance 158,657)
Feb-17: 227,930 (Lab 72,177, Syndromic Surveillance 155,753)
Mar-17: 2,071 (Lab 102,826, Syndromic Surveillance 1,968)
Apr-17: 2,100 (Lab 108,560, Syndromic Surveillance 1,990)
May-17: 1,641 (Lab 116,752, Syndromic Surveillance 1,450)
Jun-17: 2,561 (Lab 101,721, Syndromic Surveillance 2,040)
Jul-17: 1,989 (Lab 99,044, Syndromic Surveillance 1,945)
Aug-17: 3,241 (Lab 110,101, Syndromic Surveillance 3,130)
HIE Monthly Usage 2015-Aug 2017

Number of Patients Accessed Per Month 2015 - 2017

- Number of Patients Accessed
- Months: Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec
- Colors: 2015 (light green), 2016 (dark blue), 2017 (light blue)
Contact Information

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New York City (NYC) Department of Health and Mental Hygiene (DOHMH) and HIEs - Background

• NYC and HIEs
  • Covered by three HIEs
    • Front end access and analytic database capabilities at different stages
    • Statewide HIE not yet functional

• DOHMH and HIEs
  • Partnerships are key
  • Evaluation: determined availability and reliability of data
    • Compared HIE data to case investigation and electronic lab reporting (ELR) data
    • HIEs are best for lab and imaging data, not as good for symptoms, onset/diagnosis dates and medications
  • HIE front ends are regularly used for case investigations (Legionella, Hepatitis A)
    • Users must confirm they are accessing data for public health purposes
Hepatitis C and HIEs

• 2016: over 11,000 newly reported cases of hepatitis C
  • Given high number and limited resources, higher risk persons may need to be prioritized for linkage to care

• FIB-4 and APRI scores have been shown to be indicators of liver disease (1,2)
  • Calculated using AST, ALT and platelets - labs readily available in EHRs/HIEs

• Mutual Partnership
  • HIE: certifies as reporting to public health
  • DOHMH: receives supplemental lab information to calculate FIB-4 and APRI scores

Data Process

• Every six months: HIE sends supplementary lab information (AST, ALT, platelets) for any patient who had a lab test, ICD 9/10, or medication indicative of hepatitis C
  • Text file is sent via secure file transfer to a secure folder with limited access
  • Evaluation: Compared HIE file to lab records received by ELR from facilities that report to the HIE

• FIB-4 and APRI calculated
  • Evaluation: Compared HIE FIB-4 and APRI scores to fibrosis scores from a linkage to care program’s patient navigators/physicians clinical assessment

• HIE data matched to DOHMH hepatitis C surveillance data
  • Persons identified with high FIB-4/APRI scores and not treated according to surveillance data
Next Steps:

• Linkage to Care
• Evaluation:
  • Does the supplementary lab data received from the HIE help identify high risk people who need linkage to care?
• Look at additional ways to use HIE data (race and ethnicity)
• Continue to support all NYC HIEs to create analytic databases and increase data availability (lab feeds, medications)
  • Is funding needed to help HIEs with this effort?
• Continue to pursue Electronic Case Reporting
  • Many challenges!
Hepatitis C Test and Cure Program:
Data Collection and Integration to Support Disease Surveillance and Linkage to Care

Public Health – Seattle & King County
Project goal:

Increase capacity to identify and follow-up on reports of HCV cases by improving the quality, timeliness and completeness of HCV surveillance data.
Problem:

Our local surveillance database was not designed to capture data from ELR and EHRs

- No ability to capture data electronically – manual data entry exclusively
- Not a relational database – no demographic, clinical, or lab histories
- Due to administrative burden, only 1st lab reports for patients were being entered
- Not person-based, so lab/clinical data not shared across hepatitis “events”
Objective

Integrate data from
EHRs, labs, and surveillance reports
into a

unified public health data management system
Approach

1) **Reconfigure** hepatitis surveillance database to a *relational model*, allowing multiple lab and clinical reports per person to be recorded.

2) Redesign local surveillance database to include placeholders for *data elements captured from ELR and EHR*.

3) Implement algorithms to **match incoming lab and clinical records** to persons in surveillance database.

4) For labs already reporting to WA state’s ELR system, replace manual data entry with **automated upload** to our local surveillance database.

5) For HCV-TAC partner sites, capture lab and clinical reports extracted from EHRs on a quarterly basis via **upload** to local surveillance database.
- **Traditional reporting**
  - **ELR**
    - Daily (phone/fax) from providers and labs
  - **EHR**
    - Weekly (XML) from WA DOH

- **Local surveillance database**
  - Person deduplication and upload
  - Quarterly (XML) clinical and lab data from HCV TAC partner sites for patients identified as HCV+
<table>
<thead>
<tr>
<th>Facility Name</th>
<th>Date Collected</th>
<th>Lab Name</th>
<th>Requested Test</th>
<th>Result Test</th>
<th>Result/Not Coded</th>
<th>Abnormal Flag</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unknown</td>
<td>11/17/2016</td>
<td>GROUP HEALTH COOP</td>
<td>HEPATITIS C RNA QUANTITATION</td>
<td>Hepatitis C virus RNA (Units/mL)</td>
<td>NOT DETECTED</td>
<td>NORMAL (APPLIES TO NDN NUMERIC RESULTS)</td>
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<tr>
<td>Unknown</td>
<td>11/17/2016</td>
<td>GROUP HEALTH COOP</td>
<td>HEPATITIS C RNA QUANTITATION</td>
<td>Hepatitis C virus RNA log units/mL</td>
<td>NOT DETECTED</td>
<td>NORMAL (APPLIES TO NDN NUMERIC RESULTS)</td>
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<tr>
<td>Unknown</td>
<td>11/17/2016</td>
<td>GROUP HEALTH COOP</td>
<td>HEPATITIS C RNA QUANTITATION (GHC)</td>
<td>Hepatitis C RNA QUANTITATION</td>
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<td>NORMAL (APPLIES TO NDN NUMERIC RESULTS)</td>
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<tr>
<td>Unknown</td>
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<td>GROUP HEALTH COOP</td>
<td>HCV RNA SeqP lidRNAaCrc</td>
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<td>GROUP HEALTH COOP</td>
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<td>HCV RNA SERT PCR-LOG</td>
<td>NOT DETECTED</td>
<td>NORMAL (APPLIES TO NDN NUMERIC RESULTS)</td>
</tr>
</tbody>
</table>
### Visit Information

#### Diagnosis/Treatment

- **Acute HCV Diagnosis Date**: [ ]
- **Chronic HCV Diagnosis Date**: [ ]
- **Previously Treated for HCV**: Yes
- **Year of Prior Treatment**: 2016
- **Previously Achieved SVR**: No

#### Immunizations

- **History of HEP A**: No
- **Immunized for HEP A**: No
- **# Inns for HEP A at Onset**: [ ]
- **Counseled for HEP A**: Unknown
- **History of HEP B**: No
- **Immunized for HEP B**: No
- **# Inns for HEP B at Onset**: [ ]
- **Counseled for HEP B**: Unknown

#### Risk Factors

- **IDU History**: No
- **IDU Last 12 Months**: No
- **IDU Counseling Provided**: Unknown
- **IDU Counseling Date**: [ ]
- **Alcohol History**: No
- **Current Alcohol Abuse**: No
- **Alcohol Counseling Provided**: Unknown
- **Alcohol Counseling Date**: [ ]

#### Co-Morbidities

- **Cirrhosis**: No
- ** Decompensated Cirrhosis**: No
- **Liver Transplant**: No
- **Hepatitis B**: No
- **Chronic Kidney Disease**: No
- **Diabetes Type 2**: No
- **HIV**: No
- **Pregnant**: No

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*Created By: Drake, Curtis  08/16/2017 7:43AM  Last Modified: Drake, Curtis  08/16/2017 7:43AM*
### Visit Information

#### Treatments

<table>
<thead>
<tr>
<th>Regimen</th>
<th>Date Started</th>
<th>Date Stopped</th>
<th>Started?</th>
<th>Reason Not Started</th>
<th>Reason Stopped</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEDIPASVIR/SOFOSBUMIR 90-400MG PEGINTERFER ALFA-2A 180MC/0.5ML peginterferon alfa-2a ribavirin RIBAVIRIN 200MG SOFOSBUMIR 401</td>
<td>09/14/2016</td>
<td></td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Treatment Details

- **Treatment Regimen:** LEDIPASVIR/SOFOSBUMIR 90-400MG PEGINTERFER ALFA-2A 180MC/0.5ML peginterferon alfa-2a ribavirin RIBAVIRIN 200MG SOFOSBUMIR 401
- **Treatment Started:** Yes
- **Date Started:** 09/14/2016
- **Reason Treatment Not Completed:**
- **Treatment Completed:**
- **Date Completed:**
- **Reason Treatment Not Completed:**
**Visit Information**

### Past Medical History

Up to date on vaccinations for Hepatitis A but not Hepatitis B. Patient was previously treated for HCV in 2009 but did not achieve SVR. Patient comes with a long list of medical conditions but with minimal detail about each.

Procedure codes:
- NoOrderDat ~ 20130619 ~ 76705 ~ Ultrasound Abdomen ~ normal liver. mild aneurysmal dilation of proximal aorta 3.1 cm 20131205 ~ 20140114 ~ 76700 ~ Ultrasound, abdomen, Bscan/real time, c ~ renal cysts, no aneurysm 20140304 ~ 20140312 ~ 76700 ~ Ultrasound, abdomen, Bscan/real time, c ~ slight dilatation. Renal artery stenosis. 20150312 ~

### Problem List


### Assessment Notes


### Plan Notes

Continue his current meds. I have counseled him today about injection drug and alcohol use. He will follow up with us in 4 weeks.
Putting it all together...
Continuum of care for diagnosed HCV patients across all HCV-TAC partner sites, 9/30/2013 – 9/30/2017

*Genotype or fibrosis test
Challenges

Database redesign
• Time- and resource-intensive process; costly

Data integration
• High volume of input from ELR and EHR; requires significant time to de-duplicate ambiguous person matches without a unique patient key

Data extraction from EHRs
• Partners had a difficult time identifying patients of interest, and an even more difficult time assembling the data in the XML format we requested
• Partners can only report on what’s captured in their EMRs – we have missing data on risk factors, co-morbidities, biopsy/fibroscan results, start/stop treatment dates
• Patients bounce around healthcare systems; records are scanned in (difficult to extract data), if available at all
• Free-text notes are hard to interpret

Data analysis
• Extensive recoding required to support analysis/surveillance needs
Acknowledgements

Public Health - Seattle & King County Test & Cure Team

- Jeff Duchin (PI)
- Sara Glick
- Elizabeth Barash
- Meaghan Munn
- Atar Baer

King County IT

- Curt Drake
- Beth Sohlberg
- Casey Cassidy

Clinical partners - technical leads

- Scott Terry, Christine Fong, Steve Senter
  Harborview
- Ron Johnson
  Kaiser Permanente (formerly Group Health Cooperative)
- Yan Bai and Troy Hanninen
  Swedish/Providence
- Adam Ledvina, Eric Grendell, Jerry Wilkinson
  Neighborcare, Country Doctor, HealthPoint

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Further questions

Sara Glick (project manager): sara.glick@kingcounty.gov
Meaghan Munn: meaghan.munn@kingcounty.gov
Atar Baer: atar.baer@kingcounty.gov
1. Introduction from NASTAD

2. Mass Hiway: Overview of the Massachusetts statewide HIE

3. HealthInfoNet: How the Maine HIE provides population health services, including supporting the surveillance, prevention & management of chronic diseases

4. Examples of public health departments using data from EHRs or HIEs for Hepatitis C surveillance and programs:
   - New York City Department of Health and Mental Hygiene
   - Public Health – Seattle & King County

5. Open discussion: Ways that public health departments may leverage EHRs and HIEs for Hepatitis C surveillance, prevention and management

6. Conclusion
Conclusion

Thank you!

Contact information for today’s presenters:

• NASTAD:
  - Amy Killelea: akillelea@nastad.org
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• Massachusetts – Mass HIway:
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• Maine – HealthInfoNet:
  - Shaun Alfreds: salfreds@hinfonet.org or info@hinfonet.org

• New York City – Department of Health and Mental Hygiene:
  - Jennifer Baumgartner: jbaumgar@health.nyc.gov
  - Angelica Bocour: abocour@health.nyc.gov

• Public Health - Seattle & King County:
  - Sara Glick: sara.glick@kingcounty.gov
  - Meaghan Munn: meaghan.munn@kingcounty.gov
  - Atar Baer: atar.baer@kingcounty.gov
The Webinar Series & Technical Resources

- Querying Claim Databases for HCV Testing and Treatment
  - With accompanying technical resource

- Data Sharing Agreements 101: What Hepatitis Programs Need to Know
  - With accompanying technical resource

- Leveraging EHRs and HIEs for Hepatitis C Surveillance, Prevention and Management: Exploring Ways that Public Health Departments May Utilize These Resources

- All resources from this series are available here: https://www.nastad.org/informatics
Resources

- **NASTAD Resources**
  - NASTAD primer on health systems data opportunities for HIV programs: [Connections: From Health Informatics to Improved HIV Outcomes](#)
  - NASTAD’s Health Systems Integration Informatics Page

- **Additional Health Systems Data Resources**
  - HIV Health Improvement Affinity Group; HRSA, CDC, and CMS
  - Health Information Technology and Informatics, NACCHO
  - Public Health Informatics, ASTHO
  - Joint Public Health Informatics Taskforce (JPHIT)
  - Digital Bridge