Challenges Encountered in Linking Community Health Centers’ EHR Data to a Web-based Clinical Decision Support Tool

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Context: OCHIN

- A non-profit, full service HIT provider for CHCs
- 1 centrally managed Epic© EHR; NexGen also provided
- Reporting, decision support, practice coaching, workflow design & more
- >500 Epic© member clinics in 18 states (and growing!); based in Portland
- >2,500,000 patients seen in last 3 years
  - 51% Medicaid; 10% Medicare; 16% private; 22% uninsured
  - 33% Hispanic; 22% Spanish primary language
  - 1% Am-Ind / AK; 5% Asian / PI; 17% Black; 66% white; 9% unknown
  - 70% <200 FPL
- PBRN-led research using OCHIN data since 2007
Clinical decision support (CDS) tools can run EHR data through algorithms based on up-to-date evidence, to:

- help disseminate care guidelines, and
- help providers stay abreast of care recommendations.

Such tools often available only in the delivery system / EHR where they were developed

- necessitates reprogramming at many sites when guidelines change
- contributes to slow pace of guideline dissemination.

More efficient if data from any EHR could be sent to a website with regularly updated CDS algorithms – such as CV Wizard

CV Wizard was developed at HealthPartners Institute (HPI); we are now testing its effectiveness in 68 community health centers (CHCs) which share an EHR through OCHIN.

But first we had to establish a data exchange between OCHIN’s EHR & CDS website.
The CV Wizard© CDS tool

- Creates personalized, prioritized summary of a given patient’s modifiable CVD risk factors
- ‘Provider View’ includes CDS that accounts for allergies, comorbidities, etc., based on up-to-date national guidelines
- Low-literacy ‘Patient View’ enables shared decision-making
- Provider feedback tool lets users ask questions about CDS if they don’t agree
- High acceptance / use rates at HealthPartners
## CV Wizard© Provider View

### Patient Information
**Patient Name:** EPICTEST.JOHN  
**Age:** 61  
**Lifetime ASCVD Risk**  
Available for ages 20-59

### Relevant Problems: Diabetes

#### Lipids
**Goal:** Consider statin initiation.  
**CV Risk Reduction:** 8%**

<table>
<thead>
<tr>
<th>Lab</th>
<th>Value</th>
<th>Last Test</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>LDL (mg/dL)</td>
<td>94</td>
<td>9/24/14</td>
<td>2</td>
</tr>
<tr>
<td>HDL (mg/dL)</td>
<td>46</td>
<td>9/24/14</td>
<td>2</td>
</tr>
</tbody>
</table>

**Treatment Considerations:**  
- Baseline ALT measurement is recommended by many experts prior to statin therapy initiation.

### Blood Pressure
**Goal:** BP < 140/90  
**CV Risk Reduction:** < 1%**

<table>
<thead>
<tr>
<th>Lab</th>
<th>Value</th>
<th>Last Test</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP (mm Hg)</td>
<td>141/90</td>
<td>6/2/16</td>
<td>5</td>
</tr>
<tr>
<td>BP (mm Hg)</td>
<td>141/90</td>
<td>6/2/16</td>
<td>5</td>
</tr>
</tbody>
</table>

**Medications:**  
- Lisinopril Tab 10 MG

**Treatment Considerations:**  
- Consider dosage increase of a current BP medication or addition of a new BP med class (may be more effective).
- Patient meets hypertension criteria but hypertension is not on the problem list.
- Consider starting a thiazide diuretic.
- Consider starting a calcium channel blocker (e.g. amlodipine 2.5-5 mg a day).
- Potassium test is due.
- Kidney function test (Cr/CRF) is due.

### BMI
**Goal:** CV Risk Reduction: 2%** (based on 3 unit drop in BMI)

<table>
<thead>
<tr>
<th>BMI</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>4</td>
</tr>
</tbody>
</table>

**Treatment Considerations:**  
- Discuss advantages of reducing weight by 10-20 lbs. Potential actions are listed on patient interface.
- Based on BMI and/or other comorbid conditions, consider discussing bariatric surgery.

### Tobacco Use: YES
**Goal:** CV Risk Reduction: 10%**

<table>
<thead>
<tr>
<th>Tobacco Use</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>YES</td>
<td>1</td>
</tr>
</tbody>
</table>

**Treatment Considerations:**  
- Tobacco use is identified. Assess readiness and consider varenicline (Chantix), bupropion (Zyban), or nicotine patch, gum, lozenge, or inhaler. Type “top correct” in Epic order for smoking cessation counseling referral. Additional options listed on patient interface.

### Aspirin or Blood Thinner Use: NO
**Goal:** CV Risk Reduction: 7%**

<table>
<thead>
<tr>
<th>Aspirin or Blood Thinner Use</th>
<th>Priority</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>3</td>
</tr>
</tbody>
</table>

**Treatment Considerations:**  
- Clinical indication for ASA Yes
- Benefit outweighs risk based only on age, gender and heart disease risk.

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**Disclaimer:** The CV Wizard suggestions are based on electronically available data and are not intended to be a substitute for clinical judgment. Alternative actions to those that Wizard suggest may be indicated. Exercise independent clinical judgment, review allergies, and follow product labeling instructions before choosing Wizard prescribing suggestions.

*Reversible risks are not additive across risk factors because of interactions between risk factors.

**Lifetime risk is calculated for a 50 year old with the risk factor values as the patient above.

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Can you reduce danger of heart attack and stroke?

Yes, you can! If you want to reduce your chance of a stroke or heart attack, talk to your doctor about what you can do about the things with the most ⚠️ signs. The things with the 🌿 are ok.

<table>
<thead>
<tr>
<th>Cholesterol</th>
<th>Blood Pressure</th>
<th>Blood Sugar</th>
</tr>
</thead>
<tbody>
<tr>
<td>⚠️ ⚠️ ⚠️ ⚠️</td>
<td>⚠️ ⚠️ ⚠️ ⚠️</td>
<td>⚠️ ⚠️ ⚠️ ⚠️</td>
</tr>
</tbody>
</table>

**Recommendations:** A cholesterol lowering drug called a statin may be beneficial for you. Talk to your doctor.

<table>
<thead>
<tr>
<th>Weight</th>
<th>Tobacco</th>
<th>Aspirin</th>
</tr>
</thead>
<tbody>
<tr>
<td>⚠️ ⚠️ ⚠️ ⚠️</td>
<td>⚠️ ⚠️ ⚠️ ⚠️</td>
<td>⚠️ ⚠️ ⚠️ ⚠️</td>
</tr>
</tbody>
</table>

**Recommendations:** For support with weight management contact HP Nutrition Services (952-967-5120), or visit www.healthpartners.com/public/health, or call your clinic.

**Recommendations:** For help stopping tobacco use, consider calling HealthPartners at 1-800-311-1052, or the smoking hotline at 1-800-784-8669 (1-800-QUIT NOW). Or visit www.quitplan.com.

**Recommendations:** Before starting aspirin, discuss it with your doctor.

Talk to your doctor about anything with one or more ⚠️ symbols. Take notes here about what you can do to improve your heart health:

Methods

• March 2017- April 2018: OCHIN and HealthPartners collaborated to establish an exchange between OCHIN’s Epic© EHR and the CV Wizard© CDS website

• Goal: Ensure needed EHR data sent to CV Wizard© / HPI, and CDS results sent back to the EHR

• Challenges in the data exchange process were identified and resolved, as follows
Who maintains records of data sent / responses sent back?

• CVW purges patient names regularly; study ID returned to EHR, linked to patient via crosswalk in Clarity
• Remaining limited data set held for 2 weeks (in case needed to check problems)
• Then transferred to analytic dataset for storage (study purposes)
• Copy of data set sent to OCHIN monthly; HPI and OCHIN each have a copy of all data during the study (study purposes)
• Study data saved until analyses complete
• All ‘Study Materials’ – including CVW results – property of OCHIN
• HPI may not use study data without permission; will destroy/return it upon request
Legal Considerations

• **Needed:**
  - **Master Service Agreement** to specify terms for delivery of CVW (e.g., duties, fees, trademark use, protection)
  - **Business Associate Agreement** to cover terms for disclosure of PHI by OCHIN to HPI
  - **Secure File Transfer Protocol** to securely transfer EHR data and programming code used to

• HPI had some standard language that we built from

• Lawyers conferred between the two organizations to ensure acceptable legal language

• This may need to be repeated for every organization hoping to use remote CDS—and it may take much longer than expected!
What method for sending data securely between CDS website and the EHR?

- Data flow diagram
- Security plan established, per OCHIN practices
- Security plan for connecting browser to CVW website established, per OCHIN practices
- CV Wizard generates run ID → passed to the website
- ID stored in a flowsheet and database
- When ‘display call’ made, URL has ID as needed
- Website matches against key
- BAA / MSA required to ensure safety when transferring real-time patient data
Send all medication / laboratory / allergies / diagnosis data to the CDS or just data points needed by the algorithm right now?

• **Why** send all of a given patient’s data to CVW? Why not just the data that the algorithm might use?
  o Diagnoses, Medications, Allergies, Labs, Demographics, Vital signs

• **Cons**: Sending data not known to be needed at this time
• **Pros**: Future revisions of the CVW algorithm might require data points not currently needed; sending all data means no need to track and respond to such changes
  o Safety concerns
  o Maintenance concerns

• Compliance team had to be convinced
• Look-back period of 5 years in most cases; exceptions on a case-by-case basis
• CVW algorithm based on categories of information; sent all data in those categories
• Labs: used a table that points CV Wizard© to existing “Registry metrics”
• Diagnoses: used ICD-10 codes
• Medications, allergies: mapped by CV Wizard© team
• Coding differences managed ... through substantial effort
Could the CDS’ Cache routine be modified to improve performance / sustainability?

- Routine through which CDS website “calls” the data was very slow at first for certain patients – slowed down data exchange a lot
- New approach used to calculate some of the slowest data items
  - Encounter Dx - use dual key indexing
  - Labs - use Metrics as requested, use evalRule as approved by Epic
  - Problem List - use packed data to reduce global hits
  - Current Allergies - used packed data to reduce global hits
  - Current Meds - use data load operation to reduce global hits
  - Get Patient Data/Vitals - use data load operation to reduce global hits, and indexed searches
- This modified the cache routine to help it work more quickly by using standard APIs and the most efficient indices
How to manage lab data, given OCHIN’s structure (a collaborative of independent organizations)?

- OCHIN’s diverse member organizations receive lab data from >60 lab interfaces.

- To ensure CVW receives standardized lab data, we wanted to use metrics, groupers, or an interface table (that uses metrics/groupers of base names) instead of component IDs ... but this takes time to set up.

- CV Wizard© setup table includes lab key to metric mapping, allowing OCHIN to identify relevant lab components using standard processes.
  - Flexible: Lets others using CV Wizard identify lab components using standards potentially different from OCHIN’s.
  - Supports organizational-level standards of Base Names, Common Names, and VCG Groupers, and interoperability standards like LOINC.

- Short term fix:
  - OCHIN used HPI’s current labs programming for start-up, due to time needed to make change to grouper-based system
  - HPI programmed a ‘listener’ on labs to detect anything not already in their tables and alert OCHIN.
How to generate needed data on CDS use rates?

- CVW ‘use rate’ data is key to supporting CVW adoption

- HPI generates use rates - from data captured at HPI

- To let study clinics / the study team run reports themselves, we developed a method for pulling the data from the EHR, in Reporting Workbench
  - Distributive rather than centralized model needed to support OCHIN’s structure
  - Reports cannot be printed / distributed at OCHIN as at HPI, because OCHIN member clinics have different ‘owners’ of their data; quality doesn’t come back to central OCHIN, it goes back to clinics, to allow for local use

- We are developing a method for adding print rates to use rate report ...

- Enterprise model had to be adapted to fit a collaborative organization
How to modify the tool’s ‘feedback’ function for consistency with OCHIN’s usual support practices?

- At HPI, user feedback on the CDS is sent to CVW team
  - OCHIN has own system for managing user feedback on the EHR
- Had to redesign CVW so that feedback is sent to the right people at the clinic first; feedback is distributive, rather than centralized
  - Feedback sent to Site Specialist via EHR’s “Internal Help Request” function
  - Site Specialist monitors In-Basket “Internal Help Request” folder for feedback
  - Site Specialist responds to provider that the issue is being worked on
- Adapted feedback function built into a new feedback tool in OCHIN’s EHR, and CVW references it
How to customize the CVD risk cut point that triggered the CDS tool?

• CVW built the same for all users – otherwise maintenance is too intensive

• The ‘cut point’ for alerts is reversible CVD risk >10%
  o Fewer alerts in a healthier population than in a less healthy one (i.e., in CHCs)

• Does not enable adapting the tool to local need

• Will it impact adoption?
Integration challenges in first weeks after CDS tool activated

- CV Wizard© went live in 33 clinics 9/21/18 (study arm 1)

- Guidebook, trainings offered prior to and after go-live
  - Using CV Wizard© in workflows
  - Evidence
  - Clinic posters and wizard hats

- Feedback in first weeks, though minimal, included:
  - Q: Why does CVW not fire for this patient?
    - A: Reversible CVD risk <10%
    - A: Patient out of CVW age range
Discussion

- Inefficient: all CDS systems must be programmed for new care guidelines
- Improved if multiple EHRs could plug into a single ‘remote CDS’ algorithm
- Would enable rapid dissemination of up-to-date care guidelines
- Challenges to establishing data transfers needed for ‘remote CDS’ are surmountable
- Data standardization / normalization / quality across different EHRs would support data exchange for web-based ‘remote CDS’ tools like CV Wizard
- Emerging / existing standardization systems (e.g., CDSHooks; LOINC) may also help address data exchange barriers to use of web-based CDS
CV Wizard posters in an Arm 1 clinic waiting room!
Thank you! Questions?

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