EMR in Support of Smoking Cessation Counseling

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Conflict of Interest

Eric W. Ford, Ph.D.
Jaeyong Bae, Ph.D.

Have no real or apparent conflicts of interest to report.
Agenda

• Learning objectives
• Health IT as a system-wide solution
• Background
• Literature
• Research Objectives & Hypotheses
• Methods (Data, Dependent & Key Independent Variables, Analytic Strategy)
• Results
• Key findings
• Discussions
• Limitation
• Questions
Learning Objectives

• Assess EHR functionality use in relationship to smoking cessation activities in ambulatory care settings

• Evaluate differential impacts of EHRs on smoking cessation, depending on the level of sophistication of EHR adoption

• Discuss how the use of clinical reminders improves smoking documentation, counseling and the prescription of medications to support cessation
EHRs increase the prevalence of the identification of smoking status as well as smoking cessation counseling and medication in smokers’ visits.

Furthermore, EHR effects on smoking cessation vary across the level of sophistication of EHR adoption.
Health IT as a system-wide solution

- US healthcare system
  - Complex and Fragmented

- System-wide solutions
  - Complex/fragmented → integrated/coordinated

- Health Information Technology (HIT)
Background

• Unhealthy behaviors and chronic diseases are costly
  • burden on healthcare expenditure
  • Premature mortality and morbidity

• Reducing unhealthy behaviors can save cost and improve health outcomes by
  • Preventing the onset of chronic diseases
  • Delaying their progress
  • Managing their conditions effectively

• Preventive health counseling can enhance early detection, prevention, and management of chronic conditions by
  • Identifying risk factors of chronic conditions
  • Influencing health behaviors of patients
Background

• Underuse of preventive health counseling
  • Only 20% of smokers received counseling (2012 MMWR)
  • Affordable Care Act (ACA) mandates tobacco, alcohol, and diet counseling

• Barriers in providing preventive health counseling in outpatient care
  • Physician’s ability to tailor the counseling
  • Physician’s time constraints

• Electronic Medical Records (EMRs) potentially promote the delivery of preventive health counseling by
  • Providing appropriate information with clinical decision support
  • Improving efficiency of care and clinical workflow
Background – Smoking Cessation

- Smoking cessation reduces disease risk, increased life expectancy, and generally better function

- Smoking cessation counseling by physicians improves patients’ efforts to quit smoking.

- EMRs potentially enhance smoking cessation activities in ambulatory care
  - Improving documentation capabilities
  - Providing clinical decision support, reminders, and alerts to enhance smoking cessation counseling and medication
Literature

- Findings from past studies are limited
  - Scope of studies
    - A single clinical site and/or EMR system
    - Mixed and modest EMR effects on smoking cessation
  - Boyle et al (Cochrane review, 2014)
    - 16 studies on EMRs as smoking cessation support
    - Mixed and modest EMR effects on ‘tobacco use’ data collection and improvements in documentation and treatment of tobacco use.
Research Objectives

- Estimate the association of EMR functionality use with smoking cessation activities in ambulatory care settings
  - EMR sophistication (Basic/Advanced)
  - Smoking status recorded, smoking cessation counseling and medication
  - Only primary care visits
Research Hypotheses

• H1: EMR adoption is associated with improved smoking cessation activities in primary care

• H2: The level of EMR sophistication strengthen the association of EMR adoption with smoking cessation activities
Data

- 2007-2010 National Ambulatory Medical Care Survey (NAMCS)
  - U.S. nationally representative sample survey on visits to office-based physicians administered by National Center for Health Statistics (NCHS), CDC
  - 34,383 adult office visits (5,540 visits by current smokers) to primary care physicians (general practitioners, family practitioners, or general internist)
Dependent Variables

• Three dichotomous variables on smoking cessation activities
  
  • Identification of the patient’s smoking status (smoking status recorded)
  
  • Smoking cessation counseling
  
  • Smoking cessation medication
    • Bupropion, Varenicline, and nicotine replacement medications
Key Independent Variables

- EMR Sophistication
  - Following DesRoches et al (NEJM, 2008), defined as three categories
    - Minimal/no EMR (less than minimum set of EMR functions)
    - Basic EMR (minimum EMR set; 6 functions)
    - Advanced EMR (6 advanced EMR functions in addition to Basic EMR; 12 functions)
Analytic Strategy

- Logistic Regression Model
  
  Smoking Cessation Activities_{ij} = \alpha + \beta_1 \text{Basic EMR}_j + \beta_2 \text{Advanced EMR}_j + \beta_3 D_j + \beta_4 P_{ij} + \varepsilon_{ij}

- Smoking Cessation Support: Smoking status recorded, smoking cessation counseling and medication

- D: physician characteristics, P: patient/visit characteristics, health status
### Descriptive Statistics

<table>
<thead>
<tr>
<th>Dependent/key independent variables</th>
<th>(1) All visits</th>
<th>(2) Visits by current smokers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoking status recorded</td>
<td>0.677</td>
<td>0.046</td>
</tr>
<tr>
<td>Smoking cessation counseling</td>
<td>0.046</td>
<td>0.239</td>
</tr>
<tr>
<td>Smoking cessation medication</td>
<td>0.021</td>
<td>0.062</td>
</tr>
<tr>
<td>Basic EMR</td>
<td>0.120</td>
<td>0.118</td>
</tr>
<tr>
<td>Advanced EMR</td>
<td>0.106</td>
<td>0.091</td>
</tr>
<tr>
<td>N</td>
<td>34,383</td>
<td>5,540</td>
</tr>
</tbody>
</table>
EMR adoption, smoking status recorded, smoking cessation counseling and medication

<table>
<thead>
<tr>
<th></th>
<th>EMR description</th>
<th>Smoking status recorded</th>
<th>Smoking cessation counseling</th>
<th>Smoking cessation medication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>All visits</strong></td>
<td>Less than Basic EMRs: 76.4%</td>
<td>0.664</td>
<td>0.046</td>
<td>0.020</td>
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<tr>
<td></td>
<td>Basic EMRs: 12.0%</td>
<td>0.705</td>
<td>0.044</td>
<td>0.020</td>
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<tr>
<td></td>
<td>Advanced EMRs: 10.6%</td>
<td>0.740</td>
<td>0.454</td>
<td>0.028</td>
</tr>
<tr>
<td><strong>Visits by smokers</strong></td>
<td>Less than Basic EMRs: 79.1%</td>
<td>----</td>
<td>0.233</td>
<td>0.057</td>
</tr>
<tr>
<td></td>
<td>Basic EMRs: 11.8%</td>
<td>----</td>
<td>0.226</td>
<td>0.063</td>
</tr>
<tr>
<td></td>
<td>Advanced EMRs: 9.1%</td>
<td>0.310</td>
<td></td>
<td>0.099</td>
</tr>
</tbody>
</table>

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Estimated association of EMR adoption with smoking cessation activities (Odds ratio)

<table>
<thead>
<tr>
<th></th>
<th>(1) Smoking status recorded</th>
<th>(2) Counseling at smokers' visits</th>
<th>(3) Medication at smokers' visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic EMR</td>
<td>1.1673***</td>
<td>0.9119</td>
<td>1.1031</td>
</tr>
<tr>
<td></td>
<td>(0.0450)</td>
<td>(0.0967)</td>
<td>(0.2035)</td>
</tr>
<tr>
<td>Advanced EMR</td>
<td>1.3032***</td>
<td>1.3196**</td>
<td>1.8178***</td>
</tr>
<tr>
<td></td>
<td>(0.0554)</td>
<td>(0.1462)</td>
<td>(0.3095)</td>
</tr>
<tr>
<td>N</td>
<td>34,383</td>
<td>5,540</td>
<td>5,540</td>
</tr>
</tbody>
</table>

*** Statistically significant at the 99.9% level
**  Statistically significant at the 99% level
*   Statistically significant at the 95% level
Key Findings

• Basic EMR is associated with increases in documenting patients’ smoking status

• Advanced EMR is associated with increases in smoking cessation counseling and medication as well as smoking status recorded

• The level of EMR sophistication strengthen the association of EMR adoption with smoking cessation activities
Discussion

- Lager EMR effects on documenting smoking status than smoking cessation counseling and medication
  - Counseling and medication prescribing require more involved time and efforts

- Advanced EMR functionalities performed much better on all three aspects of the smoking cessation standard of care
  - Clinical reminder functions
Limitation

- Self reporting bias

- Unobserved EHR system features (e.g. Types of vendors, Data architecture, End-user interface)

- Unobserved patient/physician characteristics

- Cross-sectional data analysis
EMRs increase the prevalence of the identification of smoking status as well as smoking cessation counseling and medication in smokers’ visits.

Furthermore, EMR effects on smoking cessation vary across the level of sophistication of EHR adoption.

Metrics:
Estimated rates of smoking status recorded are 66.7 percent with less than basic EHRs, at 70.0 percent with basic EHRs, and 72.1 percent with advanced EHRs.

Estimated rates of smoking cessation counseling are 23.6 percent with less than basic EHRs, 22.0 percent with basic EHRs, and 28.8 percent with advanced EHRs.

Estimated rates of smoking cessation medication prescribing are 5.72 percent with less than basic EHRs, at 6.26 percent with basic EHRs, and 9.80 percent with advanced EHRs.
Questions

• Thank you!

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