Privacy Protection and Technology Diffusion: The Case of Electronic Medical Records

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Research Question

- Study case of Electronic Medical Records
  - Allows healthcare providers to record and exchange medical information electronically
  - 50% of US states have enacted privacy laws which restrict the exchange of electronic health information
- Research Question: How do state privacy laws restricting exchange of health information affect diffusion of EMR?
  - Do they inhibit network benefits?
  - Or do they reassure patients, giving incentives to hospitals to adopt?
Policy Motivation: Diffusion is Important

Diffusion is important: In US

- 44,000-98,000 deaths/year due to medical errors
- $100 billion estimated cost savings a year

_Paper kills. Paper records are an utterly irrational national security risk._

-Former House Speaker Newt Gingrich commenting on his book “Saving Lives and Saving Money”

_Newt Gingrich and I have disagreed on many issues, including health care, but I agree with....his book “Saving Lives and Saving Money,”_

-Hillary Clinton
Policy Contribution: But Privacy laws may be costly

- Target of national EMR by 2014
- Intense debate over how to make privacy laws tough enough: $17.3 million report
- No discussion of trade-offs between privacy and network effects (but a lot of Britney/Clooney)
- But outside our study privacy laws have real effects: Collapse of collaboration efforts
- Broader contribution: Highlighting potential costs of privacy regulation for information sharing technologies
Data on Technology Adoption

- Use the HIMSS Dorenfest database (2005 version) which records hospital’s software and hardware
- Match with AHA data for observations on 2935 hospitals (some selection)

<table>
<thead>
<tr>
<th>HospitalID</th>
<th>Zip</th>
<th>Software Application</th>
<th>Status</th>
<th>Vendor</th>
<th>Contract Year</th>
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<tr>
<td>312</td>
<td>02142</td>
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<td>Meditech</td>
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<td>214</td>
<td>02155</td>
<td>Enterprise EMR</td>
<td>Not Installed</td>
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</table>
Adoption over time

Figure: New Adoptions of EMR by Year
Data on Privacy Laws

- Surveys of state health privacy statutes by Health Privacy Project at Georgetown University (we examine hospitals)

- Example: Georgia’s state privacy law limits who can look at test results

- Example: Mass. state privacy law limits flow of information on Psych., Drug/Alcohol-Use, HIV status.
State Privacy Laws

Figure: Map of States who have Hospital Privacy Laws in 2002
Summary of Adoption Results

- Find that state privacy laws reduce adoption by 24 percent.
- With no state privacy law, one hospital’s adoption increases another’s propensity to adopt by 6%. With state privacy law, negligible effect.
- Panel data shows that privacy laws inhibit responsiveness to compatible installed base.
Neonatal Outcomes

- We study how adoption of EMR by hospitals affect birth outcomes
- US bottom of league with Latvia
- An observation is a county-year from 1994-2004
- Dependent variable is neonatal/infant death rate for that county

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Std. Dev.</th>
<th>N</th>
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</thead>
<tbody>
<tr>
<td>Infant Death Rate</td>
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<td>0.003</td>
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<tr>
<td>Neonatal Death Rate</td>
<td>0.005</td>
<td>0.002</td>
<td>4950</td>
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</table>
Why Healthcare IT may affect neonatal outcomes

- High-Risk Patients account for 70% of neonatal deaths
- 99.5% of “High-Risk” patients give birth in hospitals
- Wide medical literature: Reliable documentation and accurate monitoring by Maternal-Fetal Medicine department within hospitals is essential for successful outcomes.
  - Documentation of Blood Pressure/Testing: Pre-Eclampsia, Gestational Diabetes (Walker (2000))
  - Regular ultrasound allows management of
    - Placental Abruption, Vasa Previa, Placenta Previa, Cord Complications (Chou et al 2000), (Oyelese et al 1999)
    - Interuterine-Growth Restriction (Ott 2002)
    - Twin-Twin Syndrome (Quintero et al 2001)
Summary of Results

- Adoption of healthcare IT by an additional hospital in a county reduces infant mortality in that county by between 5 and 18 deaths per 100,000 live births.
- Gains for African-Americans are double those for Whites.
- Rough cost-effectiveness calculations suggest that healthcare IT is associated with a cost of $450,140 per infant saved.
Conclusion

- Contribution: Empirical study documenting how privacy protection is inhibiting network benefits and diffusion of Electronic Medical Records
- Contribution: Health IT Policy
  - There are many reasons that privacy laws may be a good thing
  - However, it is important to confront trade-offs between swift diffusion and protecting patient privacy
- Broader applicability to other interactive IT applications