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

Amalia Miller and Catherine Tucker

University of Virginia and MIT Sloan

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)

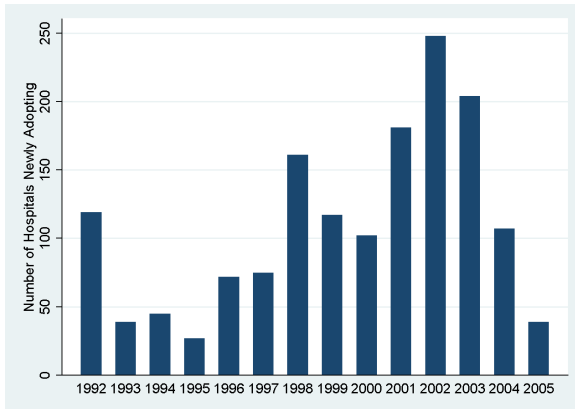| HospitalID	Zip	Software Application	Status	Vendor	Contract Year
312	02142	Enterprise EMR	Operational	Meditech	2002
214	02155	Enterprise EMR	Not Installed	-	-

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)
  - **Pritts et al (2002)** (also 1999 and 1996)
- 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

Variable	Mean	Std. Dev.	N
Infant Death Rate	0.007	0.003	4950
Neonatal Death Rate	0.005	0.002	4950

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