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)

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

Adoption over time

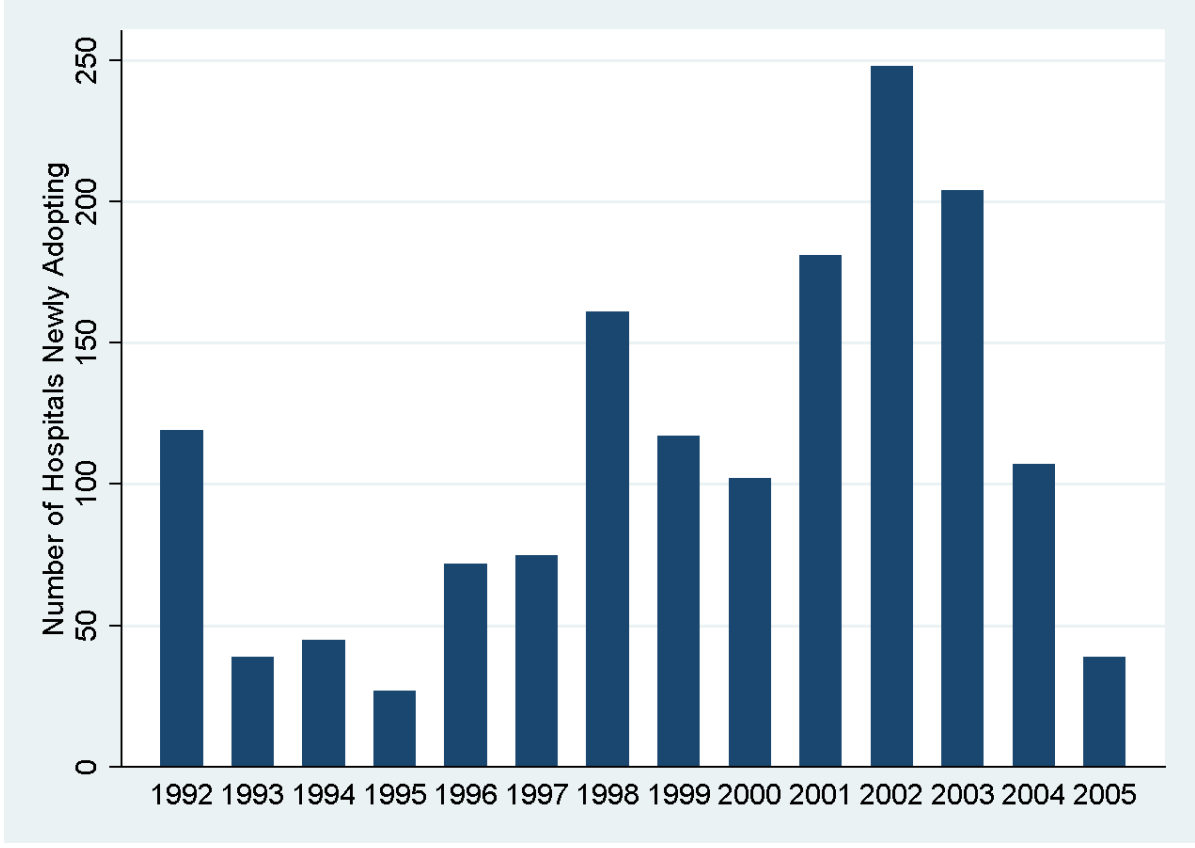

Figure: New Adoptions of EMR by Year

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

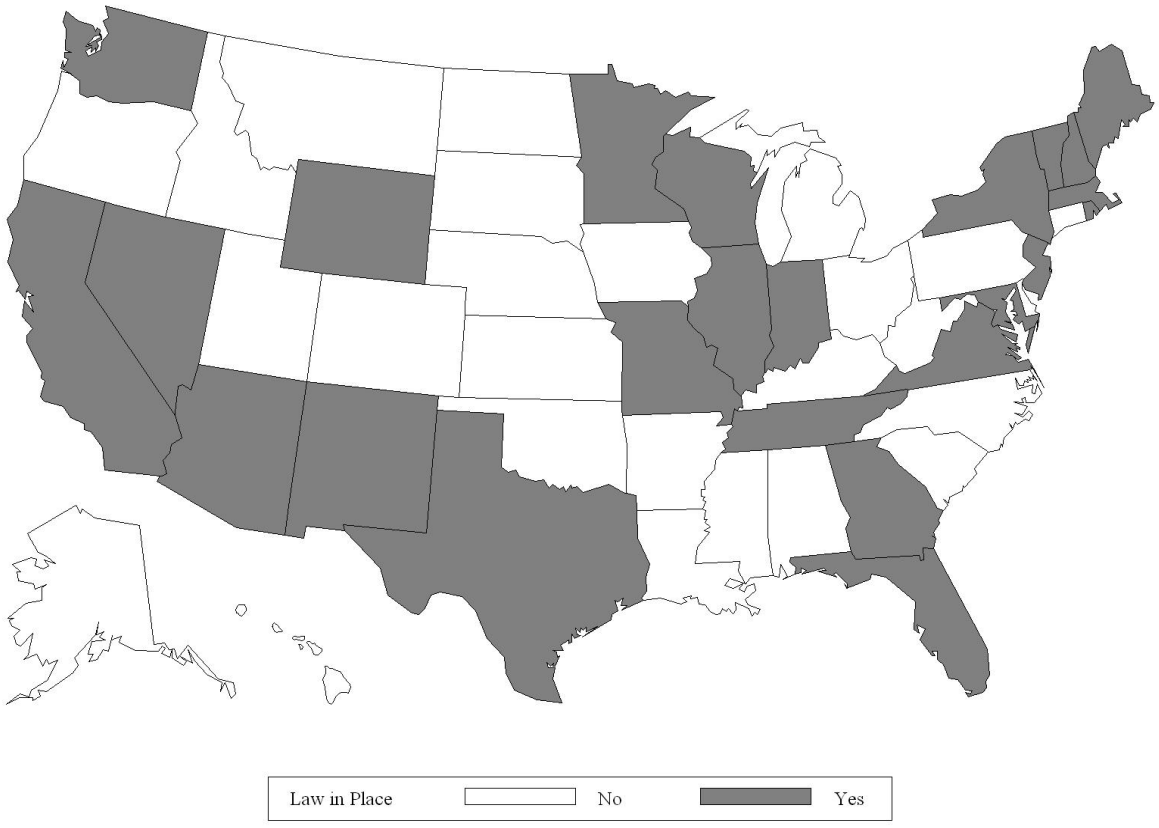

Figure: Map of States who have Hospital Privacy Laws in 2002

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