



STRATEGIC HEALTHCARE ADVANCED RESEARCH PROJECTS FOR SECURITY (SHARPS)

sharps.org

Project Overview Presented by
Carl A. Gunter

SHARPS Senior Investigators

2

University of Illinois at Urbana-Champaign Carl A. Gunter (Director) and Dan Roth

Carnegie Mellon University Anupam Datta

Dartmouth College David Kotz and Denise Anthony

Harvard University and Beth Israel Deaconess Medical Center William Maisel

Johns Hopkins University and Children's Medical And Surgical Center Avi Rubin, Christoph Lehmann, and Darren Lacey

New York University Helen Nissenbaum

Northwestern University and Memorial Hospital David Liebovitz

Stanford University John C. Mitchell (Chief IT Scientist)

University of California, Berkeley Ruzena Bajcsy and S. Shankar Sastry

University of Massachusetts Amherst Kevin Fu

University of Washington Tadayoshi (Yoshi) Kohno

Vanderbilt University Mark Frisse, Edward K. Shultz, William W. Stead (Chief Medical Scientist), and Janos Sztipanovits

Project Advisory Committee

3

Leading representatives of industry research and business, government, policy leaders, stakeholder groups

David W. Bates, MD, MSc, Chief - Division of General Medicine, Brigham and Women's Hospital

Troyen A. Brennan, MD, MPH, Executive Vice President & Chief Medical Officer, CVS Caremark

Richard A. Clarke, Chairman, Good Harbor Consulting

Dave Goetz, Commissioner, State of Tennessee

John D. Halamka, MD, CIO, Harvard Medical School/Beth Israel Deaconess Medical Center

David Horrocks, President & CEO, State of Maryland Health Information Exchange, CRISP

Eric Horvitz, MD, PhD, Principal Researcher, Microsoft Research

Ari Juels, PhD, Chief Scientist and Director, RSA Laboratories

Kristin Lauter, PhD, Principal Researcher, Microsoft Research

J. Marc Overhage, MD, PhD, President & CEO, Indiana Health Information Exchange

Deborah C. Peel, MD, Founder and Chair, Patient Privacy Rights

Richard J. Pietravalle, Principal, The MITRE Corporation

Anand Rajan, Research Manager, Intel Labs

Bruce Schneier, Chief Technology Officer, BT Counterpane Systems

Umesh Shankar, PhD, Security Engineering, Google

Richard Shoup, PhD, Director, MA eHealth Institute & HIT Coordinator, Massachusetts

Paul C. Tang, MD, MS, VP and Chief Medical Information Officer, Palo Alto Medical Foundation

Three Sub-Projects in SHARPS

4

- EHR** – Electronic Health Records, managing patient records within an enterprise
- HIE** – Health Information Exchange, sharing records between enterprises or between an enterprise and a patient in the form of a Personal Health Record
- TEL** – Telemedicine, monitoring remotely, communicating with multimedia, and controlling implanted medical devices

EHR

5

PROT – Self Protecting EHRs – using attribute based encryption to protect policies for outsourced records

POL – Policy Terrain and Implications of HIT – exploring the ramifications of regulations for HIT

PAHIS – Privacy-Aware Health Information Systems – how to build systems with formally verifiable privacy and security assurances

HIE

6

RSHIE – Responsive, Secure Health Information Exchange – formally building HIEs based on a service model

EBAM – Experience-Based Access Management – a lifecycle model for learning from experience with audit logs and improving enforced control

PHR – Personal Health Records – addressing gaps in policy for providers of PHRs

TEL

7

IMD – Implantable Medical Devices – security threats for IMDs

REMOTE – Remote Monitoring for Mobile and Assisted Living – home and mobile monitoring with personal sensors

IMMERSE – Tele-Immersion - multi-media support for telemedicine

SAFETY – Patient Safety Assessment – reviewing FDA records to measure risk

Cross-Cutting Themes

8

Service models – how can a capability be provided as a service with adequate privacy and security?

Regulations and public policy – how do regulatory and public policy considerations interact with technologies for privacy and security?

Open validation – how can SHARPS help the research community validate new ideas?

Security and Privacy

9

Security

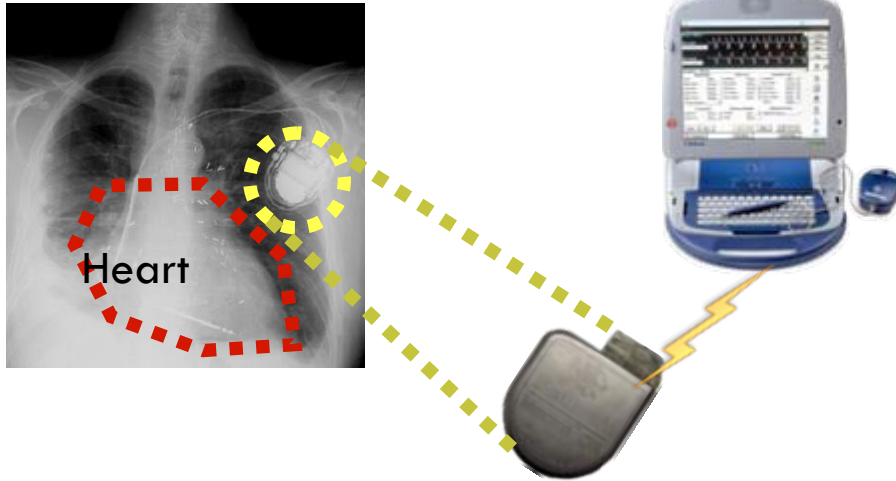
- Countering threats to the confidentiality, integrity, and availability of systems
- Theft and vandalism are common instances
- Likely in health IT?

Privacy

- Not easily defined
 - ▣ Right of a subject to control access to, and use of, data about himself or herself
 - ▣ Contextual integrity: customary flows of information in a context
- Key challenge in healthcare IT

Security for IMDs

10



Challenge: increasing interconnectedness of IMDs brings risks of surreptitious state changes and disclosure of private data

Approach: clarify criteria and design solutions focusing on communication with home healthcare infrastructure

Short Term: develop initial computer security and privacy criteria for IMDs supporting telemedicine applications.

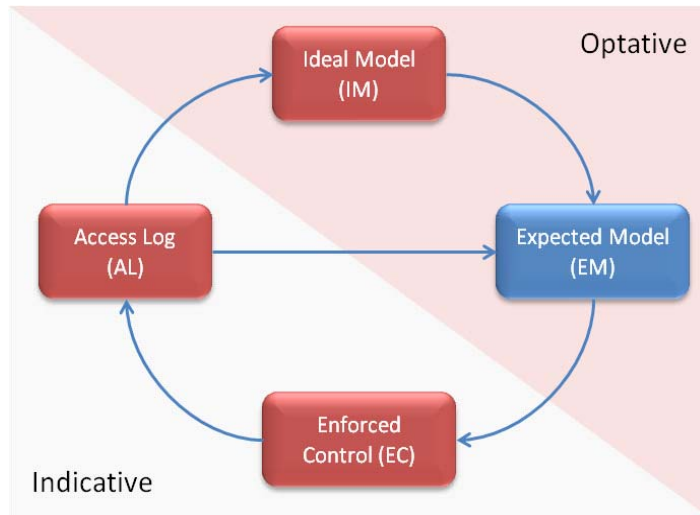
Short Term: review FDA data and provide patients and providers with risk estimates related to the clinical impact of security and privacy breaches of medical devices.

Long Term: implement research prototypes that enable IMDs to interoperate with measurable security and privacy.

Team: Kevin Fu (UMass), Yoshi Kohno (UW), Bill Maisel (Harvard/BIDMC)

Privacy for Health Records

11



Short Term: develop algorithms for supervised and unsupervised learning and analyze their effectiveness with log data from team institutions

Long Term: develop EBAM process and suite of analytic tools for use in hospitals and HIEs

Challenge: increase least privilege protection for health records within or between health organizations

Approach: develop Experience Based Access Management (EBAM) process model for health records

Team: Mark Frisse (Vanderbilt), Carl Gunter (UIUC), Darren Lacey (JHU), Christoph Lehmann (JHU), David Liebovitz (Northwestern), Dan Roth (UIUC), Avi Rubin (JHU), Janos Sztipanovits (Vanderbilt)

Conclusions

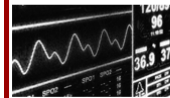
12

Security and privacy risks are a significant barrier to the deployment and meaningful use of health information technology.

Technical challenges in these areas can be addressed with emerging and new technologies from the computer security research community.

SHARPS represents a fresh team of proven researchers with a strategy for solving high priority long-term problems in a way that yields meaningful results in the short term.

<http://sharps.org>



Strategic Healthcare IT Advanced Research
Projects on Security (SHARPS)

[Home](#) | [People](#) | [Research](#) | [Partners & Stakeholders](#) | [Jobs](#) | [Publications](#)
| [Links](#)

Welcome to the SHARPS home page! SHARPS is a multi-institutional and multidisciplinary research project, supported by the Health and Human Services Office of the National Coordinator, aimed at reducing security and privacy barriers to the meaningful use of health information technology.

The project is a collaborative effort of twelve institutions and twenty senior investigators that represent expertise in cyber security and healthcare.

SHARPS was initiated in April 2010. Check back soon at www.sharps.org for much more information on the project!



SHARPS will reduce the privacy and security risks that currently prevent patients and their support networks of family, friends, and care providers from taking full advantage of the potential power of health information systems.

*Read a **fictional scenario** that illustrates some of the many ways SHARPS research will improve patients' experiences with health information systems.*

SHARPS Organizational Chart

13

