October 2009 Workshop

Discovery and Innovation in Health IT

- National Science Foundation
- National Library of Medicine
- American Medical Informatics Association
- Office of the National Coordinator for Health Information Technology
- Computing Community Consortium
- Agency for Healthcare Research and Quality
- National Institute of Standards and Technology

American Medical Informatics Association
Healthcare Is Changing

- Changing responsibilities
- Prevalence of chronic conditions
  - More healthcare at home
  - Individuals manage their own health
  - Family members act as caregivers
- Increased IT for professional caregivers
  - Promise not yet realized
  - Inefficiencies and barriers exist
- Business of healthcare delivery is increasingly complex

Snowbird 2010
Powerful Emerging Technologies Create Opportunities for CS Research Contributions

- Sophisticated imaging, sensing, monitoring and communication technologies
- Massive amounts of multi-media electronic data about individuals, disease, treatments
- Increasingly powerful data analysis methods
- Robust robotic and speech technologies
- Advancing understanding of human behavior, cognition, and incentives

Snowbird 2010
Why Health Applications Are Different

- Multi-modal data – e.g. quantitative metrics, continuous readings, human reports
- Data are incomplete and may be contradictory
- Poorly defined noise models
- Sampling bias towards the sick
- Poorly characterized individual and population variations
- Complex social dynamics

Snowbird 2010
Facilitating Research Progress

- Publically available de-identified data sets
- Open research infrastructures
- Mechanisms for migration of research results to deployment
- Lowering of legal barriers to research
- Coupled computing and medical expertise
- Appropriate forums to report multidisciplinary research results

And funding, of course
What to do with all that data?

• Government is pushing electronic health records
• Short-term technical challenges are privacy, security and trust, integration and systems, workflow
• Long-term opportunity is “secondary use”
  • Powerful decision support
  • Aggregation of individual information for public health
What if we could put it all together?

• Complete genomic data on individuals and on populations
• All the continuously changing literature on the biochemistry of diseases and of drugs
• Analysis and visualization of composable images
• Life-long, continuously updated, contextual health histories of individuals

Could drive prediction, prevention, diagnosis, and treatment