

American Medical Informatics Association

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Special Panel: Issues & Opportunities
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As changes in medical care delivery continue to diminish lines between clinical medicine and population health, potential areas of collaboration between informatics and public health continue to emerge.

What do you see as two of the more important areas for this type of collaboration?

Any attempt to identify possible interactions between Public Health and Informatics must be based on a clear understanding of what each one encompasses

(Bio)medical Informatics deals with:

- the structure of biomedical information and its management

and contributes to, or is integral part of:

- *Bioinformatics*
- *Evidence-Based Practice*
- *Medical Decision Making*
- *Discovery systems*
- *Systems/Organization Management*
- *Biomedical Engineering*

Public Health addresses:

- Individual, Family, Community, International Health
- Health Care Management & Organization of Health Care
- Biomedical Legal & Ethics issues
- Occupational & Environmental Health

and is grounded on :

- *Understanding of pathophysiology of disease (through experimental as well as observational knowledge-discovery methods)*
- *Diagnostic and therapeutic methods*

INFORMATICS

**Informatics-Heavy
Quantitative methods
→ Problem-Solving
Models**

**Integrated Access to
Problem-Solving
Information**

**In-context
Interpretation of
Information &
Linking to Policy**

Analytical Problems

Information Needs

**Information Integration
Needs**

PUBLIC HEALTH



Opportunity #1: Dealing with disease at the molecular level

- **Public health goals** will increasingly depend on ability to define, understand, prevent disease at the genomic and proteomic levels
 - Why?: attributable risk plateau, small cumulative prevalence of Mendelian diseases, small penetrance of genotypes associated to Non-Mendelian diseases, non-avoidable risk factors
 - *In the long run* the redefinition of several diseases, together with the concomitant improvements in therapeutics will allow improved primary and secondary prevention (early – effective)
 - *In the short and mid-term horizon* molecular fingerprinting methods may allow identification of subpopulations for which critical points in early disease detection yield better health outcomes (Caution is warranted in the early stages!)

Opportunity #1: Dealing with disease at the molecular level

- **Informatics methods**

- Mass-throughput molecular measurements methods capture disease processes in a detailed and comprehensive manner generating vast and complex data sets that need be stored, and accessed in a secure manner
- Complex modeling techniques for Data Mining, Knowledge Discovery & Machine Learning that extend Classical Statistics redefine disease, reveal causal risk factors, generate hypotheses
- Stochastic Planning systems will optimize individualized screening policies
- Embedded Decision Support Systems overcome Human Cognitive Limits & provide optimal recommendations at population and individual levels
- Next-generation Clinical Information Systems will bring together genomic with clinical and epidemiological information for research, policy formation and individualized health care

Opportunity #2: Functional Integration of information sources for Public Health

- **Public Health Goal** (link together research results, prevention/treatment services and resources (specialists, technology, providers), population data, and make them available at the right time to the right people according to acceptable health-enhancement strategies)
- **Informatics Methods**
 - Web-based dissemination facilitates information access
 - Automated EBP (quality) filters will verify that information is valid and up-to-date and used to enable appropriate synthesis of disparate pieces of information
 - Intelligent Application Interfaces (based on user modeling, collaborative filtering and learning methods) will adjust level of detail to user sophistication and needs
 - Semantically rich (content-based) document indexing and retrieval will allow efficient identification of relevant information & increase of knowledge by linkage of (so far) disparate bibliographic domains
 - Distributed data-model interoperability will tie up previous components thus creating dynamic, scalable problem-solving systems