



# Building Blocks for a Post-Marketing Surveillance System

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# Post-Marketing Surveillance System

- Ideally,
  - All health care products (prescription Rx, OTC Rx, vaccines, devices)
  - All segments of the population
  - Automated
  - Acute and long term outcomes
  - Optimal signal-to-noise ratio
  
- In practice, probably will include
  - Spontaneous reports (AERS, VAERS, ...)
  - Enriched claims data from multiple health plans
  - More utilization of Electronic Medical Records (EMR)
  - Specific registries

# Building blocks

- Data
- Integrate data from multiple sources
- Methods and tools to analyze data
  - Signal detection
  - Signal assessment
- Personnel to develop and utilize the system
  - Skill set / expertise
- Feedback / Risk communication
- Program / system evaluation
  - Further enhancement of the system
  - Assessment after regulatory actions

# Data for post-marketing surveillance

- Primary data: labor/resource intensive
  - Phase IIIb / IV trials
  - Registries
    - Disease specific
    - Drug (class) specific
    - Outcome specific
  - Spontaneous reports
  
- Secondary data: administrative
  - Health insurance claims
    - Augmented with additional data elements: medical records, National Death Index, socioeconomic indicator, patient reported outcomes, biological specimen
  - Electronic medical records
    - Evolving standards, multiple parties/platforms

# Strengths and limitations of different data sources

- Claims data only
  - Good for selected applications
- Claims data Plus
  - Well-established, scientifically valid, and widely used
- Electronic medical records
  - Great potential
  - Further development
    - Standards (HL-7, SNOMED, ...)
    - Methodology such as natural language processing
    - IT infrastructure
    - Common platform to enable users to pool data from different sources
      - e.g. Massachusetts eHealth Collaborative

## Data integration, an example

**Simon *et al.* Potentially Inappropriate Medication Use by Elderly Persons in U.S. Health Maintenance Organizations, 2000–2001.** *J Am Geriatrics Soc* 2005; **53**: 227–232.

- Data derived from 10 health maintenance organizations, members of the HMO Research Network
- Funded by AHRQ (U18 HS 11843), Centers for Education and Research on Therapeutics (CERTs)

# Data integration from multiple sources

- Key ingredients
  - Personnel
  - Technology
  - Rules / regulations / data sharing mechanism
  
- Some thoughts on data integration
  - Data ownership vs. Data use
  - Transparent and standard 'data cleaning' process
  - Metrics to represent quality of data
  - Standard operational definition for common constructs
    - Drug use, hospitalization, death, ...
  - Consistent interpretation of HIPAA

# Methods for post-marketing surveillance

- Signal detection / Hypothesis generation
  - Data mining with no prior hypothesis
    - Spontaneous reports
    - Data with numerator and denominator (e.g. i3Aperio™)
  - Proactive signal detection, with *a priori* drug-AE questions
    - maxSPRT for vaccine safety, potential use for drug safety
    - i3Aperio™

!! The methods need to be validated !!
- Rapid response to signals
  - Data with numerator and denominator (e.g. i3Aperio™)
- Signal evaluation / Hypothesis testing
  - Well established methods, but results not readily available
    - Database study: weeks to months
    - Clinical trial: months to years



# The right people to do all these

- “Drug safety scientists” need to
  - Know the strengths and limitations of different types of data
  - Know how to utilize data in a timely fashion
  - Know how to analyze the data and interpret the findings
  - Interact with scientists of other discipline
  
- Essential skill set
  - Clinical research methodology
    - Clinical trials
    - Observational studies
  - Familiarity with the health care delivery system
  - Population-based perspective
  
- Training programs? Training grant?