Tracking Program Electronic Health Records Pilot Projects

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Environmental Public Health Tracking Network

...a system of integrated health, exposure, and hazard information and data from a variety of national, state, and city sources.
Tracking Network Grantees

CDC’s National Environmental Public Health Tracking Program

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25 States and 1 City
Current Content and Data

Health Effects Data
- Asthma
- Birth Defects
- Cancer
- Carbon Monoxide Poisoning
- Childhood Lead Poisoning
- Developmental Disabilities
- Heart Attacks
- Heat stress illness
- Reproductive and Birth Outcomes

Environment Data
- Climate Change
- Community Design
- Homes
- Outdoor Air Quality
- Community Water Quality
- Pesticide Exposures

Population Health
- Biomonitoring
- Children’s Environmental Health
- Health Behaviors
- Population Characteristics
Some Data Gaps

• Timeliness of data
• Finer resolution data
• Linked risk factor data
Electronic Health Records

• Electronic Health Record (EHRs)
  – a longitudinal electronic record of patient health info
  – generated by one or more encounters in any care delivery setting

• Uses
  – automate provider’s workflow
  – assist providers in making patient care decisions
  – Access data from other systems: pharmacy & lab
Benefits to Public Health

- Enhance public health surveillance
- Improve public health outcomes
Electronic Health Records Pilot Projects

- Awardees participating in this optional activity must pilot the use of EHRs within the Tracking Program by
  - Obtaining, evaluating, and using EHRs data

- Awardees must report on the innovative approaches applied for utilizing EHR by addressing:
  - How could EHRs be used in Tracking?
  - What are the technical requirements for integrating EHRs data into the state/local networks and the National Tracking Network?
  - What are core data elements needed to apply EHRs to Tracking?
  - What are the challenges and barriers to acquiring and processing EHRs? and/or
  - What are the innovative and emerging approaches to utilize EHRs within Tracking?
4 Funded Projects

- California – EHRs for public health surveillance of diabetes
- Massachusetts – EHRs for public health surveillance of Asthma and ALS
- New York City – Validity of health status classifications in EHRs compared to NYC HANES survey classifications
- Missouri – Implementation of EHRs data from two systems
California: EHRs for public health surveillance of diabetes

- Analyze the practicality, validity, and surveillance utility of glycohemoglobin as a marker for diabetes risks
  - Timely surveillance
  - Inform community-level prevention efforts

- Partnered with Kaiser Permanente
  - Northern California

- 2 participating counties in San Francisco Bay area
  - 412,400 records included (≥18 years)
Methods

• Data: Patient demographics, laboratory data, characteristics of covered patients

• Definitions
  – % of members with maximum glycohemoglobin ≥7, 8 or 9%
  – Sensitivity, specificity, positive predictive value
    • Five-year maximum glycohemoglobin value ≥7%
    • Diabetes Prevalence
Results

• Disparities in diabetes prevalence
  – Race and income
  – Census tract

• Laboratory data may be sufficient for public health surveillance
  – For some conditions
Massachusetts: EHRs for public health surveillance of Asthma and ALS

- Evaluate the utility of EHRs data as a tool for routine public health surveillance of Amyotrophic lateral sclerosis (ALS) and pediatric Asthma

- MDPHnet – share EHRs data with public health agencies

- 3 health care practice groups participating
  - Approximately 1.3 million (15% of MA population)
Methods

• Asthma and ALS case definitions
  – Compared ICD-9 only with ICD-9 and drug prescription

• EHR based prevalence vs. traditional surveillance methods
  – Pediatric Asthma benchmark data from state-wide school-based nurse survey
  – ALS benchmark data from comprehensive ALS Registry involving full medical record review

• Evaluated impact of MDPHnet coverage on reliability of asthma prevalence
  – Asthma prevalence for 12 towns
  – Compared MDPHnet estimates with benchmark
Results

- Results varied greatly by case definition algorithms
- Surprisingly, ICD9 based algorithms fared better for both asthma and ALS
- Independent validation may be needed for each outcome prior to use of EHR-based surveillance
- Rare disease surveillance possible, more research is needed

Correlation between MDPHnet coverage and accuracy of asthma prevalence estimates
NYC: Validity of health status classifications in EHRs compared to population-based estimates

- To assess the diagnostic validity of health indicators from EHRs relative to NYC HANES
  - Smoking, obesity, hypertension, diabetes and elevated cholesterol

- NYC Macroscope - transforms EHR data into population-based prevalence estimates for the “in-care” population

- Population covered
  - In-care population, >700 ambulatory practices
  - 38 included in this study
Methods

• Definitions
  – BMI (obesity), diagnosis/ICD 9 (diabetes, hypertension, elevated cholesterol), or self report (smoking, hypertension, elevated cholesterol)

• Compared with NYC Health and Nutrition Examination Survey (NYC HANES) survey classifications
  – Reviewed medical charts for NYC HANES represented in EHRs
  – Sensitivity, specificity, positive and negative predictive value
Results

• Diagnostic validity
  – High for smoking, obesity, and hypertension
  – Lower for diabetes
  – Poor for cholesterol

• Limitations
  – Small sample size
Missouri: Implementing use of EHRs data from two systems

• Develop a secure data portal and warehouse to
  – Receive, validate and process EHRs data

• Integrate EHRs data in Tracking
  – Missouri health strategic architectures and information cooperative (MOHSAIC)
    • Centralized EHRs database
    • Standardizing electronic laboratory reporting
      – Blood lead testing
  – Electronic surveillance system for the early notification of community-based epidemics (ESSENCE)
    • ED visits: Heat related, CO poisonings, Asthma
Methods

• Created a back end for storing EHRs data

• Developed a front end to allow interaction with the data
Results

• Demonstrated a live query page that pulled data from the data cubes in back-end

• When complete, work on analysis of real-time data (e.g., Asthma ED) and air pollution
Some observations

• Accessing EHRs data
  – Need for health information exchanges
  – Challenges may be more policy than technical
  – Privacy policies to allow sharing of data with public health

• Validation of EHRs estimates
  – Reference data sources

• Different algorithms for different outcomes
Next steps

• Synthesize the case studies to develop
  – Utility of EHRs data for Tracking
  – Lessons learned
  – Recommendations for Tracking
Thank you!

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