Population-Level Studies Reveal Ways to Enhance Patient Care and Improve Public Health

Surveys show that the American public supports having their personal health information used in research to inform public policy and practice, as long as appropriate privacy protections are in place. Large, population-level healthcare databases enable researchers to discover answers to questions that cannot be found with individual studies or clinical trials alone. By aggregating data from many sources, population studies can help to evaluate health care treatment patterns, examine the quality of care being delivered to patients, identify disparities in treatment and outcomes, and estimate the economic burden of disease on individuals and society.

While randomized clinical trials remain extremely important in generating clinical knowledge, there are practical and resource limitations on the number of patients that can be involved in each trial. Some clinical benefits and risks will only become evident when sufficiently large numbers of patients are studied. Population-level databases can provide evidence of the benefits and risks of medical intervention among large numbers of patients treated in a variety of practice settings in the community. This evidence in return provides better information for health planners and policymakers, while also informing the development of clinical guidelines and clinical decision support systems.

To help familiarize policymakers and other interested parties with the value of population-level research, we have identified some important examples of peer-reviewed, published research utilizing large healthcare databases. The studies were conducted and funded by a range of public and private sources, including the Agency for Healthcare Research and Quality, Food and Drug Administration, Veterans Administration, Kaiser Permanente, and academic medical centers.

The American Medical Informatics Association (AMIA) plays an important role in helping policymakers understand population health applications of health information technology (HIT) with appropriate protections of patient privacy. AMIA has shared recommendations on data stewardship and a taxonomy framework for the uses of healthcare data with the American Health Information Community (AHIC) and the National Committee for Vital and Health Statistics (NCVHS) and in a recent publication.

About AMIA

AMIA is the professional home for biomedical and health informatics and is dedicated to the development and application of informatics in support of patient care, public health, teaching, research, administration, and related policy. AMIA’s 4,000 members advance the use of health information and communications technology in clinical care and clinical research, personal health management, public health/population, and translational science with the ultimate objective of improving health.

American Medical Informatics Association
4915 St. Elmo Avenue, Suite 401
Bethesda, MD 20814
(301) 657-1291 www.amia.org
Examples of Using Population-Level Electronic Healthcare Databases to Enhance Patient Care and Improve Public Health

• Evaluation of Patient Outcomes and the Impact of Interventions
  - Kaiser Permanente researchers found that diabetic patients who lost weight after being diagnosed achieved better control of their blood pressure and blood glucose levels even if they regained weight later on.5
  - A MarketScan database study showed that young children who received the pneumococcal vaccine had fewer healthcare visits for acute otitis media.2
  - A MarketScan database study showed that Hepatitis-A related healthcare utilization declined after the hepatitis A vaccine was introduced.3
  - Using Medicare data, Dartmouth researchers found that patients of “high-volume” surgeons who perform procedures more often had better clinical outcomes than patients whose surgeons performed fewer of the procedures.4

• Evaluation of the Quality of Healthcare Delivery
  - A Medicare data base study found that quality of care delivered to Medicare fee for service beneficiaries improved between 1999 and 2001.5
  - A Kaiser Permanente team developed a tool called the prevention index to assess variations in use of prevention guidelines.6
  - A Kaiser Permanente study found low adherence to osteoporosis treatment guidelines.7
  - Data from the Veterans Administration (VA) showed inappropriate antibiotic prescriptions for 65% of patients with a respiratory tract infection.8
  - A VA study of hypertensive patients with poor adherence to medications found that physicians often did not adjust medications appropriately.9
  - A MarketScan database study found suboptimal levels of prescribing statins for patients who had been hospitalized for coronary heart disease.10
  - A CDC study using MedStat MarketScan databases found that approximately 30% of insured women had not been screened for cervical cancer.11

• Improved Understanding of the Epidemiology of Disease
  - Cleveland Clinic researchers evaluating Medicare beneficiaries with chronic heart failure found poorer outcomes for those who also had untreated anemia.12
  - A Kaiser Permanente study evaluated risk factors for diagnosed abdominal aortic aneurysms.13
  - A Kaiser Permanente study of pregnant women found that half had at least one complication, including anemia, urinary tract infection, and hypertension, and that most complications did not require hospitalization.13
  - A study using IMS and Marketscan data found that psoriasis patients had a higher prevalence of cardiovascular disease than comparison patients.15
  - Duke researchers using Medicare claims data found an increasing incidence and prevalence of diabetes among the elderly, evidence of a growing burden for financing and medical care.16

• Evaluation of the Care of Underserved Populations and Healthcare Disparities
  - A Dartmouth team documented wide variability of racial disparities in care received by Medicare beneficiaries across regions and for different procedures.17
  - A study of urban, largely African-American diabetics found a high frequency of preventable hospitalizations.18
  - A study of almost 240,000 patients in the Medstat MarketScan Medicaid claims database and another study using Medicaid data found that African American patients received less aggressive treatment with statins than did white patients.19,20
  - A Medicare database study found racial, gender, and geographic disparities in rates of knee arthroplasty.21
  - Medicare data showed gender and racial disparities in colon cancer screening.22
A Harvard study found that a quality improvement program reduced some disparities in diabetes care but Black patients were still less likely to be treated with statins.\textsuperscript{23}

**Generation and Refinement of Research Hypotheses that can be Further Investigated**

- An NCI study of more than 4 million veterans found that immune-mediated conditions might act as a trigger for multiple myeloma (MM) and monoclonal gammopathy of undetermined significance (MGUS).\textsuperscript{24}
- A Kaiser study found that breast cancer patients who had been exposed to statins had proportionately fewer ER/PR negative tumors.\textsuperscript{25}

**Improvement in Public Health Surveillance**

- A Harvard study used electronic medical record data to develop an algorithm that successfully detected patients with Hepatitis B.\textsuperscript{26}

**Improved Understanding of Benefit-Risk Profiles of Healthcare Interventions**

- A Mayo Clinic study involving data from more than 350,000 women found that hormone replacement therapy may be a risk factor for meningioma.\textsuperscript{27}
- An AHRQ study of bariatric surgery using MarketScan data found a significantly higher rate of post-surgical complications compared with in-hospital complications.\textsuperscript{28}
- A large FDA-Harvard-HealthPartners study utilized managed care claims data to evaluate the risk of rhabdomyolysis associated with the use of statins.\textsuperscript{29}
- An FDA study using Kaiser Permanente data found that use of rofecoxib increases the risk of coronary heart disease compared to celecoxib, a non-steroidal anti-inflammatory.\textsuperscript{30}

**Economic Implications of Care**

- Several studies of asthmatics compared utilization and cost differences associated with the use of inhaled corticosteroids alone or in combination with other medications and also compared to other regimens.\textsuperscript{31,32,33}
- A study using data from Kaiser Permanente identified risk factors for cardiovascular disease among patients with hypertension and found that cost of care generally increased with the presence of additional risk factors such as diabetes mellitus, high cholesterol and high BMI.\textsuperscript{34}
- Researchers utilized administrative claims data from a managed care organization to determine the cost of care for patients with peripheral artery disease.\textsuperscript{35}

**References**

1. Feldstein AC et al. Weight change in diabetes and glycemic and blood pressure control. Diabetes Care 2008;


17 Baicker K et al. Who you are and where you live: how race and geography affect the treatment of medicare beneficiaries. Health Affairs. 2004; Suppl Web Exclusives: VAR33-44.


