Research and Publish on the Cheap

K. Tom Xu, MD PhD

Why publish papers

- To keep an academic job
- Tenure and promotion
- The greater goods
- Curiosity and self improvement
- Fun, for SOME people

Challenges faced by traditional clinical studies

- Money, money, money
- Funding begat funding: what happens to the little guy who has a dream
- Studies begat studies: where are my prelims
- Time and resources: headaches and not-so-pleasant surprises
  - RAs, residents, fellows
  - Research coordinator
  - Data entry
  - Participation rate
  - Time to complete a study
- Limited wiggle room if reviewers challenge your study: design, data collection, response rate, info you did not collect

Secondary data analyses

- Publicly available or can be purchased
- No funding or minimal funding is needed
  - Money spent: to purchase data and analyses
  - No data collection or entry needed
  - Minimal cost of personnel
- Study design already validated by top-notch researchers
- Data represent the entire US or states
- Short production time of a paper: IRB
- Oceans and mountains of pertinent data and information
- Reviewers understand the limitations of secondary data analyses and *usually* are reasonable when asking for revisions

The catch

- The questions you ask are not quite like what you were taught or used to
  - What you see is what you get: already collected data not to your specs (primary outcomes, interventions, timeframe, etc.)
  - Imagine a very crude chart review to extract info of tens of thousands of patients (and the government is doing it…)
  - Cross-sectional data: rarely can address causality
  - Cannot address efficacy, maybe some effectiveness
  - Heavy on sociodemographic, economic and behavioral characteristics
  - Effects of policies, clinical guidelines, national trends, utilization patterns
- Microsoft Excel won't cut it
- Much more complex analyses: usually involving multivariate analyses, often study design (PSU, strata etc)

What's out there

- Administrative data
  - Extracted from charts, billing docs, reports, etc.
  - Not all info in charts included
  - Collected by government agencies and insurance companies
- Survey
  - Subjective info
  - Studies of patient or provider behaviors

Public and Private Data

- CDC/National Center for Health Statistics (NCHS)
  - National Health and Nutrition Examination Survey (NHANES): 1959-
  - National Ambulatory Medical Care Survey (NAMCS): 1973-
  - National Hospital Ambulatory Medical Care Survey (NHAMCS): 1973-
  - National Hospital Discharge Survey (NHDS): 1965-2010
  - National Survey of Ambulatory Surgery (NSAS): 1994-
  - National Health Interview Survey (NHIS): 1963-
  - National Immunization Survey (NIS): 2010
- AHRQ
  - Medical Expenditure Panel Survey (MEPS): 1996-
- CMS: Medicare and Medicaid admin data
- Various foundations, networks, companies (e.g. Kaiser, RAND), insurance companies (e.g. BCBS)

Examples of Studies

JAMA | Original Investigation

Clinical Manifestations of Kidney Disease Among US Adults With Diabetes, 1988-2014

Maryam Afkarian, MD, PhD; Leila R. Zelnick, PhD; Yoshio N. Hall, MD; Patrick J. Heagerty, PhD; Katherine Tuttle, MD, FASN, FACP; Noel S. Weiss, MD, DrPH; Ian H. de Boer, MD, MS

IMPORTANCE Diabetic kidney disease is the leading cause of chronic and end-stage kidney disease in the United States and worldwide. Changes in demographics and treatments may affect the prevalence and clinical manifestations of diabetic kidney disease.

OBJECTIVE To characterize the clinical manifestations of kidney disease among US adults with diabetes over time.

DESIGN, SETTING, AND PARTICIPANTS Serial cross-sectional studies of adults aged 20 years or older with diabetes mellitus participating in National Health and Nutrition Examination Surveys from 1988 through 2014.

EXPOSURES Diabetes was defined as hemoglobin A_{1c} greater than 6.5% or use of glucose-lowering medications.

MAIN OUTCOMES AND MEASURES Albuminuria (urine albumin-to-creatinine ratio ≥30 mg/g), macroalbuminuria (urine albumin-to-creatinine ratio ≥300 mg/g), reduced estimated glomerular filtration rate (eGFR <60 mL/min/1.73 m^2), and severely reduced eGFR (<30 mL/min/1.73 m^2), incorporating data on biological variability to estimate the prevalence of persistent abnormalities.

ORIGINAL RESEARCH | IMPROVING PATIENT CARE

Physician Decision Making and Trends in the Use of Cardiac Stress Testing in the United States

An Analysis of Repeated Cross-sectional Data

Joseph A. Ladapo, MD, PhD; Saul Blecker, MD, MHS; and Pamela S. Douglas, MD

Background: Cardiac stress testing, particularly with imaging, has been the focus of debates about rising health care costs, inappropriate use, and patient safety in the context of radiation exposure.

Objective: To determine whether U.S. trends in cardiac stress test use may be attributable to population shifts in demographics, risk factors, and provider characteristics and evaluate whether racial/ethnic disparities exist in physician decision making.

Design: Analyses of repeated cross-sectional data.

Setting: National Ambulatory Medical Care Survey and National Hospital Ambulatory Medical Care Survey (1993 to 2010).

Patients: Adults without coronary heart disease.

Measurements: Cardiac stress test referrals and inappropriate use.

Results: Between 1993 to 1995 and 2008 to 2010, the annual number of U.S. ambulatory visits in which a cardiac stress test was ordered or performed increased from 28 per 10 000 visits to 45 per 10 000 visits. No trend was found toward more frequent testing after adjustment for patient characteristics, risk factors, and provider characteristics ($P = 0.134$). Cardiac stress tests with imaging comprised a growing portion of all tests, increasing from 59% in 1993 to 1995 to 87% in 2008 to 2010. At least 34.6% were probably inappropriate, with associated annual costs and harms of $501 million and 491 future cases of cancer. Authors found no evidence of a lower likelihood of black patients receiving a cardiac stress test (odds ratio, 0.91 [95% CI, 0.69 to 1.21]) than white patients, although some evidence of disparity in Hispanic patients was found (odds ratio, 0.75 [CI, 0.55 to 1.02]).

Limitation: Cross-sectional design with limited clinical data.

Conclusion: National growth in cardiac stress test use can largely be explained by population and provider characteristics, but use of imaging cannot. Physician decision making about cardiac stress test use does not seem to contribute to racial/ethnic disparities in cardiovascular disease.

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BMC Emergency Medicine

RESEARCH ARTICLE Open Access

Over-prescribing of antibiotics and imaging in the management of uncomplicated URIs in emergency departments

K Tom Xu[1,4*], Daniel Roberts[4], Irvin Sulapas[1], Omar Martinez[3], Justin Berk[1] and John Baldwin[2]

Abstract

Background: Unnecessary use of resources for common illnesses has substantial effect on patient care and costs. Evidence-based guidelines do not recommend antibiotics or imaging for uncomplicated upper respiratory infections (URIs). The objective of the current study was to examine medical care providers' compliance with guidelines in treating uncomplicated URIs in emergency departments (EDs) in the US.

Methods: Nationally representative data from the NHAMCS 2007 and 2008 were used. Uncomplicated URIs were identified through ICD-9 codes of nasopharyngitis, laryngitis, bronchitis, URI not otherwise specified and influenza involving upper respiratory tract. Exclusion criteria were concurrent comorbidities, follow-up visits, and age < 18 or >64 years. Most frequently prescribed classes of antibiotics were identified. Multivariate analyses were conducted to identify the factors associated with the prescribing of antibiotics and use of imaging studies.

CLINICAL PRACTICE

Neuroimaging for Pediatric Head Trauma: Do Patient and Hospital Characteristics Influence Who Gets Imaged?

Rebekah Mannix, MD, MPH, Florence T. Bourgeois, MD, MPH, Sara A. Schutzman, MD, Ari Bernstein, MD, MPH, and Lois K. Lee, MD, MPH

Abstract

Objectives: The objective was to identify patient, provider, and hospital characteristics associated with the use of neuroimaging in the evaluation of head trauma in children.

Methods: This was a cross-sectional study of children (≤19 years of age) with head injuries from the National Hospital Ambulatory Medical Care Survey (NHAMCS) collected by the National Center for Health Statistics. NHAMCS collects data on approximately 25,000 visits annually to 600 randomly selected hospital emergency and outpatient departments. This study examined visits to U.S. emergency departments (EDs) between 2002 and 2006. Multivariable logistic regression was used to analyze characteristics associated with neuroimaging in children with head injuries.

Results: There were 50,835 pediatric visits in the 5-year sample, of which 1,256 (2.5%, 95% confidence interval [CI] = 2.2% to 2.7%) were for head injury. Among these, 39% (95% CI = 34% to 43%) underwent evaluation with neuroimaging. In multivariable analyses, factors associated with neuroimaging included white race (odds ratio [OR] = 1.5, 95% CI = 1.02 to 2.1), older age (OR = 1.3, 95% CI = 1.1 to 1.5), presentation to a general hospital (vs. a pediatric hospital, OR = 2.4, 95% CI = 1.1 to 5.3), more emergent triage status (OR = 1.4, 95% CI = 1.1 to 1.8), admission or transfer (OR = 2.7, 95% CI = 1.4 to 5.3), and treatment by an attending physician (OR = 2.0, 95% CI = 1.1 to 3.7). The effect of race was mitigated at the pediatric hospitals compared to at the general hospitals ($p < 0.001$).

Conclusions: In this study, patient race, age, and hospital-specific characteristics were associated with the frequency of neuroimaging in the evaluation of children with closed head injuries. Based on these results, focusing quality improvement initiatives on physicians at general hospitals may be an effective approach to decreasing rates of neuroimaging after pediatric head trauma.

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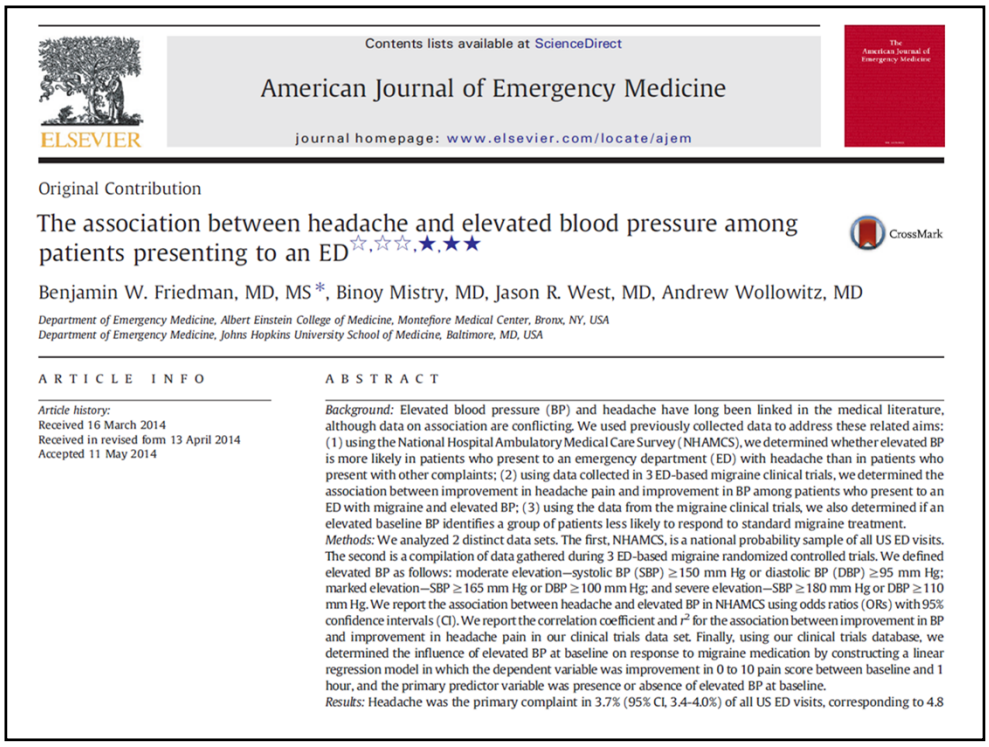
Keywords: craniocerebral trauma, diagnostic imaging, emergency service, hospital



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Original Contribution

The association between headache and elevated blood pressure among patients presenting to an ED☆,☆☆,★,★★

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ABSTRACT

Background: Elevated blood pressure (BP) and headache have long been linked in the medical literature, although data on association are conflicting. We used previously collected data to address these related aims: (1) using the National Hospital Ambulatory Medical Care Survey (NHAMCS), we determined whether elevated BP is more likely in patients who present to an emergency department (ED) with headache than in patients who present with other complaints; (2) using data collected in 3 ED-based migraine clinical trials, we determined the association between improvement in headache pain and improvement in BP among patients who present to an ED with migraine and elevated BP; (3) using the data from the migraine clinical trials, we also determined if an elevated baseline BP identifies a group of patients less likely to respond to standard migraine treatment.
Methods: We analyzed 2 distinct data sets. The first, NHAMCS, is a national probability sample of all US ED visits. The second is a compilation of data gathered during 3 ED-based migraine randomized controlled trials. We defined elevated BP as follows: moderate elevation—systolic BP (SBP) ≥150 mm Hg or diastolic BP (DBP) ≥95 mm Hg; marked elevation—SBP ≥165 mm Hg or DBP ≥100 mm Hg; and severe elevation—SBP ≥180 mm Hg or DBP ≥110 mm Hg. We report the association between headache and elevated BP in NHAMCS using odds ratios (ORs) with 95% confidence intervals (CI). We report the correlation coefficient and r^2 for the association between improvement in BP and improvement in headache pain in our clinical trials data set. Finally, using our clinical trials database, we determined the influence of elevated BP at baseline on response to migraine medication by constructing a linear regression model in which the dependent variable was improvement in 0 to 10 pain score between baseline and 1 hour, and the primary predictor variable was presence or absence of elevated BP at baseline.
Results: Headache was the primary complaint in 3.7% (95% CI, 3.4-4.0%) of all US ED visits, corresponding to 4.8

Workflow

- Come up with research questions
  - Take notes if you come across studies that used a secondary data set. You may end up using the same data set.
- Visit the website or call the authors
- Go through questionnaires, codebooks, etc. to identify whether the data set has the information you need
- Talk to someone who knows how to manage large data sets, usually someone who does stats as well
- Come up with a plan of analyses and pick the variables you want and potentially need
- Run stats
- Write up