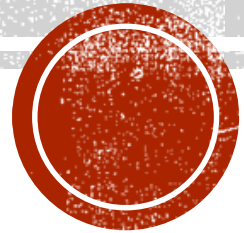
# SURGICAL RESEARCH

## Using National Databases



# DATABASE RESEARCH

- Secondary analyses of large datasets provide a mechanism for researchers to address high impact questions that would otherwise be prohibitively expensive and time-consuming to study.
- For fellows and junior faculty who need to demonstrate productivity by completing and publishing research in a timely manner, secondary data analysis can be a key foundation to successfully starting a research career.
- Using secondary data enables one to conduct studies of high-impact research questions with dramatically less time and resources than required for most studies involving primary data collection. No time spent collecting data.

Smith, Alexander K., et al. "Conducting high-value secondary dataset analysis: An introductory guide and resources." *Journal of general internal medicine* 26.8 (2011): 920-929.

# SURGICAL RESEARCH USING NATIONAL DATABASES

RAM K. ALLURI, HYUMA LELAND, NATHANAEL HECKMANN

**Abstract:** Recent changes in healthcare and advances in technology have increased the use of large-volume national databases in surgical research. These databases have been used to develop perioperative risk stratification tools, assess postoperative complications, calculate costs, and investigate numerous other topics across multiple surgical specialties. The results of these studies contain variable information but are subject to unique limitations. The use of large-volume national databases is increasing in popularity, and thorough understanding of these databases will allow for a more sophisticated and better educated interpretation of studies that utilize such databases.

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- Surgical procedures represent one of the largest expenditures in healthcare and are projected to constitute over 7% of the US gross domestic product by 2025. [1]
- healthcare institutions are increasingly tracking perioperative complications, readmissions, and overall costs.[2]
- This shift towards tracking perioperative outcomes along with the advent of "big data" accrual technology has led to the increased utilization of national clinical databases in surgical research.[2]

# SURGICAL RESEARCH USING NATIONAL DATABASES

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- Large-volume databases can include all patients or a predefined sample of patients from a broad (national) or narrow (state) geographic area, and are composed of patient-encounter records from more than one specialty or procedure.
  - Contain more generalized information such as demographics, comorbidities, cost, length of stay, as well as procedure and diagnosis codes.
- Different than registries - Typically collect data prospectively for a particular diagnosis (diabetes) or procedure (joint replacement). [3,4]
  - Often record disease or procedure-specific outcomes such as functional scores, patient-satisfaction, and radiographic reports. large-volume databases contain more generalized information such as demographics, comorbidities, cost, length of stay, as well as procedure and diagnosis codes.

# POPULARITY OF DATABASE RESEARCH

- A Google Scholar search of articles published Since 2017
  - National Health and Nutrition Examination Survey (NHANES)
    - 21,500
  - National Trauma Databank
    - 16,600
  - National Electronic Injury Surveillance System (NEISS)
    - 16,200

Note: Results represent number of hits on the Internet and may include duplicates and references, but not actual publications.

# AN EXAMPLE NHANES


- www.michaeldedonno.om
- Select Research Aids
- Scroll to the bottom
- Select NHANES
  - Select Questionnaires, Datasets, and Related Documentation
  - Readily available datasets from 1999-2016
  - Select NHANES 2015-2016
  - Select Questionnaire Data
  - Select Hospital Utilization & Access to Care (HUQ_I.Doc)
  - Review General Health Condition Question

Check out the NHANES story

https://youtu.be/EXXTQlju_Nc

# DATABASE RESEARCH
## SUMMARY

### Challenges

- Takes time to learn how to maneuver within the database and generate exports
- Takes time to learn the variables
- Limited to what is in the database

### Benefits

- No IRB
- No data collection
- Numerous examples of Method section
- Can be done anywhere and at anytime
- Great flexibility in time and effort

# GETTING STARTED

- Review articles available at www.michaeldedonno.com
- Google – "Surgery databases" or similar
  - General Thoracic Surgery Database (GTSD)
  - Adult Cardiac Surgery  Database (ACSD)
- Investigate any potential costs associated with database access
- Explore variables contained in database
- Explore recent publications based on the data in the database (e.g., since 2017)
- Use recent publications to serve as direction for your research questions
- Access and download the data
- Data cleaning, analysis, write-up

# REFERENCES


1. Muñoz E, Muñoz W 3rd, Wise L. National and surgical health care expenditures, 2005-2025. Ann Surg 2010;251:195-200.
2. Alluri, Ram K., Hyuma Leland, and Nathanael Heckmann. "Surgical research using national databases." Annals of translational medicine 4.20 (2016).
3. Clements MA, Foster NC, Maahs DM, et al. Hemoglobin. A1c (HbA1c) changes over time among adolescent and young adult participants in the T1D exchange clinic registry. Pediatr Diabetes 2016;17:327-36.
4. Cafri G, Paxton EW, Love R, et al. Is There a Difference in Revision Risk Between Metal and Ceramic Heads on Highly Crosslinked Polyethylene Liners? Clin Orthop Relat Res 2016. [Epub ahead of print].