Goals of SDA Seminar Series

• **Education:** To educate investigators about existing data and how that data can be used for research.

• **Collaboration:** To partner with investigators interested in performing SDA and assist them in developing successful research proposals.

• **Promotion:** To increase awareness and visibility of CCTS/BERD members and resources.

Seminars on the 3rd Thursday of every month, from 12:00pm - 1:00pm
## Current Schedule – SDA Series

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>February 18, 2021</td>
<td>Women's Health Initiative (WHI) Investigator Data. <a href="https://www.whi.org/">https://www.whi.org/</a></td>
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<tr>
<td>April 15, 2021</td>
<td>National COVID Cohort Collaborative (N3C). <a href="https://ncats.nih.gov/n3c">https://ncats.nih.gov/n3c</a></td>
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</tr>
<tr>
<td>June 17, 2021</td>
<td>NCTN / NCORP Data Archive - Datasets generated from clinical trials of the National Clinical Trials Network (NCTN) and the NCI Community Oncology Research Program (NCORP). <a href="https://nctn-data-archive.nci.nih.gov/">https://nctn-data-archive.nci.nih.gov/</a></td>
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<tr>
<td>July 15, 2021</td>
<td>National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) Central Repository. <a href="https://repository.niddk.nih.gov/home/">https://repository.niddk.nih.gov/home/</a></td>
<td></td>
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<tr>
<td>August 19, 2021</td>
<td>Partners for Kids. <a href="https://partnersforkids.org/">https://partnersforkids.org/</a></td>
<td></td>
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</tbody>
</table>

For more information and to register: [https://ccts.osu.edu/content/secondary-data-analysis-sda-seminar-series](https://ccts.osu.edu/content/secondary-data-analysis-sda-seminar-series)
Our Mission: To ensure that research conducted under the construct of the CCTS is based on sound and appropriate statistical design and principles.
The BERD core has a proven RECIPE for success

<table>
<thead>
<tr>
<th>Rigor</th>
<th>Best practices for rigorous design and analysis. Seasoned reviewers on NIH/PCORI/NSF/DOD panels</th>
</tr>
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<tbody>
<tr>
<td>Expertise</td>
<td>Broad spectrum covering biostatistics, clinical trials, population studies, genomics, and genetics</td>
</tr>
<tr>
<td>Collaboration</td>
<td>Established collaborations with &gt;300 unique PIs spanning multiple pediatric and adult specialties</td>
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<tr>
<td>Innovation</td>
<td>Funded methodological work in statistical bioinformatics, multiple imputation, Bayesian models, causal inference</td>
</tr>
<tr>
<td>Productivity</td>
<td>300 grant submissions, 50 new awards, 350 peer-reviewed publications since 2018</td>
</tr>
<tr>
<td>Experience</td>
<td>Over 100 combined years of continual NIH funding for BERD members</td>
</tr>
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</table>

How we can help

- Formulation of research hypotheses
- Complex study design
- Power and sample size calculations
- Statistical plan for grant proposal/IRB protocol
- Clinical trial management and monitoring
- Statistical analysis and modeling
- Datasets for secondary data analysis
- Statistical and epidemiological education
**Summary of BERD Members**

<table>
<thead>
<tr>
<th>BERD Co-Directors</th>
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<tbody>
<tr>
<td>Guy Brock, PhD</td>
<td><a href="mailto:guy.brock@osumc.edu">guy.brock@osumc.edu</a></td>
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<td>Soledad Fernandez, PhD</td>
<td><a href="mailto:soledad.fernandez@osumc.edu">soledad.fernandez@osumc.edu</a></td>
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<thead>
<tr>
<th>Center for Biostatistics, Department of Biomedical Informatics</th>
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<tbody>
<tr>
<td>Mahmoud Abdel-Rasoul, MS, MPH</td>
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<td>Brett Klamer, MS</td>
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<td>Eric McLaughlin, MS</td>
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<td>Rachel Smith, MPH</td>
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<td>Julie Stephens, MS</td>
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<td>Lai Wei, PhD</td>
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</tr>
<tr>
<td>Vedat Yildiz, MS</td>
<td><a href="mailto:vedat.yildiz@osumc.edu">vedat.yildiz@osumc.edu</a></td>
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<thead>
<tr>
<th>Division of Biostatistics</th>
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<tbody>
<tr>
<td>Kellie Archer, PhD</td>
<td><a href="mailto:archer.43@osu.edu">archer.43@osu.edu</a></td>
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<tr>
<td>Bo Lu, PhD</td>
<td><a href="mailto:lu.232@osu.edu">lu.232@osu.edu</a></td>
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<tr>
<td>Michael Pennell, PhD</td>
<td><a href="mailto:pennell.28@osu.edu">pennell.28@osu.edu</a></td>
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<td>Patrick Schnell, PhD</td>
<td><a href="mailto:schnell.31@osu.edu">schnell.31@osu.edu</a></td>
</tr>
<tr>
<td>Chi (Chuck) Song, PhD</td>
<td><a href="mailto:song.1188@osu.edu">song.1188@osu.edu</a></td>
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<tr>
<th>Department of Obstetrics &amp; Gynecology</th>
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<tbody>
<tr>
<td>Courtney Lynch, PhD</td>
<td><a href="mailto:lynch.356@osu.edu">lynch.356@osu.edu</a></td>
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</table>
Data from the Centers for Medicare and Medicaid Services (CMS)

Wendy Y. Xu, Ph.D., Associate Professor
Division of Health Services Management and Policy
College of Public Health
2021.03.17
Centers for Medicare & Medicaid Services (CMS)

• Centers for Medicare and Medicaid Services is the largest governmental source of health coverage funding.
• The CMS is responsible for administering the Medicare, Medicaid and State Children's Health Insurance Programs, as well as a number of health oversight programs.
• CMS gathers and formats data to support the agency's operations.
• Suitable for retrospective research studies using secondary data.
Overview of Medicare & Medicaid Programs

• Established through Social Security Amendments of 1965

• Adds taxpayers to health care financing equation
Eligibility and Enrollment in Medicare

• An entitlement

• Most common eligibility pathways:
  • Age≥65: ~85% of Medicare beneficiaries
  • Disability: ~15%
  • End Stage Renal Disease (ESRD)
Structure of Medicare Program

• **Part A** covers inpatient hospital stays, skilled nursing facility (SNF) stays, some home health visits, and hospice care.

• **Part B** covers physician visits, outpatient services, preventive services, and some home health visits.

• *We typically refer Part A and Part B combined as traditional Medicare fee-for-service program.*

• **Part C** refers to the Medicare Advantage program, through which beneficiaries can enroll in a private health plan and receive all Medicare-covered services.
  - ~40% Medicare beneficiaries in 2020

• **Part D** covers outpatient prescription drugs through private plans that contract with Medicare.
Sources of Medicare Funding

<table>
<thead>
<tr>
<th>Source</th>
<th>TOTAL</th>
<th>Part A</th>
<th>Part B</th>
<th>Part D</th>
</tr>
</thead>
<tbody>
<tr>
<td>General revenue</td>
<td>41%</td>
<td>&lt;1%</td>
<td>71%</td>
<td>73%</td>
</tr>
<tr>
<td>Payroll taxes</td>
<td>37%</td>
<td>87%</td>
<td>27%</td>
<td>15%</td>
</tr>
<tr>
<td>Premiums</td>
<td>14%</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Transfers from</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>states</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taxation of Social Security benefits</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Interest</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
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</tbody>
</table>

TOTAL: $705.1 billion
Part A: $299.4 billion
Part B: $305.6 billion
Part D: $100.2 billion

NOTE: Data are for the calendar year.
Eligibility in Medicaid

- Medicaid is the nation’s public health insurance program for people with low income.
  - Federal and state governments share costs
- Medicaid covers:
  - Adults ages 19-64 with incomes ≤138% FPL: 34%
  - Children: ~43%
  - Disabled: 14%
  - Medicare beneficiaries: dual-eligible: 9%
Medicaid Benefits and Spending

- Routine outpatient and inpatient care
- State enhanced benefits
- Long-term care in nursing home facilities
  - Account for 50% of LTC finance
- Support local health system and safety-network hospitals
- Assistance to 18% Medicare beneficiaries

**Figure 5**
Medicaid’s benefits reflect the needs of the population it serves.

| Low-Income Families | • Pregnant Women: Pre-natal care and delivery costs  
|                     | • Children: Routine and specialized care for childhood development (immunizations, dental, vision, speech therapy)  
|                     | • Families: Affordable coverage to prepare for the unexpected (emergency dental, hospitalizations, antibiotics)  
| Individuals with Disabilities | • Child with Autism: In-home therapy, speech/occupational therapy  
|                             | • Cerebral Palsy: Assistance to gain independence (personal care, case management and assistive technology)  
|                             | • HIV/AIDS: Physician services, prescription drugs  
|                             | • Mental Illness: Prescription drugs, physicians services  
| Elderly Individuals       | • Medicare beneficiary: help paying for Medicare premiums and cost sharing  
|                             | • Community Waiver Participant: community based care and personal care  
|                             | • Nursing Home Resident: care paid by Medicaid since Medicare does not cover institutional care |
Medicare Average Cost, Enrollment and Expenditures

<table>
<thead>
<tr>
<th>Average Medicaid Expenditures Per Beneficiary</th>
<th>Children (Ages 0-19)</th>
<th>Adults (Ages 20-64)</th>
<th>**Expansion Adults (Ages 20-64)</th>
<th>Persons with Disabilities (Ages 0-64)</th>
<th>Aged (65+)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$3,555</td>
<td>$5,159</td>
<td>$5,965</td>
<td>$19,754</td>
<td>$14,700</td>
</tr>
</tbody>
</table>

| % of Total Medicaid Expenditures             | 19%                  | 15%                 | 12%                           | 39%                                  | 16%       |
| % of Total Medicaid Enrollment               | 40%                  | 22%                 | 16%                           | 15%                                  | 8%        |

Note: Children and adults with disabilities as their basis for eligibility are included in the category of persons with disabilities.

** Expansion adults = Adults made newly eligible for Medicaid under the Affordable Care Act beginning in 2014.
A Complication in Medicaid

- Not all states allow childless adults to enroll in Medicaid
Medicare and Medicaid Programs Generate Data!

- Topics
  - Enrollment
  - Spending
  - Claims and managed care data
    - Procedures
    - Diagnosis
  - Survey of provider quality and patient satisfaction
  - Death
Data Available for Research

http://www.resdac.org

- Research Identifiable data files (IDFs or referred to as RIFs): PHI and PII data included.
  - Medicare claims with zip code, provider NPIs, and patient birth/death date
  - Can be expensive!
- Limited Data Set Files (LDSs): data elements can be similar to RIFs but stripped of PHI and PII data. No direct HIPPA identifiers.
  - Medicare Current Beneficiary Survey (MCBS)
  - LDS version of Medicare claims
Data Available for Research

- Public Use Files (PUFs): Non-Identifiable Data Files.
  - PUF version of MCBS
  - Part D Plan-level prescription drug plan formulary and drug price
  - MA plan-level enrollment and demographics
  - PUF Medicare claims (synthetic)
  - Hospital cost reports

- Other Examples of Public Data
  - Health and Retirement Study (by NIA)
  - National Health Interview Survey
  - Medical Expenditure Panel Survey
  - Behavioral Risk Factor Surveillance System (BRFSS)
Medicaid Data

• Data maintained by Medicaid:
  • Transformed Medicaid Statistical Information System (T-MSIS)

• State Medicaid Data:
  • E.g. Ohio Colleges of Medicine Government Resource Center

• Public Data
  • State Drug Utilization Data (SDUD)
<table>
<thead>
<tr>
<th></th>
<th>Public Use File</th>
<th>Limited Data Sets</th>
<th>Research Identifiable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requires Privacy Board Review?</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Requires a Data Use Agreement?</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Files include beneficiary-level data?</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Researchers may request customized cohorts (e.g. Diabetics residing in MN)?</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Data can be linked at beneficiary level to non-CMS data using a beneficiary identifier?</td>
<td>No</td>
<td>No</td>
<td>Yes[1]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Quarterly file: 3-month run off</td>
<td>Quarterly file: 3-month run off</td>
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</table>

Table 1. Overview of file difference by privacy level
In light of the evolving COVID-19 situation, we want to assure you that ResDAC is open for business. We are actively responding to all phone and email inquiries.

Find, Request and Use CMS Data

GETTING STARTED

New to CMS data

How to begin
Who is in the data?
What is in the data?
What type of data is right for me?

SUBMITTING A REQUEST

Find the documents you need & submit a request

How to request identifiable data
Timeline and process
CMS data fee information
Get the documents you need

LEARN ABOUT CMS DATA

Get answers about CMS data

How to understand & use the data
CMS data training
Articles about the data
Medicaid data quality resources

NEWS UPDATES FROM CMS

2019 Preliminary Medicaid and CHIP Data Now Available
Costs to Obtain Data

• The fees for RIF and LDS data are determined by:
  • Files Requested
  • Number of People Included
  • Whether a Finder File is needed
  • Whether it is physical delivery of data or via virtual servers

https://resdac.org/cms-fee-information-research-identifiable-data

https://www.cms.gov/Research-Statistics-Data-and-Systems/Files-for-Order/LimitedDataSets/StandardAnalyticalFiles
Medicare Administrative Claims Data

• Data derived from reimbursement or the payment of bills
• Data contains information about:
  • Procedures performed (services to be paid)
  • Providers of care (who gets paid)
  • Diagnoses codes (why service was performed so provider can be paid)
  • Care location (where the service happened, with whom)
  • Area characteristics (where the patient and care provider is located)
  • Other useful information (e.g. admission date)
• Claims can be linked to enrollment data
  • Enrollment details, age, sex, race…
Major Strengths and Limitations of Claims Data

- Data is largely reliable and valid, with rich clinical details
- Large population base
- Can easily be combined with data from other sources
  - Census data
  - Cancer registries (e.g., SEER/Medicare)
  - Vital statistics
  - Surveys (e.g., MCBS and Health and Retirement Study)
  - Other Provider Information
- Major limitations:
  - Disease stage and severity cannot be identified in most cases
  - Services paid entirely out-of-pocket cannot be known
What Types of Questions May Be Answered?


Example 1: “Risk of pelvic fractures in older women following pelvic irradiation”

Context: Pelvic fractures, including hip fractures, are a major source of morbidity and mortality in older women. Although therapeutic pelvic irradiation could increase the risk of such fractures, this effect has not been studied.

Objective: To determine if women who undergo pelvic irradiation for pelvic malignancies (anal, cervical, or rectal cancers) have a higher rate of pelvic fracture than women with pelvic malignancies who do not undergo irradiation.

Design, setting, and participants: We conducted a retrospective cohort study using Surveillance, Epidemiology, and End Results (SEER) cancer registry data linked to Medicare claims data. A total of 6428 women aged 65 years and older diagnosed with pelvic malignancies from 1986 through 1999 were included. We compared results for women who did (n = 2855) vs did not (n = 3573) undergo radiation therapy. To assess the influence of selection bias, we also evaluated the effect of irradiation on osteoporotic fractures in nonirradiated sites (arm and spine).

Main outcome measure: We evaluated the effect of irradiation on the incidence of pelvic fractures over time, and adjusted for potential confounders using a proportional hazards model.
Example 2. The Impact of Mental Illness on Postoperative Outcomes Among Medicare Beneficiaries. A Missed Opportunity to Help Surgical Patients?

Objective:
The aim of this study was to define the prevalence of preexisting mental illness, as well as characterize the impact of a preexisting mental illness diagnosis on postoperative outcomes.

Summary Background Data:
Preoperative surgical evaluation and risk stratification have traditionally centered on optimizing physical health. The influence of mental health on postoperative surgical outcomes has not been investigated.

Methods:
Medicare beneficiaries who underwent elective colectomy, coronary artery bypass grafting, abdominal aortic aneurysm repair, abdominal aortic aneurysm repair, total hip arthroplasty, total knee arthroplasty, and lung resection were identified. Patients were classified as having mental illness using International Classification of Diseases, 9th and 10th Revisions Procedures codes (ICD9/10CM) codes for anxiety, depression, bipolar disorder, schizophrenia, or other psychotic disorder.
Example 3: “Impact of the 340B Drug Pricing Program on Cancer Care Site and Spending in Medicare”

Objective: To examine the impact of the 340B drug discount program on the site of cancer drug administration and cancer care spending in Medicare.

Data sources/study setting: 2010-2013 Medicare claims data for a random sample of Medicare Fee-for-Service beneficiaries with cancer.

Study design: We identified the 340B effect using variation in the availability of 340B hospitals across markets. We considered beneficiaries from markets that newly gained a 340B hospital during the study period (new 340B markets) as the treatment group. Beneficiaries in markets with no 340B hospital were the control group. We used a difference-in-differences approach with market fixed effects.

Data collection: Secondary data analysis.

Principal findings: The probability of a patient receiving cancer drug administration in hospital outpatient departments (HOPDs) versus physician offices increased 7.8 percentage points more in new 340B markets than in markets with no 340B hospital. Per-patient spending on other cancer care increased $1,162 more in new 340B markets than in markets with no 340B hospital.

Conclusions: The 340B program shifted the site of cancer drug administration to HOPDs and increased spending on other cancer care. As the program expands, continuing assessment of its impact on service utilization and spending would be needed.
Example 4. “Socioeconomic Differences in Use of Low-Value Cancer Screenings and Distributional Effects in Medicare”

Objective: Consuming low-value health care not only highlights inefficient resource use but also brings an important concern regarding the economics of disparities. We identify the relation of socioeconomic characteristics to the use of low-value cancer screenings in Medicare fee-for-service (FFS) settings, and quantify the amount subsidized from nonusers and taxpayers to users of these screenings.


Study design: Our sample included enrollees in FFS Part B for the entire calendar year. We excluded beneficiaries with a claims-documented or self-reported history of targeted cancers, or those enrolled in Medicaid or Medicare Advantage plans. We identified use of low-value Pap smears, mammograms, and prostate-specific antigen tests based on established algorithms, and estimated a logistic model with year dummies separately for each test.

Data collection/extraction methods: Secondary data analyses.

Principal findings: We found a statistically significant positive association between privileged socioeconomic characteristics and use of low-value screenings. Having higher income and supplemental private insurance strongly predicted more net subsidies from Medicare.

Is higher privacy level better for research?


  • Using Medicaid state drug utilization data, quarterly
  • Examined changes in reimbursement and market share of long-acting insulins in Medicaid following the approval of these new products. Additionally, they estimated savings associated with the use of certain Rx
Use of CMS Data for Research

• Finding the right data for your research will depend on several factors:
  • The research question
  • Level of detail needed
  • Level of customization
  • Budget available
  • Time to obtain
  • Storage capacity
Questions?

• Make sure to first contact BERD researchers!
• My contact: xu.1636@osu.edu