BEHAVIORAL & SOCIAL SCIENCES RESEARCH IN HEALTH

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National Institutes of Health, Office of Behavioral and Social Sciences Research
NIH Consists of 27 Institutes and Centers (ICs)
About OBSSR

The Office of Behavioral and Social Sciences Research (OBSSR) opened officially on July 1, 1995. The U.S. Congress established the Office of Behavioral and Social Sciences Research (OBSSR) in the Office of the Director, NIH, in recognition of the key role that behavioral and social factors often play in illness and health.

https://obssr.od.nih.gov/
OBSSR Mission

❖ Enhance the impact of health-related behavioral and social sciences research

❖ Coordinate behavioral and social sciences research conducted or supported by the NIH and integrate these sciences within the larger NIH research enterprise

❖ Communicate health-related behavioral and social sciences research findings to various stakeholders within and outside the federal government
Contribution of Behavioral and Environmental Factors to Premature Death

- Behavioral Patterns: 40%
- Genetic Predisposition: 30%
- Social Circumstances: 15%
- Environmental Exposure: 5%
- Health Care: 10%

Figure 2. Social determinants of health. Types and subtypes of social factors that impinge on health outcomes.

<table>
<thead>
<tr>
<th>Economic Stability</th>
<th>Neighborhood and Physical Environment</th>
<th>Education</th>
<th>Food</th>
<th>Community and Social Context</th>
<th>Health Care System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Employment</td>
<td>Housing</td>
<td>Literacy</td>
<td>Hunger Access to healthy options</td>
<td>Social integration Support systems Community engagement Discrimination</td>
<td>Health coverage Provider availability Provider linguistic and cultural competency Quality of care</td>
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<tr>
<td>Income</td>
<td>Transportation</td>
<td>Language</td>
<td>Access to healthy options</td>
<td>Support systems</td>
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<td>Expenses</td>
<td>Safety</td>
<td>Early childhood education</td>
<td>Social integration</td>
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<td>Debt</td>
<td>Parks</td>
<td>Vocational training</td>
<td>Support systems</td>
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<td>Medical bills</td>
<td>Playgrounds</td>
<td>Higher education</td>
<td>Community engagement</td>
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<tr>
<td>Support</td>
<td>Walkability</td>
<td>Higher education</td>
<td>Discrimination</td>
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</tbody>
</table>

Health Outcomes
Mortality, Morbidity, Life Expectancy, Health Care Expenditures, Health Status, Functional Limitations

Multiple Levels of Influence

Figure 1
OBSSR STRATEGIC PLAN (2017-2021)
Strategic Plan Guiding Principles

❖ **Integration** of BSSR into the broader biomedical research efforts consistent with the NIH mission

❖ **Coordination** and collaboration with ICs

❖ Identify **critical challenges** that are barriers to advancement in BSSR (most impact to the largest proportion of behavioral and social science researchers)

❖ Focus on challenges that OBSSR is *uniquely positioned to address*
Scientific Priority 2: Enhance the Methods, Measures, and Data Infrastructures to Encourage a More Cumulative Behavioral and Social Sciences

- Objective 2.1: Encourage data integration and replication in the behavioral and social sciences
- Objective 2.2: Facilitate the development and testing of new measurement approaches
- Objective 2.3: Expand the repertoire of methods available to social and behavioral researchers
Transition from data-limited environment (data prospectively obtained) to data-rich environment (data collected dynamically over time from multiple sources in digitally connected world)

Increasing emphasis: precision medicine, personalized/tailored real-time (or “just in time”) interventions

Advances in medical informatics, electronic health records, big data analytics, mobile and wearable technologies, social media, web generated data, geospatial data, administrative data, and methods to curate & link data

“Big data” in the behavioral and social sciences comes from mixed sources, generated dynamically over time, not necessarily designed to produce valid or reliable data for scientific analysis
Complex Data More Easily Collected & Available, but Necessarily More Easily Analyzed

1. Intensive or voluminous longitudinal data
2. Internet, commercial, and administrative records data
3. High-density, large sample or population level agency databases
Ecological Momentary Assessment

- Experience Sampling Intensively Over Time
- Random or Event-Based Prompting
- Advantages of Incorporating with IRT
- Intensive Longitudinal Data
  - Reduces likelihood of missing critical changes in outcome
  - Increases power, especially within but also between
  - Allows for the dynamic analysis of mediators and outcomes
  - Potential for latent classes of different responses
Ecological Momentary Assessment


Growth Mixture Models: Elkhart Group Ltd
EMA Platforms - Smartphone Apps & Text Messaging

**mEMA**

Continuous sliders function as Visual Analogue Scales. You can use more than one per screen. For example:
- Frequency
  - Low
  - High
- Like it?

**REDCap Integration**

Mosio improves the usefulness of the REDCap system by enabling research teams to add dynamic text messaging functions to improve study participant engagement and data collection efforts.
Smartphone Sensors – Becoming Ubiquitous
Wearable Sensors

Wearable Activity Tracking Quantified Self

http://amiigo.co/  ION Glasses

Angel

Acoustical Optical Acceleration Temperature

Heart rate Skin temp. Blood oxygen Physical activity

@idezo_ch  Fitbit  #fec14
Wearable Sensors

HOW IT WORKS

1: Patient takes pill which has been modified to contain edible microchip

2: After pill is swallowed, chip is activated by stomach fluids, sending a signal to patch on arm

3: Patch contains receiver which decodes data about drug

4: Receiver transmits information to mobile, telling patient when next dose is due and provides other health data
Home-based Sensors

- Joint project with hospital and smart house
- Monitoring and assisting independent living for senior citizens and patients
- Application of various sensing technologies on Fujitsu Laboratories' processing platform

100 sensors per unit
Archival “Big Data” Sources

❖ Behavioral Data Traces gleaned from consumer-based data sources
❖ Social Media (Twitter, Facebook)
  ➢ Twitter opens 200 million users with 500 million tweets per day to researchers (2/10/2014)
❖ Internet Searches (Google)
❖ Cell phone Use (# calls and texts)
❖ Cable Box Data (hours of TV)
❖ Auto Black Box data (miles driven, seat belt use)
Administrative Data Sources

Year in the Life of a Patient
Adding EHR Data to Claims

Name: Jane Doe
Age: 73
PCP: Dr. Sam Smith
Location: Burlington, MA

Language: Spanish
Race: White
Ethnicity: Hispanic
Marital Status: Widow

Family History: Hypertension, Mother’s
Alcohol: 3 Times per Week
Tobacco: 1/2 Pack per Day

Visit Details:
- 10/09/2013
- Category: Dx
- Detail Type: Depression
- Description: Depressive disorder NEC
- Data Source: EHR

Outcomes:
- Ldl-Cholesterol
- Systolic Bp
- Hemoglobin A1C
Population Level Data Sources

Resources for Researchers
The National Center for Health Statistics (NCHS) is a rich source of data for researchers, teachers, and students who want to perform data analysis. This page compiles key sources of information found on the NCHS website for those who are interested in analysis of NCHS data as well as documentation and methodology of NCHS data systems.

Accessing Data for Research

Learn about CMS data
ResDAC provides a variety of resources for education and training including in-person workshops, online webinars and videos, knowledgebase articles, and national conferences.

WORKSHOPS
In-person
ResDAC-hosted workshops highlight information on the strengths and limitations of CMS data, guidance on analyses using the data and how claims-based studies can explore important health care issues.

ONLINE LEARNING
Videos and webinars
Join us online for an upcoming webinar or browse our collection of recorded video sessions addressing topics and issues of ongoing interest in new developments in CMS data.

KNOWLEDGEBASE
Articles
Search a centralized library of articles on analytic guidance, including “how-to’s” and resources, details on data file contents, information on the request process and documents are included.

For more information regarding ResDAC education opportunities, please contact ResDAC.

U.S. CENSUS DATA FOR SOCIAL, ECONOMIC, AND HEALTH RESEARCH
IPUMS USA collects, preserves and harmonizes U.S. census microdata and provides easy access to this data with enhanced documentation. Data includes decennial censuses from 1900 to 2010 and American Community Surveys (ACS) from 2000 to the present.

CREATE YOUR CUSTOM DATA SET
USE OUR ONLINE TOOL FOR ANALYSIS

WHAT IS IPUMS?
IPUMS provides census and survey data from around the world integrated across time and space. IPUMS integration and documentation makes it easy to study change, conduct comparative research, merge information across data types, and analyze individuals within family and community context. Data and services available free of charge.
Bring SDOH data into the Electronic Health Record & Using Geospatial tools to aggregate clinical & community data

Percent of children without insurance: 0-18 years of age with at least one visit to an OCHIN PBRN clinic in 2011

Areas with High Rates of Children without Insurance in OCHIN and Median Household Income Rates by Oregon County (Lincoln, Polk, Benton, Marion)

Computational modeling routinely applied in the natural sciences (e.g., physics, meteorology)

**WHAT IS COMPUTATIONAL PHYSICS?**

by justscience | © 18 Jul2017
Computational physics is the study and implementation of numerical analysis to solve problems in physics for which a quantitative theory already exists.

Computational physics can be stated as the study and the implementation of the numerical analysis for solving problems in physics for which there is the existence of a quantitative theory. Some time ago, computational physics was used as a application of modern computers in the field of science but now, it has become a subset of computational science.
Computational modeling approaches in the biological sciences
Computational Behavioral & Social Sciences?
Methodology training offered in degree programs for behavioral & social sciences has remained essentially unchanged for the last four decades.
Friedrich, Childress, & Cheng (2018 in *Teaching of Psychology*) Survey on Statistical Training Undergrad Psych

- Replication of 1990 survey of statistics instruction in undergraduate psychology programs

- Other than increases in effect size coverage, statistics instruction has changed relatively little over nearly two decades, with significant attention often reserved for a rarely offered second-level, advanced class
Aiken & West et al. (1990, 2008 in *American Psychologist*)
Survey of PhD programs in N. America

- Current PhD students are receiving traditional training in methodology and statistics that primarily supports laboratory rather than field research

- Training in new techniques and methodologies is generally unavailable within the psychology curriculum

- Substantial lack of awareness about resources on campus that may provide quantitative training for students, even though such training is sorely needed
What Should the BSSR PhD Curriculum Look Like?

❖ Current Curriculum
  ❖ Focus primarily on training professors
  ❖ Disciplinary focused

❖ Methods
  ❖ Original small sample data collection & NHST
  ❖ Non-harmonized measures
  ❖ Emphasis: inferential & sample statistics (ANOVA, regression)

❖ Curriculum for the Future
  ❖ Trains for a range of job opportunities
  ❖ Team science, prepare for multidisciplinary work

❖ Broader Toolbox of Methods
  ❖ “Big data;” “Data science”
  ❖ Harmonized measures; data linkage; data curation
  ❖ Pattern recognition; machine learning
  ❖ Computational models
  ❖ Causal inference
Scientific Inquiry: Linear

Scientific Inquiry: Iterative process with many approaches

Who wants change?

Who wants to change?

Who wants to lead the change?
Strategic Plan Guiding Principles

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Training Supported by the OBSSR

The Office of Behavioral and Social Sciences Research (OBSSR) supports a variety of in-person training experiences to encourage the application of innovative methods and enhance the research capabilities of investigators conducting health-relevant behavioral and social sciences research.

OBSSR hosts the Training Institute for Dissemination and Implementation Research in Health (TIDIRH). The training is open to researchers with interests in studying D&I across health care, public health, and community settings.

These training opportunities are primarily Summer Training Institutes, most of which are supported by an RFA on Short Courses on Innovative Methodologies in the Behavioral and Social Sciences (R25).
Summer Training Institutes via Contracts or Supplements

- Randomized Behavioral Clinical Trials (with NHLBI)
- Training Institute for Dissemination and Implementation Research in Health (TIDIRH) (with NCI)
- Training on Optimization of Behavioral and Biobehavioral Interventions (Collins P50 NIDA supplement)
Short Courses on Innovative Methodologies in the Behavioral and Social Sciences (R25 grants)

❖ CBPR: Enhancing Capacity to Use Innovative Methodologies (Chris Coombe)
❖ Dynamic Systems Modeling for Public Health (Elizabeth Bruch)
❖ Master Course on Power for Multilevel and Longitudinal Health Behavior Studies (Keith Muller)
❖ Mixed Methods Research Training Program (Joseph Gallo)
❖ Multi-Platform Educational Program in Innovative Methods for the Behavioral and Social Sciences (Lisa Bates)
❖ Strengthening Causal Inference in Behavioral Obesity Research (David Allison)
❖ Training Institutes for Mobile Health (mHealth) Methodologies (Vivek Shetty)
❖ Quick Start: A Short Course for Stimulating Innovative Collaborative Research on Breast Cancer (Marion Kavanaugh-Lynch)
Expanding OBSSR Training Opportunities

❖ K18 - Short-term Mentored Career Enhancement Awards in Mobile and Wireless Health Technology and Data Analytics: Cross-Training at the intersection of Behavioral and Social Sciences and STEM Disciplines

❖ R25 - Short Courses on Innovative Methodologies and Approaches in the Behavioral and Social Sciences

❖ T32 - Predoctoral Training in Advanced Data Analytics for Behavioral and Social Sciences Research (BSSR) - Institutional Research Training Program
Pilot Program: OBSSR T32 Predoc Training Concept

❖ RFA Funding Opportunity: Predoctoral Training in Advanced Data Analytics for Behavioral and Social Sciences Research (BSSR) - Institutional Research Training Program (T32)

❖ Vision: Support the development of a pilot program cohort of specialized BSSR predoctoral candidates pursuing careers in health-related research who will possess advanced competencies in data science analytics

❖ Purpose: Solicit applications for new BSSR predoctoral training programs that focus on innovative computational and/or data science analytic approaches and their incorporation into training for the future BSSR health research workforce
OBSSR Annual Methodology Seminars for NIH Staff

2019
OBSSR Methodology Seminar: Text Mining for Behavioral and Social Sciences Research
August 9, 2019
National Institutes of Health, 6001 Executive Blvd, Conf Room A1/A2

2018
OBSSR Methodology Seminar: Predictive Modeling for Behavioral and Social Sciences Health Research
October 12, 2018
National Institutes of Health, Porter Neuroscience Research Center, Bldg. 35A

2017
OBSSR Methodology Workshop: Emerging Non-Traditional Survey Data Collections
August 25, 2017
National Institutes of Health, Porter Neuroscience Research Center, Bldg. 35A
Questions, Comments, Ideas?

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