

Prevention Research at the National Institutes of Health

David M. Murray, Ph.D.
Associate Director for Prevention
Director, Office of Disease Prevention

Division of Epidemiology and Community Health
School of Public Health
University of Minnesota
December 1, 2017



Agenda

- Current Prevention Research at NIH
- The Office of Disease Prevention
- The Future of Prevention Research at NIH
- Important Initiatives at NIH Related to Prevention

Prevention is Part of the NIH Mission

- NIH's mission is to seek fundamental knowledge about the nature and behavior of living systems and the application of that knowledge to enhance health, lengthen life, and reduce illness and disability.
- The NIH provides leadership and direction to programs designed to improve the health of the Nation by conducting and supporting research in the causes, diagnosis, prevention, and cure of human disease.
- Prevention research is one of 3 key targets in the NIH Strategic Plan, together with research on fundamental science and research on treatments and cures.
- The ICOs define prevention differently.
 - Some include preclinical research; others do not.

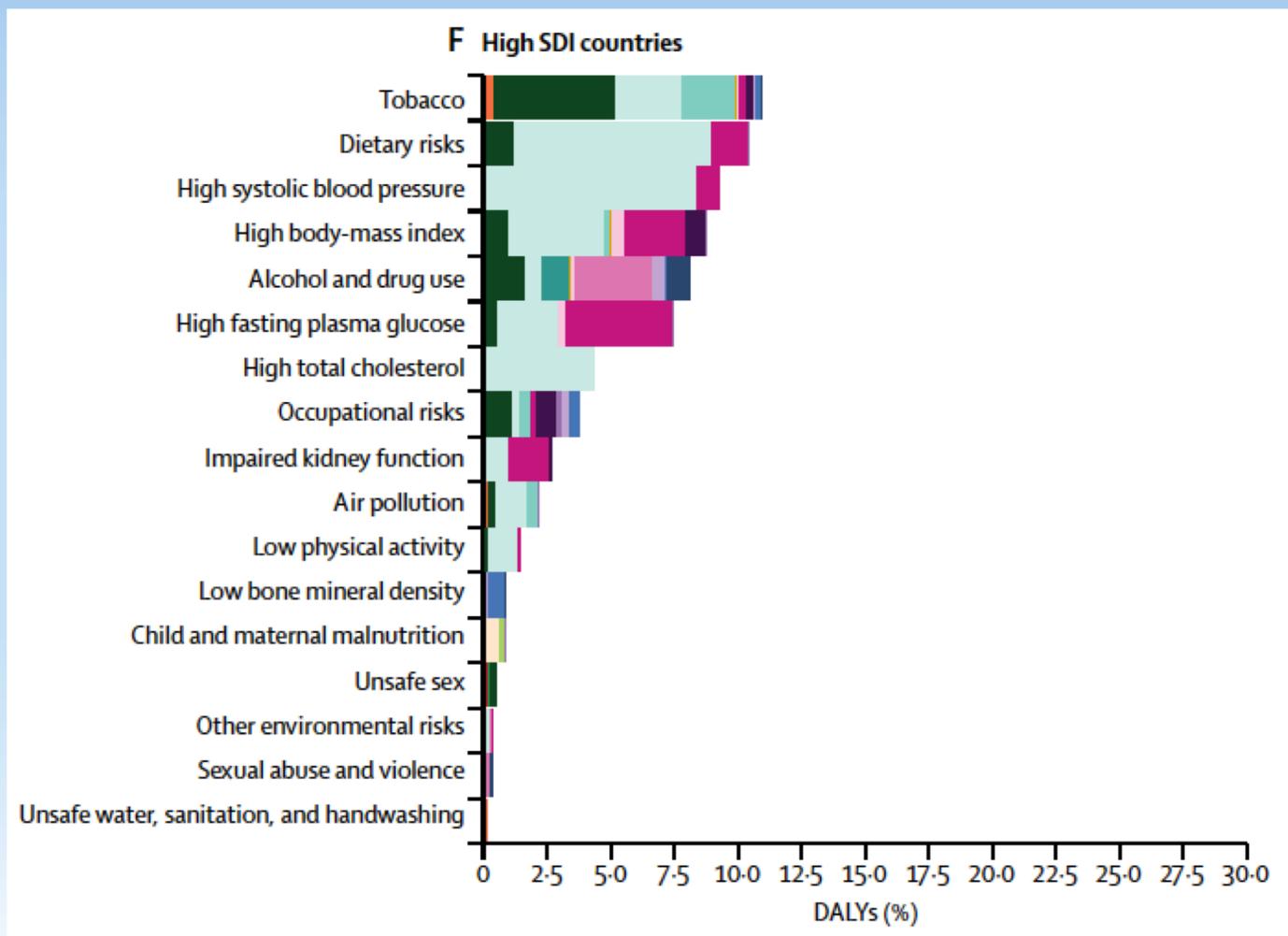
2016 CDC Data

Number of deaths for leading causes of death

- Heart disease: 633,842
 - Cancer: 595,930
 - Chronic lower respiratory diseases: 155,041
 - Accidents (unintentional injuries): 146,571
 - Stroke (cerebrovascular diseases): 140,323
 - Alzheimer's disease: 110,561
 - Diabetes: 79,535
 - Influenza and pneumonia: 57,062
 - Nephritis, nephrotic syndrome, and nephrosis: 49,959
 - Intentional self-harm (suicide): 44,193

Source: [Health United States, 2016 Table 19](#)  [PDF- 11.1 MB] (Data are for 2015)

2016 Leading Risks for Attributable DALYs



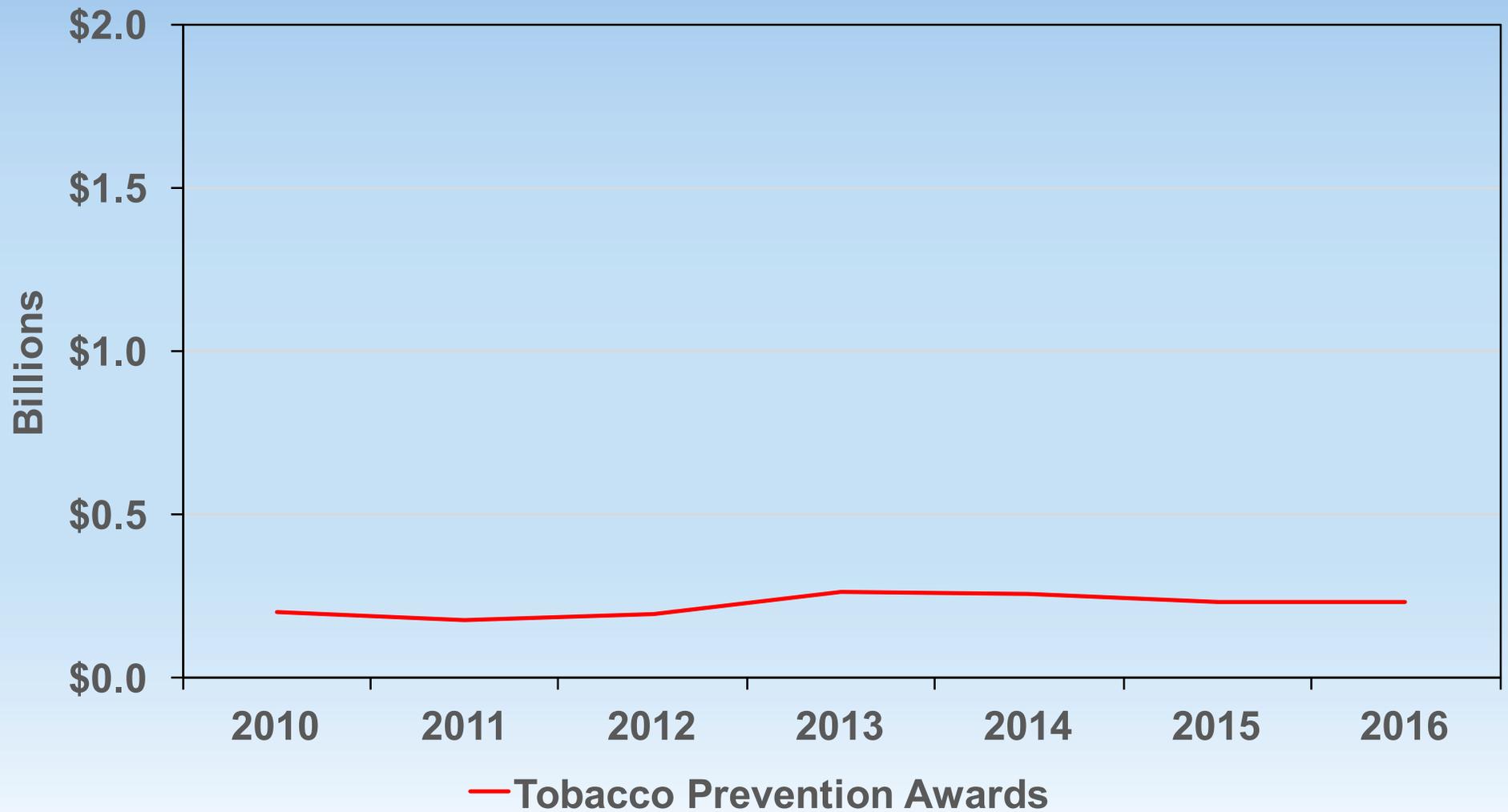
NIH Total and Prevention Funding



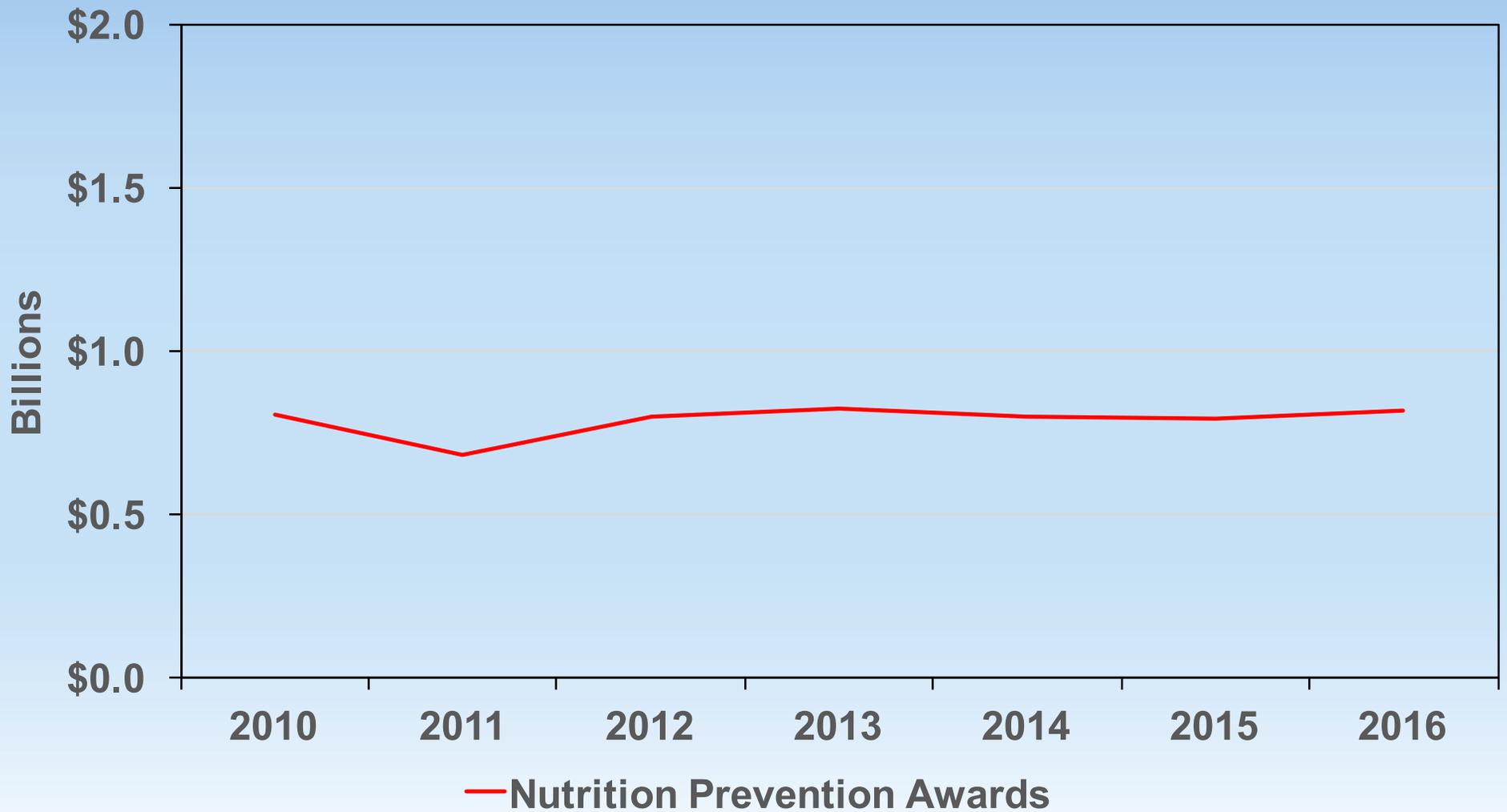
Prevention Funding



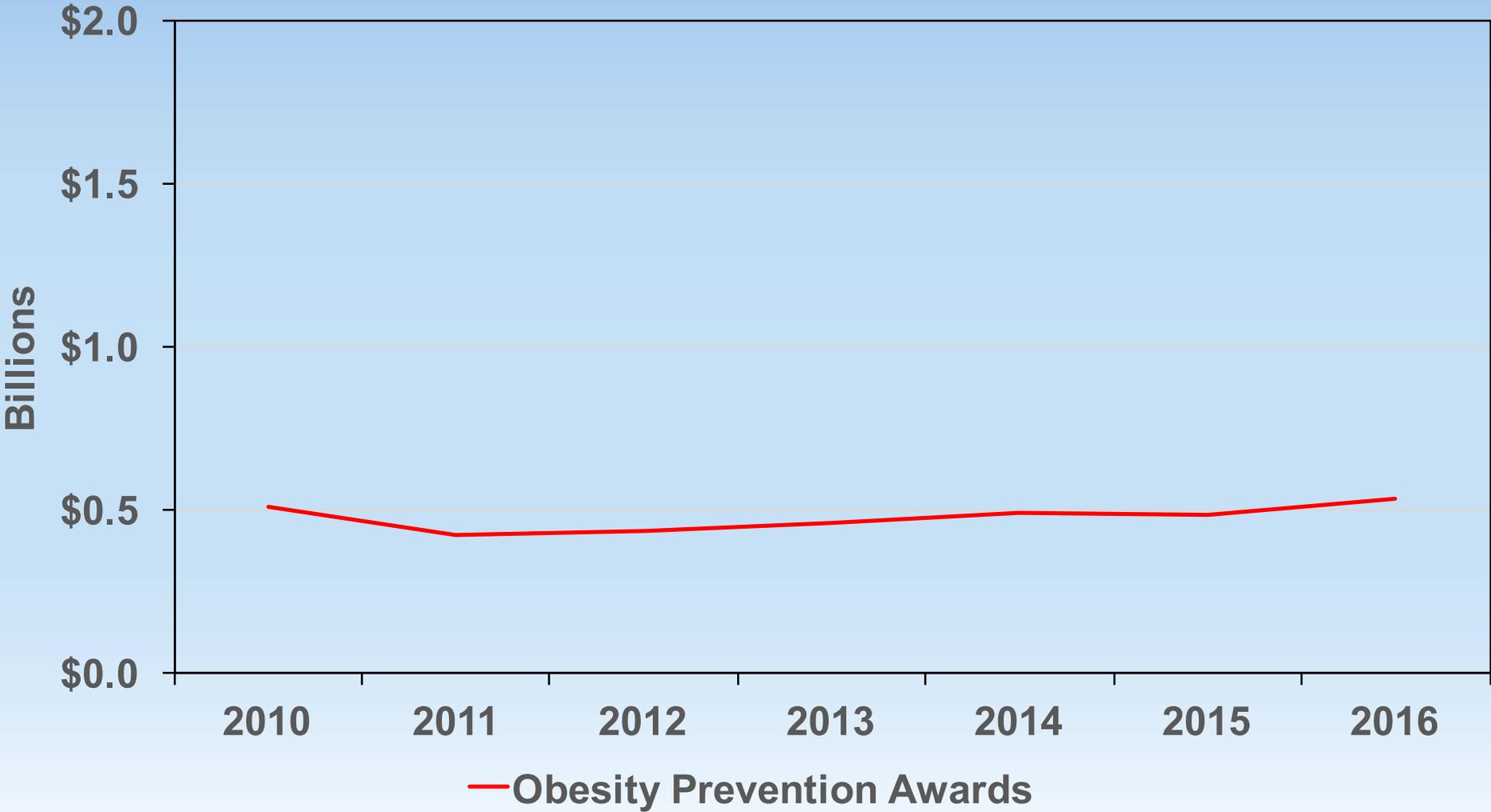
Prevention Funding: Tobacco



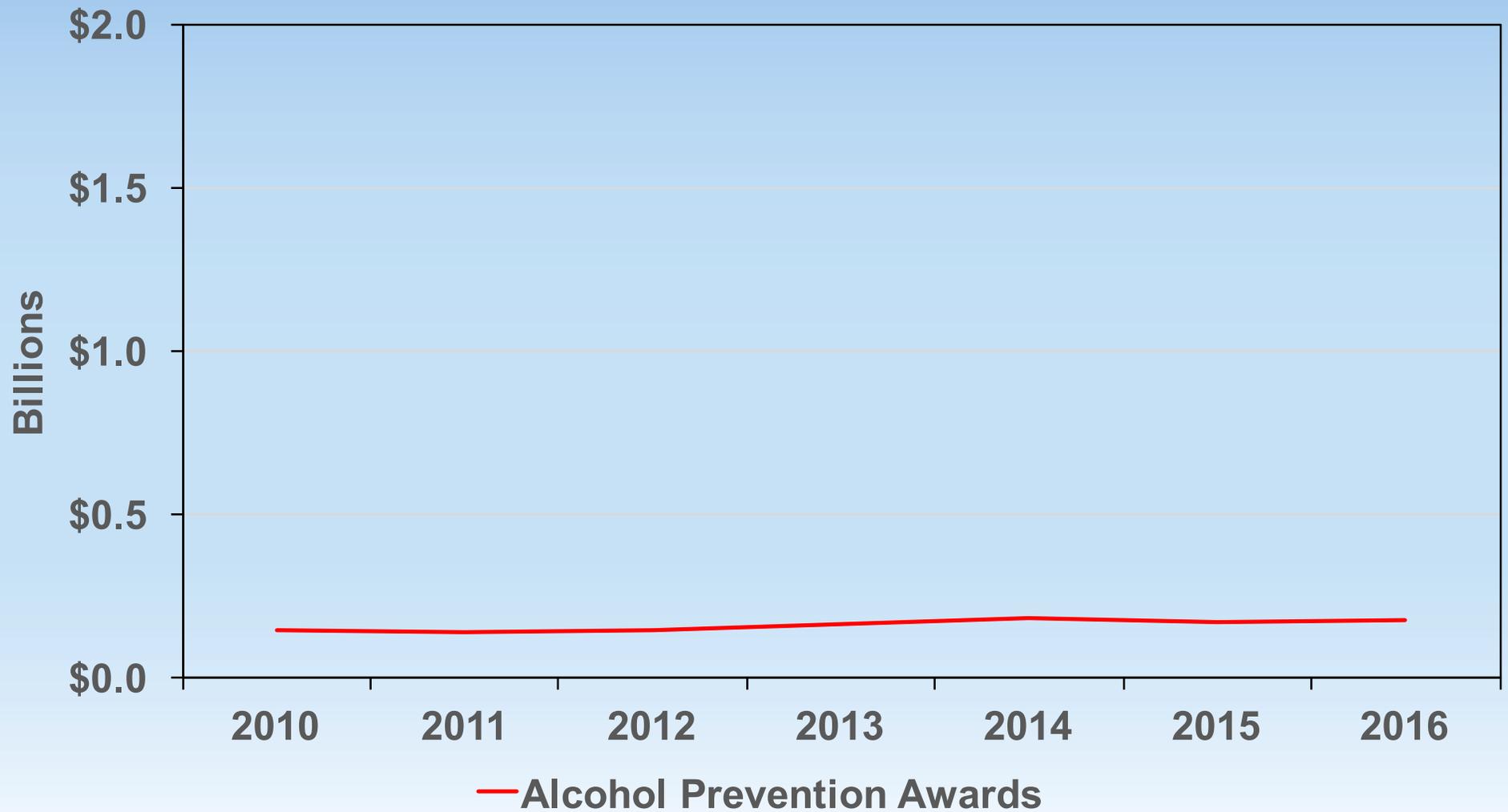
Prevention Funding: Nutrition



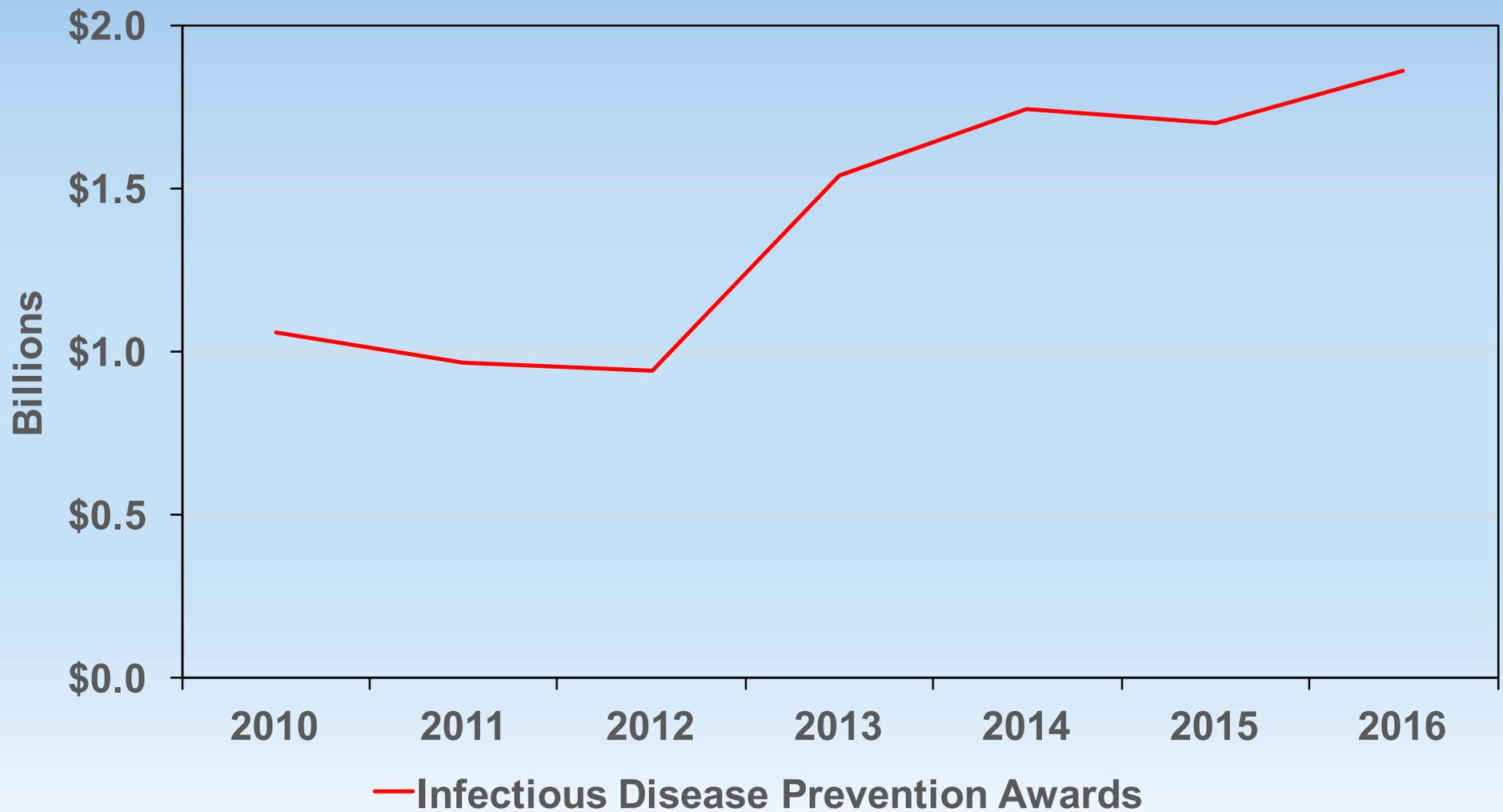
Prevention Funding: Obesity



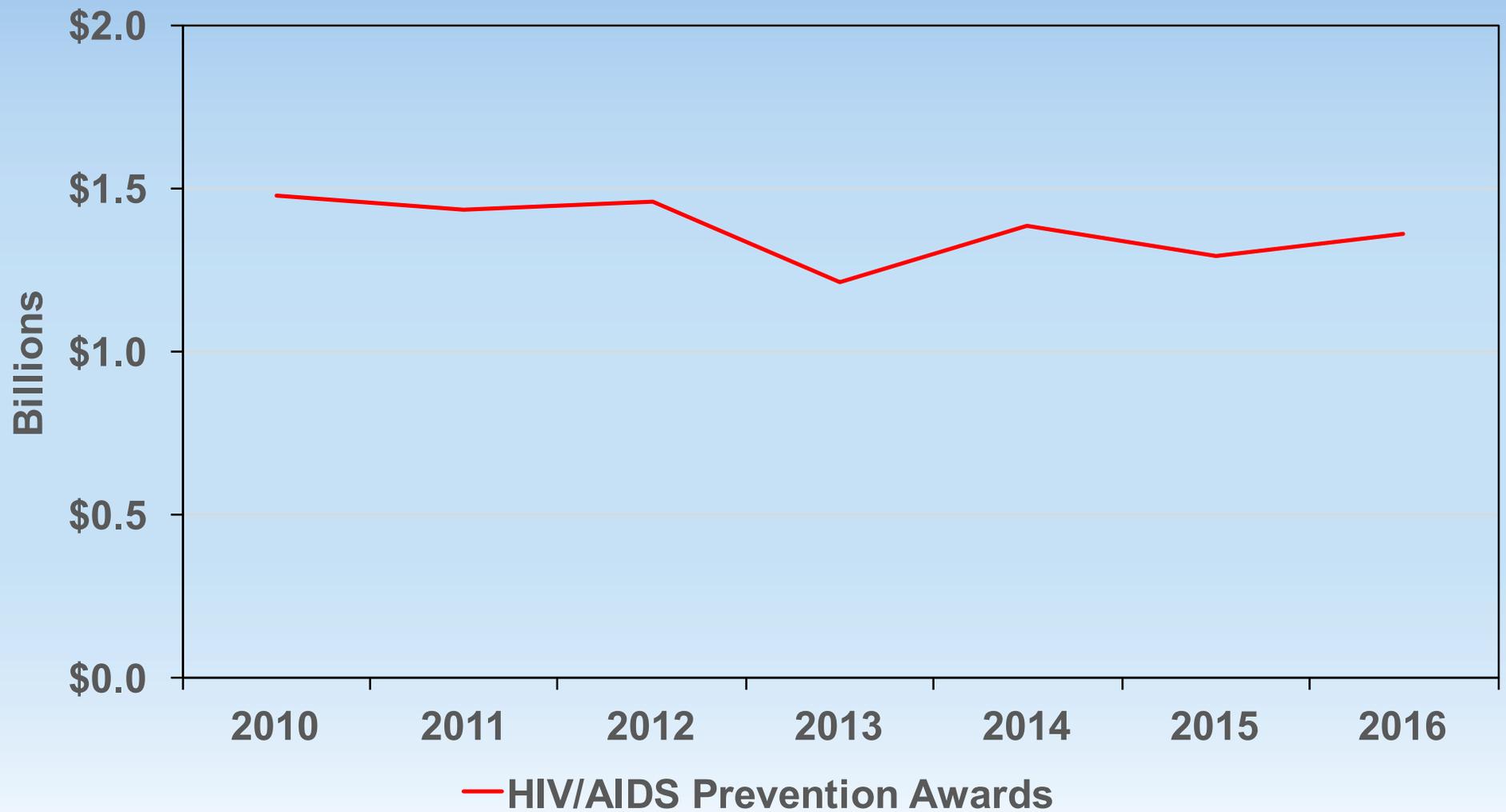
Prevention Funding: Alcohol



Prevention Funding: Infectious Disease Not HIV/AIDS



Prevention Funding: Infectious Disease HIV/AIDS



Prevention Funding: Substance Abuse



Prevention Research at NIH

- Prevention research represents only 19.9% of the NIH extramural expenditures, based on the Research Categorization and Disease Classification System.
- Moreover, expenditures on prevention of the actual causes of death are often limited.
 - Tobacco – 4.1% of prevention, 0.8% of total
 - Nutrition – 14.6% of prevention, 2.9% of total
 - Obesity – 8.8% of prevention, 1.8% of total
 - Alcohol – 3.0% of prevention, 0.6% of total
 - Substance Use – 13.0% of prevention, 2.6% of total
- Note: categories are not mutually exclusive

The Associate Director for Prevention and The Office of Disease Prevention

- The Health Research Extension Act of 1985 created the position of Associate Director for Prevention.
- The following year, the NIH Director created the Office of Disease Prevention to support the new Associate Director.
 - The Prevention Research Coordinating Committee, established in 1980, moved to ODP.
 - The Office of Medical Applications of Research (OMAR), established in 1977, moved to ODP, with its Consensus Development Program (CDP).
 - The Office of Nutrition Research Coordination was attached to the Associate Director for Prevention, and became the Division of Nutrition Research Coordination when it transferred to NIDDK in 1993.
 - The Office of Dietary Supplements was established in 1994 and placed in the ODP.

Evolution of ODP

- The Robert S. Gordon Lecture was established in 1995 to recognize scientists who have contributed significantly to the field of epidemiology or clinical trials research.
- The 2018 Lecture will be given by Ana Diez Roux, Dean of the School of Public Health at Drexel

An NIH Director's Wednesday Afternoon Lecture Series
THE 2013 ROBERT S. GORDON, JR. LECTURE



Using Risk Models
for Breast Cancer Prevention

Mitchell H. Gail, M.D., Ph.D.
Division of Cancer Epidemiology & Genetics, National Cancer Institute

February 27, 2013
3-4 p.m. Masur Auditorium
Warren Grant Magnuson Clinical Center
National Institutes of Health
Bethesda, Maryland

Evolution of ODP

- The Medicine: Mind the Gap seminar series was established in 2007 to explore issues at the intersection of research, evidence, and clinical practice—areas in which conventional wisdom may be contradicted by recent evidence.



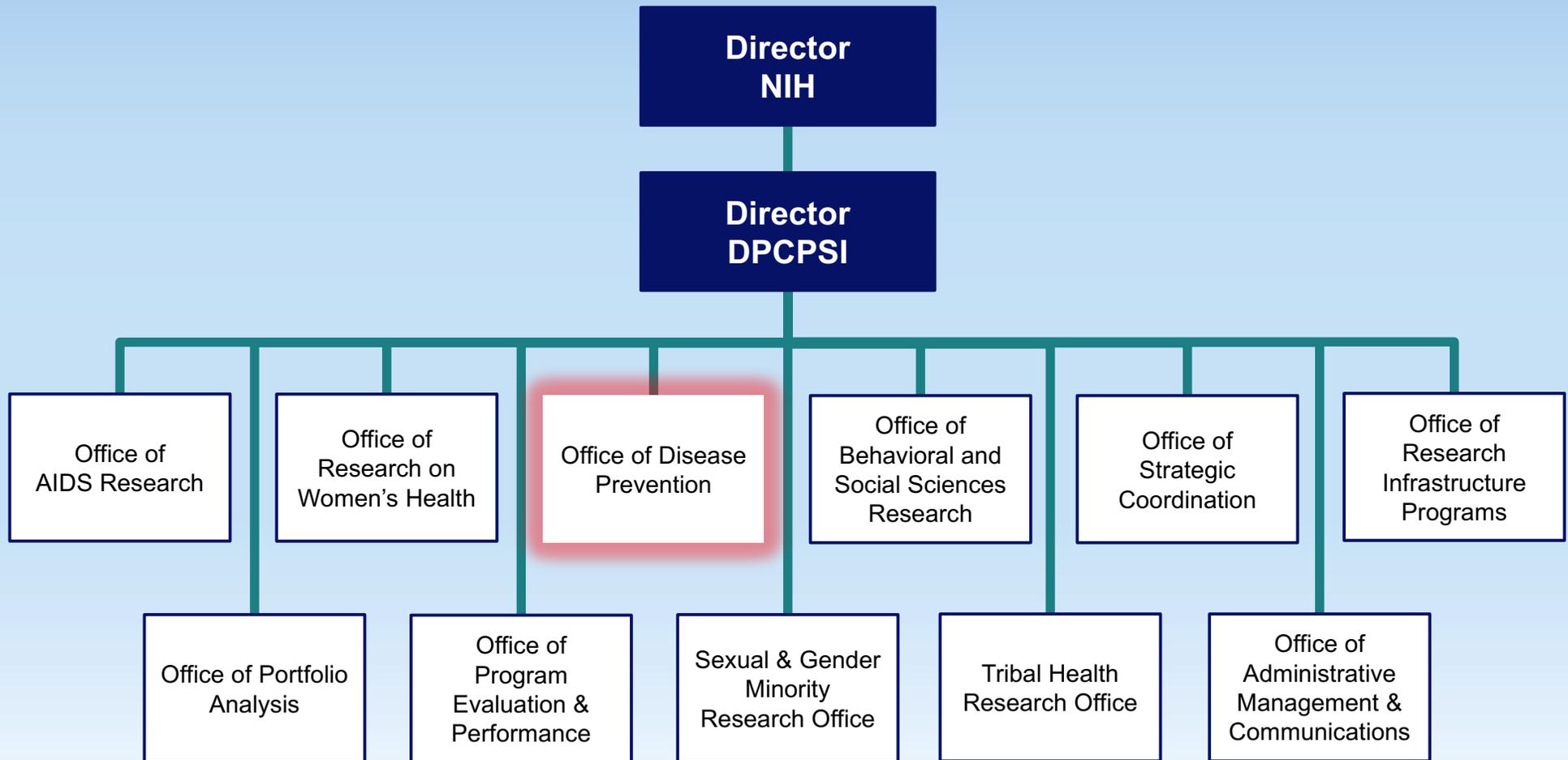
- The seminar is now a webinar and focuses on prevention science methods.
 - Videocasts are available on the ODP website.

Evolution of ODP

- In 2006, the NIH Reform act of 2006 called for the creation of a new Division within the NIH OD to focus on trans-NIH coordination, planning and strategic initiatives.
- In 2008, the Division of Program Coordination, Planning, and Strategic Initiatives (DPCPSI) was established by the NIH Director to respond to this directive.
 - ODP, OAR, ORWH, OBSSR, and several other offices were moved to DPCPSI.
 - The Associate Directors report to the NIH Director for their areas of science, and to the NIH Deputy Director for DPCPSI for office functions.

The Office of Disease Prevention

Division of Program Coordination, Planning, and Strategic Initiatives



Evolution of ODP

- In 2012, after the departure of the former ODP Director and before the appointment of the new ODP Director, the ODP was reorganized.
 - The Office of Medical Applications of Research was dissolved, and its staff were merged with the staff of the ODP.
 - The Office of Rare Diseases Research was moved to the National Center for Advancing Translational Science (NCATS).

Evolution of ODP

- Evidence-Based Methodology Workshops began in 2012 to identify methodological and scientific weaknesses in an area and move the field forward through an unbiased and evidence-based assessment of a complex clinical issue.
- The EBMW series was renamed as the Pathways to Prevention Workshops in 2013.



Evolution of ODP

- The Tobacco Regulatory Science Program was transferred to ODP in 2012.
 - TRSP is a trans-NIH collaborative effort with the FDA's Center for Tobacco Products to conduct research to support FDA's regulatory authority for tobacco products.
 - This program supported >\$89M in new research in FY17.

The screenshot shows the NIH Office of Disease Prevention website. The header includes the NIH logo, the text "National Institutes of Health Office of Disease Prevention", and logos for the Division of Program Coordination, Planning, and Strategic Initiatives (DPCPSI), National Institutes of Health, and U.S. Department of Health and Human Services. Social media links for @NIHprevents and ODP Email Updates are also present. The main content area is titled "Tobacco Regulatory Science Program (TRSP)" and includes a navigation menu on the left with options like Home, Tobacco Regulatory Research, About the FSPTCA, Research Priorities, Funding Opportunities, Research Portfolio, and Resources. The main text describes the program's location in the NIH Office of Disease Prevention and its collaborative effort with the FDA's Center for Tobacco Products. A "What's New" section highlights "Tobacco Control Regulatory Research PAR-12-267 (R01)" and a "Notice of Change in Expiration Date of PAR-12-267 Tobacco Control".

Evolution of ODP

- The Consensus Development Program (CDP) was retired in 2012.
- There are now many other organizations that conduct systematic reviews and develop consensus statements
 - US Preventive Services Task Force
 - Community Preventive Services Task Force
 - Cochrane Collaboration
 - Agency for Healthcare Research and Quality



Associate Directors for Prevention

- William T. Friedewald, M.D. (1986–1989)
- John H. Ferguson, M.D. (Acting, 1989–1991)
- William R. Harlan, M.D. (1991–2001)
- Barnett S. Kramer, M.D., M.P.H. (2001–2010)
- Paul M. Coates, Ph.D. (Acting, 2010–2012)
- David M. Murray, Ph.D. (2012–Present)

Mission

- To improve the public health by increasing the scope, quality, dissemination, and impact of prevention research supported by NIH.
- Provide leadership for the development, coordination, and implementation of prevention research in collaboration with ICs and other partners.



Defining Prevention Research

- Prevention research for the Office of Disease Prevention encompasses both primary and secondary prevention research in humans.
- It includes research designed to promote health; to prevent onset of disease, disorders, conditions, or injuries; and to detect, and prevent the progression of, asymptomatic disease.



Current Activities

- ODP manages the \$100M Tobacco Regulatory Science Program.
- ODP is the NIH liaison to other DHHS activities and partners.
 - U.S. Preventive Services Task Force
 - Community Preventive Services Task Force
 - Healthy People 2020
- ODP offers an evidence-based assessment program
 - Pathways to Prevention
- ODP offers training and education
 - Mind the Gap, Gordon Lecture, pre-conference methods workshops
- ODP co-funds NIH research projects, meetings, and workshops that support prevention research.
- ODP has a staff of 30 FTE and 1 contractor

Proposed Strategic Priorities for FY2019-23

- Systematically monitor NIH investments in prevention research and assess the progress and results of that research.
- Identify prevention research areas for investment or expanded effort by the NIH.
- Promote the use of the best available methods in prevention research and support the development of better methods.
- Promote collaborative prevention research projects and facilitate coordination of such projects across the NIH and with other public and private entities.
- Increase the visibility of prevention research at the NIH and across the country.

Monitor NIH Investments in Prevention Research

- Challenges in 2013...
 - Existing portfolio analysis methods had unknown sensitivity and specificity.
 - They provided inadequate detail on features like outcome, exposure, study type, design, age group, etc.
 - They could not accurately characterize levels or trends for awards or dollars.
 - They could not identify areas with inadequate support.
 - They could not be used effectively to address this strategic priority.

Monitor NIH Investments in Prevention Research

■ Progress

- Developed a taxonomy for prevention research with 8 categories and 135 topics.
- Coded 5612 type 1 R01 abstracts for FY10-15 -- all RCDC prevention awards, and a 5% random sample of the remainder.
- Collaborated with OPA to develop machine learning tools to automate the coding process.
- ODP has now coded >14,000 R, P, and U awards, using the machine learning tools to guide their selection.
- Will report results to IC Directors late this year and publish findings in 2018, collaborating with ICs to develop manuscripts.

Monitor NIH Investments in Prevention Research

■ Proposed Objectives

- Characterize and report on the NIH prevention research portfolio based on the taxonomy for prevention research developed by the ODP.
- Regularly assess the progress and results of NIH investments in prevention research.
- Refine automated tools to classify NIH awards and monitor their progress.

Identify Prevention Research Gaps

- Challenges in 2013...
 - ICs looked to ODP for advice on areas and topics for new or expanded prevention research.
 - Better portfolio analysis methods would help.
 - Regular interaction with key stakeholders would help.
 - US Preventive Services Task Force
 - Community Preventive Services Task Force
 - Centers for Disease Control and Prevention
 - Professional societies

Identify Prevention Research Gaps

■ Progress

- Improved coordination between NIH and the USPSTF, including an annual survey of Insufficient Evidence statements to monitor progress and identify opportunities.
- Increased efforts to disseminate the Insufficient Evidence findings of the CPSTF to the research community.
- Partnered with HHS ODPHP and the ICs to support Healthy People 2020 and develop Healthy People 2030.



Identify Prevention Research Gaps

■ Progress

- Offered the Pathways to Prevention (P2P) program.
 - Completed workshops on opioids in the treatment of chronic pain, ME/CFS, total worker health, and the prevention of youth suicide.
 - Planning 3 new workshops:
 - CY17 – Methods to evaluate natural experiments in obesity prevention and control (NCI, NHLBI, NIDDK)
 - CY18 – Medications for fracture prevention (NIAMS, NIA) – CY18
 - CY19 – Achieving health equity in preventive services (NIMHD, NCI, NHLBI, NIDDK)

Identify Prevention Research Gaps

- Proposed Objectives:
 - Work with stakeholders to identify needs in prevention research.
 - Compare needs in prevention research with the current NIH portfolio to identify gaps in prevention research (i.e., those areas that are not being addressed or have insufficient funding).
 - Work across the ODP and with NIH Institutes and Centers to identify the most promising/feasible prevention research gaps for investment or expanded effort.

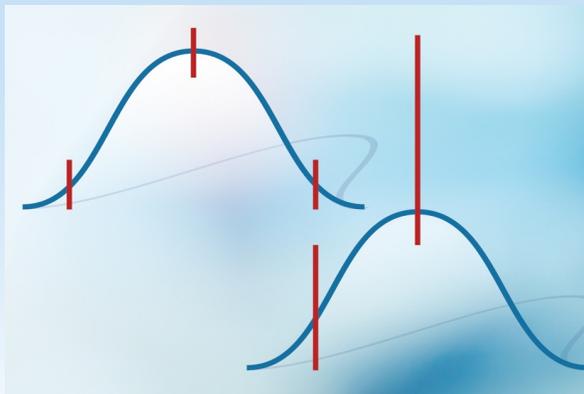
Promote the Use of the Best Available Methods

- Challenges in 2013...
 - Evidence showed that the best methods were not always used.
 - My observations, based on 33 years as an NIH funded investigator and reviewer told me that...
 - Program and review staff were not always up to date, making it harder for them to advise applicants and empanel study sections.
 - Review panels often lacked necessary methodological expertise.
 - Steps were needed to ensure applications with strong methods were distinguished from those with weak methods.

Promote the Use of the Best Available Methods

■ Progress

- Posted NIH prevention methods training opportunities and methods-related FOAs in Resources for Researchers.
- Created and posted online a 7-part course on Pragmatic and Group-Randomized Trials in Public Health and Medicine.
- Added language to the Application Guide and Review Criteria and created [ResearchMethodsResources.nih.gov](https://www.researchmethodsresources.nih.gov) to provide guidance for new clinical trial applications.



Pragmatic and Group-Randomized Trials in Public Health and Medicine

Now available! 7-part, self-paced, online course on Pragmatic and Group-Randomized Trials

Learn More.

Promote the Use of the Best Available Methods

- Proposed Objectives:
 - Maintain catalogues and directories of existing NIH and other federal resources for prevention science methods that focus on research design, intervention development, measurement, and data analysis.
 - Provide resources for review staff to identify experts in prevention research methods for recruitment to review panels.
 - Provide training in prevention science methods to NIH program and review staff, to NIH investigators, and to investigators external to NIH.

Promote the Use of the Best Available Methods

- Proposed Objectives (cont.):
 - Serve as a resource to other ICOs on prevention science methods as they develop new funding opportunity announcements, workshops, meetings, and other activities.
 - Collaborate with other ICOs to strengthen NIH policies and procedures to encourage the use the best available methods in applications for prevention research.
 - Conduct research on methods used in prevention research, including systematic reviews of the peer-reviewed literature.

Promote Collaborative Prevention Research Projects

- Challenges in 2013...
 - All of the ICs supported prevention research in their own areas.
 - Enhanced collaboration and coordination among ICs could result in better outcomes and more efficient use of resources.

[Home](#) / [Resources for Researchers](#) / [Prevention-Related Funding Opportunity Announcements](#)

Prevention-Related Funding Opportunity Announcements



The Office of Disease Prevention (ODP) is the lead Office at the NIH responsible for assessing, facilitating, and stimulating research in disease prevention and health promotion, and disseminating the results of this research to improve public health. One of our priorities is to promote prevention research projects and better research methods. Below, we identify active NIH research grant opportunities for extramural investigators.

- [Leading and Actual Causes of Death](#)
- [Cross-Cutting Topics](#)
- [Research Methods](#)

Promote Collaborative Prevention Research Projects

■ Progress

- Provided input to all strategic plans developed by the ICs or for NIH.
- Co-led the development of the National Nutrition Research Roadmap and now contributing to the NIH Nutrition Strategic Plan.
- Collaborating with existing Scientific Interest Groups to increase focus on prevention research
- Created five new Scientific Interest Groups.
 - Childhood screening
 - Adult Screening
 - Genetics of Prevention
 - Evaluation of policy and environmental interventions
 - Interventions to prevent or delay the onset of multiple comorbid diseases

Promote Collaborative Prevention Research Projects

■ Progress

- Signed on to 23 FOAs in areas of interest to the office.
- Posted 288 current FOAs that can support prevention research on Resources for Researchers.
- Serving as the NIH coordinating office for the 2018 Physical Activity Guidelines for Americans.

Promote Collaborative Prevention Research Projects

■ Proposed Objectives:

- Establish or promote infrastructures and processes to foster prevention research coordination and collaboration across the NIH and with other public and private prevention partners.
- Coordinate and support the development of collaborative prevention initiatives to address gaps in prevention research and practice.
- Advance approaches for projecting future research needs and priorities in prevention and highlighting trans-NIH efforts to address those gaps.
- Work across ODP and with other public and private prevention partners to develop a triennial State of Prevention conference highlighting research progress, gaps and opportunities.

Increase the Visibility of Prevention Research

- Challenges in 2013...
 - NIH was focused much more on basic science and on developing and evaluating treatments than on prevention.
 - The prevention community at NIH asked ODP to take a leadership role in promoting prevention research both at NIH and elsewhere.

Increase the Visibility of Prevention Research

■ Progress

- Expanded ODP website from 4 to >250 pages.
- Created a presence on social media.
- Built e-mail lists for targeted messaging.
- Strengthened partnerships with professional societies.
- Presented ODP resources at scientific meetings.



Home
Tobacco Regulatory Science Program
Prevention Research at the NIH
Resources for Researchers
Community Resources
Programs and Events
Strategic Plan
News and Announcements
About Us

Increase the Visibility of Prevention Research

- Progress
 - Provided communications support to all ODP teams, webinars, workshops, and meetings.
 - Created Resources for Researchers web section that provides information and interactive tools for prevention researchers to find valuable resources.

Resources for Researchers

[Finding NIH-Funded Research](#)

[Applying for NIH Funding](#)

[Prevention-Related Funding Opportunity Announcements](#)

[Prevention-Related Programs, Offices, and Divisions](#)

[Prevention-Related Study Sections](#)

[Prevention Research Articles](#)

[Prevention Research Needs and Gaps](#)

[NIH Training Opportunities in Prevention Research Methods](#)

[Resources for D&I Research](#)

Increase the Visibility of Prevention Research

- Proposed Objectives:
 - Increase the visibility of information about prevention research.
 - Engage and collaborate with stakeholders to coordinate and enhance communications about disease prevention research.
 - Support the communications-related efforts of all ODP Strategic Priorities including the promotion of ODP activities, events, and resources.

Tobacco Regulatory Science Program

- TRSP Supports FDA's Mandate for Research in Regulatory Science
 - NIH liaison to FDA Center for Tobacco Products (CTP)
 - Coordinates trans-NIH extra/intramural CTP activities
 - Resource for NIH program, review, budget, and grants
 - Prepare FOAs to complement existing NIH tobacco research activities
 - Screen applications for responsiveness, ensure special terms are met, monitor progress, plan scientific meetings



Tobacco Regulatory Science Program

	FY12	FY13	FY14	FY15	FY16
Number of New Awards	44	45	37	35	39
New Grant Expenditures*	30.5	76.1	14.9	16.5	11.9
Total Grant Funding*	35.4	101.5	103.2	110.8	95.3

*Figures are in millions of dollars

Tobacco Regulatory Science Program

- TRSP operates as its own team, with its own mandates, but contributes to the each of the ODP strategic priorities
 - Portfolio analyses related to tobacco research and regulatory science.
 - Collaborates with FDA to identify areas for investment.
 - Promotes the use of the best available methods, supports development of new methods.
 - Promotes collaborative prevention research.
 - Increases the visibility of prevention research at NIH and across the country.

Developing the new ODP Strategic Plan

- Input from IC Councils, IC Directors, NIH staff this fall
- Post draft plan and issue RFI on December 11, 2017
- Revise plan, prepare milestones and timelines by February 28, 2018
- Prepare staffing plan and resource request by May 31, 2018
- Submit the package for approval by June 30, 2018
- Release the final plan on September 30, 2018

Trends in Funding by Age Group

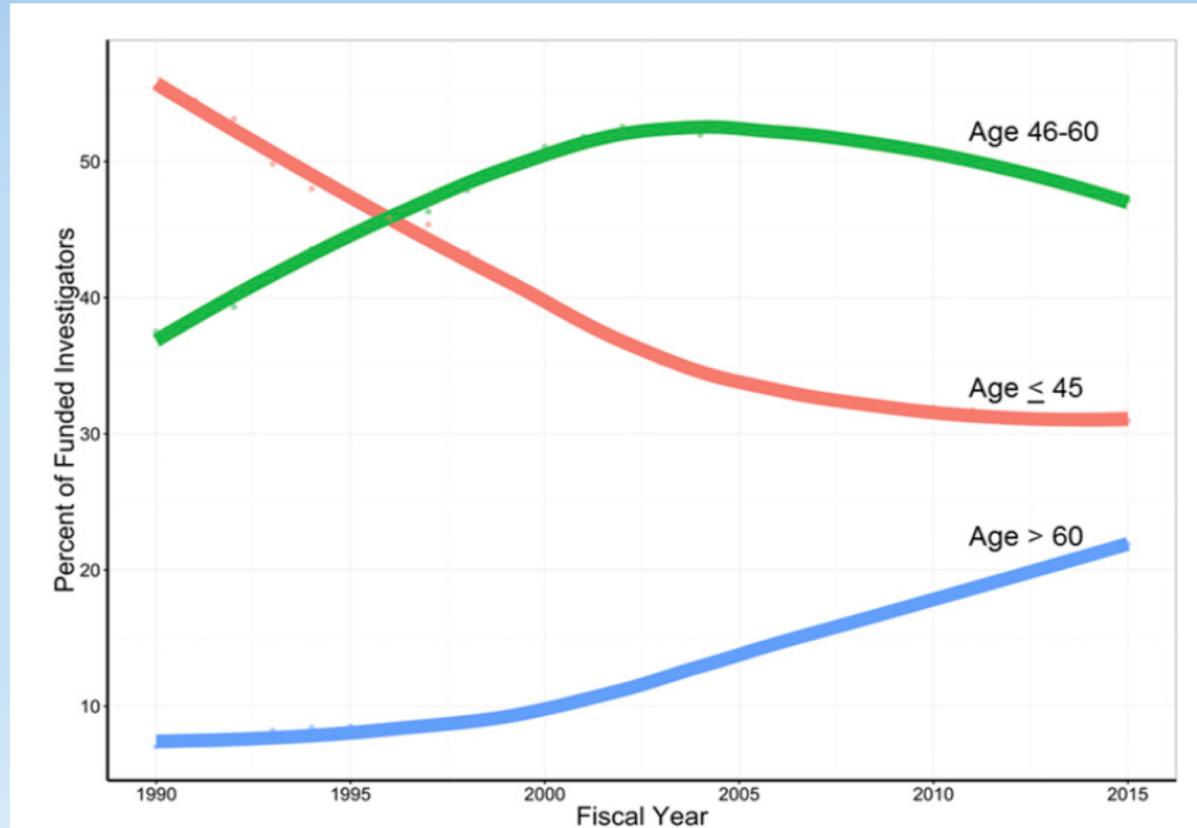


Fig. 2. Since the late 1990s, the percentage of NIH-funded investigators over the age of 60 years—those earning research-project and other substantive NIH awards—has risen significantly compared with other age groups. The curves are drawn by locally weighted scatterplot smoothing.

The Future for Prevention Research

- Prevention researchers need better training in research design and analytic methods to encourage the best science and to ensure reproducible results.
 - Clinical trials, including group- or cluster-randomized trials and individually randomized group-treatment trials
 - Less common designs (e.g., stepped wedge, regression discontinuity)
 - Key or new analytic methods (e.g., methods for intensive longitudinal data and for big data)
- This recommendation applies to animal and human studies, to drug and device interventions, and to behavioral interventions.

The Future for Prevention Research

- Prevention researchers need better training in the design, operation, and analysis of pragmatic trials, which are often more efficient and can lead to more rapid implementation of newly tested interventions.
 - Pragmatic trials are often run in health care systems.
 - They often rely on electronic health records for their data.
 - They often involve group- or cluster-randomized trial designs, or related methods (e.g., stepped wedge).
 - Training in the design and analysis is important.
 - Training in operations is also important, because these studies are often run in existing health care systems rather than in study-specific setting.

The Future for Prevention Research

- Researchers using behavioral interventions need training in the use of taxonomies and frameworks for behavioral change.
 - These methods contribute to the development of stronger behavioral interventions.
 - They also set the stage for meta-analyses and other cross-study analyses.

Important NIH Initiatives Related to Prevention

- Big Data
- Clinical Trials Requirements for Grants and Contracts
- Enhancing Diversity of the Biomedical Workforce
- Environmental Influences on Child Health Outcomes (ECHO)
- Health Care Systems Collaboratory
- HIV Vaccine
- Precision Medicine Initiative (PMI) – All of Us
- Rigor and Reproducibility
- Universal Flu Vaccine

prevention.nih.gov

prevention@mail.nih.gov

