NORA

National Occupational Research Agenda: Second Decade in Review (2006 – 2016)

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National Institute for Occupational Safety and Health

Acknowledgements

- NORA Review Work Group
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- Office of Director
- Office of Policy, Planning and Evaluation
- Office of Research Translation

NORA

The Evolution of NORA

1996 - 2016

National Occupational Research Agenda (NORA)

- Launched in 1996 as a partnership program to stimulate innovative research and improve workplace practices
- Provides research framework in occupational safety and health (OSH) for NIOSH and the nation
- Diverse parties collaborate to address research and research to practice (r2p) needs
- Structured in 10-year program cycles
- Second decade launched in 2006 - 2016

The Evolution of NORA (1996 – 2016)

First Decade (1996 – 2006)

What will the workplace of 2006 look like?
What research will be needed to ensure a safe and healthy workplace?

21 Focus Areas
Disease Prevention | Work Environment | Research Tools

NORA became a map by which the occupational safety and health community could identify, generate, design, and fund priority research efforts.

No previous occupational research agenda had captured such broad input.

The Evolution of NORA (1996 – 2016)

First Decade (1996 – 2006)	Second Decade (2006 – 2016)
What will the workplace of 2006 look like? What research will be needed to ensure a safe and healthy workplace?	How can research be better moved to practice in the workplace?
21 Focus Areas Disease Prevention | Work Environment | Research Tools	10 Sector Programs AFF|CON |HCSA|MFG|MIN|OGE|PSS|SRV|TWU|WRT
NORA became a map by which the occupational safety and health community could identify, generate, design, and fund priority research efforts. No previous occupational research agenda had captured such broad input.	20 business sectors in the U.S. defined by NAICS codes organized into 10 sector groups based on similarities in workplace safety and health issues. During the decade, NIOSH organized 24 intramural cross-sector programs to support Sector goals and priorities.

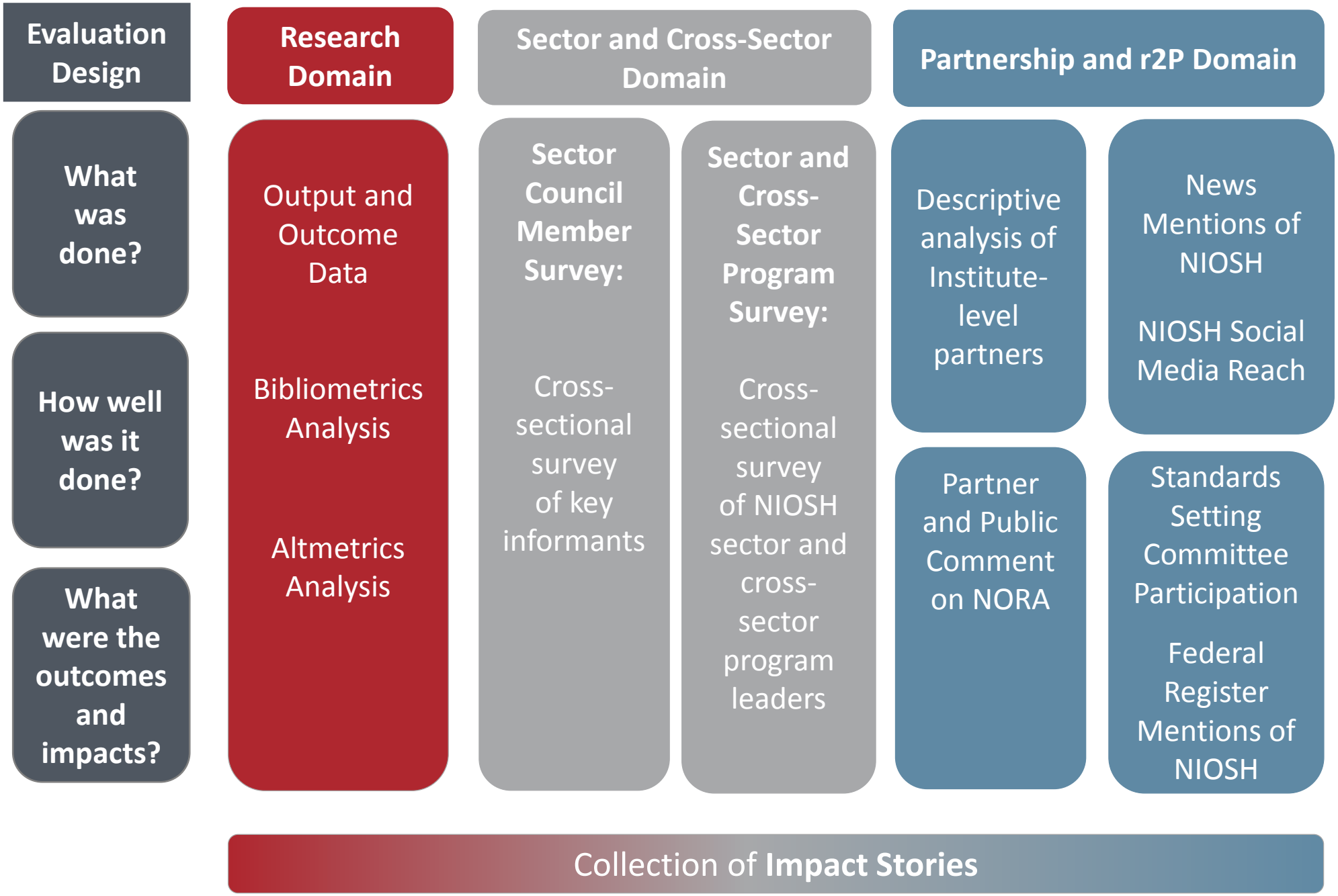
NORA

Second Decade in Review

Background and Evaluation Design

Background

- NIOSH conducts periodic reviews of the work that supports the National Occupational Research Agenda
  - NORA Update (2003)
  - Team Document (2006)
  - Delivering on the Nations Investment (2009)
- Second decade review designed to answer fundamental questions:
  - What did we do?
  - How well did we do it?
  - What were the outcomes?


Evaluation Design
Research Domain
Sector and Cross-Sector Domain
Partnership and r2P Domain
What was done?
How well was it done?
What were the outcomes and impacts?
Output and Outcome Data
Bibliometrics Analysis
Altmetrics Analysis
Sector Council Member Survey:
Cross-sectional survey of key informants
Sector and Cross-Sector Program Survey:
Cross-sectional survey of NIOSH sector and cross-sector program leaders
Descriptive analysis of Institute-level partners
Partner and Public Comment on NORA
News Mentions of NIOSH
NIOSH Social Media Reach
Standards Setting Committee Participation
Federal Register Mentions of NIOSH
Collection of Impact Stories

Intended Audiences

- Funding agencies
- Stakeholder groups
- NIOSH intramural and extramural research community
- Policy making groups
- Other OSH organizations and agencies
- Employers and employees
- Thought leaders

Second Decade in Review Products

Final Report

- Executive Summary
- NORA Sectors
- Research
- Sector Programs
- Partnerships and r2p
- Appendix of Selected Impacts
- Appendix of NIOSH and NORA Sector Leadership

Sector and Cross-Sector Program Supplement

- Sector Program Review
  - Trends
  - Activities
  - Effectiveness
  - Outcomes and Impact
  - Impact Stories
- Cross-Sector Program Review
  - Highlights
  - Impact Stories

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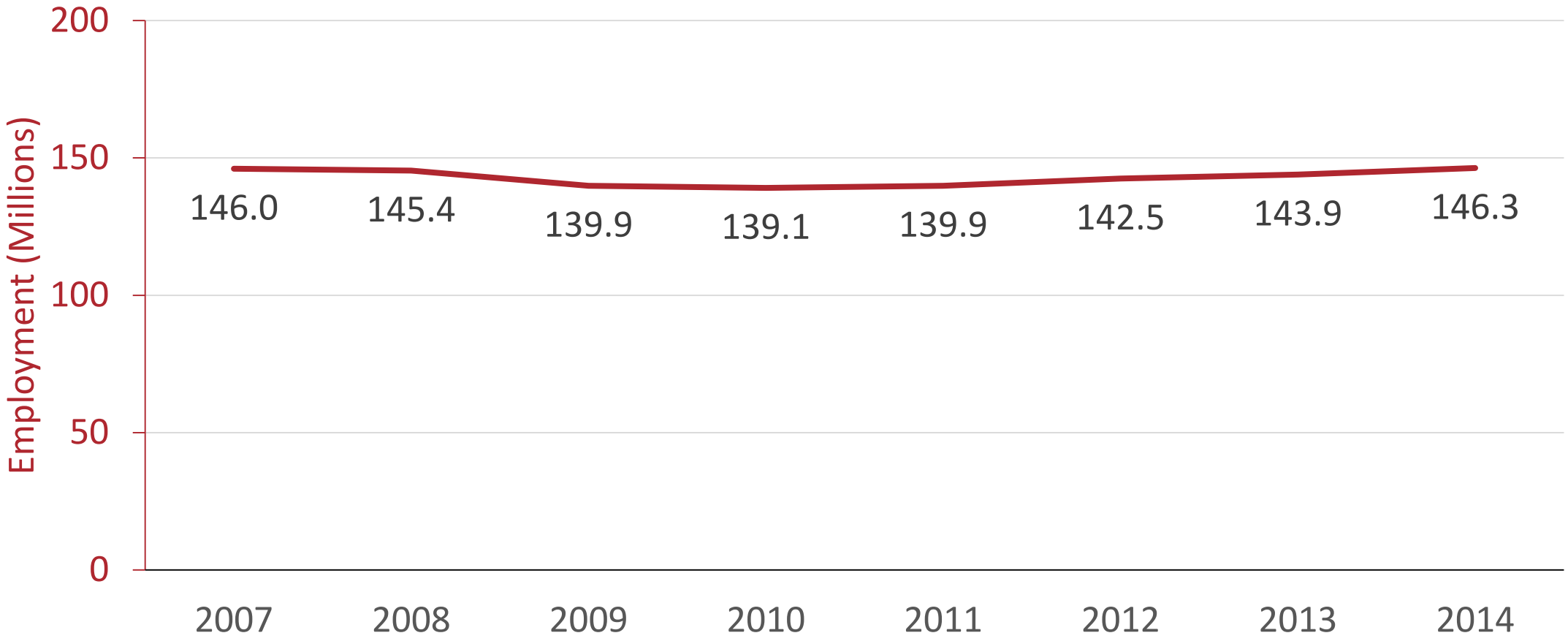
Second Decade in Review

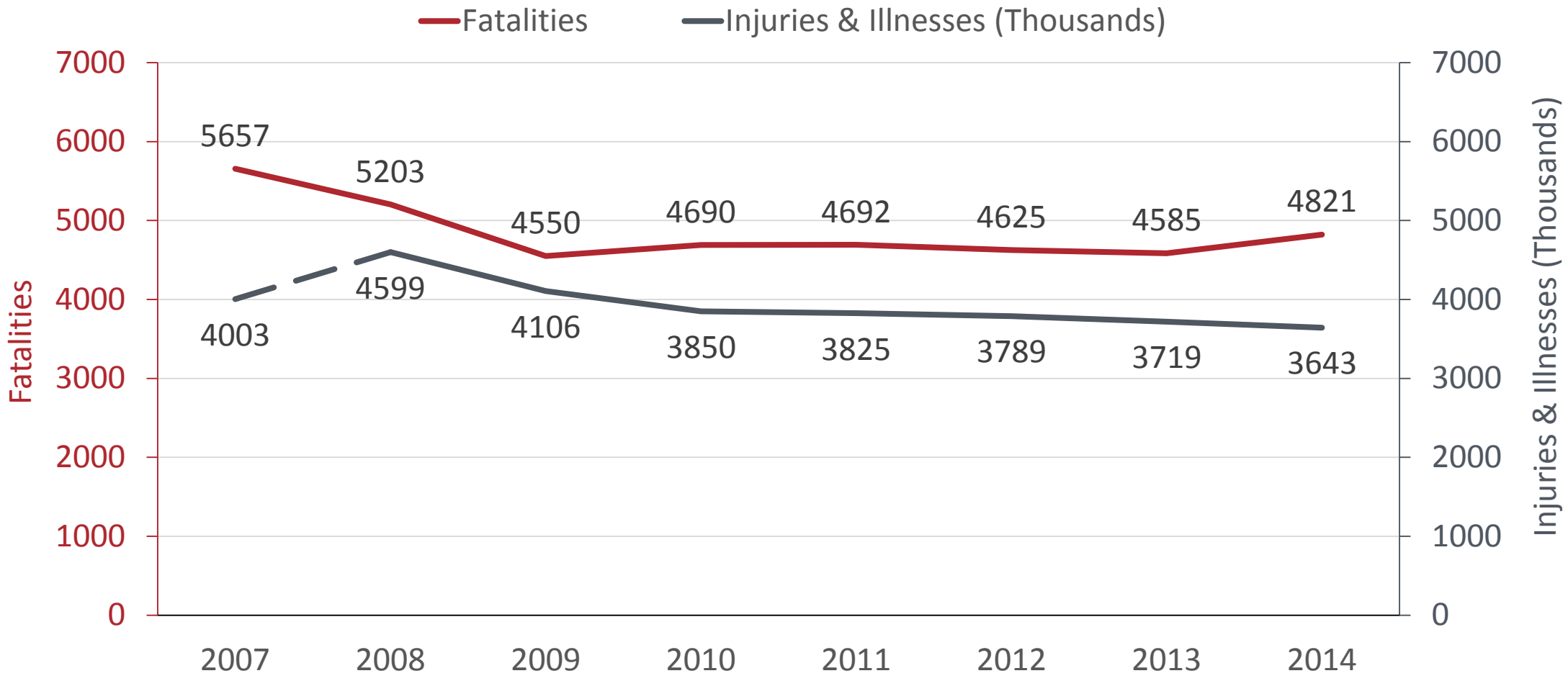
The Burden of Occupational Injury, Illness and Fatality

National Trends in Employment in all NORA Sectors (2007 -2014)



Current Population Survey (CPS) provided employment data that includes private industry and government (federal, state, and local) and the self-employed (but not volunteers) [BLS 2015].

National Trends in Fatalities, Injuries and Illnesses for all NORA Sectors (2007 – 2014)



The Census of Fatal Occupational Injuries (CFOI) provided fatality data from private industry and government (federal, state, or local), including volunteers and those self-employed [BLS 2015]. Survey of Occupational Injuries and Illnesses (SOII) provided injury and illness data from private industry and state and local government (but not federal government), excluding volunteers and those self-employed. Only private industry data were available before 2008 [BLS 2015].

Understanding Total Burden

- A measure of the broad impact of injury and illness on society that extends beyond number of reports or claims
- During the second decade we improved our understanding
  - Total estimated cost of fatalities in 2007 was $6 billion with nearly 8.6 million injuries at a total cost of $186 billion. Workers' Comp covered less than 25%.
  - Workers with access to paid sick leave were 28% less likely to be injured at work. The association varied across sectors.
  - Lower income groups have elevated hazard ratio compared to higher income groups. Women earning less than $10,000/year had 1.94 times mortality as women earning at least $50,000/year. For men ratio was 2.37.

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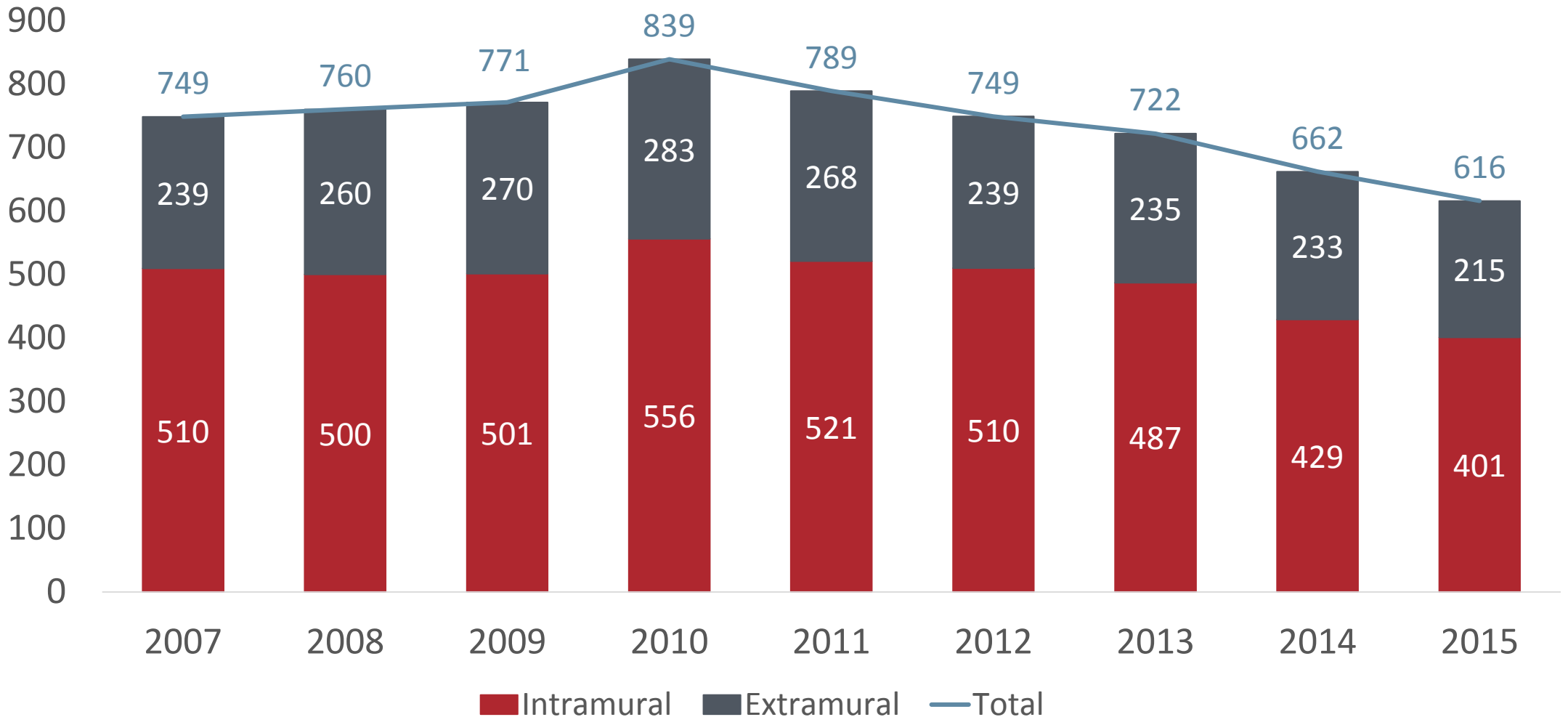
Second Decade Review Highlights

Activities and Investment | Effectiveness |Outcomes and Impact

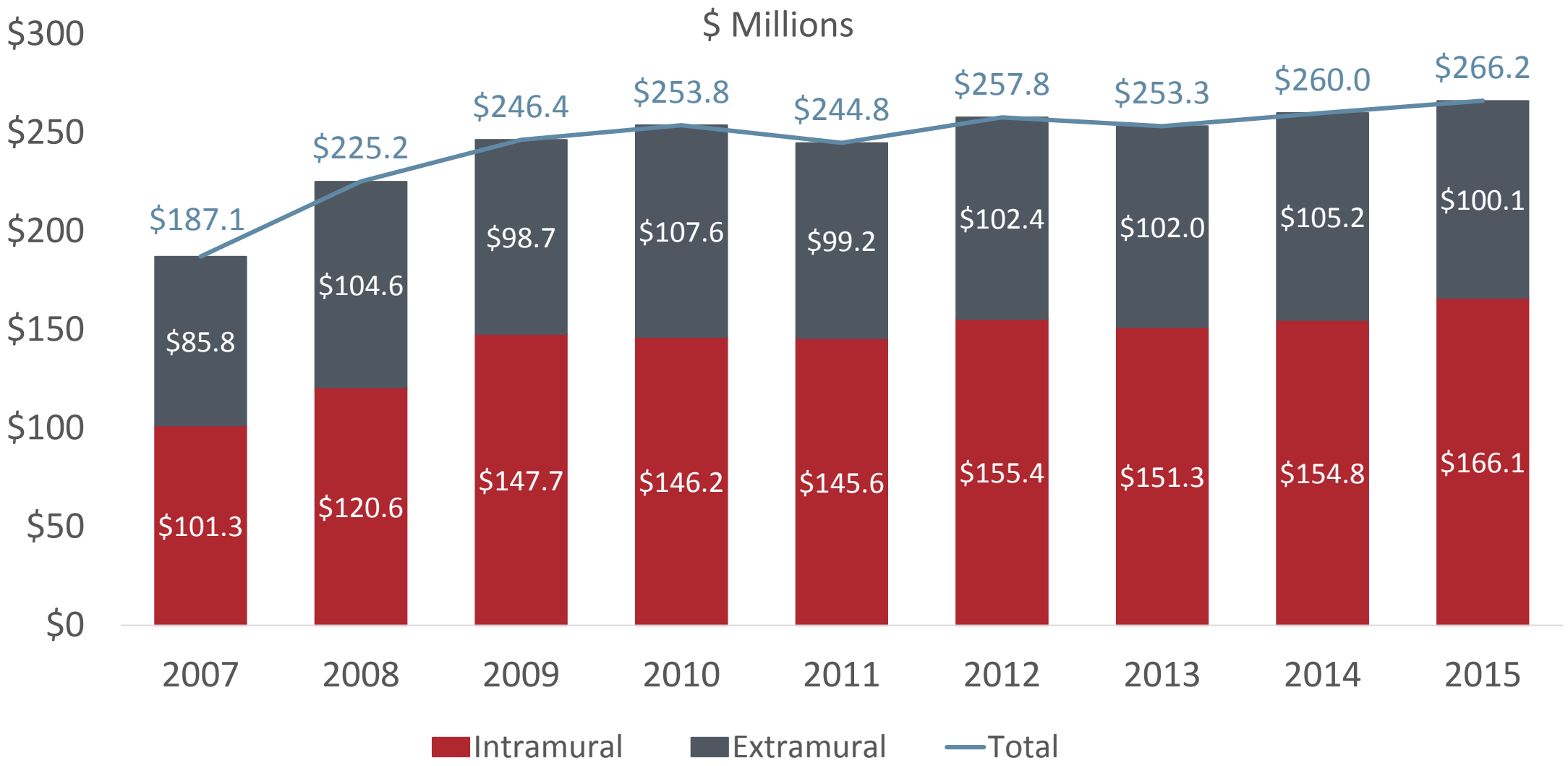
Activities and Investment

What did we do?

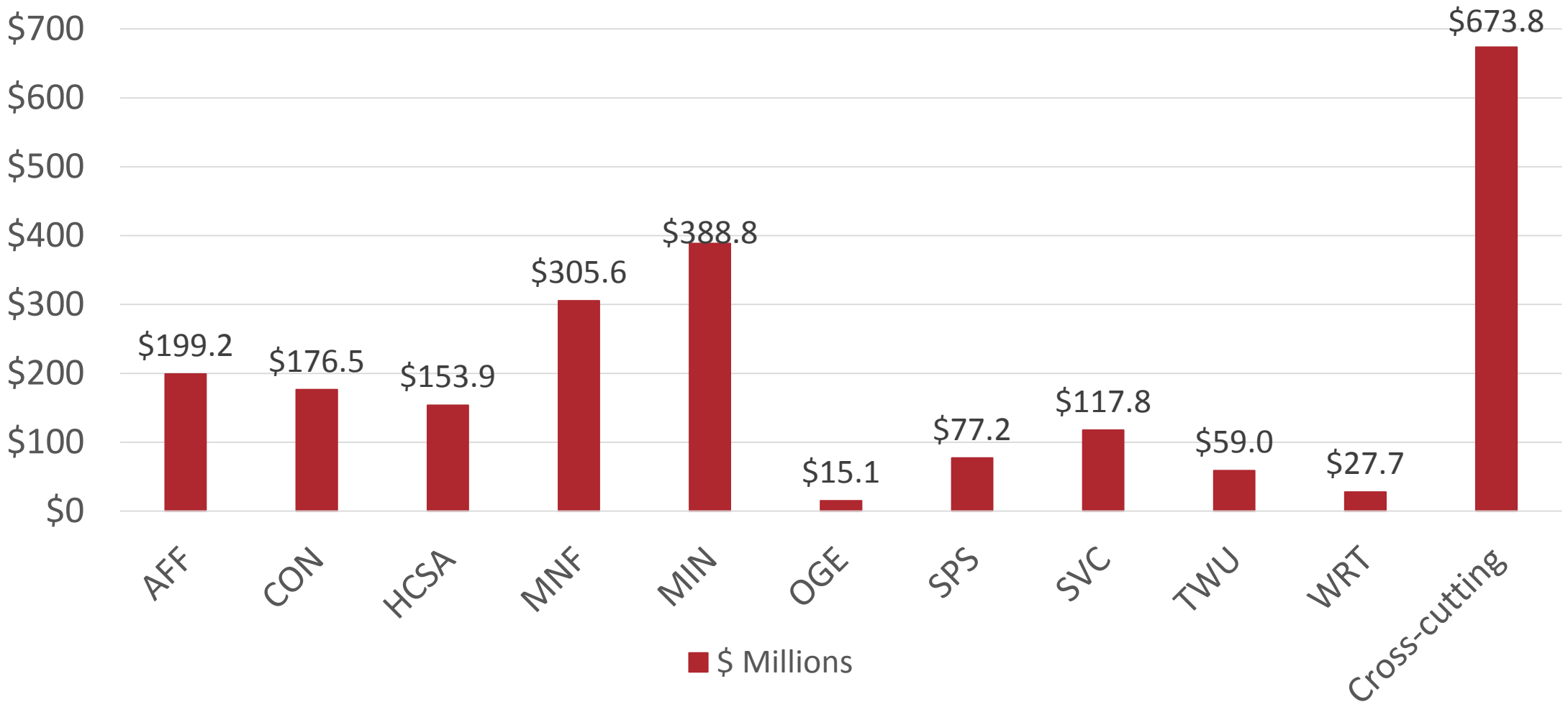
Active Research Projects by Fiscal Year



Intramural & Extramural Research Investment



Research Investment by Sector (FY2007–FY2015)



Other Activities Highlights

- More than 10,450 publications (FY2007 – FY2014)
  - Journal articles
  - NIOSH numbered publication or field report
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  - Newsletter, brochures, web pages and fact sheets
- More than 2,000 partnerships formed with 285 formal partnership agreements greatly expanding the reach of NIOSH activity

Effectiveness

How well did we do it?

Effectiveness Highlights

- Effectiveness of three domains defined as:
  - How research aligned with NORA strategic goals
  - How sector councils met goals and objectives
  - How partnerships aligned with strategic goals

Effectiveness Highlights

Research

- 95% of NORA strategic goals were addressed by intramural and extramural research projects

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Sector Councils

- Sectors most effective at developing national agendas and goals and structure effective way to organize the decade

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Sector Councils

- Sectors most effective at developing national agendas and goals and structure effective way to organize the decade

Partnerships

- 285 formal partnerships advanced all NIOSH strategic goals

Outcomes and Impact

What were the outcomes and impact?

Outcomes and Impact Highlights

- 4,819 scientific journal articles cited more than 89,500 times

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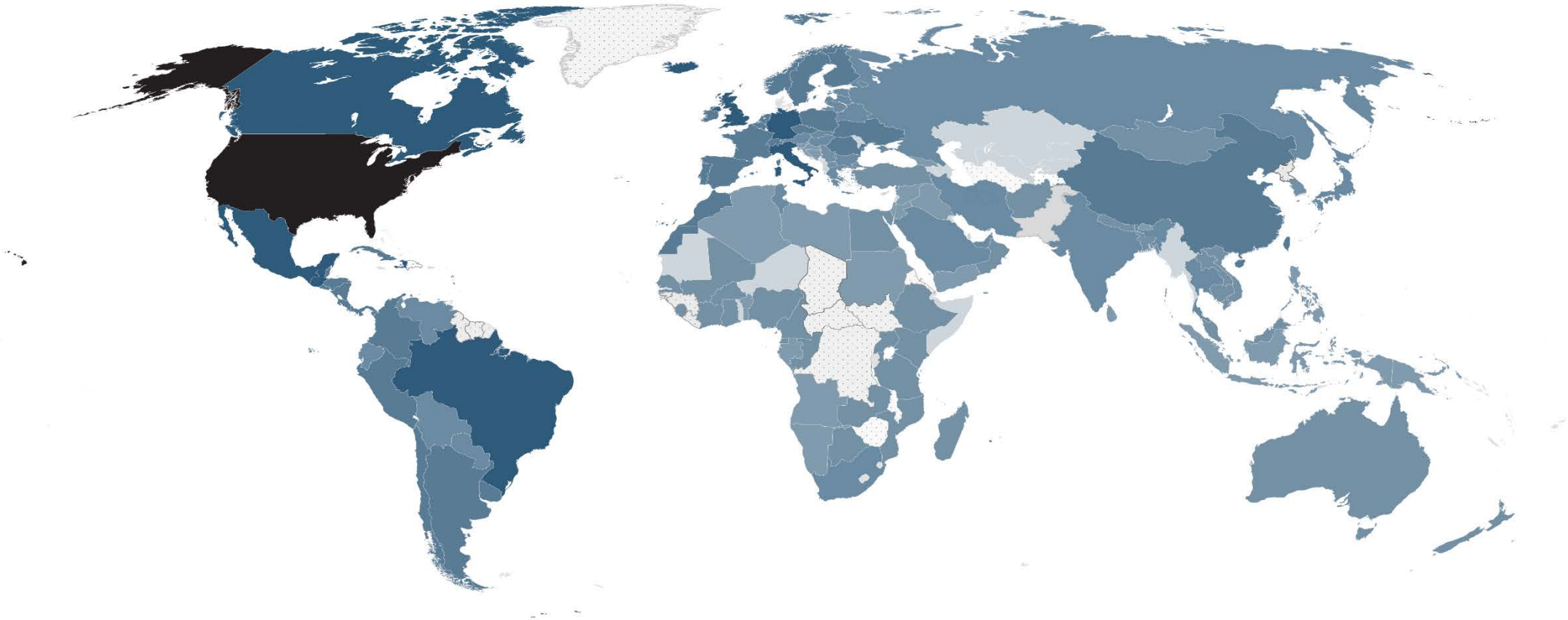
- More than 4,000 news mentions of NIOSH across media, trade publications and citations of published work defined reach

Where in the world did NIOSH work travel?

First generation citations by country of coauthor



Darker blues represent more citations; areas shaded with dots had no citations.

1 2,297

Impact Across Sectors

- Setting standards, guidance
- Recommendations impact manufacturers, trade associations, and others
- Technology adopted
- Building research base
- Outputs widely disseminated

Standards and Guidance Healthcare

- NIOSH recommendations to reduce healthcare workers' exposures in preparing and administering hazardous drugs helped healthcare facilities improve their procedures, as well as helped lead to a new law to protect workers in Washington state.

Recommendations Impact Manufacturers, Trade Associations and Others | Construction

- NIOSH launched the National Construction Falls Campaign with OSHA and CPWR – The Center for Construction Research and Training to decrease fall-related injuries among construction workers.

Technology Adopted
Agriculture, Forestry and Fishing

- Building on NIOSH partnerships to protect commercial fishermen from entanglement and death in winches on fishing vessels, all three major manufacturers of capstan winches in the Pacific Northwest now provide NIOSH-developed emergency E-Stops as standard safety features on their new seine winches. In addition, captains are installing the system, and a NIOSH training video with real commercial fishermen promotes winch and deck safety awareness.

Building Research Base
Personal Protective Technology

- Respirator manufacturers and academicians use NIOSH data on representative face and head sizes in the modern workforce when designing, sizing and testing new respirator facepieces.

Outputs Widely Disseminated

- NIOSH recommendations for prevention through design were promoted by textbook publishers, the Occupational Safety and Health Administration, the American Industrial Hygiene Association, the American Society of Safety Engineers, the Transportation Research Board, and others in textbooks and engineering education modules.

NORA

Lessons Learned

NORA 3 and Beyond

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- Measuring burden is difficult
  - Need a refined and systematic way to measure burden so that we can compare burdens across diverse subsectors

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- Measuring impact is difficult
  - Developed indicators and metrics of impact across types of research (2016)
    - Basic/etiologic
    - Intervention
    - Translation
    - Surveillance
  - Testing new evaluation strategies to assess contribution

Lessons Learned

- Need to support an integrated evaluation culture
  - Clearly articulated to extramural partners at the start of the third decade
  - Challenged by different reporting strategies for intramural and extramural research and follow up of extramural work post-performance period
  - Look to future FOAs for explicit evaluation criteria and reporting requirements

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  - NORA 3 structure will define a more efficient structure
  - Identifies most pressing OSH issues in the major economic sectors of the U.S.

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  - NORA 3 structure will define a more efficient structure
  - Identifies most pressing OSH issues in the major economic sectors of the U.S.
- Need for an integrated framework that identifies priorities and aligns research investment across intramural and extramural science
  - Burden, need and impact (BNI) framework to be rolled out in NORA 3

The Third Decade of NORA 2017 – 2027

The Third Decade of NORA 2017 – 2027

Third Decade (2017 – 2027)

What research should be done in 2020 and beyond?

Can an efficient and effective structure be found to identify and integrate research priorities?

10 Sectors | 7 Health & Safety Cross Sectors

10 Sectors Programs whose aim is to prioritize occupational safety and health (OSH) research by the major areas of the US economy

7 Health and Safety Cross-Sector Programs whose aim is to identify national OSH research priorities according to major issues affecting the US working population

Work in integrated approach to identify and integrate priorities

NATIONAL OCCUPATIONAL RESEARCH AGENDA

SECOND DECADE IN REVIEW | 2006–2016

DEPARTMENT OF HEALTH AND HUMAN SERVICES
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

DHHS (NIOSH) Publication No. 2017-146 | June 2017

NATIONAL OCCUPATIONAL RESEARCH AGENDA

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National Occupational Research Agenda: The third decade

Lore Jackson Lee
Office of Policy, Planning and Evaluation
National Institute for Occupational Safety and Health
June 2017

Department of Health and Human Services
Centers for Disease Control and Prevention
National Institute for Occupational Safety and Health

Background and Context

NIOSH and NORA

NIOSH

The National Institute for Occupational Safety and Health (NIOSH) **creates new knowledge** in the field of occupational safety and health and **transfers it into practice** globally.



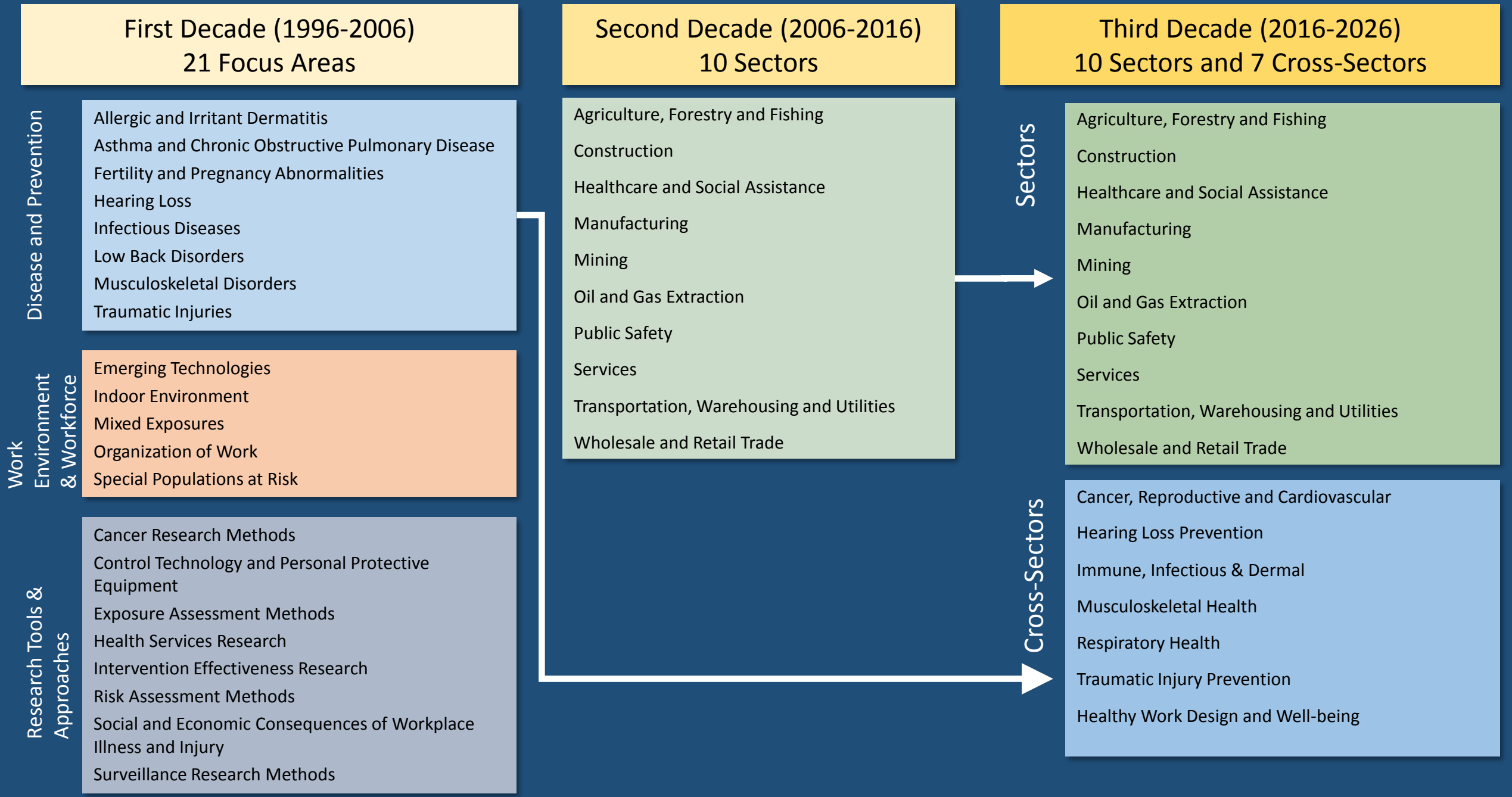

National Occupational Research Agenda (NORA)

- Begun by NIOSH in 1996 as a public-private partnership to engage diverse interests and perspectives to chart a research course
- Recognized no one organization has the resources necessary to fully address the research needs of workers in the United States
- Provided a framework to guide occupational safety and health research for the nation

"Delivering on the Nation's promise: safety and health at work for all people through research and prevention"

The Evolution of NORA

1996 - 2026


First Decade (1996-2006)
21 Focus Areas
Second Decade (2006-2016)
10 Sectors
Third Decade (2016-2026)
10 Sectors and 7 Cross-Sectors
Disease and Prevention
Allergic and Irritant Dermatitis
Asthma and Chronic Obstructive Pulmonary Disease
Fertility and Pregnancy Abnormalities
Hearing Loss
Infectious Diseases
Low Back Disorders
Musculoskeletal Disorders
Traumatic Injuries
Work Environment & Workforce
Emerging Technologies
Indoor Environment
Mixed Exposures
Organization of Work
Special Populations at Risk
Research Tools & Approaches
Cancer Research Methods
Control Technology and Personal Protective Equipment
Exposure Assessment Methods
Health Services Research
Intervention Effectiveness Research
Risk Assessment Methods
Social and Economic Consequences of Workplace Illness and Injury
Surveillance Research Methods
Agriculture, Forestry and Fishing
Construction
Healthcare and Social Assistance
Manufacturing
Mining
Oil and Gas Extraction
Public Safety
Services
Transportation, Warehousing and Utilities
Wholesale and Retail Trade
Sectors
Agriculture, Forestry and Fishing
Construction
Healthcare and Social Assistance
Manufacturing
Mining
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Public Safety
Services
Transportation, Warehousing and Utilities
Wholesale and Retail Trade
Cross-Sectors
Cancer, Reproductive and Cardiovascular
Hearing Loss Prevention
Immune, Infectious & Dermal
Musculoskeletal Health
Respiratory Health
Traumatic Injury Prevention
Healthy Work Design and Well-being

Third Decade of NORA
10 Sectors and 7 Cross-Sectors

Industry Sectors

Agriculture, Forestry and Fishing

Construction

Healthcare and Social Assistance

Manufacturing

Mining

Oil and Gas Extraction

Public Safety

Services

Transportation, Warehousing and Utilities

Wholesale and Retail Trade

Health & Safety Cross-Sectors

Cancer, Reproductive and Cardiovascular

Hearing Loss Prevention

Immune, Infectious & Dermal

Musculoskeletal Health

Respiratory Health

Traumatic Injury Prevention

Healthy Work Design and Well-being

NORA Councils

Membership

- Co-chairs: 1 NIOSH, 1 external volunteer
- Open and diverse participation

Purpose of NORA Sector & Cross-Sector Councils

- Exchanging Information
- Forming Partnerships
- Enhancing dissemination and implementation

1. Exchanging Information

- Identify research priorities for the nation
- Discuss:
  - Emerging issues
  - New research findings
  - Evidence-based solutions
- Share expertise and lessons learned

2. Forming Partnerships

- Networking
- Discussing mutual interests
- Leveraging each other's efforts

3. Dissemination and Implementation

- Share research findings
- Disseminate tools/resources
  - Guidance, fact sheets, and other resources
  - Trainings and curriculum
  - Surveillance data and query tools
- Promote use of evidence-based interventions

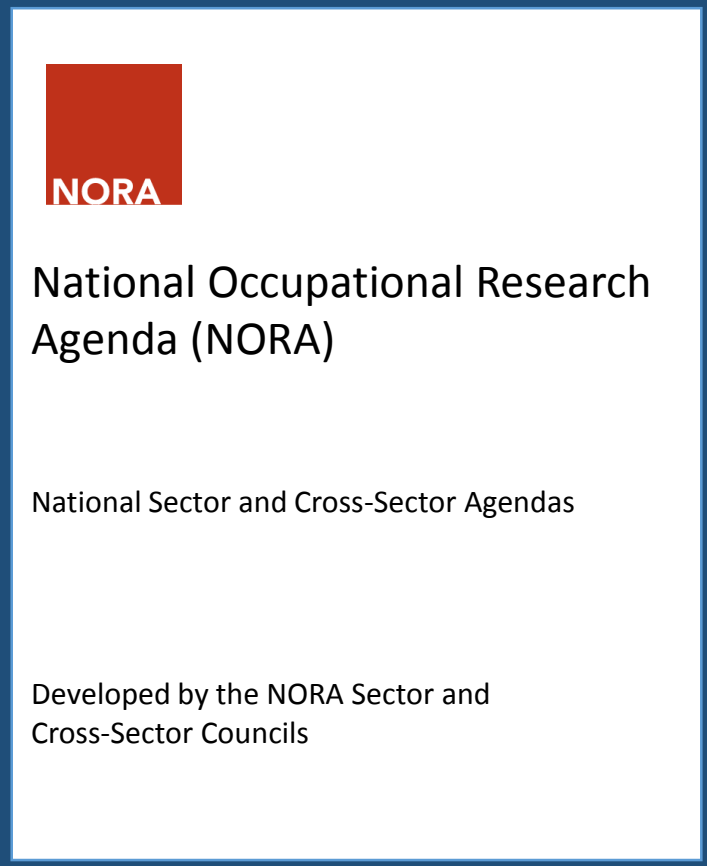
Developing NORA Agendas

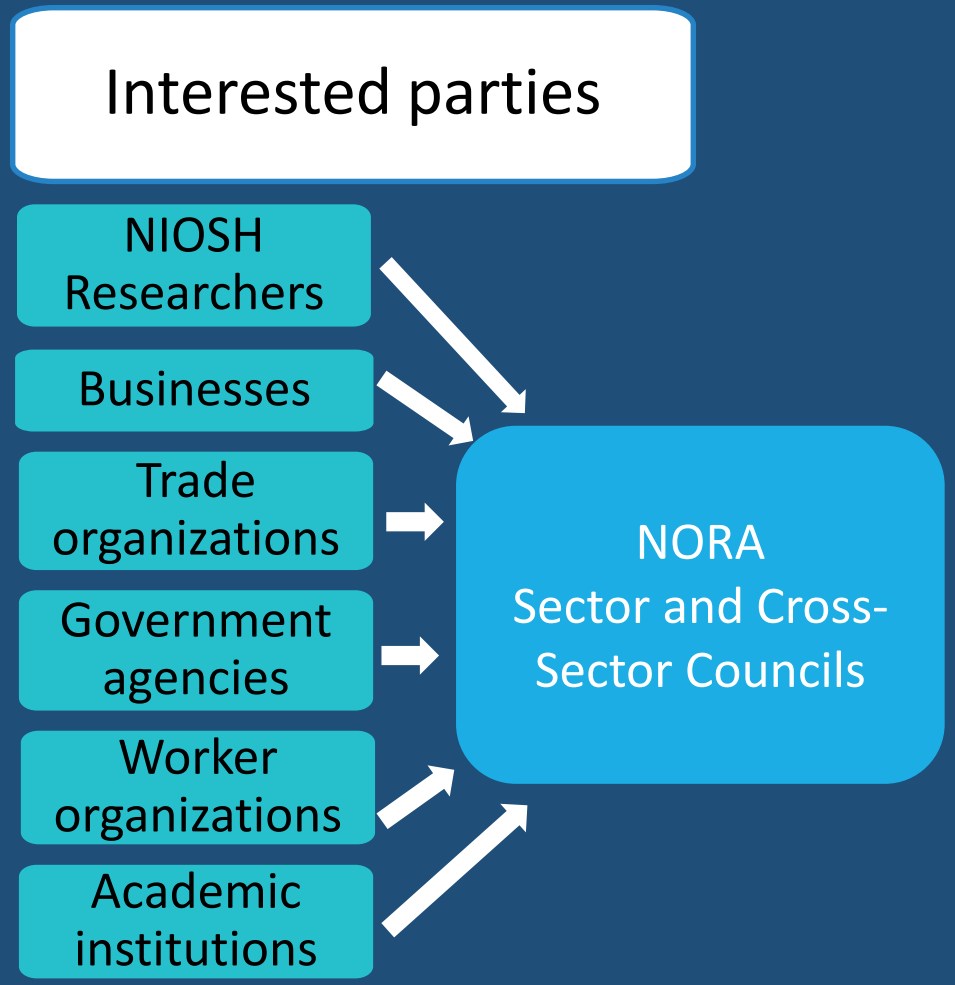
NORA Agendas

- Broad strategic objectives
  - Idea came from NORA Mining Agenda

  Examples:
  1. Reduce the likelihood of disasters in mines
  2. Improve disaster response
  3. Prevent illness from occupational health hazards

- OSH research priorities for the nation

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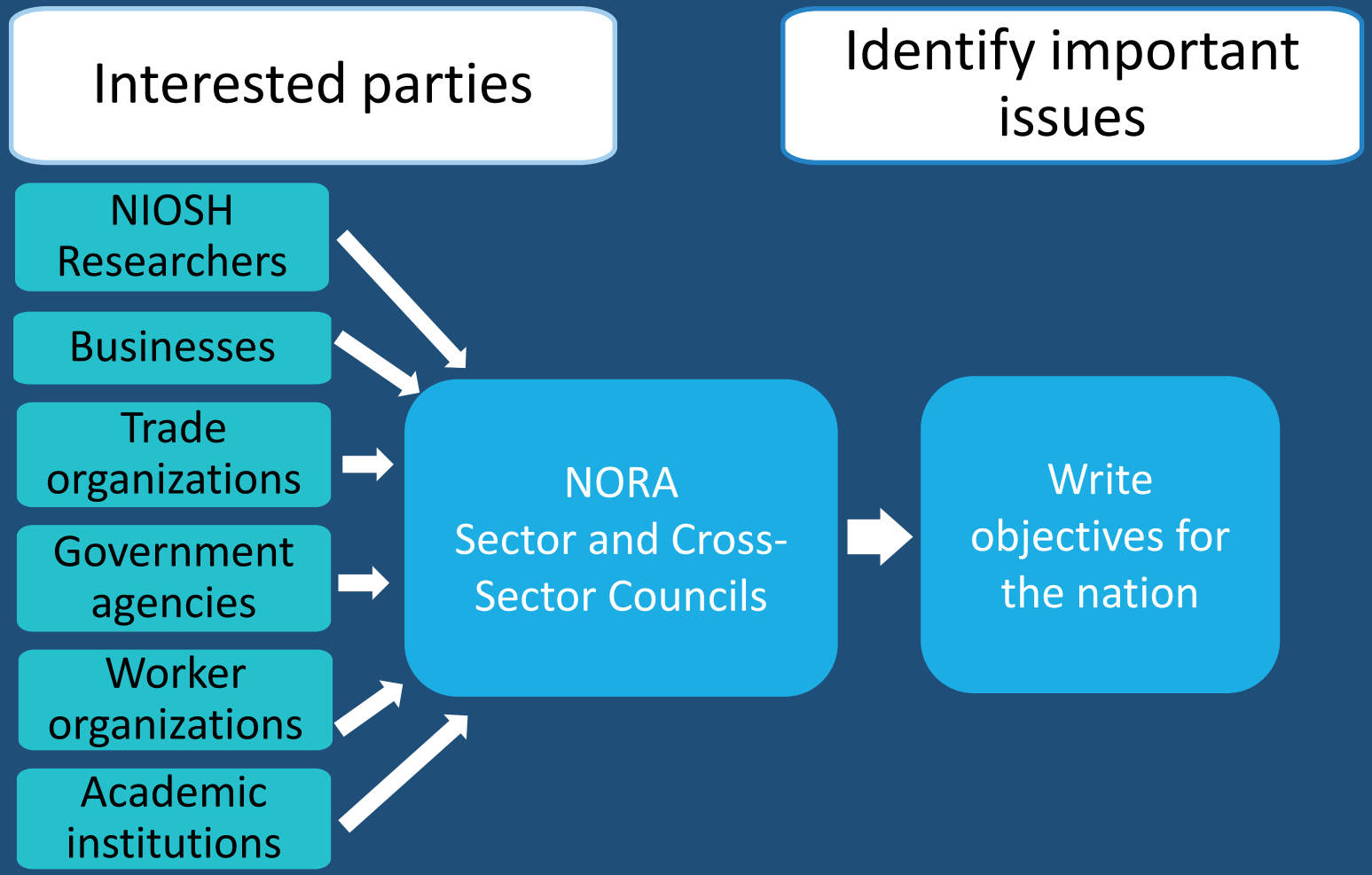
NIOSH Researchers
Businesses
Trade organizations
Government agencies
Worker organizations
Academic institutions
NORA
Sector and Cross-Sector Councils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Identify important issues
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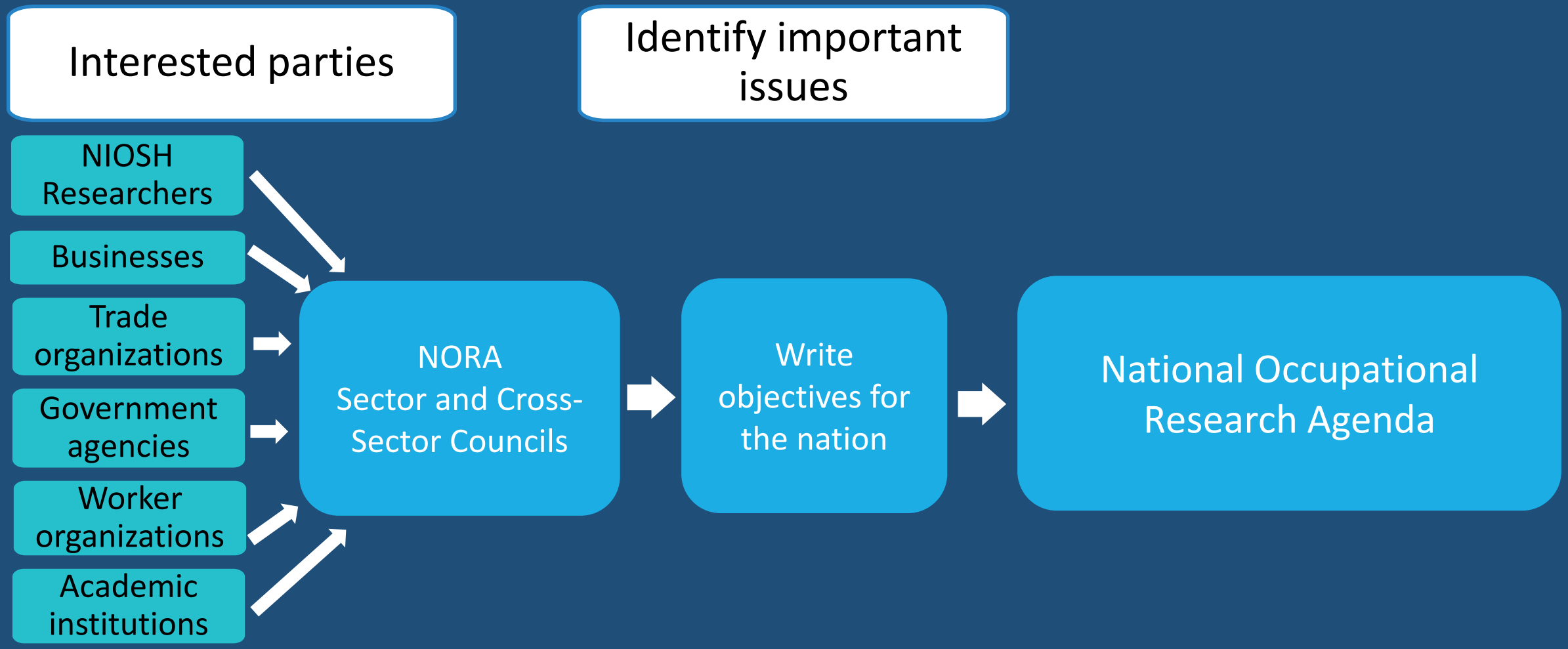
NORA Sector and Cross-Sector Councils
Write objectives for the nation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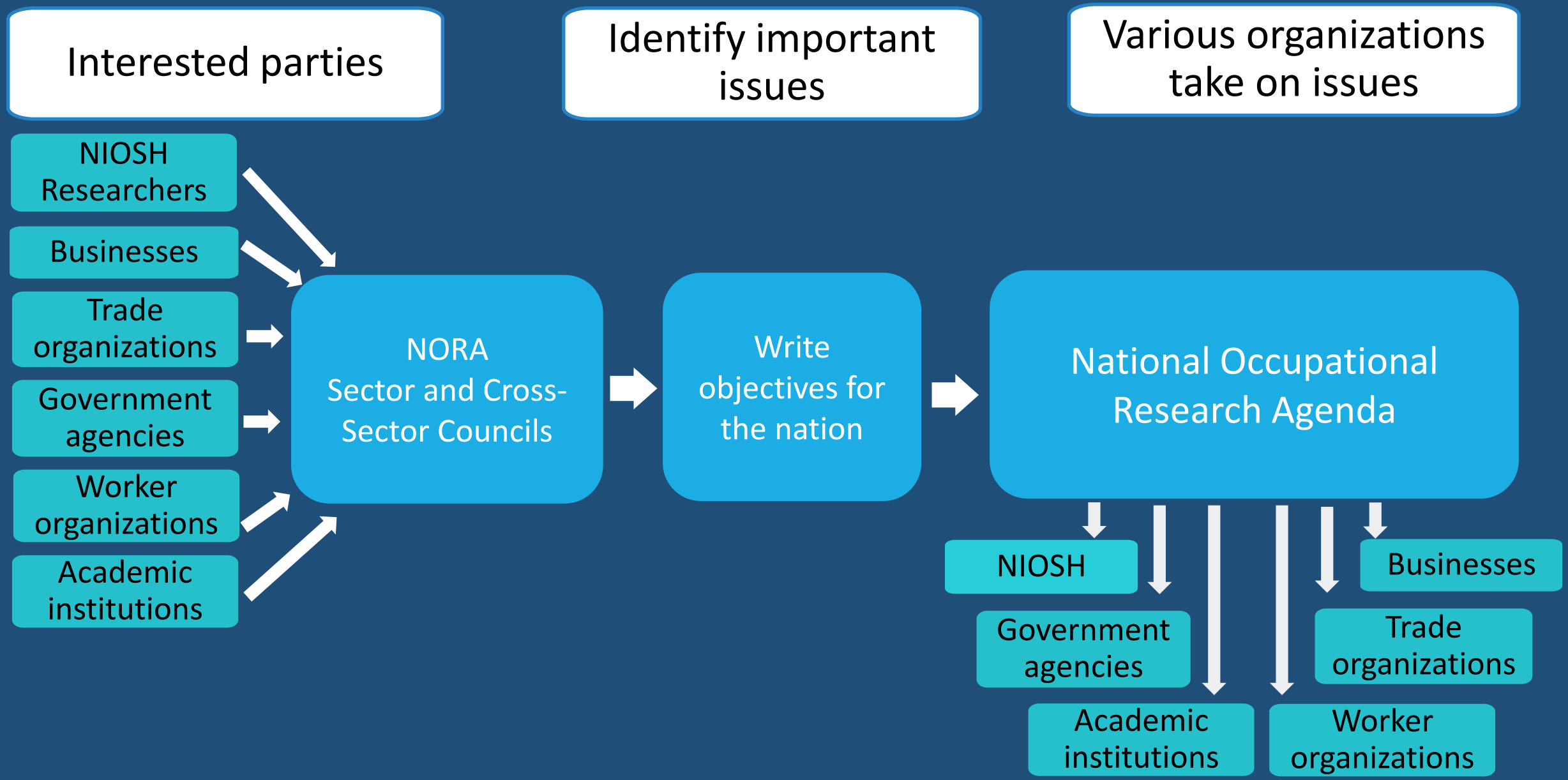
Interested parties
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Worker organizations
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National Occupational Research Agenda
NIOSH
Businesses
Government agencies
Trade organizations
Academic institutions
Worker organizations

Participate in NORA

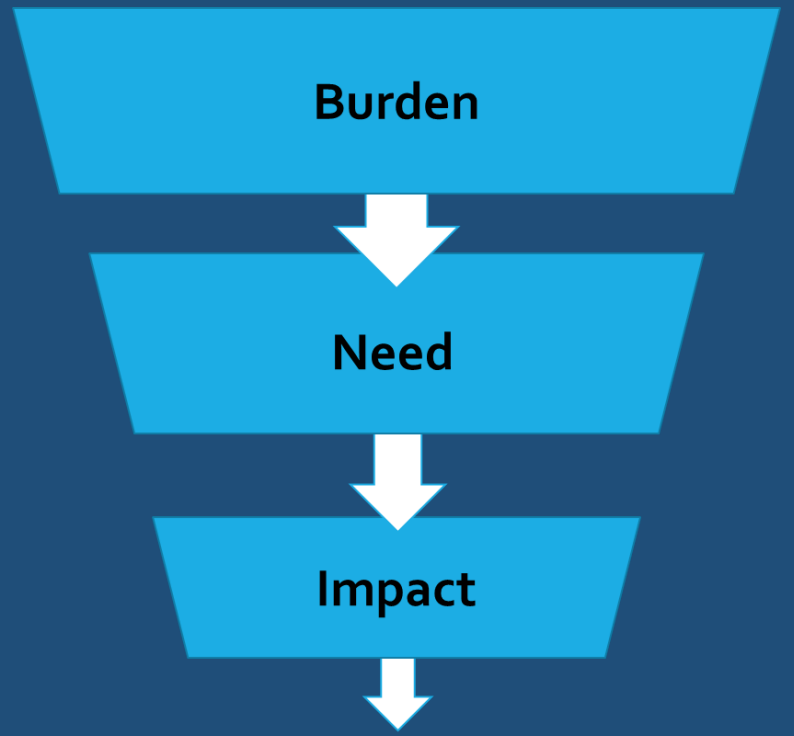
- Provide comments on draft agendas
  - https://www.cdc.gov/niosh/docket
- Join a NORA Council
  - Contact NORACoordinator@cdc.gov

NIOSH Strategic Plan

NIOSH Strategic Plan

- Inputs:
  - NORA Agendas and other stakeholder input
  - Mandates
  - Innovative ideas
  - Emerging issues

- Use Burden, Need and Impact (BNI) to decide research priorities



NIOSH Strategic Plan

- Five year period (FY 2019-2023)
- Two sections: research and service/support
- Research goals used for:
  - Intramural
  - Extramural: Priority given to proposals that address goals

Thank you

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The BNI Approach

Paul A. Schulte, Ph.D.

Disclaimer: The findings and conclusions in this report are those of the author and do not necessarily represent the views of the National Institute for Occupational Safety and Health.


BNI
Burden
Need
Impact

What is BNI?

A transparent evidence-based approach to research prioritization and planning.

Priority Setting

Burden | Need | Impact

Why BNI?

Second decade of NORA

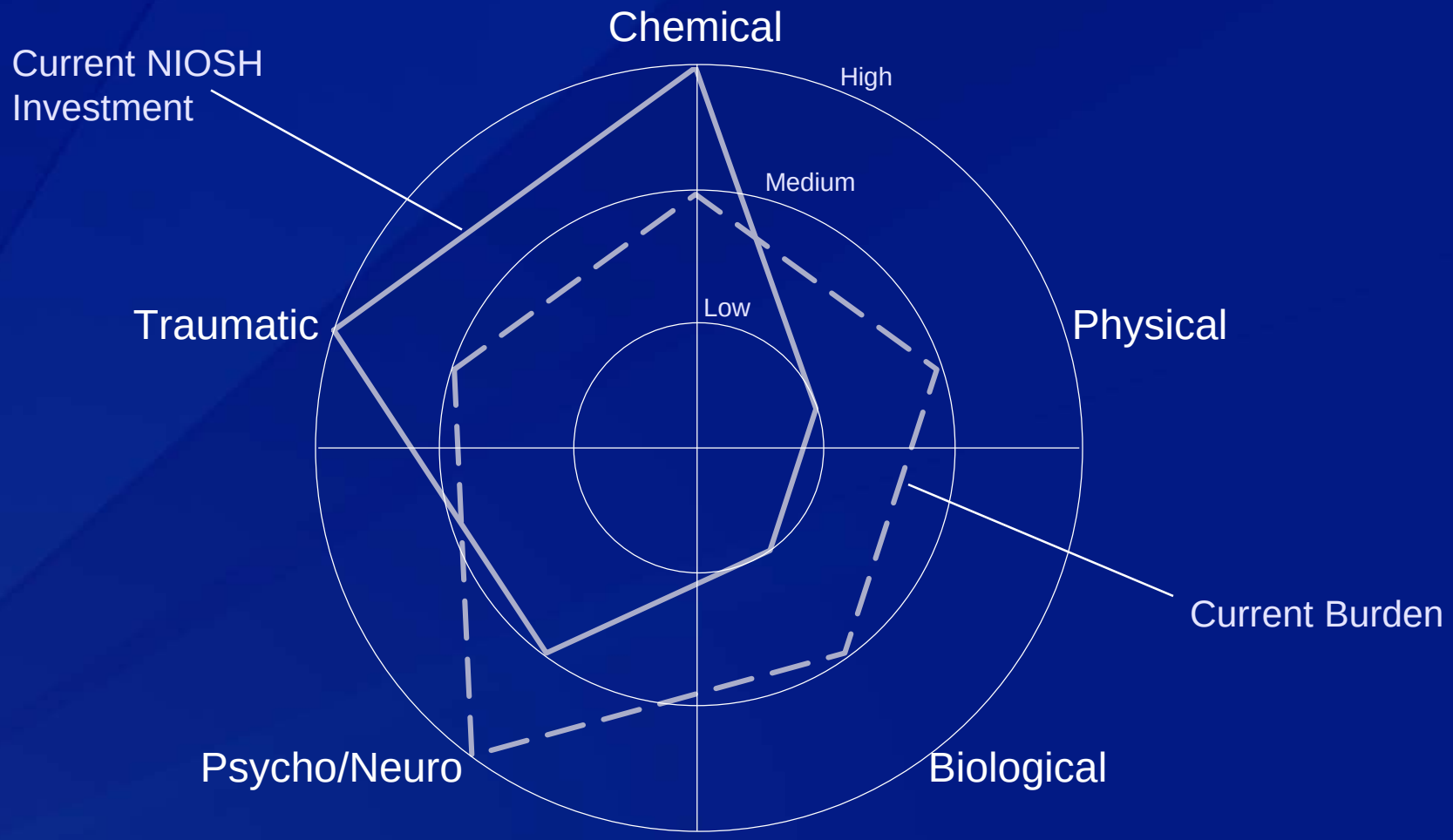
- 90 sector strategic goals
- 31 out-come cross sector goals
- 80 additional cross sector strategic goals
- Numerous sub goals and objectives

Not that strategic!

- NIOSH has a long and productive history of effectively setting and addressing priorities
  - As illustrated by the National Academy of Sciences (NAS) reviews conducted in 2005-2008.
- However in this time of limited funds
  - A comprehensive and sustained evidence-based approach to priority setting is warranted
- Need for a strategy for assessing and continuously realigning NIOSH investment priorities

Priorities for where NIOSH should be invested must be informed by where NIOSH is currently invested.

Hypothetical Analysis of OSH Burden and NIOSH Investment



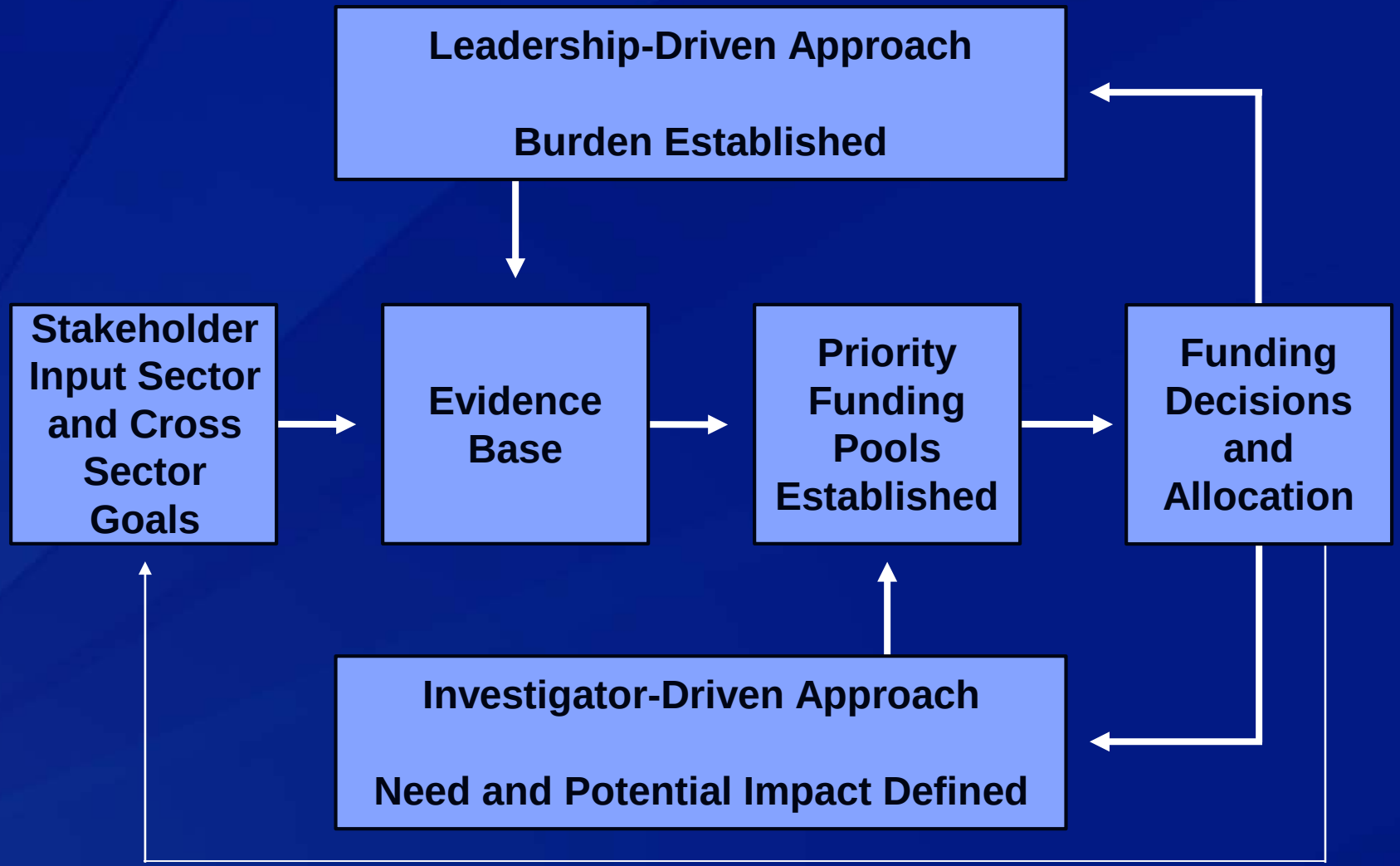
Although goals help establish priorities within a program there is need for a good way to identify priorities across all programs

Hence it is difficult to evaluate whether investments are appropriately prioritized

The BNI approach

- Identifies priorities and aligns investments
- Ensures that NIOSH is doing the most important work to protect the workforce
- Establishes priorities to drive investment in constrained resource environment
- Establishes priorities based on the evidence of
  - Burden
  - Need
  - Impact
- Burden is the primary driver and includes “anticipatory burden”

Bi-directional Priority Setting Process



Explicit criteria to identify research priorities

Burden		
Magnitude of the problem		
• Exposure/Hazard • Injury/Illness • Disability/Severity • Cost		

Explicit criteria to identify priorities

Burden	Need	
Magnitude of the problem	**Most relevant and impactful issues**	
• Exposure/Hazard • Injury/Illness • Disability/Severity • Cost	• Knowledge gap • Methodological approach • Time fit • NIOSH advantage • Stakeholder need	

Explicit criteria to identify priorities

Burden	Need	Impact
Magnitude of the problem	**Most relevant and impactful issues**	**Potential reduction in burden likely to result from research**
• Exposure/Hazard • Injury/Illness • Disability/Severity • Cost	• Knowledge gap • Methodological approach • Time fit • NIOSH advantage • Stakeholder need	• Likelihood of success • Use or dissemination of results • Follow-on research

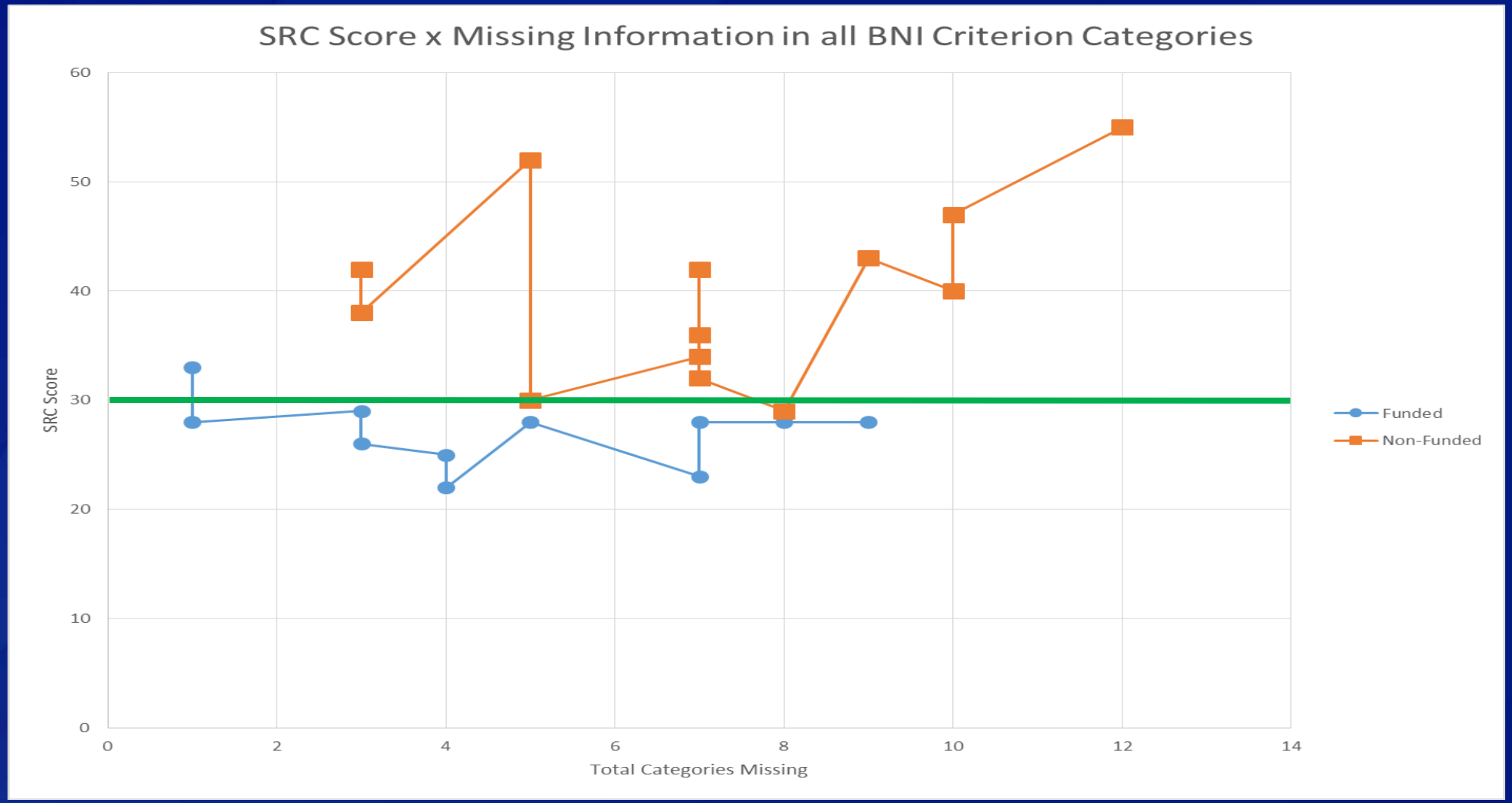
Applied BNI criteria

to

NIOSH FY16 and FY17 intramural funding competitions.

In FY16 we evaluated how funded studies compared with unfunded studies in terms of BNI criteria.

FY16 Results



Burden Criteria

Reviewers will consider the following elements in determining the burden score:

- **General statement of burden:** Is there a general statement of the burden the proposed research will address? Is this an emerging issue? Does the proposed research address high overall burden in small population with large downstream impact? Does the proposed research address a burden in a particular sector or cross-sector that would have a significant economic impact if that burden is not addressed?

- **Exposure/Hazard.** How many workers are exposed or at risk? Are there disparities among workers populations? Is there a trend in exposure or risk? Does a new or emerging burden show an increasing trend?

- **Injury/Illness.** How many fatalities or illnesses have occurred? What is the incidence or prevalence of the injury or illness? Are there disparities among worker populations?

Burden Criteria (cont'd)

- **Disability/Severity.** How serious is the health outcome under study? Is there evidence of disability, years of life lost or disabled, reduction in quality of life, or days away from work? Have the most relevant indicators been selected?

- **Cost.** What is the estimated cost such as medical expenses, productivity loss (such as absenteeism or presenteeism), lost wages, or disability payments? Have the most relevant indicators been selected?

Scoring

Burden Criteria. Reviewers will provide one overall score for burden based on the following 9-point scale: **1 = Exceptional; 2 = Outstanding; 3 = Excellent; 4 = Very Good; 5 = Good; 6 = Satisfactory; 7 = Fair; 8 = Marginal; 9 = Poor.**

Need Criteria

Reviewers will consider the following elements in determining the need score:

- **General statement of need:** Is there a general statement of need? What is the rationale for the proposed work to be conducted by NIOSH at this point in time?

- **Evidence of knowledge gap.** Is there evidence that this activity will address a knowledge gap?

- **Methodological approach.** Is the proposed research method well defined (basic/etiologic, intervention, translation, or surveillance) and appropriate to the proposed aims of the project? How does this methodological approach compare with other approaches that could be considered to fill the knowledge gap?

Need Criteria (cont'd)

- **NIOSH advantage.** Is NIOSH ideally suited for this activity? Des the activity require NIOSH expertise or facilities, take advantage of a NIOSH partnership or relationship, or require neutrality or NIOSH convening authority? What strengths or unique advantages does NIOSH have in comparison with another organization that could undertake this activity?

- **Stakeholder need.** Does this study address an explicit stakeholder need? What is the evidence of that need and why should NIOSH address the need? What are the potential advantages of NIOSH undertaking this activity, in the broad context of research, policy, and practice?

Scoring

Reviewers will provide one overall score for need based on the following 9-point scale: **1 = Exceptional; 2 = Outstanding; 3 = Excellent; 4 = Very Good; 5 = Good; 6 = Satisfactory; 7 = Fair; 8 = Marginal; 9 = Poor.**

Impact Criteria

Reviewers will consider the following elements in determining the need score:

- **General statement of impact:** Is there a general statement of impact? Has the researcher expressed the potential reduction in burden that is likely to result if the proposed research is successful?

- **Likelihood of success.** What is the probability of success? Is the proposed research feasible and likely to address the stated need? Feasibility includes available capacity, resources, and technical expertise, as well as anticipated time to completion. If relevant, are letters of support from collaborators, stakeholders, or critical data sources provided?

Impact Criteria (cont'd)

- **Use or dissemination of research results by others.** Is there potential for the proposed research to be used in setting standards, guidance, policy, or recommendations? Could the proposed research be adopted by manufacturers, trade associations, or others? Is there potential for dissemination of research result by external organizations?
  - Is there potential for others to adopt technology, training programs/materials intervention strategies, or new surveillance methods used in or resulting from the proposed research?
  - Is there a potential for technology to be transferred into the marketplace?
  - Is there potential for partners to assist in tracking progress of research translation efforts?

- **Follow-on research.** Is the proposed research likely to generate information that leads to follow-on research that builds on the findings from this project? What type of follow-on research would be anticipated as a follow-up?

Scoring

Reviewers will provide one overall score for impact based on the following 9-point scale: **1 = Exceptional; 2 = Outstanding; 3 = Excellent; 4 = Very Good; 5 = Good; 6 = Satisfactory; 7 = Fair; 8 = Marginal; 9 = Poor.**

Example of Summary BNI Score Calculation

Criteria	Scale/Formula	Score
Burden	1-9	2
Need	1-9	3
Impact	1-9	4
Overall Score	= (B+N+I) / 3 x 10	30

Implementing BNI in the Third Decade of NORA

- BNI will be a guiding principle in the third decade of NORA to help Sector, Cross-Sector, and Core and Specialty Programs identify research priorities.

Approach to Identify and Integrate Priority Goals

Health & Safety Cross-Sectors/Sectors	Cancer, Cardiovascular, Reproductive Health	Hearing Loss Prevention	Immune, Infectious & Dermal Disease Prevention	Musculoskeletal Health	Respiratory Health	Traumatic Injury Prevention	Healthy Work Design & Well-being
Agriculture, Forestry and Fishing							
Construction							
Healthcare and Social Assistance							
Manufacturing							
Mining							
Oil and Gas Extraction							
Services							
Public Safety							
Transportation, Warehousing and Utilities							
Wholesale and Retail Trade							

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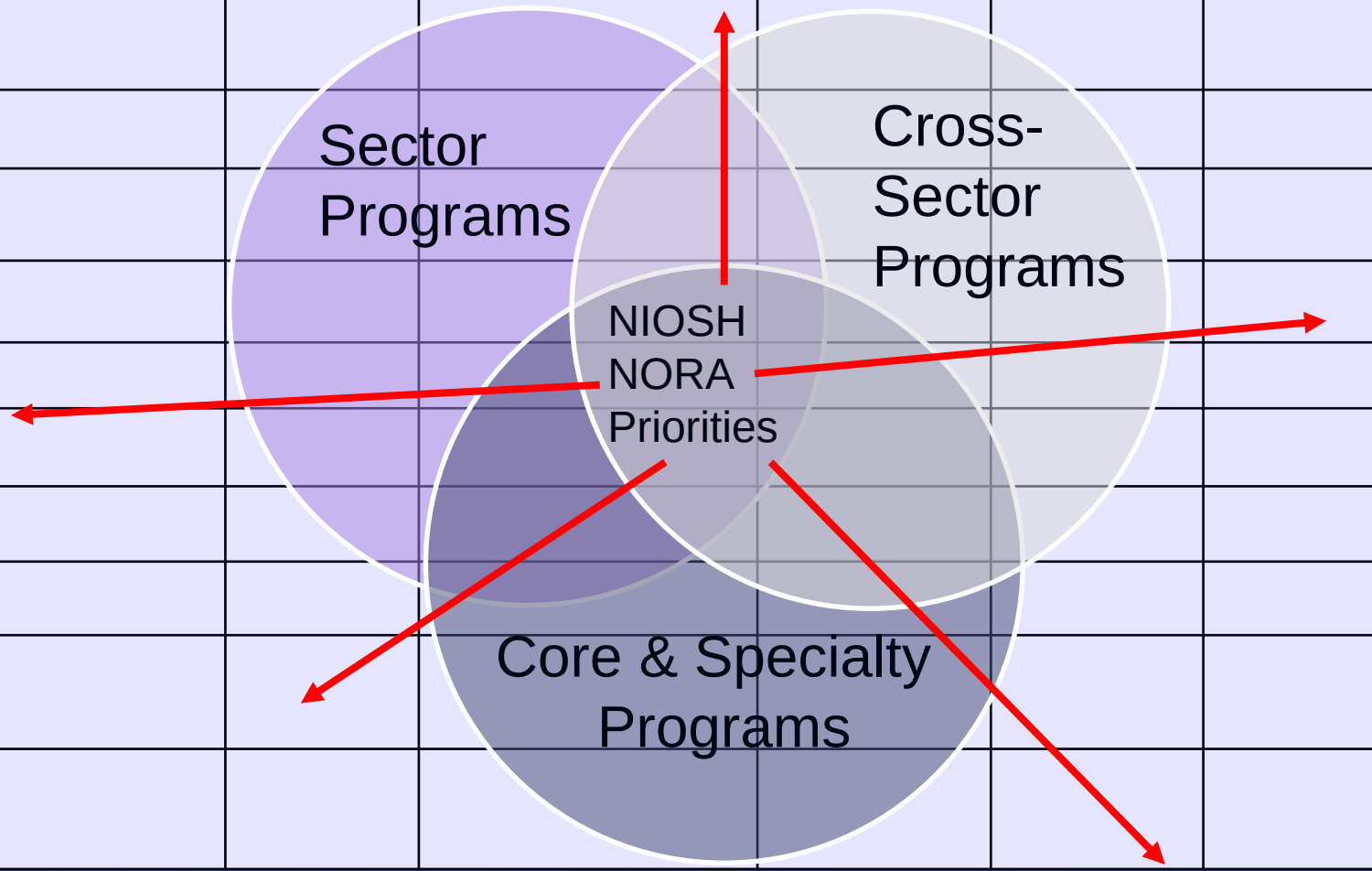

Future Issues – Burden

Continue to develop a better understanding of burden

- Current estimates of burden are not comprehensive
- Not consistent or cohesive
- Not timely
- Exposure data and number of workers exposed are old
- Not clear how to integrate different types of burden
- Need heightened surveillance and informatics capabilities

Future Issues – Need

- Take a long-term, teleological view of the continuum of research needs
- Anticipate what research will reduce a specific burden

Future Issues – Impact

- At the research planning/funding stage “impact” means “potential impact”
  - How to define and assess
- Overlap of research and r2p
  - Assess how research makes an impact
  - Translation research
- Approaches for different time horizons
- Retrospective analysis

Workgroup on Priorities

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