



# Pathways to Prevention:

Weighing the evidence. Identifying the research gaps. Determining next steps.

## A Report from the Federal Partners Meeting of the National Institutes of Health Pathways to Prevention Workshop: Total Worker Health<sup>®</sup>—What's Work Got to Do With It?

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### Sponsored by:

National Heart, Lung, and Blood Institute (NHLBI), National Institutes of Health  
National Institute for Occupational Safety and Health (NIOSH), Centers for Disease Control and Prevention  
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### Summary

On December 9–10, 2015, the National Institutes of Health (NIH) held the [Pathways to Prevention \(P2P\) Workshop: Total Worker Health<sup>®</sup>—What's Work Got to Do With It?](#) This workshop was held as part of the NIH Office of Disease Prevention's (ODP) [P2P Program](#), which uses an unbiased, evidence-based assessment of a complex public health issue both to identify research gaps and associated methodological and scientific weaknesses in a specific scientific area, and to make recommendations for moving the field forward. The P2P workshop on Total Worker Health (TWH) was cosponsored by the National Heart, Lung, and Blood Institute (NHLBI); the National Institute for

Occupational Safety and Health (NIOSH) of the Centers for Disease Control and Prevention; and the ODP. An independent panel from the P2P workshop made recommendations for moving the field forward, and the [Final Report](#) was published on the ODP website and in the *Annals of Internal Medicine* in May 2016 (Bradley, Grossman, Hubbard, Ortega, & Curry, 2016).

As the final step in the [P2P program process](#), the ODP convened a meeting on February 27, 2017, with representatives from federal government agencies (the Federal Partners) to strategize on how to address five of the eight recommendations outlined in the workshop panel report. This document summarizes the discussions and action items identified at the Federal Partners Meeting.

## Background

More than 150 million Americans are workers (Bureau of Labor Statistics, 2017); despite improvements in occupational safety and health over the last several decades, workers continue to suffer work-related illnesses, injuries, and deaths. In 2007, according to the latest estimate available, more than 53,000 deaths could be attributed to work-related illness, and the estimated total cost of occupational injuries, illnesses, and fatalities was \$250 billion (Leigh, 2011). Furthermore, in 2015, more than 4,800 U.S. workers died from work-related injuries (Bureau of Labor Statistics, 2016b), and approximately 2.9 million workers had a nonfatal occupational injury or illness (Bureau of Labor Statistics, 2016a). In 2014, according to NIOSH, 2.7 million workers were treated in emergency departments for occupational injuries and illnesses, and approximately 113,000 workers were hospitalized (Centers for Disease Control and Prevention, 2016).

NIOSH defines the concept of “total worker health” (TWH) as “policies, programs, and practices that integrate protection from work-related safety and health hazards with promotion of injury and illness prevention efforts to advance worker well-being” (Centers for Disease Control and Prevention, 2015). TWH builds upon a foundation of protecting workers from work-related exposures and hazards by championing a holistic understanding of the myriad of factors that influence safety, health, and well-being. An integrated approach recognizes that risk factors in the workplace can contribute to many health problems previously considered unrelated to work, including cardiovascular disease, obesity, depression, and sleep disorders. With wide variety in the landscape of the workplace (e.g., workplace culture, organization of work, working conditions, size of the employer) and the workforce (e.g., age, gender, access to preventive health care), this often translates to diversity in the safety and

health risks for each industry sector and the need for tailored, comprehensive interventions.

Traditionally, workplace systems addressing worker safety, health, and well-being have operated separately. An integrated approach would address the overall influences that the nature and conditions of the work itself have on worker health (e.g., stress levels, work schedules, trip or fall hazards). TWH promotes bringing together the diversity of relevant programs, including occupational safety and health, worksite health, disability management, workers’ compensation, and human resource benefits, yet currently, there is limited evidence that combining efforts through integrated workplace interventions helps safeguard the well-being of workers.

## The P2P Workshop and Federal Partners Meeting

To better understand the benefits of an integrated approach, the NHLBI, NIOSH, and ODP sponsored the December 9–10, 2015, Pathways to Prevention Workshop: *Total Worker Health®—What’s Work Got to Do With It?* A multidisciplinary expert group developed the workshop agenda, and an evidence report based on a systematic literature review was prepared by an Evidence-based Practice Center through a contract with the Agency for Healthcare Research and Quality (AHRQ) to facilitate the workshop discussion (Feltner et al., 2016). The workshop evaluated the current state of knowledge on integrated approaches to worker safety, health, and well-being and plotted the direction for future research.

Specifically, the workshop sought to address the following four questions:

1. What studies assess integrated interventions?
2. What are the known benefits and harms

of integrated interventions?

3. What are the characteristics of effective integrated interventions and programs?
4. What factors influence the effectiveness of integrated interventions?

The [Final Report](#) from the workshop was published on the ODP website and in the *Annals of Internal Medicine* in May 2016 (Bradley, Grossman, Hubbard, Ortega, & Curry, 2016). That report included eight recommendations:

1. Convene a meeting of stakeholders to set research priorities for integrated interventions.
2. Develop a consensus-based conceptual framework to guide future intervention research.
3. Develop a core set of measures and outcomes that are incorporated into all integrated intervention studies.
4. Use a transdisciplinary and participatory process for intervention development.
5. Ensure that future intervention studies represent an appropriate range of worker populations and settings.
6. Expand research and evaluation design options to include a range of rigorous methodologies.
7. Develop effective strategies for timely dissemination of findings to a wide variety of stakeholders.
8. Make investments in research infrastructure and assets to develop population-based laboratories for TWH research

Recommendation I was accomplished by convening the P2P Federal Partners Meeting on TWH; that meeting is the focus of this

report. Recommendations III and VI were the focus of the [2017 Total Worker Health® Research Methodologies Workshop](#) hosted by the University of Iowa in March 2017.

The ODP convened a meeting on February 27, 2017, with representatives from federal government agencies (the Federal Partners) to strategize on how to address the remaining five recommendations (see Appendix for a list of participants). This document summarizes the discussions and action items identified at the Federal Partners Meeting.

## Summary of Discussion of P2P Panel Recommendation II: Develop a Consensus-Based Conceptual Framework to Guide Future Intervention Research

**Background:** A major limiting factor for TWH interventions identified by the P2P workshop panel is the absence of theoretical or conceptual models (Bradley et al., 2016). The workshop panel recommended that future TWH research studies should use conceptual frameworks that are multilevel, have been validated, and use outcomes tailored to TWH. The adoption of a specific framework for TWH will strengthen the research literature in this field.

**Specific Research Focus Areas:** The Federal Partners agreed with this recommendation that a conceptual framework is needed to guide future TWH research. During the discussion, several models that have been used with TWH were presented, and the Federal Partners felt the models were generally useful for the types of studies that the NIH and other funders may be interested in supporting. However, the following priorities related to a TWH conceptual framework were identified.

- A precise definition of TWH is needed to clarify what it is, and what it is not, given that investigators and employers



tend to define TWH in different ways; this will also assist efforts to develop a robust TWH conceptual framework.

- A TWH conceptual framework needs to be broad enough to encompass the following factors:
  - Alternative types of work settings (e.g., telework, deployed)
  - Broad types of workers (e.g., union vs. non-union, contract/contingent workers, temporary workers)
  - Diverse worker demographics (e.g., socioeconomic status, millennials vs. baby boomers)
  - Worker stress and the positive and negative responses to it
  - Spillover of work issues into home and vice versa
  - Various work conditions (e.g., precarious/contingent/contract employment arrangements)
  - Ethics of privacy, worker involvement, etc.

### **Opportunities for Collaboration Among Federal Agencies, Resource Development, and Next Steps:**

The Federal Partners identified the following opportunities for collaboration on next steps:

- Develop a white paper to define TWH, identify and evaluate the models that have been used with TWH, and describe Federal Partners' interest in developing new TWH theories and models.
- Create clear descriptions of TWH and its conceptual framework by developing case studies that show how various

types of workers participating in a TWH intervention would move through the model or framework.

- The case studies could be given to employers as an example of how a similar organization has benefited from a TWH intervention, and could increase the likelihood the employer will buy into the TWH program.

### **Summary of Discussion of P2P Workshop Panel Recommendation IV: Use a Transdisciplinary and Participatory Process for Intervention Development**

**Background:** It is important to include perspectives and input from multiple disciplines and stakeholders when developing interventions (Bradley et al., 2016). Including experts from different disciplines can lead to better-designed interventions and enhanced evaluation efforts. The P2P workshop panel also recommended taking a participatory approach to intervention development to achieve better outcomes from TWH interventions.

**Specific Research Focus Areas:** The Federal Partners identified the following priorities:

- Researchers should consider the following stakeholders and their affiliated networks and interests when developing TWH interventions.
  - Employees, including organized labor
  - Employers (who maintain relationships with trade associations, chambers of commerce, public health departments, and health care service providers)
  - Small businesses (which comprise a majority of U.S. companies)

- Human resource officials (who design worker benefits and training) (e.g., Society for Human Resource Management, U.S. Office of Personnel Management)
- Employee safety organizations (e.g., National Safety Council)
- Disease-specific organizations with an interest in employee health (e.g., American Diabetes Association, American Heart Association)
- Health and short- and long-term disability insurers, including workers' compensation providers
- Architectural organizations (which contribute to design of healthier office buildings)
- Technology companies (which develop and use mobile health apps)
- Faith-based organizations
- Community health worker
- Strategies to promote a participatory process for intervention development include.
  - Seek input from employers on their major challenges, such as workplace stress and work-life balance.
  - Ensure buy-in from participating organizations' leadership teams.
  - Consider a community-based participatory research (CBPR) model for shared community responsibility.
  - Consult with employers for examples of ways employers

partner with fitness organizations (e.g., local YMCAs implementing health programs in worksites).

### **Opportunities for Collaboration Among Federal Agencies, Resource Development, and Next Steps:**

The following factors should be considered during the development of a collaborative funding opportunity announcement (FOA):

- Require a transdisciplinary team of investigators (e.g., occupational health psychologists, sociologists, cultural anthropologists, behavioral scientists, preventive medicine specialists).
- Prioritize system- or environmental- and policy-level interventions over individual-level interventions.
- Consider a variety of research designs including randomized controlled trials (RCTs) and quasi-experimental or natural experiment designs.
- Require applications to include a business model or cost analysis.

### **Summary of Discussion of P2P Workshop Panel Recommendation V: Ensure That Future Intervention Studies Represent an Appropriate Range of Worker Populations and Settings**

**Background:** TWH research should mirror the diversity of workers and worksites. The P2P workshop panel made several suggestions for how study populations could be selected: using factors such as workers' risk for job-related injuries and illnesses, basing selection on the frequency of TWH outcomes, or by modeling workers' future risk scores (Bradley et al., 2016). To increase the diversity of populations studied, workers at greatest risk for negative outcomes should be targeted, as

well as workers who are at increased risk due to health inequities. The P2P workshop panel identified the need to conduct future TWH research with small businesses due to the limited number of studies conducted in these worksites. In order to verify the robustness of the TWH conceptual framework, future research should test the TWH model with all types of worksite settings and industries.

**Specific Research Focus Areas:** The Federal Partners identified the following approaches to ensure that future intervention studies represent an appropriate range of worker populations and settings:

- Use health equity and geographic socio-economic risk factors to drive decisions on selecting study populations.
- Consider wage levels and shift work as proxy risk factors across populations.
- Focus attention on the job categories with the highest burden of risk to worker safety, health, and well-being (e.g., shift workers, service industry employees, emergency workers).
- Include workers in non-standard work arrangements (e.g., bus and taxi drivers, contingent/contract workers).
- Include workers of different generations (e.g., millennials, baby boomers, older adults).
- Include small businesses (they can be identified through chambers of commerce, local health departments, workers' compensation insurers, and university centers that study small businesses).

**Opportunities for Collaboration Among Federal Agencies, Resource Development, and Next Steps:**

The next steps identified by the Federal Partners included:

- Developing TWH FOAs that:
  - Are supported by more than one NIH Institute.
  - Specify a common set of primary outcomes of general interest, with individual Institutes indicating specific populations and secondary outcomes based on their particular interests.
  - Include language recommending that each state conduct a baseline needs assessment of its working population (e.g., [Real Iowans Research Initiative](#)).
  - Consider return on investment for various fields (e.g., cost-benefit analysis for economics).
  - Include the convening of an annual meeting to discuss findings and commonalities.
- Adding industry and occupation questions to the NIH [All of Us Research Program](#) (formerly known as the Precision Medicine Initiative® [PMI] Cohort Program).
- Reviewing the [Real Iowans Health Survey Questionnaire](#) as an example of the questions to be added to the [Behavioral Risk Factor Surveillance System \(BRFSS\)](#).

**Summary of Discussion of P2P Workshop Panel Recommendation VII: Develop Effective Strategies for Timely Dissemination of Findings to a Wide Variety of Stakeholders**

**Background:** A well-developed dissemination



strategy has been shown to be effective in translating research into policy and practice (Bradley et al., 2016). Therefore, an effective dissemination strategy is needed to translate the evidence-based knowledge generated by research on TWH interventions into improved population health. Additional means of disseminating effective interventions is needed beyond the standard academic venues of peer-reviewed journals and scientific conferences. To reach the goal of ensuring worker health, safety, and well-being, the P2P workshop panel recommended that TWH researchers should develop effective strategies, such as those taken from the dissemination and implementation research field, to promote the adoption of integrated interventions into policy and practice.

### **Specific Training and Education Focus**

**Areas:** The Federal Partners recommended that researchers build in dissemination and implementation (D&I) efforts early and that dissemination strategies consider the following:

- Disseminating information through proper channels to amplify outreach (e.g., mass media, social media).
- Conducting an analysis of the targeted marketplace and the end users.
- Considering barriers and facilitators to dissemination and implementation.
- Accounting for sustainability, scalability, and cost effectiveness.
- Adapting resources and systems to interventions in specific environments.
- Conducting studies that use research designs and strategies, such as using mixed methods, smart design studies with course corrections, and de-implementation (when appropriate).
- Collecting data on both the front end

(e.g., using needs assessments to inform strategies) and the back end (e.g., to evaluate outcomes).

- Obtaining technical assistance for implementation.
- Developing toolkits to share information (e.g., [AHRQ's toolkits](#)).
- Identifying and mobilizing key stakeholders across settings (e.g., workers, industry, small businesses, trade associations, professional groups, mass media).

### **Opportunities for Collaboration Among Federal Agencies, Resource Development, and Next Steps:**

The Federal Partners identified the following next steps:

- Develop TWH FOAs that consider key factors influencing the scaling up of research-based evidence across large networks (e.g., approximating outcomes).
- Disseminate this Federal Partners report to the Trans-NIH Dissemination and Implementation Research Workgroup and seek opportunities for partnership.

### **Summary of Discussion of P2P Workshop Panel Recommendation VIII: Make Investments in Research Infrastructure and Assets to Develop Population-Based Laboratories for TWH Research**

**Background:** The P2P workshop panel determined that foundational investments are needed in order to make a significant improvement in the body of TWH research (Bradley et al., 2016). The panel suggested creating a network of stakeholders committed



to worker well-being (e.g., employers, labor unions, health care systems, insurers), along the lines of the [NIH Health Care Systems Research Collaboratory program](#), to allow researchers to conduct retrospective analyses on linked data sets and to provide access to diverse worker populations for prospective intervention studies.

**Specific Research Focus Areas:** The Federal Partners identified the following research for consideration:

- Develop strategies to link datasets that contain occupational data, such as addressing the issue of having multiple definitions of occupations in different datasets.
- Establish common measures and other metrics to be used in survey data collection (e.g., Behavioral Risk Factor Surveillance System [BRFSS], National Health Interview Survey [NHIS]).
- Create a system similar to the NIH Health Care Systems Research Collaboratory program where federal agencies can work collaboratively to identify objectives, data sources, and funding sources for worker health.
- Explore inclusion in TWH research studies of return on investment and other measures of economic value.

### **Opportunities for Collaboration Among Federal Agencies, Resource Development, and Next Steps:**

The Federal Partners identified the following next steps:

- Share discussion points from this Federal Partners Meeting at the [2017 Total Worker Health® Research Methodologies Workshop](#) on March 7–8, 2017, at the University of Iowa.

- Collaborate with the U.S. Census Bureau to obtain representative data on workers (e.g., add occupational questions to the American Communities Survey).
- Partner with the HHS Data Council to develop an inventory of datasets with occupational data and compare the types of data being collected and the measures used.
- Collaborate with the Office of the National Coordinator for Health Information Technology (ONC) to add employment information to electronic health records (EHRs), which could be used to create a TWH population-based laboratory.
- Establish a Center of Excellence with data and standards to promote collaborative work.
- Consider submitting TWH as an NIH Common Fund initiative, given interest from multiple Institutes and Centers.
- Augment potential federal budgetary constraints by exploring funding support from foundations and other private-sector partners.
- Convene meetings with a network of stakeholders (e.g., insurers, unions, health systems).

### **Conclusions and Next Steps**

The key recommendations from the Federal Partners Meeting are:

1. Develop a precise definition of TWH to clarify what it is, and what it is not, given that investigators and employers tend to define TWH in different ways.
2. Foster a transdisciplinary and participatory process for TWH



intervention development by using multiple strategies and consulting a wide array of stakeholders.

3. Consider using geographic and socio-economic risk factors to drive decisions on selecting study populations to ensure that future TWH research represents an appropriate range of workers.
4. Build in effective dissemination and implementation strategies early.
5. Develop strategies to link datasets with occupational data and establish common TWH measures.

While the Federal Partners Meeting represents the conclusion of P2P activities related to TWH, efforts to improve worker safety, health, and well-being should continue in a significant and coordinated way. This report presents a set of prioritized research and programmatic strategies that could be advanced through collaborations across the federal government and with private-sector partners. As a resource for the larger TWH community, the report will be publicly available, and will be distributed to key stakeholders.

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