Implementation Science Approaches for Advancing Occupational Safety and Health Research and Practice

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Presentation overview

- Complex occupational safety and health challenges and systems-based solutions
- Implementation science at NIOSH
- Applying an implementation science lens to NIOSH young worker research
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- Dr. Russ Glasgow, University of Colorado Anschutz Medical Campus
Systems-based approaches to address occupational safety and health research to practice gaps
Complex future of work challenges

- Changing nature of work, the workforce, and the workplace
  - “Megatrends” [ILO 2020]
    – Globalization
    – Technology
    – Demography changes
    – Climate change
- Global pandemics
- Rise in psychosocial hazards [Schulte et al. 2020, Sorensen et al. 2021, Tamers et al. 2020]
- Occupational health equity


Schulte et al. [2020]. https://doi.org/10.1093/annweh/wxaa051
Sorensen et al. [2021]. https://doi.org/10.1016/j.socscimed.2020.113593
Tamers et al. [2020]. https://doi.org/10.1002/ajim.23183
Complex systems

The whole is greater than the sum of its parts...
Systems-based approaches in occupational safety and health


https://doi.org/10.1016/j.socscimed.2020.113593
A team science approach

Additive | Interactive | Holistic
---|---|---
Multidisciplinary | Interdisciplinary | Transdisciplinary


The “leaky” research-to-practice pipeline

Implementing an evidence-based intervention

Even if 100% effective ...it is only as good as how and whether:

- It is **adopted** widely, including in low resource workplaces
- Employers choose to deliver it
- It can be **implemented** consistently with quality
- Intended recipients (workers, employers), including those at highest risk, **receive** it
- It can be **sustained**

*If we optimistically assume 70% success for each step above...*

**Overall Impact:** [.7x] [.7x] [.7x] [.7x] [.7x] = **17% benefit to workers**

Glasgow RE, Vogt TM, Boles SM [1999]. [https://doi.org/10.2105/ajph.89.9.1322](https://doi.org/10.2105/ajph.89.9.1322)
Pipeline issues in occupational safety and health

- Effective OSH interventions are not broadly adopted or implemented; Research “sits on the shelf”
  
  For instance, only 17% of U.S. fishing safety research has been adopted in workplaces to benefit workers
  [Lucas et al. 2014]

- Limited evidence exists of workplaces that adopt, implement, and maintain workplace safety and health programs

- These gaps seriously impact worker safety, health, and well-being

Anger et al. [2015]. https://doi.org/10.1037/a0038340
Lucas et al. [2014]. https://doi.org/10.1016/j.ssci.2013.11.023
Punnett et al. [2020]. https://doi.org/10.1093/annweh/wxaa003.
Implementation science: bridging the research to practice gap

“Study of methods to promote the adoption and integration of evidence-based practices, interventions, and policies into routine health care and public health settings to improve our impact on population health.”

—National Cancer Institute
Wealth of theories, models, frameworks

- **61 models with research focus**
- **> 100 used in an international sample**
- **159 identified**
Implementation study designs (example)

Lane-Fall, MB, Curran, GM, & Beidas, RS [2019].
https://doi.org/10.1186/s12874-019-0783-z
Implementation science at NIOSH
Moving research into practice at NIOSH: A brief history and timeline

1994
- Intervention Effectiveness Research Conference

2004
- Research-to-Practice (r2p)

2006
- Second Decade of NORA

2009
- National Academies of Science Report

2013
- Burden, Need, Impact Workgroup (Impact Science)

2016
- NIOSH Translation Research Program

2019
- NIOSH Capacity Building Plan

1996
- National Occupational Research Agenda (NORA)
What’s in a name?
Implementation research for NIOSH

- Studies how promising interventions are disseminated, adopted, implemented, sustained, and scaled equitably in real-world settings
- Uses models, methods, and measures to systematically identify, develop, evaluate, and refine strategies (to support these processes)
- Applies to all workplaces and workers (addresses health equity)
NIOSH Research for Impact Framework

Credit: NIOSH Visual Communications Team and the NIOSH Implementation Research Workgroup
The research continuum in occupational safety and health

Guerin et al. [2022]. https://doi.org/10.1016/j.ssci.2022.105763
Implementation research, implementation science and NIOSH

- Conduct “T3” implementation research
- Identify, develop, evaluate, and refine strategies to disseminate, adopt, implement, sustain, and scale successful workplace interventions
Applying implementation science to young worker safety and health research

Artwork for the NIOSH Youth@Work-Talking Safety curriculum by Chi-Yun Lau
The problem: Young worker injuries

- From 2012–2018, about 3.2 million nonfatal, job-related injuries to young workers (15–24 years) were treated in hospital ERs.
- Compared with adult workers, young workers have rates of job-related injury that are about twice as high.
- Long-term impacts on health and well-being; “cumulative burden of morbidity” [Koehoorn et al. 2008]
- Adolescent workers (< age 18) face unique risks

Guerin RJ et al. [2020]. https://doi.org/10.15585/mmwr.mm6935a3
Solutions: OSHA 10-hour training

- Is the industry standard work safety training; used in career and technical education (CTE)
- Teaches general workplace safety and health, like ladder or chemical safety, and regulations
- Trained, authorized instructors teach it.
- Has evidence it’s effective, but not about its implementation

NIOSH Talking Safety

- Based on efforts by NIOSH and its partners
- Is a free, interactive, middle and high school curriculum; six 45-minute lessons
- Teaches Core OSH Competencies
- Customized for each state
- Has evidence that it’s effective and about its implementation [Guerin et al. 2019]

Guerin RJ et al. [2019].
https://doi.org/10.1007/s11221-019-01008-2
Study population and environment

- Service providers: about 40 M-DCPS high school CTE teachers
- Intervention recipients: 2,000–3,000 career tech students in health sciences pathway, grades 9–12
- Key partners: M-DCPS administrators, Board of Education, union leaders (American Federation of Teachers), OSHA

(Former) MDCPS Superintendent, Alberto Carvahlo (center), and the Board of Education
Number of items for PRISM Context Domains and RE-AIM Outcomes*

- External environment: 3
- Implementation & Sustainability Infrastructure: 19
- Intervention: 120
- Recipient: 300
- Reach: 67
- Effectiveness: 407
- Adoption: 14
- Implementation: 70
- Maintenance: 15

*Items can address more than one construct and may be double counted.
Final thought ...

Systematic methods and team science are needed to better understand and address complex future of work challenges.

Implementation science moves workplace safety and health forward, putting effective interventions into practice, fitting end user needs, enhancing equity, sustaining actions, and having a positive impact.

Image credit Dr. Carol Brown, Center for Health, Work & Environment
Colorado School of Public Health
Methods to improve the translation of evidence-based interventions: A primer on dissemination and implementation science for occupational safety and health researchers and practitioners

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Dissemination and Implementation Science Approaches for Occupational Safety and Health Research: Implications for Advancing Total Worker Health

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Abstract: Total Worker Health® (TWH), an initiative of the U.S. National Institute for Occupational Safety and Health, is defined as policies, programs, and practices that integrate protection from workplace-related health and safety hazards by promoting efforts that advance worker well-being. Interventions that apply the TWH paradigm improve workplace health more rapidly than wellness programs alone. Evidence of the barriers and facilitators to the adoption, implementation, and long-term maintenance of TWH programs is limited. Dissemination and implementation (D&I) science, the study of methods and strategies for bridging the gap between public health research and practice, can help address these system, setting, and worker-level factors to increase the uptake, impact, and sustainability of TWH activities. The purpose of this paper is to draw upon a synthesis of existing D&I science literature to provide TWH researchers and practitioners with: (1) an overview of D&I science; (2) a plain language explanation of key concepts in D&I science; (3) a case study example of moving a TWH intervention down the research-to-practice pipeline; and (4) a discussion of future opportunities for conducting D&I science in complex and dynamic workplace settings to increase worker safety, health, and well-being.

Keywords: dissemination and implementation science; Total Worker Health; translational science; occupational safety and health; evidence-based interventions; health equity

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Third edition includes a chapter on dissemination and implementation research in occupational safety and health!
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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.