

Understanding the Economic Benefit Associated with NIOSH Research and Services: A New Analysis of NIOSH Impact by RAND

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Do you ever wonder if NIOSH research and services yield a positive economic benefit to workers, employers, and society?

Assessments of the impact of worker safety and health research and services often involve statistical analyses of written publications or qualitative analyses conducted by subject matter experts. Such assessments do not quantify the economic return on research and services investments in terms of lives saved, injuries or illnesses averted, or increases in worker productivity. NIOSH wanted to understand whether investments in worker safety and health yield an economic benefit. NIOSH tasked RAND with developing a systematic approach and illustrative case studies to inform the occupational safety and health community about this issue.

On January 2, 2018, RAND, a research organization that develops analysis and solutions to public policy challenges, published [the report](#) on the RAND website. The report contains analyses of the impact of NIOSH research and services on worker health and safety practices and outcomes, including initial estimates of the economic benefit associated with those impacts.

The RAND analyses used two common metrics to represent the economic benefit of avoided injury and illness. The first metric is the sum of avoided medical costs and productivity losses. The second metric is based on estimates of society's willingness to pay to avoid illnesses and to avoid deaths. The latter is referred to as the value of a statistical life (VSL). These estimates consider broader costs to society and are larger than medical cost and productivity loss estimates. For both metrics, the study's results are expressed in 2016 dollars.

The first case study examined research to develop, test, and support implementation of engineering controls to limit exposure to crystalline silica dust among road construction workers working with large asphalt milling machines. This case is an example of intervention and surveillance research, and technical assistance. RAND estimated that NIOSH activities contributed to \$4.9 million in avoided medical and productivity losses on an annualized

basis for fatal lung cancers. RAND did not have sufficient data to estimate avoided medical costs and productivity losses for the majority of averted deaths that were attributed to other causes. Using willingness-to-pay and VSL metrics, RAND estimated that the economic value of these NIOSH activities ranged from \$304 million to \$1.1 billion on an annualized basis, with a midpoint estimate of \$692 million per year.

The second case study involved two NIOSH studies that strengthened the evidence of the linkage between firefighting activities and increased risk of certain cancers among firefighters. This case is an example of etiological and exposure surveillance research, coupled with an intervention study. RAND estimated that reductions in mortality and morbidity would reduce medical costs and productivity losses by \$71 million per year, with a range of \$23 million to \$93 million. Using VSL estimates, RAND estimated benefits of approximately \$1 billion.

The third case study involved a NIOSH evaluation of the effectiveness of Ohio's Safety Intervention Grant Program and implementation of safety-oriented engineering controls by employers. It illustrated intervention research targeting government organizations. RAND concluded that, even though the impacts of this work are still developing, between 2013 and 2017 NIOSH research resulted in \$4 million to \$7 million per year in avoided workers' compensation costs, \$7 million to \$11 million in new streams of annual productivity gains per year, and almost \$700,000 to more than \$16 million in avoided uncompensated wage losses per year.

NIOSH provided RAND with preliminary, unpublished estimates of NIOSH costs, not including NIOSH partner costs, to produce the research and services described in the RAND analyses. Preliminary estimates were \$2.2 million for the silica case, \$2.4 million for the firefighter case, and \$0.5 million for the safety grants case.

RAND noted that difficulties in assessing the economic benefit of research and services include assigning a dollar value to prevented injury and illness; determining when and to what extent risk-reduction measures might have occurred without the research in question; and determining the significance of NIOSH's contribution to resulting benefits. Despite the limitations noted by RAND, the analyses illustrated some specific ways in which NIOSH research can produce economic benefits, and provided the likely magnitude of these benefits in dollar terms. This study also provided an analytical framework that can be used to conduct additional case studies.

RAND concluded that in the future, NIOSH should consider:

- Conducting additional case studies to explore other types of research, services, and intended users of NIOSH research and that account for the costs of producing and implementing research;
- Examining cases in which the linkages between its research and safety and health improvements are less clear because there can be important lessons from cases of unrealized impact; and
- Ways in which it might start to fill some of the data and methods gaps identified while conducting the current economic analyses.

NIOSH believes that the RAND report is a good start in developing a sound scientific approach that can be used on a routine basis to demonstrate the economic yield to workers, employers, and society from NIOSH-supported worker safety and health research.

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