

Information Collection Request for
“Enhanced Utilization of Personal Dust Monitor Feedback”

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October 29, 2013

Part B: Collection of Information Employing Statistical Methods

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B. Collections of Information Employing Statistical Methods

1. Respondent Universe and Sampling Method

According to the National Mining Association (NMA) almost 55,000 individuals currently work in underground coal mines in the U.S. (NMA, 2013). A good description of the five mines where data is collected will be provided (e.g., size, location, height of coal seam, type of extraction method utilized, etc.). However, CDC does not claim that the mines selected for this study are statistically representative of the entire population of US coal mines, or of any subpopulation of mines or miners. It should not be assumed that the findings of this exploratory study are generalizable to other groups of coal miners.

The respondents will be employees from five mine organizations. Phase 1 includes a pilot mine and Phase 2 includes four intervention mines. Mines will be recruited via stakeholder meetings and previous research contacts. First a mine and respective employees within the mine will be recruited for Phase 1 of the study. One pilot mine will be recruited through previous research contacts and will be contacted either by phone or e-mail to describe the details of the study (Attachment E- script for phone and/or email mine recruitment script and Attachment F for the recruitment script for individual miners). The pilot group will consist of no more than nine individuals who will receive the same data collection materials as the experimental groups in Phase 2.

Phase 2 of the study will consist of underground coal miners from four participating mines. Mines will be recruited via stakeholder meetings and previous research contacts via personal phone calls, e-mails, or conference sessions (Attachment E- script for phone and/or email mine recruitment script and Attachment F for the recruitment script for individual miners). The following will be considered when recruiting mines:

- Size of the mine: Large mines will be contacted first for participation to help recruit an adequate sample size of individuals wearing PDMs to create both an experimental group and a control group.
- Layout of the mine: To control for unintended “discussion” between the control and experimental groups, selection of mine sites will favor mines where separate portals are used or where sister mines within the same company are located near one another.
- Experience using PDMs: An attempt to recruit mines that vary in terms of how long they have been using their PDMs will be made to help account for differences in previous knowledge of PDMs.

It is expected that the employees of the participating mines will also vary along a number of variables including age, gender, and experience. The number of employees selected for participation in the different data collection activities will depend on the size of each mine. Convenience sampling will occur based on the individuals available to participate at the point in time when the study is conducted. All employees will either consent or decline individual participation in the study.

Phase 1: One mining organization will participate during Phase 1 of the study. Once the pilot mine is recruited, mine management will help identify a crew to participate in the pilot study. No more than 9 individuals will be recruited for Phase 1. This sampling of participants will be a convenience sample. Convenience sampling will occur based on the individuals available to participate at the point in time when the study is conducted. The nine individuals will receive the same materials as the experimental groups in Phase 2 in order to pre-test the data collection materials and make any subsequent changes, if necessary.

Phase 2: The target number of participating mine organizations during Phase 2 of this study is four. The number of individuals at each mine organization participating in the study will vary depending on the size of the organization and the number of PDM units the mine has available. Across the four mine organizations it is expected that up to 200 participants will complete the pre- and post-test survey (100 from the experimental groups and 100 from the control groups); up to 100 participants in the experimental groups will complete weekly worksheets; and up to 40 participants will be involved in the interviews (20 from the experimental groups and 20 from the control groups). In addition, mine operators will provide NIOSH with daily PDM output for each participating miner.

The same individuals at each mine site who are a part of the experimental groups will participate in all of the data collection activities, while individuals in the control group will only be involved in the pre/post-test and interview portion of the data collection. The sampling of participants will be a convenience sample. Convenience sampling will occur based on the individuals available to participate at the point in time when the study is conducted.

All of the data across the six mine organizations will be collected over a period of approximately 30 months. For any one mine, data collection will take approximately six weeks, making this a longitudinal study.

The data collected for this study will be both quantitative and qualitative in nature. Tests for statistical significance of group differences will be performed only on the survey data and PDM output collected in this study. All other data collected will be presented in terms of descriptive statistics (e.g., *n*-size, means) or qualitative summaries.

2. Procedures for the Collection of Information

The design of this intervention uses different methods to collect information about behaviors related to respirable dust exposure including surveys, worksheets, and interviews. These different methods complement one another and provide a way to collect both quantitative and qualitative data about the behaviors of interest. The same methods will be used at each of the underground mines participating in the study in order to allow comparative analyses across the sites. A description of these data collection tools are below:

- o Week 1 PDM Pre-survey (Part A; Attachment C3) – is typically completed prior to beginning an intervention. Information gained through this paper-and-pencil

- questionnaire administered to participants will allow researchers to understand participants' initial efficacy toward using the PDM and practicing safer behaviors, participants' self-regulation toward wanting to adopt safer behaviors, and participants' perceived susceptibility and severity toward CWP. Establishing a baseline of respondents' knowledge, attitude and behaviors in these areas is necessary to understand the effectiveness of the intervention over the six-week period.
- o Weeks 2-5 Participant Worksheets (Part A; Attachments C4-C5) – is a written paper-and-pencil worksheet provided to respondents on a weekly basis and provides a quantitative and objective way to collect information. Questions are both close- and open-ended. Topics covered on the worksheets include: behaviors performed to reduce sources of dust exposure, ease of using and responding to information on PDMs, and likelihood of continuing to make behavior modifications to reduce exposure to dust. Close-ended questions require respondents to describe their opinions using a Likert-type scale. Open-ended questions require respondents to describe goals they have for the subsequent week to reduce their sources of exposure to respirable dust and what changes they can make in their work practices to reduce other miners' exposure to respirable dust. This tool is especially effective in probing dialogue during the weekly meetings among the respondents as well.
 - o Week 6 PDM Post-survey (Part A; Attachment C6) –is identical to the pre-test and used as a method to assess a change in respondents' knowledge, attitude and behaviors to understand the effectiveness of the intervention over the eight-week period. The questions on the pre-test and post-test have been adapted from reliable survey scales with a Cronbach's alpha of at least .70, to ensure reliable and valid statistical analysis.
 - o Interview Guide for Miners' Utilization of PDM Feedback (Part A; Attachment C2) – consists of questions guided by the stages of the PDM conceptual model [Peters et al. 2008]. These questions help document more in-depth examples of how respondents use PDM information to make behavioral changes and reduce their exposure to respirable dust, barriers to any of these behavioral changes, and what may empower them to sustain behavior change or modify current behaviors over time. These interviews will allow us to further probe components of the theories that were used to develop the intervention and in response, make potential changes to the intervention in the future. Finally, since the interviews include participants from both the experimental and control groups they provide us an opportunity to see how miners behaved in absence of the intervention. Interviews will generally last about one hour and will be in a face-to-face, one-on-one or two-on-one setting where the interviewer(s) poses a series of questions/topics to the interviewee and records information provided. A set of pre-scripted questions serves as the basis for the interview with interviewer discretion in terms of follow-up and additional questions.

Upon returning to the office, members of the research team will enter the information from the survey into a password protected computer database using the Statistical Package for the Social Sciences (SPSS), a word processor program, and a database

spreadsheet. Any completed interview guides or individual data forms will then be destroyed.

3. Methods to Maximize Response Rates and Deal with Nonresponse

It is anticipated that at least 95% of individuals selected to participate in the evaluations will participate. The instruments will be administered in group sessions, which should help to ensure a higher response rate. Due to normal absences from work, a few miners may be unavailable on the particular days that the data collection activities are conducted.

4. Tests of Procedures or Methods to be Undertaken

The survey items were created based on a thorough literature review of health behavior theories, PDM-related literature, and past practice utilized by NIOSH researchers when developing mine health and safety research protocols. To make the items relevant in the mining context, information was gained by reviewing previous NIOSH research and interviews with underground coal miners who wore prototype PDM units and provided feedback about their experiences.

5. Individuals Consulted on Statistical Aspects and Individuals Collecting and/or Analyzing Data

The persons who will collect and/or analyze the data are listed below.

Project Staff:

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