

Icons Help Determine More Accurate Worker History

New interview methods may pave the way for better chronic exposure assessments

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Assessing lifetime exposure of farm laborers to pesticides is a difficult and complex proposition. Unknown variables exist in almost every part of the equation. One important aspect of chronic (long-term) exposure is work history, but compiling an accurate picture of a transient worker's employment history is difficult. A refinement in interviewing techniques—tying employment history with life events by use of pictures on a calendar—may help, according to a recent study by the Pacific Northwest Agricultural Safety and Health Center (PNASH).

Assessing Pesticide Exposure

Pesticide exposure is a function of:

A environmental concentration (what agents are present, and in what quantity?)

and

B subject activity (what was the subject doing while in the exposure environment, and what was the duration of the activity?)

By tracking a subject's career history, researchers can discern the subject's activities in relation to agrichemicals, as well as the duration of the subject's exposure—part B of the exposure equation. Daily average and lifetime exposures can then be extrapolated and compared to "No Observable Effect Levels" (NOELs) and Environmental Protection Agency (EPA) reference doses (RfDs).

Determining Work History

Personnel and employment records are common means of determining worker histories, but such documents may not exist for transient workers such as farm laborers. When this is the case, the only alternative may be work histories related by the workers themselves. But workers may have several employers and perform a wide variety of tasks during a work year, which can lead to confusion and inaccurate reporting. The potential for inaccuracy increases when workers are asked to recall employment over an

extended period of time, or when the interviewer and interviewee have different native languages, or when the worker is illiterate or semi-literate.

Icons and Calendars as Memory Aids

To help in solving the problems inherent in reporting employment histories, PNASH researchers investigated the use of memory aids. A calendar was used to provide a visual format spanning the years of the subject's employment history. An interview began with the subject providing the month and year of important life events: births, deaths, marriages, geographic relocations, injuries, illnesses, etc. The interviewer placed an icon such as a small toy or self-sticking picture on each important date. The life events, thus visually represented, would now serve as chronological anchors around which subjects can more easily recall their work history.

Next, the subject was asked a series of detailed questions concerning his or her entire work history, starting with the present and moving backward. The interviewer recorded information on the calendar by drawing a line between the starting and ending dates of each job, using different colors and visual icons for different job types. The interviewer aided the subject's recall by referring to the life event icons already placed on the calendar.

Results and Observations

The PNASH study compared work histories collected using icon-calendar memory aids with those collected via a traditional questionnaire for a group of farm workers and a group of non-farm workers. Analysis of the data collected shows the icon-calendar interview system performed much better than the traditional questionnaire in terms of number of jobs reported in a subject's job history. Median total job count reported

The icon-calendar system provided a far more detailed and complete picture of work history...

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...Icons and Worker History, cont.

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by subjects was 23 using the icon-calendar questionnaire, compared to 9 with the traditional questionnaire. The amount of time accounted for was also much greater with the icon-calendar questionnaire than with the traditional method. This was true for both duration of work history and for the percentage of time explained by employment. The researchers found the percentage of missing time on the icon-calendar questionnaire was very low, never going above 2.4%, while the percentage of missing time on the traditional questionnaire was quite high, ranging from 22.1% to 100% in the most recent and most distant time periods, respectively. Jobs reported via the icon-calendar questionnaire were also more likely to have sufficient starting and ending date information than were those in the traditional questionnaire.

Similar patterns were found when analyses were restricted to agricultural job counts and durations, and when analyses were stratified by gender.

The objective of the study was to compare the occupational histories collected using the two methods: icon-calendar interview system vs. traditional questionnaire. The study did not attempt to measure the validity or reliability of the data, just the quantity of information and completeness of work history.


The icon-calendar questionnaire provided a far more detailed and complete picture of a subject's occupational history. It provided greater detail in both numbers of jobs and time spent on individual jobs. This difference was more pronounced the further back in a subject's employment history the interviewer went.

On another note, the interviewers found the subjects interviewed using the icon-calendar questionnaire to be much more patient and cooperative. Farm workers interviewed using the traditional method appeared to

have a great deal of difficulty recalling details, tending to become frustrated and impatient. This was not the case where the icon-calendar questionnaire was

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used. In fact, the researchers reported study subjects "seemed to be intrigued by seeing their lives literally drawn in front of them."

"It is likely that a cooperative and engaged subject will provide better information than one who is irritated and confused," researchers added. Indeed, the subjects were often concerned about the accuracy of the completed calendar, reviewing and correcting details. "They often asked for a copy of the completed work-life calendar to take with them. Based on this behavior, we submit that the easily interpretable graphical portrayal of their personal and work lives elicited a commitment to accuracy and completeness on the part of the subject." 

The Pacific Northwest Agricultural Safety and Health Center, funded by NIOSH, is one of eight such centers in the United States. The Center's mandate is to study occupational health and safety issues in farming, forestry and fishing in the four Region X states of Idaho, Washington, Oregon and Alaska. Dr. Richard Fenske is the Center Director, Dr. Matthew Keifer is Co-Director.

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