

EVALUATION AND SOLUTION OF WORKERS' HEALTH PROBLEMS: CRITICAL ANALYSIS IN PRACTICE

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BACKGROUND AND OBJECTIVES

In 2000, the CDC/NIOSH consultant at the Pan American Health Organization office in Mexico presented a course on the conduct of workplace evaluations to two different audiences: physicians in their second year of an occupational medicine residency program and newly hired workplace inspectors with varying years of experience in diverse specialties (e.g., chemical engineering, medicine, nursing, social work, economics, and law). The requesters of both courses specifically asked that the course cover the methods of NIOSH health hazard evaluations.¹ The objective—to put theoretical knowledge into practice for the evaluation and solution of workers' health problems. To meet Mexican collaborators' priorities, the course focused on high-risk industries and emphasized interventions as well as evaluations. This presentation describes the course design and content. A separate presentation describes the approaches and solutions developed to overcome learning obstacles encountered during the presentation of the course.²

COURSE DESIGN AND CONTENT

Despite substantial differences between the two audiences, both courses had similar objectives, concurrent and similar schedules (2 days a week for 3 to 4 months), weekly opportunities to visit worksites, and somewhat limited access to information sources. Thus, the consultant, in collaboration with course administrators and instructors, developed a course that could serve both audiences. The course design included (1) modules that focused on a different industry each week to introduce participants to a variety of workplaces (Table 1), (2) conceptual tools and multifactoral models for developing frameworks to evaluate and solve problems, (3) stepwise introduction of concepts and processes to demonstrate the multiple and integrated facets of occupational health, (4) a workshop format to give participants an opportunity to put knowledge into practice, (5) participatory, self-teaching, and experiential learning methods, which were necessary because of limited teaching resources but also useful for developing practical skills, (6) team presentations to develop communication as well as team-building skills, (7) games, role playing, and multidisciplinary models to demonstrate alternative perspectives and promote critical thinking, (8) interrogatories to develop critical and analytic thinking, and (9) tutorials to guide post-course field work.

The consultant and instructors met with participants three times a week. A week before each worksite visit, the consultant or instructors tutored a team of participants on where to find and how to present information about the worksite's industry, processes, potential hazardous exposures, potential health

effects, and possible preventive measures. Before each worksite visit, the team of participants responsible for the module creatively presented background information to other participants in a classroom setting. At the worksite, management presented an overview of work processes, equipment, materials, occupational hazards, and protective measures. During the walk-through survey of work areas, participants were encouraged to ask questions of workers as well as of managers and supervisors. After each visit, participants reconvened in a classroom to present and debate their findings, interpretations, and recommendations. Throughout these activities, the consultant and instructors challenged participants to account for multidisciplinary perspectives and critically analyze each step of the evaluation and problem-solving process. Participants had to clarify reasons for evaluating the worksite; identify and prioritize problems; develop multifactoral cause-and-effect models for evaluating and solving problems (Figures 1 and 2); critically analyze and justify alternative strategies and methods (Table 2); clarify interpretations of results, justify recommendations; and effectively communicate results and recommendations.

RESULTS

The two courses trained 10 resident physicians, 2 residency program faculty members, 31 workplace inspectors, and 4 social service personnel who focused on women's issues. Four instructors gained experience in the development and presentation of a course as well as knowledge of the course content.

Unfortunately, the workplace inspectors did not have an opportunity to perform post-course field work with the consultant, external events interrupted evaluation of the resident physicians, and time constraints did not permit a formal post-course evaluation. However, the participatory nature of the course allowed formative evaluation. The following indicators show that the course was useful and successful in meeting its objectives. Specialists in disciplines unrelated to occupational health grasped occupational health concepts and principles through multidisciplinary teamwork and demonstrated their progress by their performance in classroom presentations and discussions. A medical director joined course participants in a post-survey discussion of his worksite. He stated that he planned to include some of the course methods, particularly the multifactoral cause-and-effect model, in his evaluations.

At the end of the course, one participant stated that the course provided "a framework that helps us identify all or almost all of the factors that produce adverse effects on workers' health; allows us to develop hypotheses to explain problems; permits us to give opinions based on facts; helps us identify solutions; and allows us to transcend from the complexity of problems to clarity." His colleagues, including those who had initially questioned the necessity of the course, also had positive comments. Resident physicians' performance during post-course field work indicated that they had broadened their perspective from a narrower medical model to the multidisciplinary concepts of occupational health. A medical director at a plant involved in post-course field work asked his team of two resident physicians to repeat the presentation of their evaluation and recommendations at a departmental staff meeting. After the presentation, he instructed his professional staff to incorporate the processes demonstrated by the

resident physicians. The requester of the course for resident physicians had been responsible for first year of their training. He was not involved in the implementation of the course and, thus, had not seen the participants since the onset of the course. He noted significant changes among course participants and deemed the course a success.

CONCLUDING COMMENTS

A practical and comprehensive multidisciplinary framework for evaluating and solving workers' health problems emerged as the course evolved to address differences in perspectives and underlying assumptions (e.g, multidisciplinary as well as transnational) and differences among multiple industries and workplaces. Thus, this course, which had not been designed to test educational theories, evolved along current trends in problem-based education³ and contextual learning.⁴

Further development, testing, and evaluation of the course are warranted.

REFERENCES

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TABLES AND FIGURES

Table 1. Examples of workplaces visited

Occupational Medicine Resident Physicians	Workplace Inspectors	
Underground mine Petroleum refinery Maritime terminal Railroad maintenance shop Manufacturing plants Printer Hospital	Construction site Clothing manufacturer Furniture manufacturer Metalworking shop	Tortilla shop Bakery Restaurant Hotel Dry cleaners

Table 2. Examples of interrogatories to justify evaluation methods

- When knowledge about the causes of problems and preventive measures are well known, what additional information is necessary to make conclusions and recommendations?
- How will evaluation activities contribute to the solution of the problem?
- What additional costs (e.g., in terms of health lost) would a delay in corrective and preventive measures cause?
- What is the availability and feasibility of the proposed methods?

Figure 1. Multifactorial cause-and-effect model

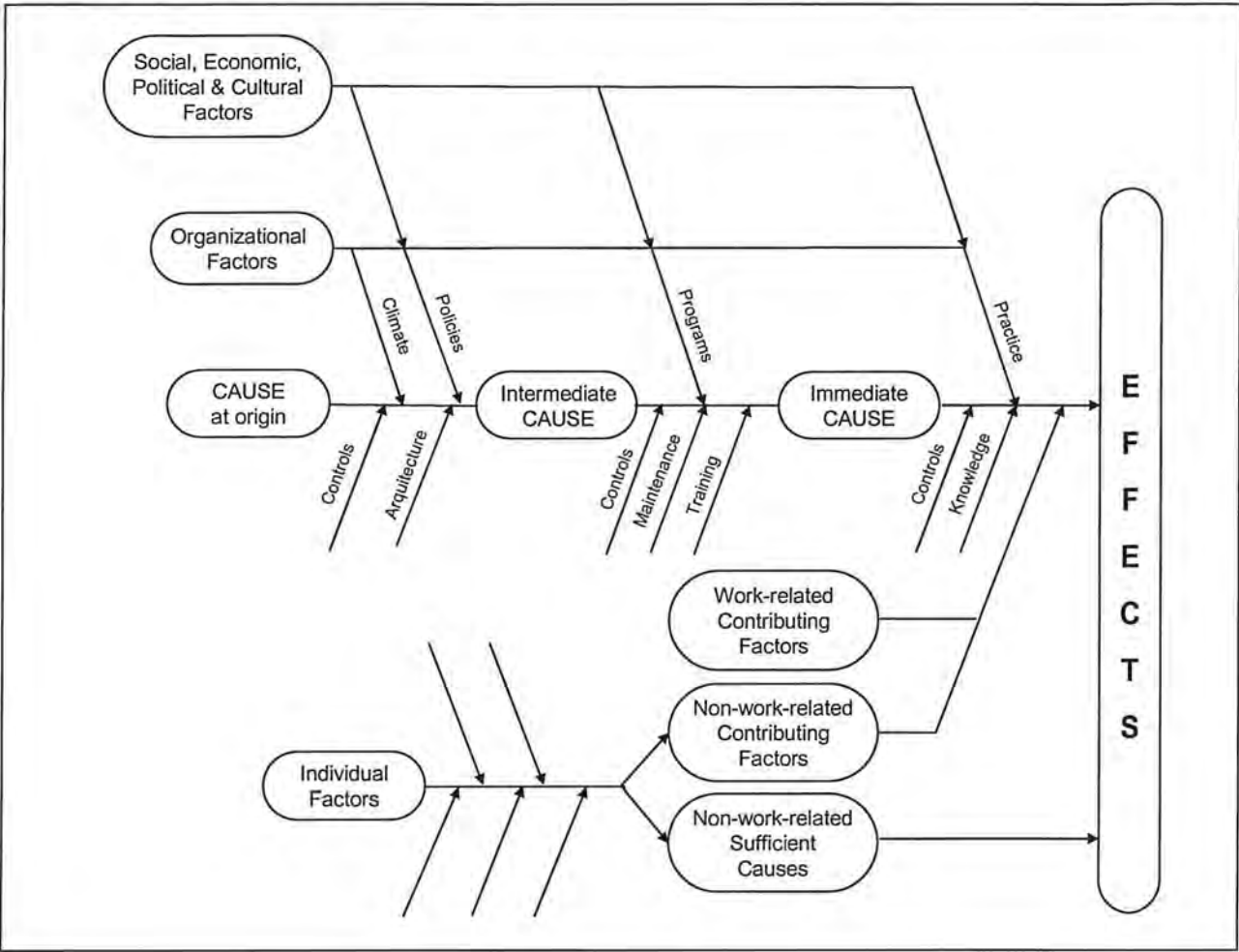
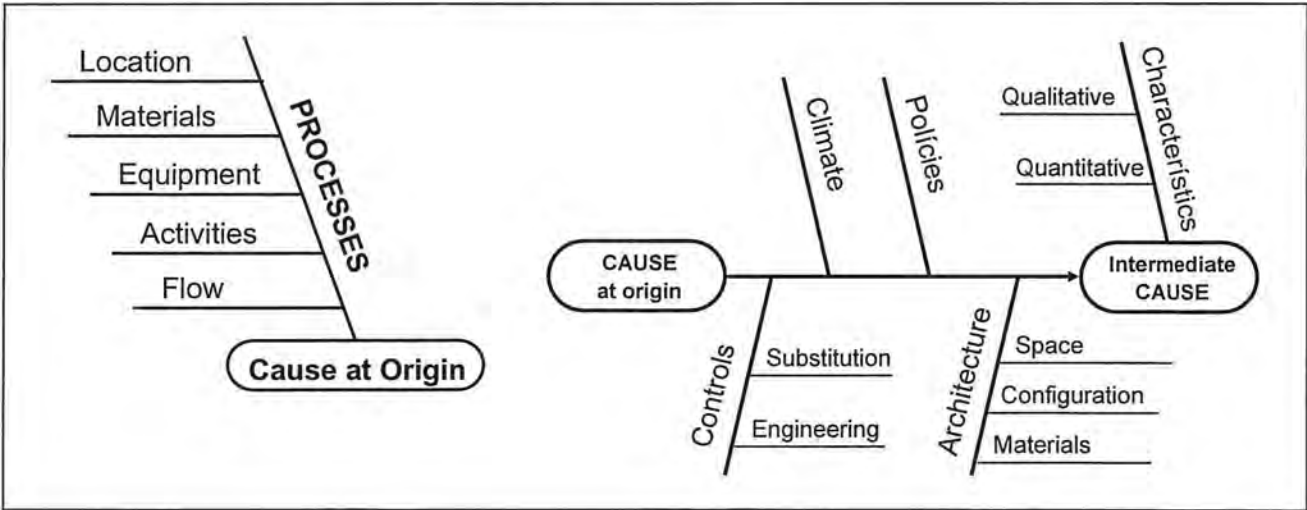


Figure 2. Details of the multifactorial cause-and-effect model



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BACKGROUND AND OBJECTIVES: In 2000, the Centers for Disease Control and Prevention's National Institute for Occupational Safety and Health consultant at the Pan American Health Organization office in Mexico presented a course on the conduct of workplace evaluations to two audiences: (1) young physicians in an occupational medicine training program and (2) newly hired workplace inspectors with varying years of experience in diverse specialties. This presentation describes course methods and content, which were successful (1) in overcoming training obstacles that arose throughout the course and (2) in meeting course objectives for promoting the practical application of knowledge for workers' health.

APPROACH: To meet Mexican collaborators' training objectives, the course focused on high-risk industries and interventions as well as evaluations. The course format included didactic teaching, worksite visits, and workshops. Participatory and interactive methods stressed self-teaching and experiential learning. Before worksite visits, participants presented background information; after the visits, they presented and debated findings, interpretations, and recommendations. Course content stressed a multidisciplinary approach. Participants had to clarify reasons for evaluations, identify and prioritize problems, develop multifactoral cause-and-effect models for evaluating and solving problems, critically analyze alternative strategies, and effectively communicate results and recommendations. Course methods and content evolved to address differences in perspectives and underlying assumptions that were related to culture, language, and specialty.

RESULTS: A practical and comprehensive multidisciplinary framework for evaluating and solving workers' health problems emerged as the course evolved to address differences in perspectives and assumptions. Participants demonstrated new understanding as they created and analyzed multidimensional, multidisciplinary models, and recommended alternative strategies for evaluating and solving workers' health problems.

CONCLUSIONS: The methods and content of this prototype course successfully overcame transnational and multidisciplinary obstacles. Further development, testing, and evaluation of the course are warranted.

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