

IMPLEMENTATION PLAN

# National Strategies for Health Care Providers: Pesticides Initiative

MARCH 2002



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# Executive Summary

**P**esticides are ubiquitous in our society in both agricultural and urban environments. We use pesticides in our homes, schools, in our workplaces, and in our communities. Due to the widespread dissemination of pesticides, and the potential for related illness and injury (especially among farmworkers and pesticide handlers), health care providers should be prepared to recognize, manage and prevent pesticide-related health conditions in their patients and communities. Communities expect that their primary care providers will be prepared to deal with pesticide-related health conditions, as well as other environmental-related illnesses, but often times they are not.

This report, an Implementation Plan for the *National Strategies for Health Care Providers: Pesticides Initiative*, sets out a strategic direction for the nation to improve the recognition, management, and prevention of pesticide-related health conditions. It will lead to health improvements in both agricultural and urban sectors. The Implementation Plan's vision is for all primary care providers on the front lines of our health care system to:

- Possess a basic understanding of the health effects associated with pesticide exposures as well as broader environmental exposures; and
- Take action to ameliorate such effects through clinical and prevention activities.

The Implementation Plan sets forth a three-pronged approach to move toward the vision, and includes both short and long-term components. The Implementation Plan will be used to build national consensus on this issue and to gain funding and resource support to implement and evaluate the entire initiative.

This Initiative — the *National Strategies for Health Care Providers: Pesticides Initiative* — began in 1998 and is a partnership between the US Environmental Protection Agency (EPA) and The National Environmental Education & Training Foundation (NEETF), in collaboration with the US Department of Health and Human Services (DHHS), the US Department of Agriculture (USDA), and the US Department of Labor (DOL). From the outset, this national interagency initiative has been conceived of as a long-term effort. Sustained funding will be needed to ensure the success of the Implementation Plan, and multi-stakeholder involvement is necessary from federal agencies, academic institutions, professional organizations, foundations, farmworker and farm groups, industry and trade associations.

## **Pesticides Education: A Model for Environmental Health Issues**

This Implementation Plan focuses on pesticides as an important model which can easily be expanded to incorporate other toxic agents and other related initiatives in the field of environmental health. To avoid duplication of effort, this Implementation Plan will be integrated into the broader context of other national efforts to educate health care providers about occupational and environmental health, including children's health protection, drinking water, nursing and environmental health, Healthy People 2010, and NEETF's Health & the Environment Programs. This Implementation Plan reflects the landmark reports from the Institute of Medicine, National Academy of Sciences (1988, 1995) that set broad recommendations on environmental health in medicine and nursing, as well as the extensive efforts by key stakeholders across the country to address this issue. It is hoped that this Implementation Plan will pave the way for the strategic next steps needed to move forward a common national vision for environmental health awareness, education and training to health care providers.

## **The Initiative's Driving Forces**

This Initiative received its impetus from a number of sources.

### ***The Worker Protection Standard***

A primary contributor is EPA's Worker Protection Standard, designed to reduce pesticide exposure to agricultural workers, mitigate exposures that occur, and inform agricultural employees of the hazards of pesticides. The regulation, implemented in 1995, mandates that millions of farmers, pesticide applicators, and farmworkers be educated. This in turn was expected to create additional demand for services from health care providers.

After the first year of full implementation of the Worker Protection Standard, EPA held nine public meetings to evaluate the progress of implementation and hear the experience of the people most affected by the regulation. One clear message from the public meetings was the need to improve the recognition, diagnosis, and management of adverse health effects from pesticide exposures by all primary health care providers.

Although the primary populations affected by pesticides are the 3 to 4.5 million farmworkers in America and the million or more pesticide applicators, pesticides are widely used in the urban sector, and rural populations not directly involved in farming also may be at risk for exposure to pesticides. Urban and suburban exposures to insecticides, fungicides, rodenticides and other pesticides in the home and workplace are affecting the population at large. Health care providers in urban settings are even less likely to "think pesticides" in taking patient histories or diagnosing illnesses.







**Table 1: Components of the Implementation Plan**

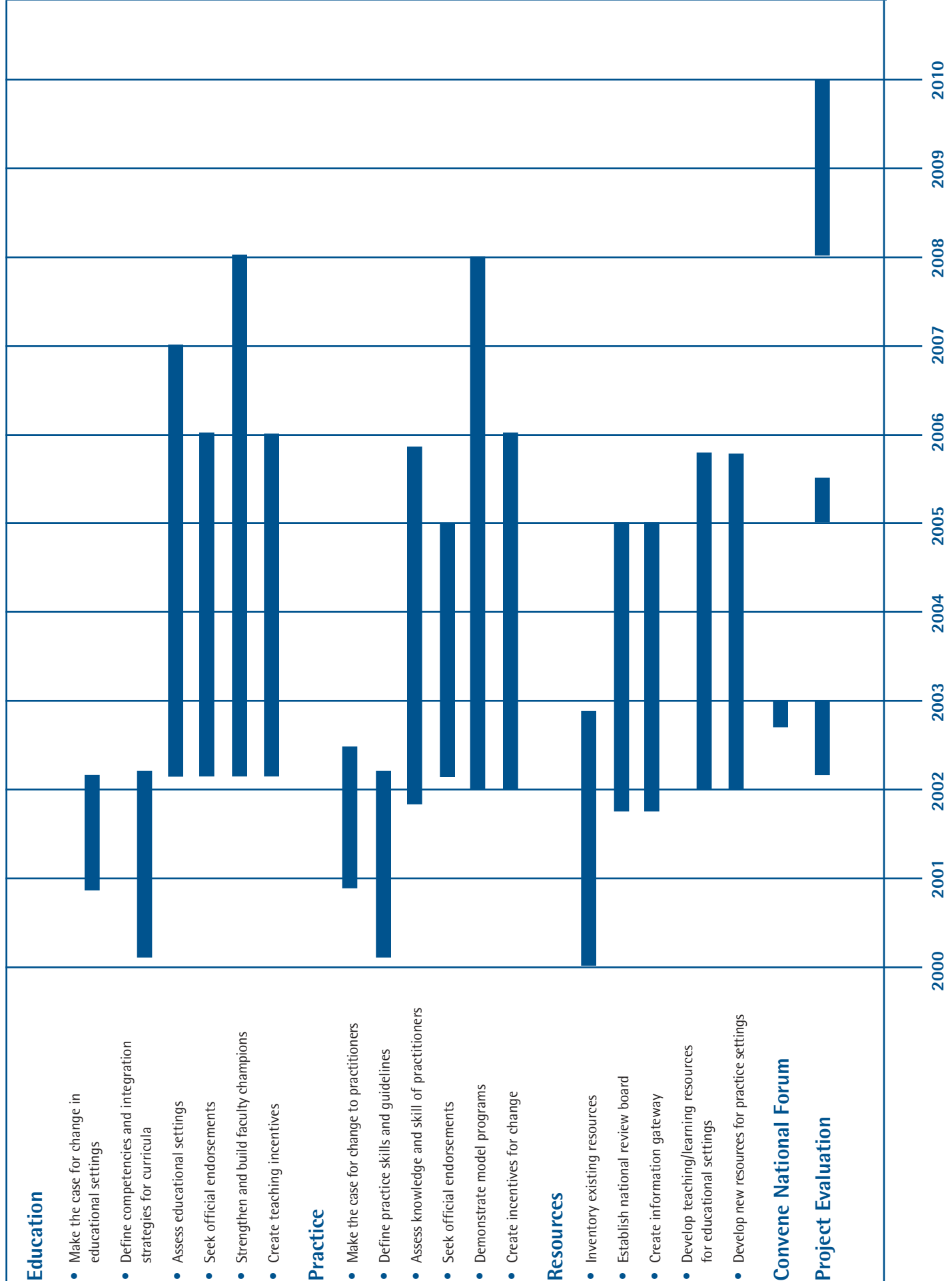
Educational Settings	Practice Settings	Resources and Tools
<p><b>Component A: Make the case for change in educational settings</b> — Develop an effective case statement to convince decision makers about the need for environmental health and pesticide education in medical and nursing educational institutions.</p> <p><b>*Component B: Define competencies and integration strategies for curricula</b> — Produce National Guidelines that recommend competencies specific to the recognition, management and prevention of pesticide exposures, for all basic and advanced training in medicine and nursing; define accompanying content areas; suggest methods of integration into curricula; and provide access to relevant resource materials.</p> <p><b>*Component C: Assess educational settings</b> — Conduct an assessment of the target audience of educational institutions to determine (a) amount of existing coursework, (b) faculty members' current knowledge and comfort level with teaching pesticide-related topics, and (c) how faculty and educational institutions will best respond to educational programs and information resources. This assessment will be comprised of a literature review and a range of needs assessment analyses.</p> <p><b>Component D: Secure official endorsements</b> — Ensure the integration of the core competencies outlined in the National Guidelines into educational institutions by securing the official endorsements of key professional organizations and decision-making bodies.</p> <p><b>Component E: Strengthen and build faculty champions</b> — Create and support faculty champions within medical and nursing schools to teach environmental health and pesticide education in the curriculum, and to bring about change within their institutions.</p> <p><b>Component F: Create teaching incentives</b> — Influence the appropriate boards, organizations, and institutions that create board exams to include several key competencies on pesticides and environmental health.</p>	<p><b>Component A: Make the case for practitioners</b> — Develop an effective case statement to convince primary care providers about the need to incorporate environmental health and pesticide awareness into their practice settings.</p> <p><b>*Component B: Define practice skills and guidelines</b> — Produce National Guidelines that recommend practice skills and guidelines for the recognition, management, and prevention of pesticide exposures for all practicing health care providers; define accompanying content related to expected behavior; suggest methods of integration into practice and training settings; and provide access to relevant resource materials.</p> <p><b>*Component C: Assess knowledge and skills of practitioners</b> — Conduct an assessment of the target audience of primary care providers to determine: (a) providers' current knowledge; and (b) how providers will best respond to educational programs and information resources. This assessment will be comprised of a literature review and a range of needs assessment analyses.</p> <p><b>Component D: Secure official endorsements</b> — Ensure the integration of the expected practice skills into practice settings by securing the official endorsements of key professional organizations and decision making bodies.</p> <p><b>Component E: Demonstrate model programs</b> — Mobilize practice settings to become population-specific and to incorporate environmental considerations (specifically pesticides) into prevention, education, diagnosis, and treatment. Achieve incremental, site-specific improvements in identification, early intervention, and prevention, as well as in measures of practice-specific health outcomes. By 2010, half of all primary health care practice settings in the United States should incorporate environmental considerations in prevention, education, management, and referral.</p> <p><b>Component F: Create incentives for change</b> — Identify and promote a number of incentives to incorporate appropriate prevention, recognition, and management of pesticide-related health conditions into health care practices.</p>	<p><b>Component A: Inventory existing resources</b> — Determine what educational and information programs and materials for health care providers exist in educational and practice settings and what gaps should be filled.</p> <p><b>*Component B: Establish a national review board</b> — Create a national body to determine assessment criteria and to evaluate existing resources, with the goal of identifying, selecting, and assessing the ideal resources that primary health care providers use in both educational and practice settings for prevention, diagnosis, treatment, and referral of pesticide-related health conditions.</p> <p><b>*Component C: Create an information gateway</b> — Establish a print, telephone, and web-based gateway through which primary health care providers can access information and educational resources.</p> <p><b>Component D: Develop teaching/learning resources for educational settings</b> — Identify and develop new content resources, tools, and methods for faculty in educational settings.</p> <p><b>Component E: Develop new resources for practice settings</b> — Identify and develop new content resources, tools, and methods for health care providers in practice settings.</p>

\* Priority Project





**Figure 2: Timeline for Implementation Plan Activities (dependent upon funding)**



























also play close to the ground and they put objects in their mouths. They may be more susceptible to toxins because their neurological, immunological, digestive, and other bodily systems are still developing, and they may be less able than adults to metabolize and excrete the pollutants (Landrigan, 1997).

In the agricultural setting, children may be exposed to pesticides in a number of ways; through prenatal exposure, from being in the fields where their parents work, contact with pesticide residues on parents' clothing, living in migrant camps next to camps being treated and working in the fields themselves (US Congress, Office of Technology Assessment, 1990). A report by the General Accounting Office (GAO, 2000) found that improvements were needed to ensure the safety of farmworkers' children.

In addition to the agricultural settings, children may be exposed to pesticides in urban and suburban settings, e.g. in their houses, yards, day care settings and schools. In 1996, Poison Control Centers were notified about approximately 80,000 children (age 0-19) being exposed to common household pesticides in the United States. It is estimated that one quarter of those children developed symptoms of pesticide poisoning. In a study of unintentional exposures to pesticides (excluding disinfectants), EPA found that 78,500 such exposures were reported annually to Poison Control Centers in 1985-92, with 92 percent of them occurring at residences (AAPCC, 1994). Children ages five and younger accounted for 63 percent of the

**Table 4: Pesticides Most Often Implicated in Symptomatic Illnesses, 1998\***

Rank	Pesticide or Pesticide Class	Child < 6 years	Adults and 6-19 yrs.	Total*
1	Pyrethrins/pyrethroids	947	3369	4333
2	Organophosphate insecticides	429	2865	3307
3	Hypochlorite disinfectants	963	1425	2394
4	Other insecticides	601	1551	2167
5	Herbicides	314	1748	2078
6	Pine oil disinfectants	1182	844	2029
7	Insect repellents	959	748	1712
8	Phenol disinfectants	591	391	987
9	Carbamate insecticides	165	762	932
10	Other disinfectants	323	460	785
	All other pesticides	456	1237	1750
	<b>TOTAL</b>	<b>6930</b>	<b>15,400</b>	<b>22,474</b>

\* Includes only unintentional illnesses. Intentional (e.g., suicide attempts) cases excluded.

\*\* Column totals include 144 cases of unknown age.

Note: Poison Control Center Specialists categorized 86 percent of these cases as minor medical outcome, and 31 percent of the total were seen in a health care facility.

Source: American Association of Poison Control Centers, Toxic Exposure Surveillance System, 1998 data.















































**Table 7: Proposed Competencies for Educational Institutions**

<p><b>Competency I:</b> Basic Knowledge and Concepts of Pesticides</p>	<p><b>Basic:</b> 4-year medical school, undergraduate nursing, undergraduate allied health professional education</p>	<p><b>Advanced:</b> Medical residents, advanced practice nursing students, physician assistant students, other advanced degree programs (Faculty in primary care would need to be at this level to teach)</p>	<p><b>Specialty:</b> Fellows and advanced students specializing in occupational and environmental health/medicine/nursing</p>
<p>1. Principles of Environmental and Occupational Health</p>	<p>1a. Understand principles of environmental and occupational health</p> <p>1b. Understand broad spectrum of chemicals classified as pesticides and areas of use (should be aware of various types of pesticides)</p> <p>1c. Understand mechanisms and pathways of exposure</p>	<p>1a. Strengthen skills from basic competencies</p> <p>1b. Understand temporal relationship between exposure and symptoms (Medicine)</p> <p>1c. Understand advanced toxicology, specifically related to organophosphates, carbamates, and pyrethroids (most commonly reported pesticides implicated in symptomatic illness)</p>	<p>1a. Apply validated epidemiologic and biostatistical principles and techniques to analyze injury/illness data in defined populations</p> <p>1b. Understand temporal relationship between exposure and symptoms (Nursing)</p> <p>1c. Understand and apply advanced courses in toxicology</p>
<p>2. Individual and Patient Knowledge and Skills</p>	<p>2a. Be aware of the environment in which the patient (and family) lives, works, and plays (understanding of the hazards and potential exposures in different settings)</p> <p>2b. Identify risk factors for pesticide exposure (e.g., occupation, location of home, vulnerable populations)</p> <p>2c. Recognize other family members may also be ill (possibly due to exposure in the home, or “paraoccupational exposures”, e.g., contaminated work overalls brought home)</p> <p>2d. Recognize socio-economic impacts on the patient of pesticide-related illness</p> <p>2e. Understand potential moral, ethical and legal implications for patients of reporting and referral</p>	<p>2a. Strengthen skills from basic competencies</p> <p>2b. Understand at a basic level the health effects of organophosphates and carbamates</p> <p>2c. Identify risks to patients served (i.e., special vulnerabilities of children, the elderly)</p>	<p>2a. Apply individual patient interventions to prevent or mitigate exposure and/or resultant health effects</p>
<p>3. Population-Based Health Knowledge and Skills</p>	<p>3a. Understand population-based health, including epidemiology</p> <p>3b. Recognize socio-economic impacts of pesticide-related illness</p> <p>3c. Understand potential moral, ethical and legal implications for the community of reporting and referral</p> <p>3d. Possess a basic awareness of the role of prevention, general awareness of benefits of alternatives to conventional pest control</p>	<p>3a. Strengthen skills from basic competencies</p> <p>3b. Develop more in-depth knowledge of the environment in which they are learning and practicing</p> <p>3c. Develop specific understanding of communities and populations at risk for pesticide exposure</p> <p>3d. Understand advanced epidemiology, specifically related to pesticide-related poisonings</p>	<p>3a. Develop, implement, evaluate and refine screening programs for groups to identify risks for disease or injury and opportunities to promote wellness</p> <p>3b. Apply community-based interventions to prevent or mitigate exposure and/or resultant health effects</p>

**Table 7 (continued)**

<p>4. Information and Resources</p>	<p>4a. Identify and access information on pesticides</p> <p>4b. Be aware of importance of information on pesticide labels</p> <p>4c. Be able to locate resources including web-based information, print materials, Material Safety Data Sheets (MSDS), and poison control centers</p>	<p>4a. Strengthen skills from basic competencies</p> <p>4b. Demonstrate ability to locate leading information resources and experts for health care providers</p>	<p>4a. Use appropriate written and computerized databases (e.g. MSDS, Registry of Toxic Effects of Chemical Substances [RTECS]) to identify hazardous ingredients of chemical agents</p>
<p><b>Competency II: Diagnosis and Assessment</b></p> <p>1. History Taking Differential Diagnosis</p>	<p><b>Basic</b></p> <p>1a. Be able to take occupational and environmental history</p> <p>1b. Be aware that signs and symptoms of pesticide exposure may be non-specific (there is nothing pathognomonic about most pesticide symptoms)</p> <p>1c. Be able to consider pesticides in differential diagnosis (pesticide exposures may result in health effects common to similar diseases)</p> <p>1c. Recognize signs and symptoms of pesticide overexposure, with priority given to widely-used pesticides with identifiable symptoms, such as cholinesterase-inhibitors and pyrethroids</p> <p>1d. Perform a complete and focused physical examination as indicated (ACOEM)</p>	<p><b>Advanced</b></p> <p>1a. Strengthen skills from basic competencies</p> <p>1b. Ask patients 2-3 screening questions (students need to know how to take a full occupational and environmental history before they are able to ask screening questions)</p> <p>1c. Identify signs and symptoms of overexposure to a wider range of pesticides</p> <p>1d. Be able to diagnose pesticide-related illnesses related to organophosphates and pyrethroids</p> <p>1e. Properly utilize cholinesterase testing</p>	<p><b>Specialty</b></p> <p>1a. Determine the nature and extent of potential pesticide poisoning or overexposure considering routes of exposure and routes of absorption</p> <p>1b. Detect, in so far as possible, pre-clinical or clinical effects arising from chemical exposure</p> <p>1c. Be able to order/ interpret appropriate diagnostic tests</p> <p>1d. Effectively diagnose pesticide-related illnesses</p> <p>1e. Provide consultation on diagnosis</p> <p>1f. Identify at risk populations, including children</p> <p>1g. Collaborate with other disciplines such as industrial hygiene, sanitarians, Cooperative Extension</p>

**Table 7** (continued)

Competency III: Treatment/Intervention/ Referrals/Follow-up	Basic	Advanced	Specialty
1. Treatment	1a. Effectively treat health conditions related to pesticide exposures (Medicine)	1a. Strengthen skills from basic competencies 1b. Effectively treat health conditions (Nursing)	1a. Be able to effectively treat specific pesticide-related health conditions
2. Intervention	2a. Advise patients on how to decontaminate patient and environment following exposure	2a. Strengthen skills from basic competencies 2b. Provide specific guidance on how to decontaminate patient and environment following overexposure	2a. Identify and prescribe appropriate preventive action, for example alternatives to pesticides, substitution of harmful with less harmful products, or use of better system design, personal protective equipment and engineering controls for specific pesticides 2b. Develop and manage a comprehensive occupational health program
3. Referrals	3a. Refer to appropriate specialist (i.e., occupational medicine/nursing, industrial hygienist, environmental health specialist, Cooperative Extension) (Medicine)	3a. Strengthen skills from basic competencies 3b. Make appropriate referrals for medical diagnosis (Nursing)	3a. Provide consultation on treatment, intervention, and referrals
4. Follow-up	4a. Arrange appropriate follow-up (Medicine)	4a. Strengthen skills from basic competencies 4b. Arrange appropriate follow-up (Nursing)	4a. Provide consultation on follow-up

**Table 7 (continued)**

Competency IV: Risk Communication, Advocacy, & Ethics	Basic	Advanced	Specialty
1. Risk Communication	1a. Provide guidance and education to patients on how to minimize exposures to pesticides, and about the basic routes of exposure and absorption 1b. Advise patients to read pesticide label 1c. Refer patients to appropriate resources	1a. Strengthen skills from basic competencies 1b. Communicate on issues of risks and public health protection to the general public 1c. Publish research and intervention findings in the professional literature	1a. Communicate with media, the public, and policy makers on issues of scientific uncertainty 1b. Provide expert testimony on behalf of patients and communities 1c. Publish research and intervention findings in the professional literature
2. Advocacy		2a. Advocate on behalf of patients	2a. Communicate with media, the public, and policy makers on issues of scientific uncertainty 2b. Provide expert testimony on behalf of patients and communities
3. Ethics (under development)			
Competency V: Reporting	Basic	Advanced	Specialty
Reporting	1a. Understand importance of surveillance and incident reporting 1b. Understand case reporting requirements for pesticide exposures 1c. Report concerns about pesticide exposure situations to appropriate authorities	1a. Strengthen skills from basic competencies	1a. Interact with workers' compensation system efficiently and effectively

**Table 7 (continued)**

Competency VI: Legislative and Regulatory Knowledge	Basic	Advanced	Specialty
Legislative and Regulatory Knowledge	<ul style="list-style-type: none"> <li>1a. Understand that several pieces of federal law require health care providers to address pesticide poisonings</li> <li>1b. Understand that 15 states have mandatory surveillance systems, and that 31 states have some form of reporting requirements</li> </ul>	<ul style="list-style-type: none"> <li>1a. Know the specific components of FIFRA, OSHA, TSCA and WPS that reference health care providers</li> </ul>	<ul style="list-style-type: none"> <li>1a. Influence policy regarding pesticides and public health</li> </ul>







































### **Activity #2**

Produce National Guidelines to guide practitioners on the recognition and management of pesticide-related health conditions. A complementary report focuses on the educational settings where primary care providers receive their training.

The National Guidelines contain the following components:

- Recommended practice skills.
- Relevant content for each practice skill.
- Suggested points of insertion into practice settings.
- Suggested resources to teach content specific to each competency in practice settings.

The report is designed as a user-friendly guide on how to integrate pesticides content into practice skills. It serves as a supplementary practitioner guide to the *Recognition and Management of Pesticide Poisonings*. The report does not contain actual training modules or resources, but instead provides a listing of relevant resources.

### **Activity #3**

Promote the National Guidelines with key stakeholders and solicit official endorsements and organizational support for the report, including dissemination to their members.

## **Stakeholders**

- National professional associations for practicing primary care providers
- Practicing health care providers who have already developed tools and practice models

## **Evaluation of Outcomes/Indicators of Success**

- The National Guidelines will include defined practice behaviors, content areas, insertion points, examples as necessary, and recommended resources.
- Endorsement by key professional organizations for providers.

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## **Table 9**

The preliminary list of “Expected Practice Skills” shown in Table 9 (page 72-73) is recommended as a useful goal for primary care providers seeking to provide the highest quality care to their patients. Further developed practice skills are available in 2002.















































- *To build awareness among health care providers:* Disseminate persuasive case statements (see Education Component A, page 41, Practice Component A, page 67, for development of case statements) through professional associations, journals, and peers that address the main issues, why primary care providers should be concerned, and how to access the gateway.
- *To provide tools/resources to health care providers ready to make changes:* Disseminate curricular packages to educational settings and training packages to practice settings. Packages may be defined as lectures, slides, case studies, exercises, assignment/project ideas, ideas on how to involve experts, access to gateway, etc. Packages would be combined from existing resources and/or new resources that have undergone peer-review and pilot testing.
- *To help health care providers learn of the latest resources:* Disseminate concise information on how to access the gateway, especially the network of expertise. Dissemination methods include posters, flyers at conferences, NPIC clearinghouse, and links on websites.
- Convene one or more focus groups to evaluate the effectiveness of the dissemination efforts.

## Stakeholders

- Federal Interagency Planning Committee
- Organization to manage the gateway

## Evaluation of Outcomes/Indicators of Success

- Number of requests for information.
- Number of pageviews and downloads from the website.
- Number of calls.
- Customer satisfaction feedback on the website.
- Feedback from focus groups.
- Degree to which the dissemination efforts are nationwide.
- Degree to which dissemination efforts and resources address primary health care providers at varying stages of change.

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## Background

A centralized gateway to information can be an efficient way to provide comprehensive access to evaluated, pesticide-related resources. This centralized resource should include



























































































