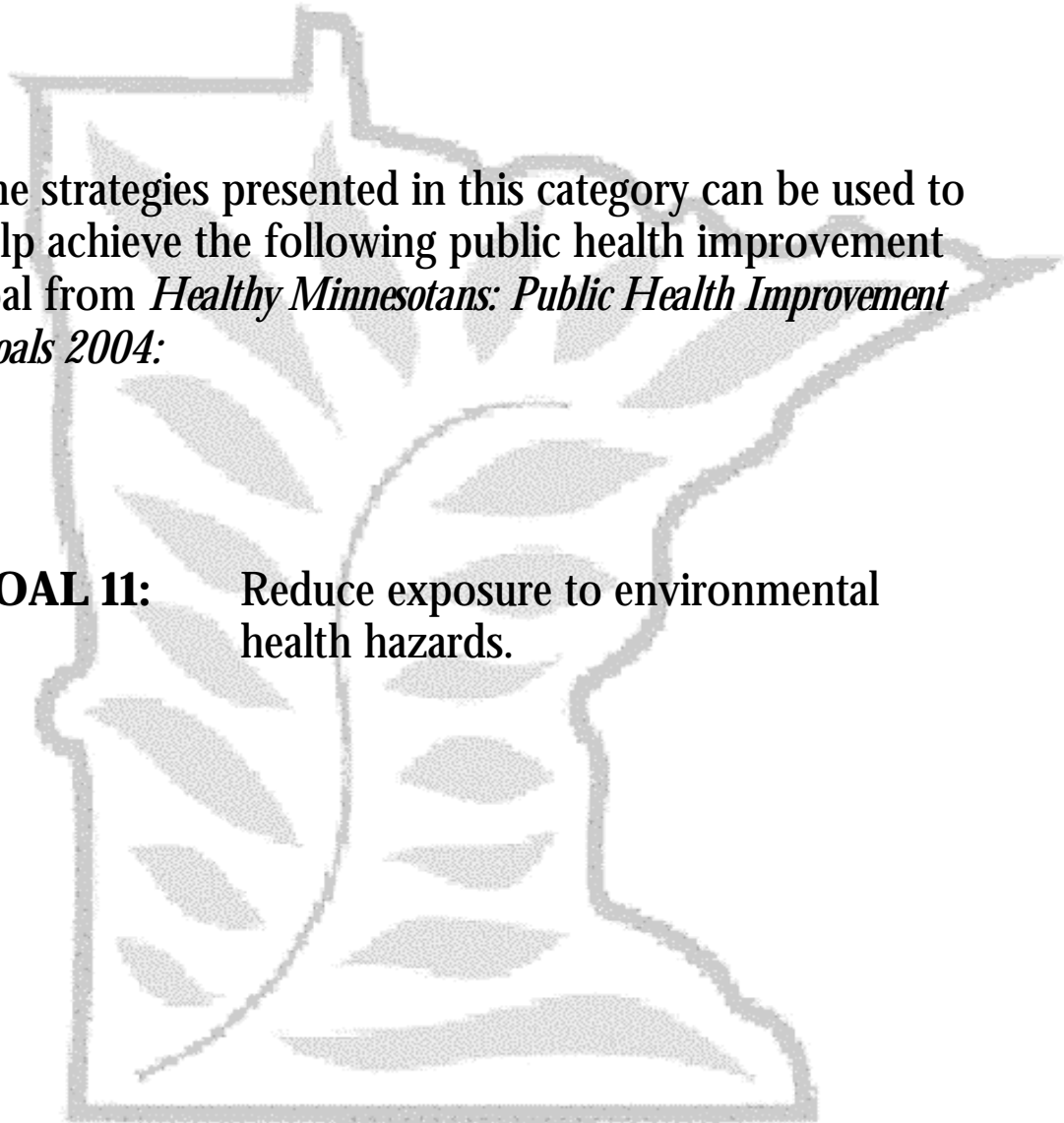


Category:

ENVIRONMENTAL CONDITIONS

The strategies presented in this category can be used to help achieve the following public health improvement goal from *Healthy Minnesotans: Public Health Improvement Goals 2004*:

GOAL 11: Reduce exposure to environmental health hazards.



CATEGORY: ENVIRONMENTAL CONDITIONS

Introduction1

Asbestos3

Childhood Lead Poisoning

This topic is located within the category, *Child and Adolescent Growth and Development*

Clean Indoor Air/Radon/Carbon Monoxide Poisoning9

Fish Consumption

This topic is located within both of the following sections within the category, *Pregnancy and Birth*: “Birth Outcomes and Prenatal Care”, and “Women’s Health”

Food Safety/Protection19

Safe Water33

Environmental health programs work to protect the public's health by assuring that risks from exposure to environmental hazards are minimized and controlled. Environmental health hazards include biologic, physical, chemical, and radiologic agents and substances, both those that are human made and those that are naturally occurring. Exposures to these hazards may occur in the workplace, home, the natural environment, or in a public facility.

Environmental health programs protect Minnesotans from environmental hazards by ensuring that they have clean drinking water, safe food, sanitary lodgings, and protection from hazardous materials and public health nuisances in their environment. These programs also protect Minnesotans from the hazards resulting from floods, landfill fires, chemical spills, contaminated wells, and other environmental disasters.

Those who benefit from environmental health programs include the general public, regulated entities, and federal, state, and local agencies. These services are delivered through a variety of regulatory, consultative, informational, and educational programs.

Environmental health risks are identified through collection and assessment of environmental health data. Improved scientific information and technology have increased the understanding of the effects of environmental contaminants and fueled the public's demand for increasing protection. The development of appropriate interventions based on health risk is made possible by good environmental health data.

Environmental health risks are mitigated primarily through the enforcement of state and federal standards. This enforcement occurs through partnerships with local public health agencies to enforce the standards; effective working relationships with regulated communities and other state agencies; and evaluation of potentially health-threatening environmental conditions. An equally important and complementary method of delivering environmental health programs is the provision of health education aimed at the general public, health professionals, and other partners. Providing health education involves many community sectors, increases awareness of the importance of environmental conditions to the public's health, and complements and supports the regulatory responsibilities and functions of environmental health services.

The number of requests from state and local agencies for assistance or support on health risk assessment and protection issues is growing. There is also increasing demand from the public for more information about hazardous environmental agents and inclusion in the risk-management decision-making process. Environmental health programs continue to work hard to meet these demands.

Nuisance control, which routinely affects all communities, is the responsibility of the community health board (M.S. 145A) in each county. A community health board's ability to respond to public health nuisances can be increased by adoption of a formal policy and determination of a designated agent responsible for the identification and abatement of public health nuisances. Clear policy and guidelines will enable staff to act confidently and swiftly to alleviate public

health concerns. A board that acts consistently within well-grounded public health principles also gains the credibility and trust of the public.

The strategies presented throughout this category address many of these environmental health issues, as well as those that complement and support the regulatory and enforcement responsibilities and functions of both state and local public health agencies. The topics addressed in this category are asbestos, clean indoor air/radon/carbon monoxide poisoning, food safety/protection, and safe water. Strategies that address additional environmental health issues are found elsewhere in this document: childhood lead poisoning (please see the category on *Child and Adolescent Growth and Development*), and fish consumption (please see the category on *Pregnancy and Birth*; fish consumption is included in the sections on Birth Outcomes and Prenatal Care, and on Women's Health).

CATEGORY: Environmental Conditions

TOPIC: ASBESTOS

The strategies below can be used to work on this topic.
Organizations that may play a role in implementing each strategy are indicated.

	Governmental Public Health Agencies	Health Plans	Hospitals & Clinics	Educational Systems	Community-based Organizations	Businesses/ Work Sites	Other
Provide the public and the regulated community with education on asbestos issues and exposure.	✓	✓	✓	✓	✓		Pollution Control Agency (PCA), Occupational Safety and Health Association (OSHA), Professional Associations, Media
Monitor and provide assistance with residential and non-residential asbestos-related work procedures.	State						PCA, Professional Associations
Monitor training course providers who conduct approved asbestos training courses.	State						PCA

Exposure to asbestos has been linked to a variety of lung diseases, including lung cancer, asbestosis, and mesothelioma. As part of its regulatory function to prevent asbestos exposure, the MDH Asbestos Unit adopted asbestos abatement rules in 1988, with revisions in July 1996 and August 2001. One of the important provisions of these rules focuses on homeowners and nonresidential building or facility owners as important decision-makers regarding asbestos issues.

Protecting the public from asbestos exposure requires maintaining reasonable and comprehensive regulations that include ensuring the quality of training for individuals and the regulated community, inspecting asbestos-abatement projects, providing audits of trainers, and continuing to take consistent enforcement action against violators. In addition, working with partners to provide health education, outreach, and technical assistance to both the public and the regulated community enables these groups to make educated decisions regarding asbestos issues, as well as supports the regulatory functions of the MDH.

Strategy: Provide the public and the regulated community with education on asbestos issues and exposure.

	Systems	Community	Individual
Primary	✓	✓	✓
Secondary			
Tertiary			

Background:

The purpose of this strategy is to inform the public and the regulated community about

exposure to asbestos, about what to do if an asbestos exposure event occurs either at home or at a work site, and of the availability of resources, lists, guidelines, and regulatory information. This information is provided through presentations, newsletters, and fact sheets. The kinds of information available include:

- ▶ Resources, including numerous studies of asbestos exposure and methods used in the industry to remove or isolate potential asbestos hazards.
- ▶ Lists, including asbestos contractors, training providers, consulting groups, labs, professional associations, and program contacts, as they relate to asbestos.
- ▶ Guidelines, including fact sheets, brochures, and educational articles (local and national).
- ▶ Regulatory information, including state and federal rules and regulations, as they relate to asbestos-related activity.

Additional resources:

- ▶ Environmental Protection Agency documents: 1) *Asbestos in the Home* (MDH IC# 141-0455); 2) *EPA Asbestos in the Home - Homeowners Guide* (1998, June).
- ▶ *Focus on Asbestos* fact sheets. (651) 215-0900 from the MDH Asbestos Unit.
- ▶ National Institutes of Health, National Cancer Institute. *Cancer Facts*. (MDH IC# 141-0447).

Evidence for strategy:

General principles of adult education and behavioral change theory have contributed to this strategy. The materials mentioned above have not been evaluated.

Has this strategy been implemented in Minnesota?

Yes, the Asbestos Unit has developed and distributed *Focus on Asbestos* documents to the general public at health fairs, events, and by request. They have been distributed to the regulated community at various professional associations in Minnesota, and as part of the training of individuals for the various disciplines certified within the asbestos program. On an annual basis, the MDH Asbestos/Lead Compliance Unit publishes the *Asbestos/Lead Link* newsletter, which is distributed locally to licensed contractors and businesses and public health staff. In addition, the Asbestos Unit has made presentations to a variety of professional organizations and associations throughout Minnesota.

Indicators for this strategy:

- ▶ Numbers of materials distributed.
- ▶ Number of telephone inquiries to the MDH Asbestos Unit.
- ▶ Circulation of the newsletter.
- ▶ Number of presentations conducted.
- ▶ Number of different associations, organizations, and businesses that receive presentations.

For more information contact:

MDH Asbestos Unit, at (651) 215-0900.

Strategy: Monitor and provide assistance with residential and nonresidential asbestos-related work procedures.

	Systems	Community	Individual
Primary	✓	✓	✓
Secondary			
Tertiary			

Background:

Compliance with asbestos-related work procedures has a direct relationship with minimizing the exposure of workers and the public to asbestos. Regular field surveillance of asbestos abatement projects continues for residential, commercial, and facility projects. Currently, approximately 15 percent of all asbestos-abatement projects in the state are inspected to ensure that they are properly permitted and licensed, and that they follow safe asbestos-related work procedures. Field surveillance of asbestos abatement projects is necessary to ensure that workers and the public are protected from exposure to asbestos.

Compliance with the asbestos-abatement rules means abatement projects meet all requirements of rules, including a review of asbestos fiber air monitoring and other records. The MDH Asbestos Unit records all inspections, the number of violations, and the number of inspected projects in compliance with the asbestos abatement rules and statutes.

In 1997 and 1998, the compliance rates were 72 and 79 percent, respectively. In the 1999 fiscal year, 68 percent of inspected sites were in compliance with the rules and in the 2000 fiscal year, 71 percent of sites were in

compliance. The percentage of sites with serious violations has remained relatively unchanged for all four years averaging seven percent. In August 2001, minor revisions to the certification portion of the asbestos rules were implemented. In an effort to increase the compliance percentages, workers and site supervisors are now included in enforcement actions.

Additional resources:

N/A

Evidence for strategy:

Past data indicate that continuous compliance monitoring of residential and nonresidential asbestos-related work procedures affects the behavior of contractors and workers.

Has this strategy been implemented in Minnesota?

Yes, the MDH Asbestos Unit receives notifications from licensed asbestos contractors for asbestos-related projects. Staff inspect approximately 15 percent of all asbestos work sites. Sites found to be in compliance are entered into a database. In some instances, the Asbestos Unit receives complaints regarding non-permitted asbestos removal activities.

When violations are observed during an inspection, the inspector informs the responsible individual or company, and in some cases may recommend a cease and desist of all work activity, especially if immediate danger to public health is known. If violations have been cited, the inspector makes a recommendation for enforcement action using the MDH administrative penalty order. Once the violations have been corrected and finalized, the inspector enters

the information into a database for tracking purposes.

Indicators for this strategy:

- ▶ Number of notifications for asbestos-related projects.
- ▶ Number of inspections conducted.
- ▶ Number of complaints received of non-permitted asbestos-removal activities.
- ▶ Number of violations cited and kinds of action taken.
- ▶ Amount of assessed penalties collected.
- ▶ Number of inspected projects in compliance with the asbestos abatement rules and statutes.

For more information contact:

MDH Asbestos Unit, at (651) 215-0900.

Strategy: Monitor training course providers who conduct approved asbestos training courses.

	Systems	Community	Individual
Primary	✓	✓	✓
Secondary			
Tertiary			

Background:

Regulatory agencies recognize that a crucial part of maintaining a competent workforce is having effective trainers and training providers. The programs that regulate trainers have the task of performing audits of those who offer state or federal training programs in order to ensure consistency, course content, and overall quality of those courses.

Asbestos abatement rules require that five disciplines (worker, site supervisor,

inspector, management planner, and project designer) be trained and certified. There are 12 training providers in Minnesota that offer initial and refresher training courses. Asbestos-related training courses are permitted, which ensures that individuals involved in asbestos-related work receive appropriate instruction to perform their jobs safely and according to the asbestos law and rules.

Additional resources:

Bibliographic resources:

- ▶ Environmental Protection Agency. (1995). *Train-the-Trainer Guidance*. Available through the MDH Asbestos Unit. (651) 215-0900.
- ▶ Minnesota Rules, parts 4620.3702 to 4620.3720 (Training Provisions).

Organizational resource:

- ▶ Laurel & Associates, Ltd. (1993). *Train the-Trainer seminar*. 917 Vilas Avenue, Madison, WI 53715; (608) 255-2010.

Evidence for strategy:

Past data indicate that continuous compliance monitoring of trainers and training providers contributes to the compliance of training providers. Audits ensure that the information presented in training courses is consistent with the Minnesota asbestos rules.

Has this strategy been implemented in Minnesota?

Yes, the MDH Asbestos Unit performs audits of permitted training courses on a regular basis. If problems or issues with the training provider are observed, the MDH will make recommendations for the training course content or instructor to improve prior to their next training session. The MDH also can use enforcement procedures to correct

the deficiencies or violations of the training provisions outlined in the Minnesota Asbestos Rules.

Indicators for this strategy:

- ▶ Number of initial and renewal training courses.
- ▶ Number of training audits performed.
- ▶ Number of enforcement actions taken.
- ▶ Knowledge of course participants of asbestos abatement procedures, laws, and rules.

Practices of course participants that are safe and fall within the law and rules.

For more information contact:

MDH Asbestos Unit, at (651) 215-0900.

CATEGORY: Environmental Conditions

**TOPIC: CLEAN INDOOR AIR/RADON/
CARBON MONOXIDE POISONING**

The strategies below can be used to work on this topic.
Organizations that may play a role in implementing each strategy are indicated.

	Governmental Public Health Agencies	Health Plans	Hospitals & Clinics	Educational Systems	Community- based Organizations	Businesses/ Work Sites	Other
Reduce exposure to environmental tobacco smoke.	State and Local	✓	✓	✓	✓	✓	
Provide homeowner education about radon-resistant new construction.	Local						Home Owners, Builders, Building Code Officials, Housing Nonprofit Organizations, Media, Real Estate Professionals
Conduct a public awareness campaign on carbon monoxide poisoning.	State						Homeowners, Faith Communities, Public Libraries, Housing Nonprofit Organizations, Media

Indoor air is becoming more of a concern to Minnesotans. Studies have shown that people spend approximately 90 percent of their time indoors; about 60 percent of their time is spent inside the home. And 20 percent of the U.S. population spends a significant amount of time in school buildings. The U.S. Environmental Protection Agency (EPA) has estimated that indoor air is two-to five-times more polluted than outdoor air even in our most industrialized cities. Because people spend most of their time indoors, the risks to health may be greater from indoor air than from outdoor air pollution.

Three pollutants of particular importance to Minnesotans are environmental tobacco smoke (ETS), radon, and carbon monoxide. Both ETS and radon have been classified by the EPA as known human carcinogens; both cause lung cancer. Approximately 3,000 lung cancer deaths each year are associated with ETS.

Populations that may be more susceptible to the health effects from indoor air include children, elderly people, and individuals with pre-existing respiratory or cardiovascular diseases (for related strategies, see the section on Heart Disease/Heart Attack/Stroke in the *Chronic/Noninfectious Disease* category). Exposure to ETS increases the risk of lower respiratory tract infections in children and the frequency of episodes and severity of symptoms in asthmatic children (for related strategies, see the section on Asthma in the *Child and Adolescent Growth and Development* category). One way to reduce exposure to ETS is to avoid smoking around nonsmokers, especially children (for additional prevention strategies related to

tobacco use, see the *Alcohol, Tobacco, and Other Drugs* category).

The National Academy of Sciences released a report in 1999 that attributes about one-tenth of all lung cancer deaths to radon, a naturally occurring, radioactive gas. Carbon monoxide is a gas produced by burning any fuel such as gasoline, natural gas, or wood. The most common symptoms are nausea, tiredness, headaches, and dizziness. At very high levels, carbon monoxide can cause death.

Strategy: Reduce exposure to environmental tobacco smoke.

	Systems	Community	Individual
Primary	✓	✓	
Secondary	✓	✓	
Tertiary	✓	✓	

Background:

Smoke-free environments reduce exposure to environmental tobacco smoke (ETS) and reinforce a community norm that smoking is unacceptable. Public policies aimed at work sites, schools, child-care settings, hospitals, public places and other settings can be implemented at the state, local or institutional levels. Family policies and other voluntary approaches can also be considered for more private settings. Legal strategies have also been successfully used to reduce ETS exposure (e.g., the Americans with Disability Act, Federal Fair Housing, Worker's Compensation and Unemployment Compensation). A comprehensive approach will involve regulations, policies, enforcement, incentives, education and training.

Mounting evidence suggests that exposure to ETS is a significant threat to health, particularly for pregnant women, children and persons with allergies and other chronic diseases. Exposure in utero and during infancy is a leading cause of low birth weight, Sudden Infant Death Syndrome (SIDS) and otitis media. Of the estimated 480,000 smoking-related deaths that occur every year in the U.S., 53,000 have been attributed to ETS.

ETS exposure is widespread in many settings, including workplaces and homes. ETS levels in restaurants are approximately two times higher than in offices; whereas levels in bars have been measured at four to six times office levels.

Children are exposed to more ETS in the home than in any other single environment. Two out of five children in the U.S. are exposed to smoking by household members, and these children miss one-third more school days annually than their peers from nonsmoking households.

Additional resources:

- ▶ Centers for Disease Control and Prevention. 1994. *Preventing Tobacco Use Among Young People: A Report of the Surgeon General*. Washington, D.C.: USDHHS.
- ▶ *Clearing the Air*. 1996. Americans for Nonsmokers' Rights. Berkeley, California.
- ▶ Environmental tobacco smoke: A hazard to children, a report of the American Academy of Pediatrics, Environmental Health Committee. 1977. *Pediatrics*, 99(4), 639-642.
- ▶ *Final Report of the Advisory Committee on Tobacco Policy and Public Health*

(Co-Chairs: C. Everett Koop, M.D., Sc.D. and David A Kessler, M.D.). 1997.

- ▶ Jones et al. 2000. Where there's smoke, there's disease: The dangers of environmental tobacco smoke. *Minnesota Medicine*, 83 (3).
- ▶ Lynch, BS. and Bonnie, RJ., editors. 1994. *Growing Up Tobacco Free: Preventing Nicotine Addiction in Children and Youths*. Washington, D.C.: Institute of Health: National Academy Press.
- ▶ Mannino et al. 1996. ETS exposure and health effects in children: Results from the 1991 National Health Interview Survey. *Tobacco Control*, 5, 13-18.
- ▶ Pirkle et al. 1996. Exposure of the U.S. population to ETS. *JAMA*, 275(16).
- ▶ *Reducing Tobacco Use Among Youth: Community-based Approaches*. 1997. Department of Health and Human Services, Substance Abuse and Mental Health Services Administration.
- ▶ Siegel, M. Involuntary smoking in the restaurant workplace: A review of employee exposure and health. *JAMA*, 270(4), 490-493.

Internet resources:

- ▶ Environmental Protection Agency, <http://www.epa.gov/iaq>
- ▶ Montana State University Extension Service. *Healthy Indoor Air for America's Homes*, <http://www.montana.edu/www.cxair/>

Evidence for strategy:

Studies show that a smoke-free environment protects nonsmokers from ETS and encourages smokers to reduce or quit smoking. As the number of smoke-free environments increase, children and adolescents will be exposed more to nonsmoking role models.

Has this strategy been implemented in Minnesota?

Yes, the Minnesota Clean Indoor Air Act (MCIAA) restricts smoking in public places including restaurants, bars, day care premises, health care facilities and clinics, public schools, hotels, retail stores, and office buildings. Outside of Minnesota, some municipalities have passed ordinances requiring restaurants and other work sites to be smoke-free.

Indicators for this strategy:

- ▶ The number and percentage of environments that restrict smoking or are smoke-free.
- ▶ Extent of compliance and level of enforcement of existing ordinances.

For more information contact:

- ▶ MDH Tobacco Prevention and Control Section, at (651) 215-8952.
- ▶ Laura Oatman, at (651) 215-0911, laura.oatman@health.state.mn.us, MDH Indoor Air Program.

Strategy: Provide homeowner education about radon-resistant new construction.

	Systems	Community	Individual
Primary	✓		
Secondary			
Tertiary			

Background:

One-third of Minnesota homes have levels of radon gas above four picocuries per liter, which is the federal guideline. Nationally, the estimates are that one of 15 homes has radon levels above the guideline. Radon is colorless, odorless, and tasteless. The only

way to determine if a home has a high radon level is to test the home.

When homes with elevated radon concentrations are identified through testing, corrective measures can be taken to lower the levels of radon, which decreases the occupants’ risk of developing lung cancer. This strategy is used to educate Minnesotans who are interested in building new homes about construction techniques that reduce the amount of soil gases, including radon, that enter the home. Radon, a natural radioactive gas that collects in some homes, is linked to about 21,800 lung cancer deaths a year in the U.S. One of the most frequently used radon-reduction techniques in existing homes is a sub-slab depressurization system. Typical installation costs for a system in existing homes range from \$1,000 to \$1,500. If the same system is installed during new construction, the cost is much lower ranging from \$350 to \$500.

Minnesota’s builders are not required to incorporate new radon-resistant construction techniques (RRNC) in building new homes. Therefore, it is especially important to educate homeowners about these techniques. In turn, as homeowners begin to request this type of construction, builders will become more aware of its health benefits and its importance in building Minnesotans’ new homes.

The approach to this strategy is to educate individual homeowners and homebuyers to include RRNC techniques during the building-planning phase. The benefits from incorporating RRNC techniques in new home construction are many:

- ▶ It reduces the health risk of developing lung cancer.

- ▶ It increases energy savings.
- ▶ It can be readily implemented by builders.
- ▶ It is cost-effective.
- ▶ It controls other soil gases, including moisture (i.e., it keeps basements drier).

The scientific community has documented the connection between exposure to elevated levels of radon gas and the increased risk of developing lung cancer. Radon is the second leading cause of lung cancer deaths in the U.S. The U.S. Environmental Protection Agency (EPA) recommends that if your home has annual radon concentrations at or above the guideline of 4 picocuries per liter (pCi/L), steps should be taken to reduce the radon level to below 4 pCi/L. About one out of three Minnesota homes has radon levels above 4 pCi/L.

The EPA has developed technical guidance (see additional resources) for homeowners and builders on incorporating RRNC techniques during the building phase. The guidance manual is designed to provide homeowners and builders with an understanding of operating principles and installation details of RRNC.

Minnesota is at high risk for elevated radon levels in homes. The soil in our state contains widespread low-grade uranium and radium, which decay to radon gas.

Minnesota is ranked fourth highest in percentage of homes with elevated radon levels. Minnesota has 68 counties (out of 87) that are included in the high radon-potential area. Minnesota has only high and medium radon-potential zones; there is no low radon-potential zone in Minnesota.

Additional resources:

- ▶ Environmental Protection Agency. 1994. Model standards and techniques for control of radon in new residential buildings. *Federal Register*.
- ▶ Environmental protection agency. 1991. *Radon-resistant Construction Techniques for New Residential Construction*. EPA/625/2-91/032.
- ▶ *The Health Effects of Exposure to Indoor Radon: National Research Council's Report of the Sixth Committee on Biological Effects of Ionizing Radiations (BEIR VI)*. 1998. This report addresses the risk of lung cancer associated with exposure to radon.
- ▶ *Minnesota-Map of Radon*. MDH Indoor Air Program. 1993. IC# 141-0228.
- ▶ *Minnesota Radon Testing and Use of Test Results*. 2001. MDH Indoor Air Program. IC#141-1137.
- ▶ National Association of Home Builders' Research Center. 1994. *The New Home Evaluation Program: Final Report*. EPA Grant #x819586.

Internet resources:

- ▶ Environmental Protection Agency, <http://www.epa.gov/iaq>
- ▶ Montana State University Extension Service. *Healthy Indoor Air for America's Homes*, <http://www.montana.edu/www.cxair/>

Evidence for strategy:

In July 1994, the National Association of Home Builders' Research Center completed a study of the passive sub-slab or sub-membrane depressurization system's effectiveness in resisting radon.

Builders were contacted to install passive systems into the homes they were building.

The radon levels in the houses were then measured with these systems working and not working (a cap was put on top of the stack over the roof). The results of the passive system study were impressive, of the 20 homes with levels measured at or above 4pCi/L, the levels of 19 homes were reduced by the passive system.

Radon is one of the most extensively investigated human carcinogens. The carcinogenicity of radon is convincingly documented through epidemiologic studies of underground miners, all showing a markedly increased risk of lung cancer. Based on the epidemiologic evidence from miners, exposure to radon in homes is expected to be a cause of lung cancer in the general population.

Has this strategy been implemented in Minnesota?

Yes, although RRNC is not currently included in the Department of Administration’s state building code, many Minnesota builders are including RRNC in their building projects. The MDH’s Indoor Air Program regularly receives requests from the general public and builders for information on RRNC.

The Minnesota Indoor Air Quality Coalition offered a RRNC Workshop in February 1997 to educate builders and building code officials on RRNC techniques. The workshop was attended by over 50 builders, building code officials, and other public health professionals. All builders who attended the workshop were eligible to receive one of 45 new home RRNC kits free. The University of Minnesota received State Indoor Radon Grant monies from the MDH Indoor Air Program to conduct field research

to demonstrate RRNC techniques to builders and to monitor the effectiveness of them.

Indicators for this strategy:

- ▶ Number of homes built with radon-resistant new construction.
- ▶ Changes in knowledge and attitudes of homeowners, builders, and building code officials regarding the importance of incorporating RRNC.
- ▶ Number of builders using RRNC techniques.

For more information contact:

- ▶ Laura Oatman, at (651) 215-0911, laura.oatman@health.state.mn.us, MDH Indoor Air Program.
- ▶ David Jones, at (651) 215-0886, david.bw.jones@health.state.mn.us, MDH Indoor Air Program.

Special notes:

The MDH’s Indoor Air Program continues efforts to educate Minnesota builders and the general public regarding the importance of RRNC. Please contact the MDH staff listed above for a copy of the guidance document from the EPA.

Strategy: Conduct a public awareness campaign on carbon monoxide poisoning.

	Systems	Community	Individual
Primary		✓	
Secondary			
Tertiary			

Background:

Most homes in Minnesota use fuel-burning appliances such as furnaces, boilers, cooking stoves, water heaters, clothes dryers, and

fireplaces. All of these appliances have the potential to produce carbon monoxide. Every year, Minnesotans die from accidental exposure to carbon monoxide. Annual inspections of fuel-burning appliances reduce the likelihood of a carbon monoxide problem. The use of carbon monoxide alarms in homes will also provide protection against carbon monoxide poisonings.

This strategy is used to educate Minnesotans about the health hazards of carbon monoxide (CO) exposure in the home. Indoor air quality is becoming more and more of a concern to the people of Minnesota. Most people spend over 90 percent of their time in the home, workplace, or school. Because people spend most of their time indoors, the risks to health are usually greater from indoor pollutants than outdoor pollution. Fortunately, most of the indoor pollutants commonly found in homes are not life threatening. However, CO can cause serious health problems and even cause death.

The desired outcomes of this strategy include:

- ▶ Increased homeowner knowledge of the dangers of CO poisoning and the steps that can be taken to prevent it.
- ▶ At least one CO alarm in every new and existing home in Minnesota.
- ▶ A decreased number of deaths related to accidental CO poisoning.

Many Minnesotans use fuel-burning appliances to heat their homes and attached garages. This creates an increased potential for exposure to CO. Infants and children, the elderly, and individuals with upper respiratory problems are at greater risk. It is difficult in Minnesota to identify the number of CO deaths, because deaths from CO

poisoning are not required to be reported to the MDH.

It is of great importance to increase the knowledge of the general public about the health hazards of CO. In October 1996, the MDH's Indoor Air Program conducted focus-group research with homeowners across the state that revealed significant gaps in what people know about CO. Many of the participants lacked information on how to select a CO alarm, or how to properly maintain fuel-burning appliances. The information obtained from the focus groups helped prioritize the importance of various themes that could be used in a CO public awareness campaign, and to test consumer reaction to preliminary messages and designs.

Additional resources:

- ▶ Minnesota Department of Health. 1998. *Facts About Carbon Monoxide (CO) Poisoning*. Indoor Air Program, at (651) 215-0909.
- ▶ 2001 Winter Hazard Awareness Week Media Packet. (This media packet was sent to all local public health agencies from 1996 to 2001 for Winter Hazard Awareness Week.)

Internet resources:

- ▶ Environmental Protection Agency, <http://www.epa.gov/iaq>
- ▶ Montana State University Extension Service. *Healthy Indoor Air for America's Homes*, <http://www.montana.edu/www.cxair/>
- ▶ University of Minnesota Extension Service. *Carbon Monoxide: Your Safe Home*. This fact sheet is available in English, Southeast Asian languages, and Spanish, <http://www.extension.umn.edu/housing/>

Evidence for strategy:

Focus groups produce qualitative data that provide insights into the attitudes, perceptions, and opinions of participants. Focus groups are useful because they assist in determining the strength of attitudes and beliefs. Group “brainstorming” is valuable, as it brings issues to the front that quantitative research tools might miss.

The MDH sponsored three focus groups located in St. Paul and St. Cloud in September 1996 to test public reaction to a proposed public service campaign about CO poisoning and:

- ▶ To determine participants’ attitudes toward CO poisoning.
- ▶ To prioritize the importance of various themes that could be used in such a campaign.
- ▶ To test consumer reaction to preliminary messages and designs.
- ▶ To gather consumer suggestions for future directions of the campaign.

Has this strategy been implemented in Minnesota?

Yes, during the initial MDH campaign, the CO public service announcement (PSA) was printed on 1.9 million grocery bags and distributed during Minnesota’s Winter Hazard Awareness Week (November 11-15, 1996) to Cub Foods stores throughout the state. Additional PSAs appeared in weekend editions of newspapers in six Minnesota cities (Fargo/Moorhead, Duluth, Rochester, St. Cloud, Mankato, and Worthington) during November, reaching a total of 276,600 readers.

Indicators for this strategy:

- ▶ Adoption of a statewide code for CO alarms in residential new construction.

- ▶ Changes in knowledge and attitudes of homeowners regarding the prevention of CO poisoning.
- ▶ Number of homes with CO alarms.
- ▶ Number of CO poisoning cases in Minnesota.

For more information contact:

- ▶ MDH Indoor Air Program, at (651) 215-0909 or (800) 798-9050. The indoor air program has health education materials including several fact sheets and brochures to assist CHS agencies in implementing this strategy at the local level.
- ▶ Laura Oatman, at (651) 215-0911, laura.oatman@health.state.mn.us, MDH Indoor Air Program.

CATEGORY: Environmental Conditions

TOPIC: FOOD SAFETY/PROTECTION

The strategies below can be used to work on this topic.
Organizations that may play a role in implementing each strategy are indicated.

	Governmental Public Health Agencies	Health Plans	Hospitals & Clinics	Educational Systems	Community- based Organizations	Businesses/ Work Sites	Other
Conduct K-12 food safety education.	State and Local			K-12			Minnesota Department of Agriculture (MDA), Department of Children, Families and Learning, University of Minnesota
Conduct food manager education.	State and Local			University, Vocational, and Technical Institutions; Private Educational Vendors			MDA
Provide food safety education during inspections.	State and Local						MDA, FDA
Develop and maintain working partnerships with the food industry to promote active managerial control of food borne disease risk factors.	State and Local			Private Educational Vendors			MDA, FDA

CATEGORY: ENVIRONMENTAL CONDITIONS

TOPIC: FOOD SAFETY/PROTECTION

	Governmental Public Health Agencies	Health Plans	Hospitals & Clinics	Educational Systems	Community- based Organizations	Businesses/ Work Sites	Other
Conduct surveillance of food borne disease risk factors and their antecedents.	State and local						MDA, FDA
Conduct consumer education on food safety risks and safe food handling, storage, and preparation in households.	✓	✓	✓	✓	✓	✓	
Develop and implement consumer education to promote consumer acceptance and use of irradiated foods.	✓	✓	✓	✓	✓	✓	
Respond to consumer questions about food biotechnology and genetically modified organisms (GMOs).	✓	✓	✓	✓	✓	✓	

Food borne illness is a major cause of personal distress, preventable death, and avoidable economic burden in Minnesota and throughout the country. For many victims, food borne illness results only in minor discomfort or time lost from their jobs. For some, especially children, senior citizens, and those with compromised immune systems, food borne illness may be life threatening. According to the Centers for Disease Control and Prevention (CDC), mishandling of food is a leading cause of food borne outbreaks. Food mishandling can occur in retail food establishments or in homes.

Since the adoption of the Minnesota Food Code, inspections have focused on personal hygiene, food temperatures, and elimination of cross contamination between raw and ready-to-eat foods. The Food Code emphasizes the need for food establishment managers to be knowledgeable about food safety and to train their staff in food safety.

Strategy: Conduct K-12 food safety education.

	Systems	Community	Individual
Primary		Y	
Secondary		Y	
Tertiary			

Background:

The simple act of washing your hands before preparing a meal for your family can greatly reduce the possibility of food borne illness transmission. It is our belief that few kids receive this important lesson, either at home or in school. Schools offer an excellent opportunity to involve kids in their own health protection. Lessons about the

importance of hand washing, refrigerating prepared foods, the need for temperature controls, and avoiding cross contamination will serve students throughout their lives.

Additional resources:

Many of the resources listed here are further described below under the heading, “Has this strategy been implemented in Minnesota?”

- ▶ The Austin High School Food Technology program. For more information, contact the Austin High School, at (507) 433-0400.
- ▶ Hennepin County Environmental Health Department has done extensive teaching and food hygiene training in the K-12 school systems. For more information, contact Debra Anderson, at (952) 351-5209.
- ▶ Minnesota Department of Health has developed a handwashing video titled, *Clean Hands, Safer Foods*. For more information contact the MDH Library at (651) 215-0909.
- ▶ United States Department of Agriculture (USDA) and the Food and Drug Administration (FDA) maintain a website which contains a list of books, reference guides, videotapes, brochures, slide shows, and teaching materials. The list includes the names and addresses of the producers, phone numbers, a detailed description of the materials available, and any associated costs. The list may be viewed at: www.nal.usda.gov/fnic/foodborne/.

Evidence for strategy:

State and local food safety inspectors report that food workers who received handwashing training in high school are more likely to be compliant with hygiene requirements.

Has this strategy been implemented in Minnesota?

Yes, the Austin High School food technology program has been in existence for several years. The enrollment varies from year to year, but has been as many as 65 students. The one-year program emphasizes an understanding of nutrition, food biochemistry, technology-based processing, food safety, and food preparation.

The Hennepin County Environmental Health Department has done extensive teaching and food hygiene training in the K-12 school systems of Hopkins, Eden Prairie, Osseo, Robbinsdale, Plymouth, and Wayzata.

The Minnesota Department of Education has developed a course aimed specifically at school and childcare providers with a chapter on food safety targeted at children.

Indicators for this strategy:

- ▶ Pre- and post-testing of knowledge and skills.
- ▶ The increase in the number of students taught each year.
- ▶ Observation of skill use during food service inspections.
- ▶ The number of schools requesting food protection training.

For more information contact:

- ▶ Carol Schreiber, at (651) 215-0846, carol.schreiber@health.state.mn.us, MDH Metro Environmental Health Office.
-

Strategy: Conduct food manager education.

	Systems	Community	Individual
Primary	Y		
Secondary			
Tertiary			

Background:

The Minnesota Food Code requires the person in charge of most food establishments to have a significant amount of food safety knowledge. Such individuals must have in-depth understanding of personal hygiene and food borne disease transmission by ill workers. Food Manager Certification classes are currently available through the University of Minnesota, vocational institutions, private industry, and local public health agencies.

Additional resources:

One of the longest-running training courses offered in the U.S. is available through the Education Foundation of the National Restaurant Association. Their training course, SERVSAFE, and the Applied Foodservice Sanitation course book have been in use around the country since 1974. This book is updated every seven years, and includes an exam. Following successful completion, a nationally recognized certificate is provided. Current course providers include a variety of public and private organizations around the state. Additional information maybe found at:

- ▶ <http://www.servesafefood.com>
- ▶ <http://www.health.state.mn.us/divs/eh/food/fmc/index/html>

Evidence for strategy:

The State of Illinois has required food handler training and certification since the

mid-1970s. Several states, including New York, Florida, and Wisconsin require the person in charge of food-service operations to be certified. Internationally, Australia and several European countries also require food establishment manager training and certification. There is empirical evidence from scientific studies that clearly indicate that fewer critical violations are observed in establishments that have certified food managers.

Has this strategy been implemented in Minnesota?

Yes, this is an ongoing program. The State’s food manager certification became effective in 1999.

Indicators for this strategy:

- ▶ Fewer critical violations during inspections.
- ▶ Better rapport between the establishment operator and the health inspector.
- ▶ Fewer food borne illness outbreaks in establishments with certified operators.
- ▶ Food establishment staff are more knowledgeable about food safety.

For more information contact:

- ▶ Sue Hibberd, at (651) 215-0866, sue.hibberd@health.state.mn.us, MDH Environmental Health Metro Office.
 - ▶ Tracie Zerwas, at (651) 215-0843, tracie.zerwas@health.state.mn.us, MDH Environmental Health Metro Office.
-

Strategy: Provide food safety education during inspections.

	Systems	Community	Individual
Primary	Y		Y
Secondary			
Tertiary			

Background:

Inspections provide a unique opportunity to provide education to food service workers. Every observation of food handling error in an establishment provides the inspector a teachable moment in which to correct food handling procedures that can be taught to the employee who committed the error.

Inspectors take extensive time to explain appropriate food safety measures and share information about illness-prevention during inspections.

Additional resources:

- ▶ The Minnesota Food Code and fact sheets. For more information see the website for strategies resources at: www.health.mn.us/strategies/. Click on “Food Code”. A hard copy of the Minnesota Food Code can be purchased from the Minnesota Book Store at 117 University Avenue, St. Paul. A summary handout can be obtained, from the MDH by contacting the section for Environmental Health Services, at (651) 215-0871 or from the Minnesota Department of Agriculture (MDA) by contacting the Dairy and Foods Division, at (651) 296-1592.
- ▶ Food safety information sheets are also available from local food protection agencies.

Evidence for strategy:

Since this is a state rule, no research has been conducted.

Has this strategy been implemented in Minnesota?

Yes, the implementation of this strategy (including food-safety instructions during inspections) has been in place throughout Minnesota for many years.

Indicators for this strategy:

- ▶ More time spent per inspection.
- ▶ Better rapport with food industry.
- ▶ Better communications between the food industry and health departments.
- ▶ More trust.
- ▶ More invitations by food industry to health inspectors to train in-house staff.
- ▶ Fewer food borne illness outbreaks.
- ▶ More knowledgeable managers.

For more information contact:

- ▶ Randall Deckert, at (320) 650-1067, randall.deckert@health.state.mn.us, MDH St. Cloud District Office.
- ▶ Glenn Donnay, at (218) 739-1376, glenn.donnay@health.state.mn.us, MDH Fergus Falls District Office.
- ▶ Mark Peloquin, at (218) 725-7767, mark.peloquin@health.state.mn.us, MDH Duluth District Office.
- ▶ David Reimann, at (507) 389-2203, david.reimann@health.state.mn.us, MDH Mankato District Office.
- ▶ Thomas Sobolik, at (218) 755-4153, thomas.sobolik@health.state.mn.us, MDH Bemidji District Office.
- ▶ Pamela Steinbach, at (651) 623-5147, pamela.steinback@health.state.mn.us, MDH Metro District Office.

Strategy: Develop and maintain working partnerships with the food industry to promote active managerial control of food borne disease risk factors.

	Systems	Community	Individual
Primary	Y		
Secondary			
Tertiary			

Background:

If the food industry and consumers are to benefit from regulation, a partnership must exist between the regulated industries and the regulating agencies. Better working relationships will help to improve communication and reduce tensions that can result in adversarial relationships. Partnerships will be established by inviting the industry to provide input on proposed policies that would affect the industry. MDH will also institute announced inspections when possible so that industry representation is available at the time of inspections for in depth discussions of the findings.

Additional resources:

- ▶ Center for Food Safety and Applied Nutrition, FDA, at <http://www.cfsan.fda.gov/>.
- ▶ Pete Gieson, Olmsted County Public Health Services, at (507) 285-1492.
- ▶ Geri Maki, at (507) 280-3551, geri.maki@health.state.mn.us, MDH, Rochester District Office.

Evidence for strategy:

Increasingly there is the recognition that the responsibility for safe food lies with establishment operators and not the

regulatory agencies. In light of this, a great deal of emphasis is being placed on providing operators with the tools necessary for them to exercise active control of the factors that lead to food borne disease. This new approach to food regulation will require inspectors to avoid doing the traditional autocratic “gotcha” inspections and instead to perform audits which involves positive interaction with operators. This type of non-confrontational interaction will allow inspectors to learn more about the nature of the operation, including processing procedures that are performed when inspectors cannot be present.

For the active managerial control strategy to work, there must be a trusting relationship between the industry and the regulatory agencies. Operators must be willing to share intimate details about their operations in order for the regulator to assist them. In the present environment there is little trust between industry and the regulatory community; thus, open information sharing is rare.

Has this strategy been implemented in Minnesota?

Yes, in the late 1990’s, MDH established an Inter-Agency Review Council to help resolve issues that were of mutual concern to regulators and the food industry. The council is comprised of state and local regulators, food industry personnel, and various technical experts who serve on the council on a pro-tem basis. The council deals with a variety of issues related to food establishment operations and develops policies that help clarify and streamline the interpretation and application of the Minnesota Food Code.

In addition, Olmsted County Public Health has been emphasizing active managerial

control as a part of their regulatory tool kit since 2000. The work done by this agency in creating and maintaining effective working relationships between the county’s regulators and its establishment operators, helped the county win the national Crombine award in 2001.

Indicators for this strategy:

- ▶ Fewer confrontational inspections.
- ▶ Better working relationships.
- ▶ The food industry seeking agency input before new processes are put in place.
- ▶ Better inspections and cleaner establishments.
- ▶ Reduction of risk factors for food borne diseases.

For more information contact:

- ▶ James Feddema, at (320) 650-1055, james.feddema@health.state.mn.us, MDH EHS Supervisor, St. Cloud and Fergus Falls District Office.
- ▶ Colleen Paulus, at (651) 215-0861, colleen.paulus@health.state.mn.us, MDH Environmental Health Services Director (EHS), Metro District Office.
- ▶ Gerald Wambach, at (218) 755-4152, gerald.wambach@health.state.mn.us, MDH EHS Supervisor, Bemidji and Duluth District Office.

Strategy: Conduct surveillance of food borne disease risk factors and their antecedents.

	Systems	Community	Individual
Primary	Y		
Secondary			
Tertiary			

Background:

It has been known for some time that certain conditions in food establishments are strongly associated with food borne disease outbreaks. For example, according to the CDC, the majority of food borne disease outbreaks are associated with the following five risk factors: improper cooling, poor personal hygiene, obtaining food from unsafe sources, time/temperature abuses, and cross contamination. While there is basic understanding of the above risk factors, their antecedent causes are not well understood and so our efforts to prevent food borne diseases are hampered. This strategy will allow the systematic collection, analysis, interpretation, and dissemination of data related to key risk factors for food borne disease in licensed facilities.

Additional Resources:

- ▶ Centers for Disease Control and Prevention, at www.cdc.gov.
- ▶ Center for Food Safety and Applied Nutrition, FDA, at <http://www.cfsan.fda.gov/>.
- ▶ Minnesota Department of Health, Acute Disease Investigation and Control, at (612) 676-5414.

Evidence for Strategy:

Surveillance is one of corner stones of public health. There are various surveillance programs in existence at the federal, state, and local levels across the country.

Surveillance will improve our understanding of how, when, and why food borne disease risk factors occur, and provide clues about steps that can be taken to prevent them. In addition, systematic collection and analysis of data on food borne illness risk factors will help us determine effectiveness of existing food safety tools such as the Minnesota Food Code.

Has this strategy been implemented in Minnesota?

No, the MDH Acute Disease Investigation and Control section conducts surveillance of food borne disease symptoms and syndromes. Currently, surveillance of food borne disease risk factors is not being done.

Indicators for this strategy:

- ▶ Food borne disease risk factors are monitored.
- ▶ Food safety policy is guided by risk factor data.

For more information contact:

Paul Allwood, at (651) 215-0871, paul.allwood@health.state.mn.us, MDH, Environmental Health Services Section, Metro Office.

Strategy: Conduct consumer education on food safety risks and safe food handling, storage, and preparation in households.

	Systems	Community	Individual
Primary	Y	Y	Y
Secondary	Y	Y	Y
Tertiary			

Background:

Most people do not think about food safety until a food-related illness prompts concern. But threats are real, numerous, and varied. The U.S. food supply is among the worlds safest, but as many as 9,000 Americans, mostly the very young, the elderly, and those with weakened immune systems, die each year, and many more are sickened as the result of a food-related illness. The

impact of food borne infections can be substantial. Some pathogens give rise to diseases far more serious than the uncomfortable vomiting or diarrhea that accompanies what most people call "food poisoning." Food borne infections can cause spontaneous abortions, reactive arthritis, Guillain-Barre syndrome, Hepatitis A, and hemolytic uremic syndrome (HUS), which can lead to kidney failure and death.

Lack of consumer awareness is a critical food safety gap that we need to close. While food-related illness may occur outside of the home, such as at a restaurant or cafeteria, many cases are the result of improper food handling at home. Consumers, as the last stop in the farm-to-table continuum, have an important role to play in protecting themselves. In the past 20 years, the rules of safe food handling have changed significantly. Eating foods made with raw egg or a rare hamburger is no longer safe. These changes have resulted from advances in our understanding of food borne illness, changes in the nature of food borne illness, changes in our food supply, and changes in the way we eat.

Consumer education to promote safe food handling, preparation, and storage in the home can be conducted by state and local public health agencies, hospitals and clinics, community organizations, and other relevant state and federal agencies. The content of the consumer education should include information about:

- ▶ Washing hands, utensils, and surfaces with hot soapy water before, during, and after food preparation.
 - ▶ Washing fresh fruits and vegetables before eating in safe, fresh, running water without soap or detergent.
 - ▶ Avoiding cross-contamination.
 - ▶ Purchasing safe food in intact packaging
- ▶ from clean and reputable sources and transporting it home in a safe manner.
 - ▶ Cooking food to the proper internal temperature and checking for doneness with a food thermometer.
 - ▶ Holding prepared foods at appropriate temperatures for safe periods of time.
 - ▶ Ensuring proper refrigeration and/or freezing of perishables, prepared foods, and leftovers.
 - ▶ Safe use and preparation of irradiated foods.
 - ▶ Selecting and using a food thermometer.
 - ▶ Chilling prepared foods thoroughly and quickly.
 - ▶ Provision of factual materials in the language and/or format most suitable to the consumer.
 - ▶ Special considerations for seniors about safe food handling, special vulnerability issues, and attitudes.

Additional resources:

- ▶ The American Dietetic Association, at (312) 899-0040, 216 W. Jackson Boulevard, Chicago, IL 60606-6995. This organization provides food safety education materials for professionals and consumers, at www.eatright.org.
- ▶ Food and Drug Administration (FDA) Center for Food Safety and Applied Nutrition (CFSAN), at <http://vm.cfsan.fda.gov/list.html>.
- ▶ FDA, at (612) 334-4100 (ext.129), Fax: (612) 334-4134; 240 Hennepin Avenue, Minneapolis, MN 55401.
- ▶ Hospitality Institute of Technology and Management, at <http://www.hi-tm.com/>.
- ▶ Minnesota Department of Health, Nutrition and Physical Activity Unit for consumer food safety materials in four languages. For more information see the website for strategies resources at: www.health.state.mn.us/strategies/. Click on "5 A Day" and "food safety".

- ▶ Partnership for Food Safety Education, at (202) 452-8444, Fax: (202) 429-4549, 800 Connecticut Ave, N.W., Suite 500, Washington, D.C. 20006-2701, <http://www.fightbac.org>. Includes downloadable consumer education kit.
- ▶ United States Department of Agriculture (USDA) Food Safety and Inspection Services (FSIS), at (202) 720-7943; Fax: (202) 720-1843, <http://www.fsis.usda.gov>, Room 1175-S, 1400 Independence Ave. S.W., Washington, D.C. 20250-3700. For consumer food safety publications in downloadable format, contact: <http://www.fsis.usda.gov/OA/consedu.htm>.
- ▶ USDA/FDA Foodborne Illness Education Information Center, National Agricultural Library/USDA, at (301) 504-6365; Fax: (301) 504-6409, croberts@nal.usda.gov, <http://www.nal.usda.gov/foodborne/index.html>, Beltsville, MD, 20705-2351.

Evidence for strategy:

Research strongly supports the efficacy of adequate hand washing, control of cross-contamination, and temperature control in preventing food-related illness. The data indicate that consumers have major misconceptions about food borne illness that pose challenges for education programs. There is limited evidence that carefully targeted social marketing strategies are effective in decreasing incidence of food borne illness. Additional research is needed to identify key determinants of effective campaigns.

Has this strategy been implemented in Minnesota?

Yes, a variety of community agencies and organizations have conducted consumer education programs about food safety.

Indicators for this strategy:

- ▶ Number of consumer education programs about food safety.
- ▶ Numbers and kinds of organizations involved in food safety programs.
- ▶ Numbers of ways that information about safe food handling is disseminated.
- ▶ Numbers of people reached with this information.
- ▶ Increase in knowledge about safe food handling techniques.

For more information contact:

- ▶ Fran Doring, at (651) 281-9843, fran.doring@health.state.mn.us, MDH Consumer Food Safety Education Program, Nutrition and Physical Activity Unit.
- ▶ Pam York, at (651) 281-9831, pam.york@health.state.mn.us, MDH Consumer Food Safety Education Program, Nutrition and Physical Activity Unit.

Strategy: Develop and implement consumer education to promote consumer acceptance and use of irradiated foods.

	Systems	Community	Individual
Primary	Y	Y	Y
Secondary	Y	Y	Y
Tertiary			

Background:

Many Minnesota consumers can now find irradiated foods for sale in grocery stores. Minnesota has been a leader in introducing frozen ground beef patties in grocery stores, first in the Twin Cities, and now across the country. This represents an important opportunity to decrease the risk of food borne illness. The irradiation technology to

kill food pathogens was developed - and approved - years ago, but controversy and public fear so far have largely kept irradiated food out of the grocery store. In recent years, however, food borne illness has become an increasingly serious and widely publicized health problem, one that this technology can help solve.

Food irradiation, which is the process of exposing food to specific doses of high-energy electrons, can help prevent food borne illnesses by drastically reducing the presence of the pathogens *E. coli*, *Salmonella*, *Campylobacter*, *Cryptosporidium*, *Listeria*, *Toxoplasma*, and *Trichinella*.

The primary reason irradiated food has not been readily available to consumers until now is the public's fear of the word "radiation." However, more than 40 years of scientific research and testing support the safety of food irradiation. Some researchers have found that, with education, consumers prefer irradiated food. (ADA, 2000; Henkel, 1998.)

The content of the consumer education should include the following information:

- ▶ Food irradiation is but one step in the safe food handling process, which begins with safe and clean food production processes and ends with safe food preparation and storage in the home.
- ▶ Food irradiation kills most pathogens in meats and poultry that can cause illness.
- ▶ There is insignificant nutritional loss in irradiated foods, less than canning, cooking, or storing.
- ▶ Food irradiation is safe and widely accepted by the international health and scientific communities.

Additional resources:

Bibliographic resources:

- ▶ American Dietetic Association. 2000. Food irradiation. Position statement of the American Dietetic Association. *Journal of the American Dietetic Association*, 100:246.
- ▶ Henkel, J. May/June 1998. Irradiation: A safe measure for a safer food. *FDA Consumer*. Publication No. (FDA) 98-2320.

Organizational resources:

- ▶ Centers for Disease Control, at: www.cdc.gov/ncidod/dbmd/diseaseinfo/foodirradiation.htm.
- ▶ Iowa State University, at <http://www.extension.iastate.edu/foodsafety/rad/irradhome.html>.
- ▶ Kansas State University, at www.oznet.ksu.edu/foodsafety/.
- ▶ Minnesota Department of Health. For more information see the website for strategies resources at: www.health.state.mn.us/strategies/. Click on "Irradiation".
- ▶ National Food Safety Information Network, at www.foodsafety.gov/~fsg/irradiat.html.

Evidence for strategy:

There is a wealth of scientific research on the safety of irradiated food and its effectiveness in killing most harmful pathogens on meats and poultry, reducing spoilage and increasing the exportability of foods. Research also indicates that consumers who are educated about the risks of food borne illness and the effectiveness of food irradiation prefer irradiated food. The MDH Nutrition and Physical Activity Unit recently surveyed several targeted groups about food safety and food irradiation. Data indicate that consumers think they are knowledgeable about food safety, but less so about irradiation. National research indicates

that consumers do not follow safe food handling procedures in the home.

Has this strategy been implemented in Minnesota?

Yes, the MDH has conducted communications campaigns promoting the use of irradiated beef as has the Minnesota Beef Council. SureBeam and SuperValu have been industry leaders in education and advocating for irradiated food products.

Indicators for this strategy:

- ▶ Number of consumer education programs about food irradiation.
- ▶ Numbers and kinds of organizations involved in educating consumers about food irradiation.
- ▶ Numbers of ways that information about safe food handling is disseminated.
- ▶ Numbers of people reached with this information.
- ▶ Increase in knowledge about food irradiation.
- ▶ Decrease in the public’s level of fear of irradiated food.
- ▶ Increase in public acceptance of irradiated food.

For more information, contact:

- ▶ Fran Doring, at (651) 281-9843, fran.doring@health.state.mn.us, MDH Consumer Food Safety Education Program, Nutrition and Physical Activity Unit.
- ▶ Pam York, at (651) 281-9831, pam.york@health.state.mn.us, MDH Consumer Food Safety Education Program, Nutrition and Physical Activity Unit.

Strategy: Respond to consumer questions about food biotechnology and genetically modified organisms (GMOs).

	Systems	Community	Individual
Primary	Y	Y	Y
Secondary			
Tertiary			

Background:

Advances in biotechnology allow gene technologists to select and introduce specific DNA into organisms. The most astounding advance may be the ability to “cut and paste” genes across species. According to the Institute of Food Science and Technology, there are great advantages and potential benefits to genetic modification. A wider variety of beneficial traits can be selected for, with more precision, speed and cost savings. This allows for higher and/or more nutritious yields, reduced use of pesticides, improved processing characteristics, and the ability to grow crops in previously inhospitable environments. Aside from the advantages and potential benefits of GMOs, consumers in Minnesota and worldwide are expressing concern and turning to scientists and public health for answers regarding the safety and regulation of food containing GMOs. Some of the concerns that are imperative to address include: food safety, labeling and other government oversight and regulation, and the impact on the environment and poorer nations of introducing genetically modified seeds and foods.

The content of the consumer education should include the following information:

- ▶ An outline of the benefits and concerns of consumers about GMOs.
- ▶ A list of reliable resources for more

information about food biotechnology and GMOs.

Additional resources:

- ▶ FoodFirst: Institute for Food and Development Policy, at www.foodfirst.org.
- ▶ Institute of Food Science and Technology, at www.ifst.org.
- ▶ Institute of Food Science and Technology (UK): Genetic Modification and Food, at www.ifst.org/hotspot10 (12/13/01).

Evidence for strategy:

This strategy promotes opening conversation in communities about the issues related to food biotechnology to promote science-based information and clarification of community values.

Has this strategy been implemented in Minnesota?

Yes, we have begun to respond to professionals and consumers requests for information, but much more discussion is needed to enable and encourage communities and community members to provide input to policy-makers on the development and use of these new technologies.

Indicators for this strategy:

- ▶ Development of science-based curricula and programs for the public on food biotechnology and genetically modified organisms.
- ▶ Numbers of key community leaders, professionals and lay personnel trained to respond to consumer questions.
- ▶ Number of consumer education programs about food biotechnology and genetically modified organisms.
- ▶ Numbers and kinds of organizations involved in educating consumers about

food biotechnology and genetically modified organisms.

- ▶ Numbers of ways that information is disseminated.
- ▶ Numbers of people reached with this information.
- ▶ Increase in knowledge about and understanding of food biotechnology and genetically modified organisms
- ▶ Decrease in the public's fear of food biotechnology and genetically modified organisms.
- ▶ Increase in public acceptance of food biotechnology and genetically modified organisms.

For more information, contact:

- ▶ Fran Doring, at (651) 281-9853, fran.doring@health.state.mn.us, MDH Consumer Food Safety Education Program, Nutrition and Physical Activity Unit.
- ▶ Pam York, at (651) 281-9831, pam.york@health.state.mn.us, MDH Consumer Food Safety Education Program, Nutrition and Physical Activity Unit.

CATEGORY: Environmental Conditions

TOPIC: SAFE WATER

The strategies below can be used to work on this topic.
Organizations that may play a role in implementing each strategy are indicated.

	Governmental Public Health Agencies	Health Plans	Hospitals & Clinics	Educational Systems	Community-based Organizations	Businesses/ Work Sites	Other
Inform citizens about water concerns and the ways in which their actions affect the environment.	State and Local			✓	✓	Well Contractors	Media, Public Utilities
Educate private well owners about well protection and maintenance, as well as regular water quality testing.	State and Local			K-12, Conferences for Professionals, Vocational-Technical Schools, U of M Extension		Real Estate Professionals, Well Contractors	State Education Associations, Media, Public Utilities
Develop and implement a wellhead protection plan for public wells.	State					Well Contractors	Public Utilities
Conduct education, training, technical assistance and certification for water operators.	State			Universities, Vocational and Technical Institutions			Public Utilities, MN Section of the Am. Water Works Assoc., MN Rural Water Assoc., MN Training Coalition
Develop education, technical assistance and enforcement options to assist local governments, businesses and individuals in preventing nonpoint sources of pollution.	State and Local			K-12, University of Minnesota	✓	✓	U.S. Environmental Protection Agency, MN Pollution Control Agency, MN Dept. of Natural Resources, Office of Environmental Assistance, MN Technical Assistance Program

Minnesotans are fortunate in that the state has one of the nation's highest rates of compliance with drinking water standards and construction codes. A great deal of emphasis has been placed on inspecting well construction and training water operators throughout the state, including those working with community water systems. Community water systems include municipalities as well as facilities like manufactured housing developments, nursing homes and housing subdivisions.

Achieving high rates of compliance with the federal Safe Drinking Water Act and the Minnesota Groundwater Protection Act contributes significantly to the quality of life here in Minnesota. The Safe Drinking Water Act sets compliance standards for contaminants, and provides mechanisms for replacing aging infrastructures including water treatment plants, storage facilities, wells and components of the distribution system. The Groundwater Protection Act authorizes the inspection of new wells for sanitary protection, and requires the proper sealing of old, abandoned wells, which can spread groundwater contamination.

Education is a key part of the process, both for the majority of Minnesotans who get water in their homes from public water systems and for those who have private well systems. Private well-system users must understand why it is important to test their water supplies regularly for nitrate and bacterial contamination and also be aware of nearby contamination sources that could affect their supplies. In addition, knowledge of the risks that abandoned wells pose to health and the environment will help to assure compliance with these regulations.

The Safe Drinking Water Act also addresses public notification. Users are alerted sooner to violations that may pose immediate and serious risks. The most significant portion of the landmark amendments to the Safe Drinking Water Act in 1996, in terms of public participation, is the requirement that community water systems publish an annual water quality report. The report contains basic information on each water system, including where it gets its water and the results of the preceding year's monitoring. This has a great impact on consumer awareness of drinking water issues.

Even where water sources are more plentiful, the need to protect or treat water exists. Safe drinking water results from work done by trained and dedicated water professionals. Proper construction and protection of supplies, licensing and oversight of well contractors, maintenance of a trained force of water supply operators, replacement or upgrade of aging drinking water treatment plants and facilities, and awareness of drinking water issues on the part of consumers are keys to maintaining an adequate supply of safe drinking water.

Strategy: Inform citizens about water concerns and the ways in which their actions affect the environment.

	Systems	Community	Individual
Primary	✓	✓	✓
Secondary			
Tertiary			

Background:

This strategy acknowledges that, while certified operators are responsible for

ensuring the safety of drinking water provided to consumers of public water systems, citizens play a key role in the process. Educated and informed citizens can do several things to protect drinking water supplies from contamination. Citizens are involved directly or indirectly in legislation that affects public water systems. They make decisions related to financial investments necessary for maintenance and upgrade of their local public water systems. With some contaminants - particularly lead and copper, which usually enter water after it has left treatment plants - citizens can take steps to protect themselves and their families.

Lead is a contaminant for which education is key. All community water systems have tested homes for lead during the 1990s. Those that exceeded a federally set action level have had to perform corrective actions, including an ongoing program of public education. This education informs citizens about the health effects of lead exposure, the way it enters drinking water, and simple steps they can take to reduce their exposure to lead in drinking water. The MDH has assisted all water supplies that have been required to provide this education and has monitored their compliance with the regulations. In addition, the MDH has performed an aggressive public education campaign on its own that is directed to all citizens of the state, not just those served by water systems that exceeded the federal action level. The MDH education occurs in many ways: fact sheets (written in Hmong and Spanish in addition to English), posters, refrigerator magnets, articles in publications such as *Minnesota Parent*, and appearances on radio and television shows. In addition, the lead message has been printed on the shopping bags of two major grocery store

chains (Cub and Rainbow) and one major discount chain (Target Stores) throughout Minnesota. Please refer to the Childhood Lead Poisoning section of the *Child and Adolescent Growth and Development* category for additional strategies to prevent childhood lead poisoning.

The Minnesota Department of Health (MDH) also produces a great deal of educational literature aimed at the general public. This literature may focus on specific issues, such as particular contaminants, or on general information about drinking water and how the program is administered at the state level to ensure that Minnesotans receive safe drinking water.

Since 1999, as mandated by the federal Safe Drinking Water Act, all community water supplies have been required to issue an annual water quality report to their customers. The MDH works with public water systems to assist them in developing and distributing reports, in addition to tracking compliance with the regulation. The MDH has issued its own Annual Drinking Water Report since 1995 and will continue to issue this report on a statewide basis.

Additional resources:

The MDH Section of Drinking Water Protection offers many fact sheets and brochures on a wide variety of topics (e.g., bacterial contamination, copper in drinking water, cryptosporidium, drinking water disinfection, the Drinking Water Revolving Fund, home water treatment units, lead poisoning, the responsibilities under the Safe Drinking Water Act of noncommunity public water systems, and the roles of water utilities and the Minnesota Department of Health in protecting drinking water). See the

information section below for ordering information.

Evidence for strategy:

Making information available to the public about health issues is a traditional and basic public health activity. It is known to change attitudes and increase awareness among the public about health issues.

Has this strategy been implemented in Minnesota?

Yes, the Community Water Supplies in Minnesota have a 100 percent compliance rate for conducting semi-annual public education activities regarding lead in drinking water, which is mandated for systems that have exceeded the federal action level. In addition, the federal Safe Drinking Water Act is implemented throughout Minnesota through the MDH Section of Drinking Water Protection.

Indicators for this strategy:

- ▶ Compliance rates for general regulations of the federal Safe Drinking Water Act.
- ▶ Specific public information activities carried out as a result of the regulations dealing with lead in drinking water.
- ▶ The issuance of annual water quality reports.

For more information contact:

MDH Environmental Health Division, at (651) 215-0700, Section of Drinking Water Protection.

Strategy: Educate private well owners about well protection and maintenance, as well as regular water quality testing.

	Systems	Community	Individual
Primary			✓
Secondary			
Tertiary			

Background:

Approximately 400,000 residences in Minnesota rely on a private well as their primary source of drinking water. Although new wells are required to be tested for bacteria and nitrate before they are placed into service, maintenance of the well and water testing thereafter is the responsibility of the well owner. The purpose of this strategy is to assure that owners of private wells understand the importance of proper well maintenance, well protection, and regular water testing.

It is equally important for well owners to understand the importance of sealing old, abandoned wells. Abandoned wells threaten groundwater by acting as channels for surface contaminants. The number of abandoned wells in Minnesota, estimated in 1989 at 750,000 to one million, is now being reduced at the rate of 13,000 per year.

The MDH Well Program provides every new well owner with information about testing and maintenance of wells, and is available for direct consultation on specific well problems. Program staff also participate in dozens of local water quality clinics each year. Additional ways to accomplish this strategy may include presentations to school classes or civic groups. In addition, MDH staff are available upon request to provide

local governments and others with education, training, and technical assistance in initiating local well sealing programs.

Additional resources:

None, presently.

Evidence for strategy:

Though this particular program has not been evaluated, it is well known that providing information to individuals can increase knowledge and change attitudes.

Conventional wisdom and experience indicate that most participants in this program become more knowledgeable about their wells and well water. In addition, many people express their appreciation for the consultation they receive at the water clinics, and through other direct contacts with MDH staff. The brochures are clearly useful as many thousands are requested and distributed each year.

Has this strategy been implemented in Minnesota?

Yes, the current strategy of the MDH Well Program includes providing: a fact sheet and general brochure to new well owners which covers basic information and provides instructions on how to obtain an MDH *Well Owner's Handbook*; a variety of brochures on well protection, water quality, sealing unused wells, etc.; or direct consultation with an MDH well specialist on specific well problems. Many of the same publications and brochures are also available on the MDH web site, and from many local environmental health agencies, offices of the University of Minnesota Extension Service, and licensed well contractors. In addition, the Well Program, in partnership with the Minnesota Department of Agriculture and various local agencies, annually co-sponsors

dozens of water quality (“nitrate”) clinics around the state, which present the opportunity for MDH professional staff to talk one-on-one with thousands of Minnesotans about private well protection and water quality issues. Staff of the MDH Well Program also provide direct training and education to well contractors, real estate brokers, staff of local governments, and others.

Indicators for this strategy:

- ▶ Number of requests for informational materials.
- ▶ Number of visits to web site pages.
- ▶ Number of requests for individual assistance.
- ▶ Number of persons attending nitrate clinics.
- ▶ Number of well problems addressed as a result of the outreach.

For more information contact:

MDH Environmental Health Division, at (651) 215-0811, Well Management Section.

Strategy: Develop and implement a wellhead protection plan for public wells.

	Systems	Community	Individual
Primary	✓		
Secondary			
Tertiary			

Background:

The purpose of this strategy is to prevent contaminants, which may have adverse effects on human health, from entering public water supply wells. The strategy is to develop and implement a plan that addresses the potential sources of contamination

within a delineated wellhead area. This planning is a requirement of Minnesota rules and statutes. A key part of the strategy is education and outreach. Target audiences for this education are public water supply officials; government officials having responsibilities related to the protection of drinking water, groundwater resources, and public health; and the general public, with special emphasis on reaching owners of potential contaminant sources as well as those who drink water from public sources.

Additional resources:

The MDH Source Water Protection Unit has hydrologists and planners on staff to assist public water suppliers in developing their plans.

Evidence for strategy:

Research consists of approximately four dozen communities that worked with MDH on a volunteer basis to pilot test the preparation and implementation of wellhead protection plans. The MDH has used the lessons learned through these pilot efforts to: (1) formulate the state wellhead protection rule, and (2) develop a full-scale implementation plan that will address all 960 community and 700 nontransient noncommunity water supply systems that will be brought into the wellhead protection program.

Has this strategy been implemented in Minnesota?

Yes, actual wellhead protection plans have been completed with 20 cities. Another 90 are now in the planning process.

Indicators for this strategy:

- ▶ Number of plans completed.
- ▶ Number of plans implemented.

- ▶ Updated list of communities with plans that are completed, or implemented, or both.

For more information contact:

MDH Environmental Health Division, at (651) 215-0700, Section of Drinking Water Protection.

Strategy: Conduct education, training, technical assistance and certification for water operators.

	Systems	Community	Individual
Primary	✓	✓	✓
Secondary			
Tertiary			

Background:

Minnesota has nearly 8,000 public water systems. The operators and people responsible for these systems must have the skills and knowledge necessary to provide safe drinking water to Minnesotans in their homes, schools, workplaces, and other venues such as restaurants and lodging establishments. The operators of many of these public water systems, those classified as Community Water Supplies or Noncommunity Nontransient Water Supplies, must be certified.

It is the responsibility of the MDH in conjunction with other agencies, councils, and associations to make sure those responsible for public water systems have the necessary skills and knowledge to operate the systems and protect public health. The MDH is involved in coordinating water operator training throughout the state. The training comes in

the form of one- and three-day operator schools, teleconferences, and special seminars. The MDH works with other groups in administering the training. These groups include the Minnesota Section of the American Water Works Association, Minnesota Rural Water Association, and the Minnesota Training Coalition. The MDH also communicates these training opportunities to all certified operators and city administrators in Minnesota as well as other interested parties.

Technical assistance is provided by on-site visits to all public water systems in Minnesota by MDH field engineers and public health sanitarians.

Certification of operators of Community Water Supplies and Noncommunity Nontransient Water Supplies is mandated by Minnesota Statute. The MDH certification officer administers the statewide certification program. To be certified, a water operator must fulfill specific education and experience requirements and pass an examination and must attend ongoing training to maintain the certification. The MDH certification officer oversees all aspects of this program.

Additional resources:

Bibliographic resources:

- ▶ Minnesota Department of Health. *Annual Drinking Water Report*. For more information see the website for strategies resources at: www.health.state.mn.us/strategies/. Click on “MDH Annual Drinking Water Report”.
- ▶ *MDH Water Works Operators’ Study Guide*. IC 141-0133. Contact: MDH Drinking Water Protection Section, at

(651) 215-0770.

- ▶ *Minnesota Water Works Operations Manual*. Contact: Minnesota Rural Water Association, at (218) 685-5197, <http://www.mrwa.com/>

Organizational resources:

- ▶ American Water Works Association at (303) 347-6170, <http://www.awwa.org>
- ▶ American Water Works Association, Minnesota Section, <http://www.winternet.com/~breeze/>
- ▶ Minnesota Rural Water Association, at (218) 685-5197, <http://www.mrwa.com/>
- ▶ Minnesota Training Coalition, at (651) 215-0771.
- ▶ U. S. Environmental Protection Agency, <http://www.epa.gov>

Evidence for strategy:

There are high rates of compliance of Minnesota public water systems with regulations of the federal Safe Drinking Water Act. This information is documented in the Drinking Water Annual Report, which has been issued by the MDH every year since 1995.

Has this strategy been implemented in Minnesota?

Yes, the strategy has been implemented through the MDH and the state Operator Certification Council and backed up by Minnesota rules and statutes.

Indicators for this strategy:

- ▶ Compliance of public water systems with standards and regulations of the federal Safe Drinking Water Act.
- ▶ Maintenance of pass/fail rates on certification examinations.

For more information contact:

MDH Environmental Health Division, at (651) 215-0700, Section of Drinking Water Protection.

Strategy: Develop education, technical assistance, and enforcement options to assist local governments, businesses, and individuals in preventing nonpoint sources of pollution.

	Systems	Community	Individual
Primary	✓	✓	✓
Secondary	✓	✓	
Tertiary	✓		

Background:

This strategy broadly covers the myriad impacts that individuals, local governments, and businesses have on nonpoint source pollution. Nonpoint sources, which are widely distributed small sources rather than large-volume permitted or regulated point sources, include the following:

- ▶ Animal feedlots, which can contribute to nitrate and bacteria contamination of ground water used for drinking, surface water contamination affecting water (such as rivers or lakes) used for drinking water, and air quality, through release of hydrogen sulfide and ammonia.
- ▶ Storm-water run-off, which includes motor vehicle fluids, herbicides, pesticides, fertilizers, improperly disposed-of household hazardous wastes, and compostable yard waste, all of which can adversely affect ground or surface water sources used for drinking.
- ▶ Individual sewage treatment systems, which, when improperly located, used,

or maintained, can contaminate private residential wells with nitrate and bacteria.

- ▶ Motor vehicle emissions and fluid releases, which have a major impact on water and air quality, including elevating carbon monoxide levels, increasing ozone, elevating air toxics, contributing to global climate change, and contaminating ground and surface water.
- ▶ Asbestos, which was once widely used as an insulator and construction material, including in hospitals and schools, and which, when released into the air during demolition and removal, can cause lung disease.
- ▶ Leaking underground storage tanks, which are commonly found associated with gas stations, small businesses, farms, and residences with fuel oil heat, and which can release a variety of chemicals to the ground and surface water.
- ▶ Improper disposal of solid waste, including backyard farm dumps, old municipal unpermitted dumps, open burning of yard waste, waste tire abandonment, and illegal dumping, which can contribute to contamination of air, water, and land and possible mosquito-borne illness.
- ▶ Ozone-depleting chemicals, such as chlorofluorocarbons (CFCs), resulting in damage to protective layers of the atmosphere.
- ▶ Mercury, a priority pollutant, which is released into the environment and accumulates in fish tissue as the result of improper disposal of mercury switches, thermostats, thermometers, medical equipment, and other sources.

While regulation and enforcement are important components of reducing nonpoint sources of pollution, education and technical assistance can be more effective in reducing such widely distributed small sources and achieving major reductions in environmental pollutants. This process must, of necessity, involve all sectors of society, from the individual to government to private industry.

Additional resources:

Bibliographic resources:

- ▶ Minnesota Pollution Control Agency (MPCA) offers hundreds of general and industry specific fact sheets on best management of wastes, <http://www.pca.state.mn.us>.
- ▶ U.S. Environmental Protection Agency, has publications, <http://www.epa.gov>.
- ▶ Waste Education Clearinghouse, Office of Environmental Assistance, at (651) 215-0232 or (800) 877-6300. It has a wealth of resources on waste reduction, pollution prevention, recycling, and other topics.

Organizational resources:

- ▶ County household hazardous waste programs, solid waste officers, and water planners have substantial local expertise and resources.
- ▶ Local watershed districts, soil and water conservation districts, and lake associations.
- ▶ Association of State and Territorial Solid Waste Management Officials, at (202) 624-5828.
- ▶ Board of Water and Soil Resources, at (651) 296-3767 or (888) 234-1133.
- ▶ Minnesota Department of Natural Resources, at (651) 296-6157.
- ▶ Minnesota Technical Assistance Program, at (612) 627-4646.

- ▶ Recycling Association of Minnesota, at (651) 486-0455.
- ▶ University of Minnesota Extension Service, at (612) 625-1915, or Info-U, a 24-hour consumer information line, (612) 624-2200.

Evidence for strategy:

In each area of nonpoint source pollution, research has demonstrated the effects of educational strategies in reducing emissions to the environment.

Has this strategy been implemented in Minnesota?

Yes, this strategy has been implemented throughout the state and nation, but with particular success in given areas. Among the examples of education and technical assistance approaches in Minnesota:

- ▶ Educational efforts directed toward the agricultural community about nonpoint sources and best farming practices, including a manual of best practices for the environment.
- ▶ Minnesota River project, a multi-year, multi-million-dollar effort to work with local communities along the river to minimize nonpoint source impacts.
- ▶ Lake Superior project, an education and assistance campaign to reduce improper disposal of hazardous wastes to protect the lake.
- ▶ Feedlot education efforts, including articles, a videotape, fact sheets, and public meetings.
- ▶ A best management practices guide for cities to reduce nonpoint source pollution and run-off in urban areas.
- ▶ Programs to collect household hazardous wastes, educate the public about such waste and their proper disposal, encourage waste reduction and recycling,

and provide streamlined mechanisms for very small quantity generators of hazardous waste to use public facilities.

- ▶ Educational efforts such as “AutoFocus” newsletter, the Motor Vehicle Salvage Yard initiative, used oil and antifreeze collection systems, and a best practices.
- ▶ A baseline five-year report detailing the current status of Minnesota ground water as regards major contaminants, as well as a study of the impacts of land use on ground water, as elements to increase awareness among citizens and aid local government in identifying problems and planning for the future.
- ▶ Brochures for the general public on common air quality problems associated with motor vehicles, as well as major reports on air quality and status.
- ▶ Training for construction and demolition contractors to instruct them on how to remove harmful substances before building renovation or destruction.
- ▶ Storage tank educational efforts, such as newsletters and fact sheets.
- ▶ A mercury task force, working with partners at all levels of government and industries, to reduce mercury releases to the environment.
- ▶ Abandoned Waste Pilot Project, working with communities to prevent illegal dumping and manage abandoned wastes.

Indicators for this strategy:

- ▶ Air, water, and soil monitoring, including both problem specific testing and ambient data collection.
- ▶ Computer modeling using data collected to predict or identify problems or trends.

For more information contact:

Depending upon the topic, a number of Minnesota Pollution Control Agency staff

can provide advice and assistance in implementing this strategy. To locate the appropriate resource, call (651) 296-6300 (Metro area) or toll-free/TDD (800) 657-3864.

Special notes:

The MPCA also implements point source, cleanup, and emergency response efforts to prevent contamination of water supplies.