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## Applying a General Best Practices Identification Framework to Environmental Health

**Editor's Note:** NEHA strives to provide up-to-date and relevant information on environmental health and to build partnerships in the profession. In pursuit of these goals, we feature a column from the Environmental Health Services Branch (EHSB) of the Centers for Disease Control and Prevention (CDC) in every issue of the *Journal*.

In this column, EHSB and guest authors from across CDC will highlight a variety of concerns, opportunities, challenges, and successes that we all share in environmental public health. EHSB's objective is to strengthen the role of state, local, tribal, and national environmental health programs and professionals to anticipate, identify, and respond to adverse environmental exposures and the consequences of these exposures for human health.

The conclusions in this article are those of the author(s) and do not necessarily represent the views of CDC.

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Environmental health is the second largest public health professional sub-discipline, therefore it has significant potential for impact (University of Michigan, 2013). Several realities have recently become firmly rooted at all levels: greater number of and more complicated demands; more constrained resources (human and fiscal); and increased calls to prove efficiency, efficacy, and impact. The following recent federal statements illustrate this point.

- The Office of Management and Budget issued guidance to agencies to “build on the President’s vision for growth, opportunity, and national security by *reducing spending on lower priority programs in order to create room for effective investments*

*in areas that remain critical* (White House Office of Management and Budget, 2014).”

- The National Prevention Council recommended that public health agencies and their partners “*identify and implement strategies that are proven to work and conduct research where evidence is lacking* (National Prevention Council, 2011).”

These statements underscore the need, where multiple options exist, to choose the one with the highest likelihood of producing the largest impact. Within environmental health programs it is critical to be able to demonstrate that current interventions have gone through periodic evaluations to determine that they continue to represent best practices with demonstrated success in the field.

Several sources are available for identifying interventions with a high evidence base, including the U.S. Taskforce for Community Preventive Services ([www.thecommunityguide.org/](http://www.thecommunityguide.org/)) and the Cochrane Collaboration ([www.cochrane.org](http://www.cochrane.org)). The challenge facing environmental health practitioners is what to do when multiple responses to a threat exist and no recommendation comes from the taskforce or similar sources. Centers for Disease Control and Prevention (CDC) staff confronted this challenge by creating a “Conceptual Framework for Planning and Improving Evidence-Based Practices (Spencer et al., 2013).”

The author and CDC colleagues conducted a literature review regarding best practices. We found that “best practice” and related terms do not refer to a static state but rather to *where on a continuum* a practice falls at a given time. We adopted the following definition of best practice: “a practice supported by a rigorous process of peer review and evaluation indicating effectiveness in improving health outcomes, generally demonstrated through systematic reviews.” Supporting this definition, Rooney and co-authors (2014) have validated systematic reviews for environmental health.

The conceptual framework consists of two interrelated components: *public health impact* and *quality-of-evidence* (Figure 1). The impact component includes effectiveness, reach, feasibility, sustainability, and transferability (see Sidebar on page 41) The quality-of-evidence component includes four evidentiary levels: weak, moderate, strong, and rigorous (see Sidebar on page 42). At the intersection of the axes, a continuum of practice emerges.

FIGURE 1

**A Conceptual Framework for Planning and Improving Evidence-Based Practices**



So, how might each of the framework's elements apply to environmental health?

**Public Health Impact**

- **Effectiveness**—Within the framework's definition of effectiveness, both *effect magnitude* and *equity* are key. Environmental health improvements (along with vaccination) have demonstrated significant results, receiving credit for much of the increase in U.S. longevity in the 20th century (Koplan & Fleming, 2000). Additionally, via environmental justice efforts, environmental health has demonstrated impact in the area of equity (Cook, 2008).
- **Reach**—Given the ubiquitous nature of the environment, the potential reach of environmental health interventions is often greater than others. Examples include the reach of

smoke-free environments legislation (Tan & Glantz, 2012) and removal of lead from gasoline (Sexton, Needham, & Pirkle, 2004). In addition, compared to efforts to prevent transportation-related injuries through education, environmental interventions such as modifying road environments may have greater reach (Walsh, 2012).

- **Feasibility**—As to feasibility, because of its long practice history and related documented successes, environmental health has significant advantages in demonstrating and communicating feasibility (e.g., retail food inspections and food handler training: Campbell et al., 1998, and healthy housing: Jacobs et al., 2010).
- **Sustainability**—Sustainability may be environmental health's area of greatest advantage. Unlike educational interventions that

**Elements of Public Health Impact and Examples of Questions to Consider Related to the Elements**

**Effectiveness:** Extent to which the practice achieves the desired outcomes

1. What are the practice's desired outcomes?
2. How consistent is the evidence?
3. What is the magnitude of the effect, including efficiency or effectiveness or both, as appropriate?
4. What is the significance to public health, systems, or organizational outcomes?
5. What are the benefits or risks for adverse outcomes?
6. In considering benefits or risks for adverse outcomes, does the practice promote health equity?
7. To what extent does the practice achieve the desired outcomes?

**Reach:** Extent that the practice affects the intended and critical target population(s)

1. What is the practice's intended and critical target population (individuals, customers, staff, agency, and other target populations)?
2. What beneficiaries are affected?
3. What is the proportion of the eligible population affected by the practice?
4. How much of the population could ultimately be affected (potential reach)?
5. How representative are the groups that are currently affected compared with groups ultimately affected by the problem?
6. In considering representativeness, does the practice promote health equity?
7. To what extent does the practice affect the intended and critical target population(s)?

**Feasibility:** Extent to which the practice can be implemented

1. What are the barriers to implementing this practice?
2. What are the facilitators to implementing this practice?
3. What resources are necessary to fully implement the practice?
4. Does the practice streamline or add complexity to existing procedures or processes?
5. What is the cost-effectiveness and what are the available resources to implement the practice?

*continued on page 42*

**Elements of Public Health Impact and Examples of Questions to Consider Related to the Elements**

*continued from page 41*

**Sustainability:** Extent to which the practice can be maintained and achieve desired outcomes over time

1. How is the practice designed to integrate with existing programs or processes or both?
2. How is it designed to integrate with existing networks and partnerships?
3. What level of resources is required to sustain the practice over time?
4. What long-term effects or maintenance or improvement of effects over time can be achieved?
5. How has the practice been maintained to achieve its desired outcomes over time?

**Transferability:** Extent to which the practice can be applied to or adapted for various contexts

1. How has the practice been replicated in similar contexts, and did it achieve its intended outcomes?
2. Was adaptation required in different contexts?
3. How has the practice been adapted?
4. What is the impact of varying political, organizational, geographic, social, and economic climates?
5. Has the practice been proven to be effective in different settings?
6. To what extent has the practice been applied to or adapted for a variety of contexts?

must be repeated to maintain efficacy, environmental interventions—whether removing a hazard or modifying the environment to create facilitators/protectors for health—are often more sustainable.

- **Transferability**—Because many of the most well-studied and deployed areas of environmental health represent policies (restaurant inspection) or environmental engineering standards (water purification, transportation engineering) their transferability is easier.

**Quality of Evidence**

The quality of evidence in areas of significant environmental health involvement (e.g., surveillance [Charreire et al., 2014], food safety

**Definitions and Examples Related to Levels of the Evidence Quality Supporting Public Health Practices**

Level of Evidence	Definitions and Examples
Weak	Field-based summaries or evaluations in progress that have plausible impact (e.g., abstracts, book chapters without peer review, demonstration projects lacking appropriate evaluation)
Moderate	Intervention evaluations without peer review of practice or publication that have evidence of impact (e.g., case studies with appropriate evaluation, evaluation reports, peer-reviewed abstracts and presentations)
Strong	Case-control or cohort analytic studies; peer-reviewed journal publications; published reports from consensus panels such as the Advisory Committee on Immunization Practices (e.g., nonsystematic review of published intervention evaluations with peer review of practices that have evidence of impact)
Rigorous	Intervention evaluations or studies with systematic review that have evidence of impact (e.g., meta-analyses, Guide to Community Preventive Services)

[Campbell et al., 1998], indoor air quality [Tan & Glantz, 2012], and built environments [Taskforce for Community Preventive Services, 2014a]) has improved greatly. More practice areas have access to research that falls in the categories of rigorous or strong. And in areas with moderate or weak evidence, environmental health practitioners can learn from past successes within the discipline to improve the evidence base. One example is the Taskforce for Community Preventive Services's recommendation for home-based multi-trigger, multicomponent environmental interventions (2014b). Building on successes like these, it seems very possible for environmental health practice to move rapidly along the continuum towards best practice.

**Conclusion**

We developed the framework to begin a dialogue and to encourage further evaluation of current and emerging practices in every public health discipline. It is our hope that the ongoing dialogue will increase our collective efficiency and efficacy, ensure the public's confidence in their public health investments, and improve our collective ability to predict and respond to new challenges. It is my individual hope that environmental health practitioners will not only engage others, but will lead the way in pursuing the very best practices possible in all our activities. 🐾

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