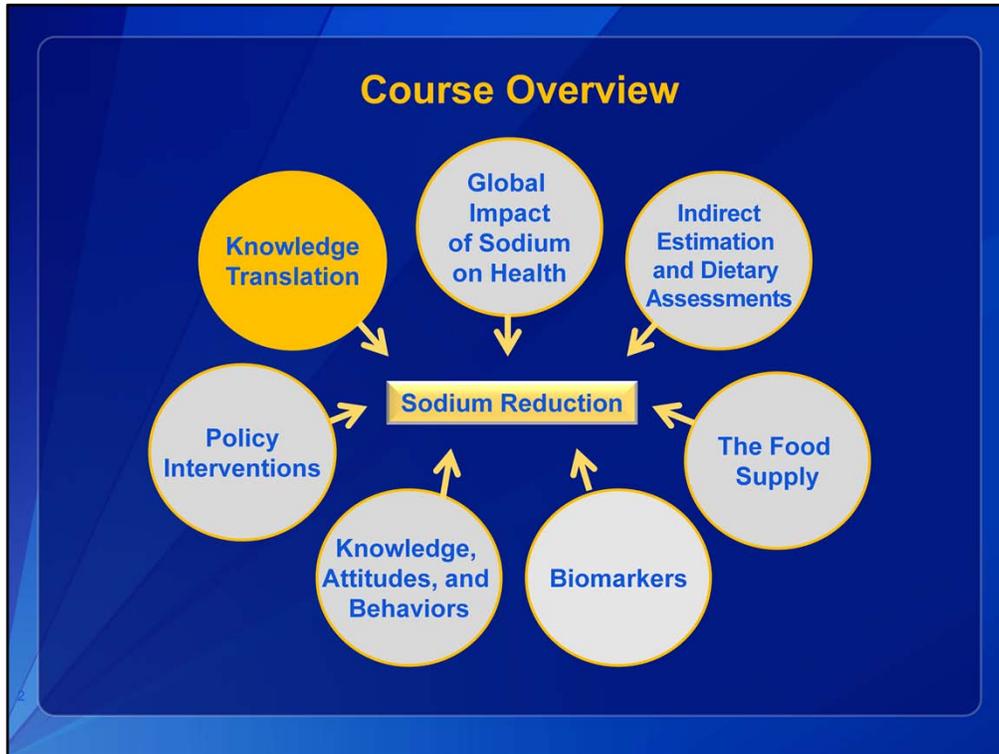


This module is part of the Centers for Disease Control and Prevention’s Sodium Reduction Toolkit: A Global Opportunity to Reduce Population-Level Sodium Intake. The toolkit is designed to provide government agencies, international organizations, and other stakeholders with a brief overview, tools, and information necessary to inform strategies to reduce population-level sodium intake.

The synthesis, exchange, and application of knowledge by relevant stakeholders to accelerate the benefits of global and local innovation in strengthening health systems and improving people's health.¹



This module in the Sodium Reduction Toolkit covers the process of translating and sharing evidence-based research. Other modules in the toolkit provide information about the global impact of sodium on health; methods to evaluate sodium intake through biomarkers, indirect estimation, and dietary assessments; analysis of sodium in the food supply; knowledge, attitudes, and behaviors related to sodium intake and health; and strategies for using sodium-reduction policy interventions to reduce sodium intake. Each module also includes examples and a list of top 10 resources.

Please note that throughout this module, the term “salt,” also known as sodium chloride, is not synonymous with the term “sodium.” Modules in this series use the term “salt” when referring to sodium chloride and sodium when referring to sodium. A list of conversions for salt and sodium is available on the toolkit web page.

Objectives

1. Provide an overview of sodium reduction evaluation
2. Discuss key evaluation principles
3. Discuss disseminating best practices in sodium reduction strategies
4. Provide select examples of knowledge translation

The World Health Organization defines knowledge translation as the “synthesis, exchange, and application of knowledge by relevant stakeholders to accelerate the benefits of global and local innovation in strengthening health systems and improving people's health.”¹

Or, to put it simply, knowledge translation means taking knowledge, or important information, and making it useful to improve health.

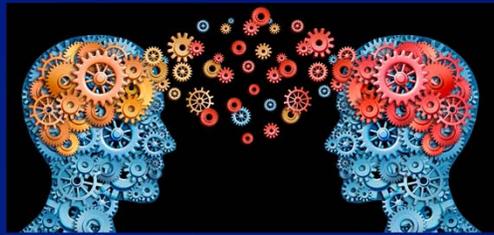
The objectives of the Knowledge Translation module are to:

1. Provide an overview of sodium reduction evaluation.
2. Discuss key evaluation principles.
3. Discuss disseminating best practices in sodium reduction strategies.
4. Provide select examples of knowledge translation.

Please note that the examples and recommendations provided should be used for training purposes only and do not necessarily imply that they are appropriate for use in your country.

Background

- ❑ Knowledge translation is traditionally used in clinical medicine.
- ❑ It provides an opportunity to use research and data optimally to guide decision-making.
- ❑ **Common terms:**
 - Uptake
 - Research utilization
 - Diffusion
 - Implementation science
 - Knowledge transfer
 - Dissemination
 - Knowledge to action
 - Adoption

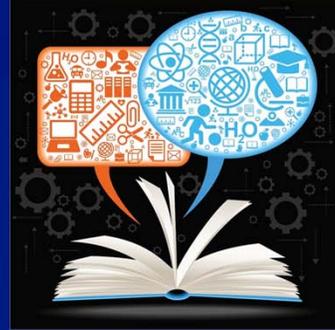


Historically, knowledge translation was used in clinical medicine to identify the gap between what was known and what was practiced. Today, knowledge translation aims to connect current data with evidence-based best practices to create new initiatives that improve health.

In sodium reduction efforts, knowledge translation helps prioritize research to create policy and improve health. Knowledge translation can also be referred to as uptake, research utilization, diffusion, implementation science, knowledge transfer, dissemination, knowledge to action, and adoption.²

Health Research and Knowledge Translation

- **Goal of health research:**
Advance scientific knowledge
- **Goal of knowledge translation:**
Use scientific knowledge to improve health



The goal of health research is to increase scientific knowledge in medicine and health. The goal of knowledge translation is to turn health research into a public good and to improve health.^{3,4}

For example, in 1964, the U.S. Surgeon General released the first report of the Surgeon General's Advisory Committee on Smoking and Health. Using health research and more than 7,000 articles relating to smoking and disease, the committee concluded that cigarette smoking is harmful and should be avoided.

Since 1965, the U.S. government has translated this knowledge into action, including requiring a health warning on cigarette packages, banning cigarette advertising in broadcast media, and enacting various laws and policies limiting firsthand and secondhand cigarette smoke. These efforts greatly decreased consumers' use of tobacco, ultimately achieving the goal of knowledge translation and improved health.⁵

Knowledge Translation: Benefits

- **Knowledge translation fills the gap between research and implementation.**
- **Knowledge translation and sodium reduction:**
 - The adverse health effects of sodium have been known for decades, but effective sodium reduction strategies have yet to be put in place in most parts of the world.

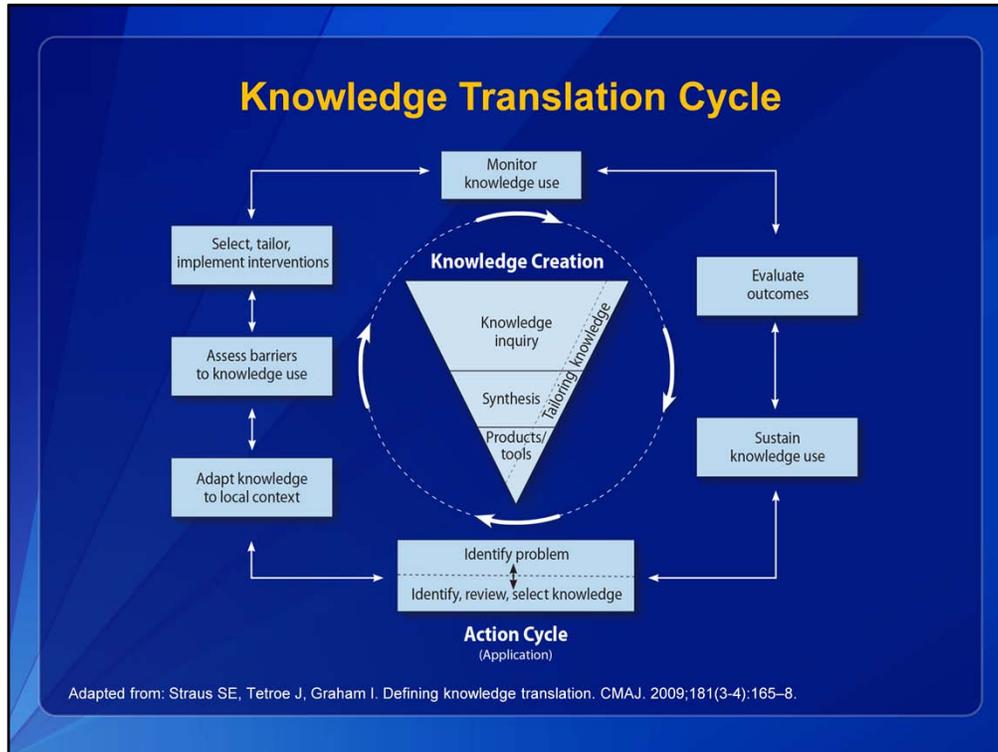
Knowledge translation can fill in gaps between sodium reduction research and policy intervention. As the Institute of Medicine noted in its 2010 report, the health effects of sodium have been known for decades, but effective sodium reduction strategies have yet to be put in place in most parts of the world.⁶

Knowledge Translation: Limitations

- ❑ **Complexity of health conditions**
- ❑ **Volume and limitations of research**
- ❑ **Individual adherence or priorities**
- ❑ **Health care providers' attitudes, skills, and practice patterns**
- ❑ **Health care systems' financial incentives and disincentives**
- ❑ **National governments' priorities**
- ❑ **Systems' competing or conflicting priorities**
- ❑ **Lack of monitoring and evaluation**

Several factors may be barriers to knowledge translation. Among these are the sheer volume of research available that needs careful analysis, the complexity of certain issues, individual and government priorities, health care providers' attitudes, health care system incentives, systems with competing or conflicting priorities, and lack of monitoring and evaluation.

These limitations can be barriers in the implementation of specific knowledge translation rather than limitations of knowledge translation as a practice. These barriers can also be used to help an organization or government adapt an intervention to fit the needs of a population, to be sustainable in the current environment, and to ensure that interventions are financially sustainable.⁴



Dr. Sharon E. Straus and her colleagues created a framework that can be useful in understanding knowledge translation.⁷ The framework provides several steps to follow to achieve knowledge translation. The framework includes steps in an action cycle that range from the identification of a problem to creating a sustainable program or policy.

The first step of the action cycle is identifying the problem, which is followed by reviewing and selecting knowledge to implement, adapting knowledge to the local context, assessing determinants and barriers of knowledge use, tailoring and implementing interventions, monitoring those interventions, evaluating outcomes, and, finally, determining strategies for sustainability.

The first step of the action cycle, identifying the problem, refers to a thorough investigation into the most recent and relevant available literature related to the existing problem. Next, adapting knowledge to the local context is an important step in ensuring the success of a program or policy. Assessing determinants and barriers of knowledge use is helpful in preventing possible errors. Tailoring, implementing, and monitoring programs are essential to staying on track. Evaluating outcomes is necessary to assess the success of the program, and determining strategies for sustainability is crucial in ensuring a program's future.

Example: United Kingdom

□ Background

- In 2003, Scientific Advisory Committee on Nutrition (SACN) published report linking salt intake to high blood pressure.
- U.K. Food Standards Agency (FSA) and Department of Health committed to reducing salt intake at the population level.

□ Multisector Approach

- FSA worked with industry, manufacturers, procurement bodies, voluntary organizations, and retail and trade associations.
- Public awareness campaign to show sodium as a public health issue.

The United Kingdom provides an example of using knowledge translation to create a comprehensive, multisector sodium reduction initiative. In 2003, the government's Scientific Advisory Committee on Nutrition published a literature review and report, concluding that the link between high salt intake and high blood pressure was stronger than originally thought.⁸ As a result of this report, the government made a commitment to reduce salt intake on a population level using a multisector approach.

The government began by working with stakeholders including food industry representatives, manufacturers, procurement bodies, voluntary organizations, and retailers and trade associations. The government also conducted a public awareness campaign.

Example: United Kingdom

□ Overcoming Challenges

- Major concerns: consumer acceptance, technological barriers, and safety
- Created a set of guidelines for bakers, manufacturers, and industry

□ Monitoring Success

- Reduction in average salt intake of 0.5 g at the population level
- Monitor levels of salt in processed foods
- Created databank as a reference

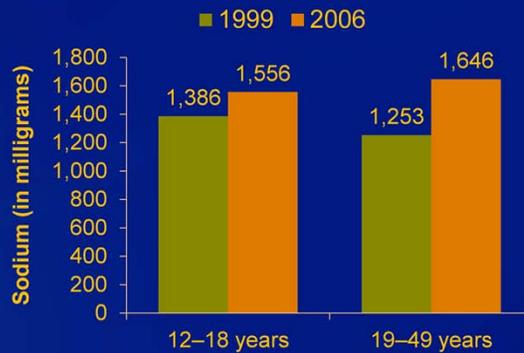
Some of the challenges that the government faced in implementing a salt reduction initiative were consumer acceptance, technological barriers, and perceived safety. These also were among the major concerns of various stakeholders.

To address these concerns, the government measured the effects of sodium reduction in products and has been able to create a set of guidelines for bakers, manufacturers, and industry. To monitor the impact of the initiative, population sodium intake has been measured via urinary sodium analysis. Results have shown success by a reduction in average salt intake of 0.5 grams. In addition, levels of salt in processed foods have been monitored, and a databank was designed as a reference tool to provide indicative information on levels of salt in food.

Example: Mexico

- **High mortality rates from chronic diseases**
 - Ischemic heart disease and cerebrovascular disease among the top 5 causes of death in 2004
- **61% increase in chronic diseases from 2000 to 2008**
 - High blood pressure, cardiovascular disease, cerebrovascular disease

Sodium consumption trends in Mexico on the rise



Mexico provides another example of using knowledge translation for sodium reduction. Heart disease and stroke were among the top five leading causes of death in 2004,⁹ and there has been a 61 percent increase in chronic diseases from 2000 to 2008, including high blood pressure, cardiovascular disease, and cerebrovascular disease.^{10,11}

Example: Mexico

□ Task Force Formation

- National Task Force focuses on healthy foods to prevent overweight and obesity (“El Acuerdo Nacional para la Salud Alimentaria, Estrategia contra el sobrepeso y la obesidad”)
- Set objectives to counter high blood pressure

□ Task Force Recommendations

- Reduce daily sodium intake by reducing the amount of sodium added to foods prepared at home
- Increase availability and accessibility of low and no sodium products

□ Sustainability

- Partnered with 15 different governmental divisions to support institutionalization of recommendations and sustainability

Mexican policymakers first formed a National Task Force that focuses on healthy foods to prevent overweight and obesity. The task force was responsible for setting objectives to prevent high blood pressure, among other diseases.

The task force recommended that less salt should be added to foods prepared at home. It also recommended that more low- and no-sodium products should be available in retail outlets.

The task force addressed sustainability of the initiative by partnering with 15 governmental divisions to support institutionalization of recommendations.

Example: Chile

□ Background

- Mortality attributable to high blood pressure is high (cerebrovascular mortality double the rate of the United States).
- By law, citizens have guaranteed access to testing and treatment; however, in practice, access is not universal.
- High blood pressure awareness, control, and treatment are low.

□ Task Force Formation

- Multisector Chilean National Task Force formed in November 2008 to help reduce sodium intake in the Chilean population
- Representation from the Ministry of Health, Pan American Health Organization, industry, academia/scientific societies, nongovernmental organizations, and consumers

Yet another example of sodium reduction through knowledge translation can be seen in Chile, where deaths from high blood pressure and excessive sodium intake are prevalent, with stroke death rates almost double that of the United States.

By law, all Chilean citizens are guaranteed access to testing and treatment for high blood pressure. However, according to the Chilean National Task Force, cost-effective, population-wide prevention methods have not been widely implemented. Awareness, treatment, and control of high blood pressure are low in Chile.

In 2008, the National Task Force was formed to review existing best practices and translate them to a Chilean context. The task force aims to reduce sodium intake in the Chilean population and has representation from the Ministry of Health, Pan American Health Organization, food industry, academia and scientific societies, nongovernmental organizations, and consumers.

The task force estimates that a reduction of 4 millimeters of mercury in average systolic blood pressure would avoid 1,254 deaths each year and 35,281 disability-adjusted life years.⁹

Example: Chile

- **Sodium Reduction in Foods (*in progress*)**
 - Food industry to voluntarily lower sodium content
 - Bread industry expressed preference for mandatory regulation and financial incentives
 - Future regulation of labeling and monitoring of health claims
- **Monitoring, Evaluation, and Sustainability**
 - Urinary sodium excretion measurements through spot collection as part of Chile's 2nd National Health Survey
 - National food survey 2009–2010

Translating the evidence in a way that made stakeholders and the Chilean population understand the number of lives at stake due to high salt intake helped bring public attention and action to the issue.

With the help of the National Task Force, the majority of the food industry is voluntarily lowering sodium in their foods.⁹ In contrast, bread producers have noted a preference for regulation and financial incentives to ensure universal compliance within their industry. Bread is the main staple food in Chile, and significant reductions in the sodium content in bread could have widespread positive implications.

Mandatory labeling of packaged foods also has been implemented in Chile, including sodium labeling, and health claims on packaged foods are now monitored and regulated.⁹

In 2009 to 2010, Chile assessed national dietary sodium consumption with a national food survey and monitored urinary sodium excretion measurements through spot collection as part of its Second National Health Survey.¹² These efforts allowed the task force to gain baseline data to support its sodium reduction policies and eventually lower rates of high blood pressure and heart disease.

Example: China

□ Background

- Higher levels of high blood pressure and mortality caused by stroke and cardiovascular disease in Tianjin than in other similar cities
- National survey discovered excessively high intake of salt in the Tianjin population

□ Reviewing and Selecting Knowledge to Implement

- Multipronged community-based approach:
 - Education
 - Local street committee
 - Communication posters and stickers
 - Special measuring spoons
 - Availability of special mineral salts

Shifting focus to Asia, we can take a look at a sodium reduction initiative in the city of Tianjin in northern China. Tianjin is one of the three largest cities in the country, with deaths caused by stroke and cardiovascular disease accounting for more than 50 percent of all deaths, a rate that is higher than in other Chinese cities.¹³

A community-based approach to cardiovascular disease prevention had been tested in the North Karelia Project, through which preventive interventions were targeted to reach the whole population, not just people living with a chronic condition or those at high risk. The project was shown to be feasible, so the Tianjin Project decided to implement a version of this intervention.⁷

The Tianjin Project implemented a multipronged community-based approach in which education was a priority, local street committees were stationed as “on the ground” support, a communication campaign was created using posters and stickers, special measuring spoons were distributed to families to measure salt added to foods, and availability of special lower-sodium mineral salts was guaranteed in all retail stores in the intervention area.

Example: China

- **Adapting Knowledge to Local Context**
 - Much sodium in the Chinese diet comes from sodium added while cooking.
 - Interventions aimed to reduce salt added while cooking rather than decreasing salt from food supply as in some previous examples.
- **Determinants and Barriers of Knowledge Use**
 - Worked with salt manufacturers and retail stores to ensure the availability of mineral salt in all retail stores in intervention area.

The Tianjin Project understood that the majority of sodium in the Chinese diet comes from salt added while cooking. Therefore, interventions aimed to reduce added salt rather than decrease sodium in the food supply, as in some of the previous examples.

The Tianjin Project's work with salt manufacturers and retail stores ensured the availability of mineral salt for individuals wishing to try new recipes and salt alternatives.

Example: China

□ Outcomes

- Significant reduction in systolic blood pressure in men and women in the intervention area without significant changes in body weight.
- Researchers attributed reductions in high blood pressure to sodium reduction as opposed to weight loss.

□ Sustainability

- Results indicate that community-based approach is feasible in promoting sodium reduction in Chinese populations.

The Tianjin Project was successful in reducing dietary sodium intake for city residents and in significantly reducing systolic blood pressure in men and women. The mean sodium intake fell 22 millimoles per day in men and 11 millimoles per day in women within the intervention period. Researchers attributed reductions in blood pressure to sodium reduction because body weight, another major contributor to high blood pressure, did not decrease.

This intervention showed that translating current research and evidence into a community-based approach can be a feasible approach to promoting sodium reduction in Chinese populations.

Example: Canada

- ❑ **Successfully translated high blood pressure reduction research into policy**
- ❑ **Translating policy into sodium reduction is a work in progress**
- ❑ **Sodium task force created to help inform and guide knowledge translation efforts; works to increase cooperation between stakeholders**
- ❑ **Monitors and evaluates evidence-based practices**

Finally, we can look at a Canadian example of using knowledge translation in sodium reduction.

Canada has been successful in translating high blood pressure reduction research into policy and in creating a sodium task force to reduce population-level sodium intake. In 2006, a work group reviewed current data, trends, and research to create a strategy aimed at reducing sodium consumption and rates of high blood pressure.¹⁴

The work group has developed tools to help inform health care professionals, the public, government agencies, and the food industry of evidence about dietary sodium from credible scientific organizations. The work group designed a plan to involve a broader range of partners, from individuals to health care providers to the private sector and government agencies.

The work group aims to continue the process of evaluating evidence-based practices, increasing cooperation between stakeholders, and monitoring the environment to ensure that dietary sodium reduction and, more broadly, high blood pressure reduction are sustainable in the long term.

Review

- ❑ **Identifying the problem**
- ❑ **Reviewing and selecting knowledge to implement**
- ❑ **Adapting knowledge to local context**
- ❑ **Assessing determinants and barriers of knowledge use**
- ❑ **Tailoring, implementation, and monitoring of interventions**
- ❑ **Evaluating outcomes**
- ❑ **Determining strategies for sustainability**

Adapted from: Straus SE, Tetroe J, Graham I. Defining knowledge translation. CMAJ. 2009;181(3-4):165-8.

In summary, the main steps in the knowledge translation framework discussed in this module are identifying a problem; reviewing and selecting knowledge; adapting knowledge to the local context; assessing determinants and barriers of knowledge use; tailoring, implementing, and monitoring the intervention; evaluating outcomes; and determining strategies for sustainability.

Organizations, stakeholders, and governments can use these steps to create, implement, and evaluate effective and sustainable programs and policies.

Considerations

- ❑ Many frameworks that describe knowledge translation are available.
- ❑ Research and best practices must inform all public health interventions.
- ❑ Dissemination of knowledge is crucial for public health impact.



This module highlights several frameworks of knowledge translation; however, many more are available. Various examples of sodium reduction have shown that research, best practices, and the adaptation of those best practices to a local context are important in the implementation of public health interventions. Finally, without dissemination for knowledge, research remains research. Once this research is disseminated and implemented, it can effect change and improve public health.

Top 10 Resources

1. Brownson RC, Fielding JE, Maylahn CM. Evidence-based public health: a fundamental concept for public health practice. *Annu Rev Public Health*. 2009;30:175–201.
2. Campbell NR. Hypertension prevention and control in Canada. *J Am Soc Hypertens*. 2008;2(2):97–105.
3. Canadian Coalition for Global Health Research. Knowledge Translation in Low & Middle-Income Countries: A Learning Module Web site. www.cih-irsc.gc.ca/e/44240.html#a7. Accessed February 7, 2013.
4. Public Health Agency of Canada, World Health Organization Collaborating Centre on Chronic Noncommunicable Disease Policy. *Mobilizing for Dietary Salt Reduction in the Americas: Meeting Report*. Pan American Health Organization Web site. 2009. http://www.paho.org/english/ad/dpc/nc/salt_mtg_rpt.pdf. Accessed February 7, 2013.
5. Glasgow RE. Translating research to practice: lessons learned, areas for improvement, and future directions. *Diabetes Care*. 2003;26:2451–6.

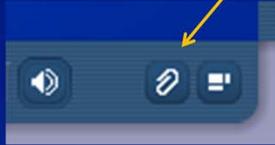
The resources included here provide additional background about knowledge translation.

Top 10 Resources

6. Lavis JN, Robertson D, Woodside JM, McLeod CB, Abelson J. How can research organizations more effectively transfer research knowledge to decision makers? *Milbank Q.* 2003;81:221–48,171–2.
7. Madon T, Hofman KJ, Kupfer L, Glass RI. Public health. Implementation science. *Science.* 2007;318(5857):1728–9.
8. Pang T, Sadana R, Hanney S, Bhutta ZA, Hyder AA, Simon J. Knowledge for better health: a conceptual framework and foundation for health research systems. *Bull World Health Organ.* 2003;81:815–20.
9. Santesso N, Tugwell P. Knowledge translation in developing countries. *J Contin Educ Health Prof.* 2006;26:87–96.
10. Straus SE, Tetroe J, Graham I. Defining knowledge translation. *CMAJ.* 2009;181(3-4):165–8.

References

References for the information presented in this module are available for download. Click on the paperclip icon below.



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Module Evaluation

We are interested in hearing your feedback on this module. Your feedback and comments will be used to make training improvements and better meet the needs of participants. Please click on the link below to provide your feedback.

www.surveymonkey.com/s/GlobalSodiumReductionKnowledge 

This concludes the Knowledge Translation module. Please review the other modules to learn more about strategies for reducing sodium intake in your country.

We are interested in hearing your feedback on this module. Your feedback and comments will be used to make training improvements and better meet the needs of participants. Please click on the link below to provide your feedback.

Sodium Reduction Toolkit: A Global Opportunity to Reduce Population-Level Sodium Intake

Knowledge Translation: References

1. World Health Organization. Knowledge Translation Framework for Ageing and Health Web site. www.who.int/ageing/publications/knowledge_translation/en/index.html. Accessed February 7, 2013.
2. Canadian Coalition for Global Health Research. Knowledge Translation in Low & Middle-Income Countries: A Learning Module Web site. www.cihr-irsc.gc.ca/e/44240.html#a7. Accessed February 7, 2013.
3. Pang T, Sadana R, Hanney S, Bhutta ZA, Hyder AA, Simon J. Knowledge for better health: a conceptual framework and foundation for health research systems. *Bull World Health Organ*. 2003;81:815–20.
4. Ali MK. Knowledge translation [PowerPoint Presentation]. Rollins School of Public Health. Atlanta, GA, 2012.
5. Centers for Disease Control and Prevention. History of the Surgeon General's Reports on Smoking and Health Web site. www.cdc.gov/tobacco/data_statistics/sgr/history/index.htm. Accessed February 7, 2013.
6. Institute of Medicine. *Strategies to Reduce Sodium Intake in the United States*. Washington, DC: National Academies Press; 2010.
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12. Gobierno de Chile, Ministerio de Salud. Encuesta Nacional de Salud, ENS 2009–2010 Web site. www.redsalud.gov.cl/portal/url/item/99bbf09a908d3eb8e04001011f014b49.pdf. Accessed February 7, 2013.
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14. Campbell NR. Hypertension prevention and control in Canada. *J Am Soc Hypertens*. 2008;2(2):97–105.