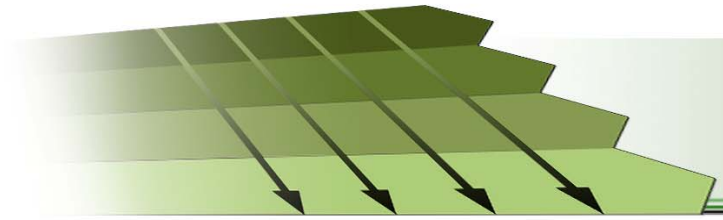

CORE
Public Health Functions for BC

Model Core Program Paper:
Food Safety

BC Health Authorities

Population Health and Wellness
BC Ministry of Health

March 2006

This Model Core Program Paper was prepared by a working group consisting of representatives of the BC Ministry of Health and BC's health authorities.

This paper is based upon a review of evidence and best practice, and as such may include practices that are not currently implemented throughout the public health system in BC. This is to be expected, as the purpose of the Core Public Health Functions process—consistent with the quality improvement approach widely adopted in private and public sector organizations across Canada—is to put in place a performance improvement process to move the public health system in BC towards evidence-based best practice. Where warranted, health authorities will develop public performance improvement plans with feasible performance targets and will develop and implement performance improvement strategies that move them towards best practice in the program component areas identified in this Model Program Paper.

This Model Program Paper should be read in conjunction with the accompanying review of evidence and best practice.

Model Core Program Paper approved by:
Core Functions Steering Committee (March 2006)
Population Health and Wellness, BC Ministry of Health (March 2006)

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EXECUTIVE SUMMARY

This paper identifies the core elements that are provided by health authorities in the delivery of food safety programs in British Columbia. It is intended, as part of the BC Core Functions in Public Health initiative, to reflect evidence-based practice and continuous performance improvement.

A Working Group of representatives from the Ministry of Health and the health authorities worked together in the development of this paper. They agreed that the main program components are:

- A food premises inspection program.
- Foodborne illness investigations, food seizures and recalls.
- Food safety education.
- Surveillance and ongoing evaluation of food safety.

Best practices are identified, based on research evidence demonstrating effective program outcomes. These include the use of:

- A "risk assessment and categorization" tool.
- An appropriate hazard analysis/appraisal system for inspections.
- A risk-based inspection frequency, based on an inherent risk rating of high, medium or low.
- Requirements for food premises operators and staff to have training in food handling.

For those program elements where there is not clear evidence, "promising practices" are presented, based on expert opinion from professionals with extensive experience in the field.

Indicators and benchmarks for food safety programs are presented for each of the program components to provide a basis for ongoing performance review and evaluation. Two indicators were assessed to be the most significant in determining overall performance:

- The inspection frequency of food service establishments categorized by high risk, medium risk and low risk.
- The percentage of investigations of foodborne illness outbreaks started within 24 hours of notification of the outbreak.

Key success factors highlight a range of strategies that ensure the successful implementation of a high quality food safety program. These include: strong support from the Board and management; allocation of sufficient resources; well-trained and competent staff; a well-developed information system capable of handling required data; high quality and competent management; and clear mechanisms of reporting and accountability.

Intersectoral collaboration and coordination with officials at the federal, provincial and municipal levels is essential. As well, it is important to establish positive working partnerships with the food industry, food establishments, non-government agencies and the community at large. Cooperative approaches strengthen all prevention, protection and promotion strategies.

1.0 OVERVIEW/SETTING THE CONTEXT

As demonstrated in recent Canadian reports, public health needs to be better structured and resourced, in order to improve the health of the population. The Framework for Core Functions in Public Health is a component of that renewal in British Columbia. It defines and describes the core public health activities of a comprehensive public health system. This policy framework was accepted in 2005 by the Ministry of Health and the health authorities.

Implementation of core functions will establish a performance improvement process for public health developed in collaboration between the Ministry of Health, the health authorities and the public health field. This process will result in greater consistency of public health services across the province, increased capacity and quality of public health services and improved health of the population. To ensure collaboration and feasibility of implementation, the oversight of the development of the performance improvement process is managed by a Provincial Steering Committee with membership representing all health authorities and the ministry.

What are core programs? They are long-term programs representing public health services that health authorities provide in a renewed and modern public health system. Core programs are organized to improve health; they can be assessed ultimately in terms of improved health and well-being and/or reductions in disease, disability and injury. In total 21 programs have been identified as "core programs", of which food safety is but one. Many of the programs are interconnected and thus require collaboration and coordination between them.

In a "model core program paper", each program will have clear goals, measurable objectives and an evidentiary base that shows it can improve people's health and prevent disease disability, and/or injury. Programs will be supported through the identification of best practices and national and international benchmarks (where such benchmarks exist). Each paper will be informed by: an evidence paper; other key documents related to the program area; and by key expert input obtained through a working group with representatives from each health authority and the Ministry of Health.

The Provincial Steering Committee has indicated that an approved model core program paper constitutes a model of good practice, while recognizing it will need to be modified to meet local context and needs. The performance measures identified are appropriate indicators of program performance that could be used in a performance improvement plan. The model core program paper is a resource to health authorities that they can use to develop their core program through a performance improvement planning process. While health authorities must deliver all core programs, how each is provided is the responsibility of the health authority, as are the performance improvement targets they set for themselves.

It is envisioned that the performance improvement process will be implemented over several years. During that time the process will contribute to and benefit from related initiatives in public health infrastructure, health information and surveillance systems, workforce competence assessment and development and research and evaluation at the regional, provincial and national levels. Over time these improvement processes and related activities will improve the quality and

strengthen the capacity of public health programs, and this in turn will contribute to improving the health of the population.

1.1 An Introduction to This Paper

This model core program paper for food safety builds on the work of two other important documents. In March 2005, the Ministry of Health released a document entitled *A Framework for Core Functions in Public Health*. This document was prepared in consultation with representatives of health authorities and experts in the field of public health. It identifies the core programs that must be provided by health authorities, including food safety, and the public health strategies that can be used to implement these core programs. It provides an overall framework for the development of this document.

In addition, the paper entitled *Evidence Paper: Food Safety* provides important program and technical information. The evidence base document was invaluable in the drafting of this paper as it identified the major elements of a core program for food safety based on the evidentiary base supporting the program, best practices and some key indicators relating to effective program delivery. The evidence base document was prepared by a working group with representation from the British Columbia Centre for Disease Control; the health authorities; the Health Officers Council; the Canadian Institute of Public Health Inspectors; and the Ministry of Health.

These two documents set the context for this model core program paper.

An initial draft paper on food safety was produced in the spring of 2005, based on the evidence paper and one-to-one consultations with representatives of health authorities. Having learned from the initial experience, further changes to the document were made and a Working Group for Food Safety was formed. This group met and provided further input. Finally, the Steering Committee for Core Functions in Public Health considered the approach and their comments and feedback were also integrated into this document

1.2 Introduction to Food Safety

Food safety is an important area of public health. Foodborne illness can affect large numbers of people with significant costs to society. However, foodborne illnesses and outbreaks are largely preventable with appropriate education and sound public policies and programs.

Health Canada reported that in 1995 there were 1,705 cases of confirmed foodborne illness in BC (Todd 2001); based on this number, population growth, and increases in the number of food service establishments, it could be reasonably assumed that the current estimate would exceed 2,000 reported cases per year. It should be noted that the term “food service establishment” is used in provincial legislation to refer to restaurants. “Food premises” is a more generic description referring to places where food is sold, prepared, processed, served or transported, including food processes plants, food wholesalers as well as restaurants.

In 2002, the British Columbia Centre for Disease Control reported some 3,500 cases of enteric illness, mainly spread by food (British Columbia Centre for Disease Control 2002). Furthermore, it is estimated that for every case that is reported a large number of cases go unreported.

Depending on the methods used, the overall number of estimated cases of foodborne illness in BC, in 2003, would be between 200,000 and 700,000 per year (Ministry of Health [MOH] 2005).

Using data from international studies on the costs of foodborne illness (which include direct costs such as medical care, travel, investigation of illness complaints and legal action, and indirect costs such as loss of productivity and loss of business, the annual costs in BC, in 2003, have been estimated to range from $200 million to over $600 million (MOH 2005).

Again, based on Health Canada data, it is estimated that about three quarters of foodborne illness occurred in "food service establishments," with the remainder occurring in food processing establishments, homes or other settings (MOH 2005).

One of the goals of the Ministry of Health is to have "improved health and wellness for British Columbians." The Ministry of Health also believes that "a strengthened public health system" makes a major contribution towards achieving this goal. Prevention and health promotion are important aspects of a high quality public health system. Therefore, ensuring that British Columbians receive the benefits of high quality food safety programs and services is an important contribution towards achieving the Ministry's overall goals.

There needs to be a clear recognition of the complexity of public health. In the area of food safety, it is often very difficult to link an intervention with the health outcome and, more often than not, multiple factors come into play in determining the health outcomes of a population. A high quality food safety program is one of several concurrent approaches and strategies that need to be taken to minimize the incidence of foodborne illness in BC.

As well, a food safety program does not exist in isolation and will not achieve optimum efficiency or effectiveness unless it works collaboratively with other key partners involved with food safety. At the federal level, the health authorities need to have linkages and relationships with the Canadian Food Inspection Agency, Fisheries and Oceans Canada and Health Canada. At the provincial level, the key linkages are with the British Columbia Centre for Disease Control, the Ministry of Agriculture and Lands and, of course, with the Ministry of Health. At the local and regional levels, the important linkages are with municipalities, school boards, public and private post secondary institutions and the communities in the region. As food safety officials are also mandated to inspect facilities operated by the health authority, appropriate linkages should also be developed within the health authority itself.

Finally, implementing high quality and successful food safety programs is challenging in the food service industry because: there is often a very high turnover in the number of food service establishments and in the workforce; the workers in such establishments are often young and inexperienced; and ethnic, cultural and language barriers also come into play.

2.0 SCOPE AND AUTHORITY FOR THE FOOD SAFETY PROGRAM

2.1 Provincial Roles and Responsibilities

The Ministry of Health has three main roles and responsibilities:

- Providing overall stewardship of the health system in BC, including conducting strategic interventions with health authorities to ensure the continuation of the delivery of efficient, appropriate, equitable and effective health services to British Columbians.
- Working with health authorities to provide accountability to government, the public and the recipients of health services.
- Providing resources to health authorities to allow them to deliver health-related services to British Columbians.

More specifically, in the area of food safety, the following provincial-level functions are carried out by the Ministry of Health (MOH) and/or the British Columbia Centre for Disease Control (BCCDC):

- Advising the Minister of Health on provincial food safety legislation (MOH & BCCDC).
- Developing strategies and providing information to assist the health authorities to implement strategies that minimize the risk of foodborne illness (BCCDC).
- Acting as the primary provincial contact for food emergencies (BCCDC).
- Providing an inspection service to the provincially licensed dairy and meat plants (BCCDC).
- Ensuring the public and the food industry have access to reliable food safety information (MOH & BCCDC).

2.2 Health Authority Roles and Responsibilities

The role of health authorities is to identify and assess the health needs in the region; to deliver health services (excluding physician services and BC Pharmacare) to British Columbians in an efficient, appropriate, equitable and effective manner; and to monitor and evaluate the services which they provide.

With regard to food safety, the Ministry of Health expects health authorities to deliver consistent, high-quality food safety programs in their regions. Health authorities should:

- Assess regional needs and develop food safety policies and strategies.
- Provide a food inspection program.
- Investigate incidences/complaints of foodborne illness.
- Work with local governments to enforce bylaws.

- Collaborate with the food production, food service and food retail industry to ensure safe food production, sale and service.
- Facilitate and provide food safety education.
- Monitor and evaluate food safety programs.

2.2 Legislation and Policy Direction

The legislative and policy direction for a food safety program is derived from:

- The following acts and regulations: *Health Act*; *Food Safety Act*; *Fish Inspection Act* and regulations; Food Premises Regulation; Sanitary Regulations; Meat Inspection Regulation; *Milk Industry Act* and regulation; and municipal health bylaws.
- The *Framework for Core Functions in Public Health* document.
- The Performance Agreements currently in place with each health authority;
- The strategic directions of the Ministry.
- The rolling *Health Services Redesign Plan* for each health authority.

When the new *Public Health Act* is passed and proclaimed, it will also provide guidance to this program. In addition, the Ministry of Health is developing a Food Policy Framework that will further inform the policy context for food safety.

The scope of responsibility for providing food safety programs and services in the health authorities is further defined by recognizing the scope and responsibilities of the other "players" involved in the area of food safety. At the federal level there is Health Canada, the Canadian Food Inspection Agency, Agriculture and Agri-Food Canada and Fisheries and Oceans Canada. At the provincial level, the Ministry of Agriculture and Lands and the British Columbia Centre for Disease Control deliver programs and also partner with health authorities in providing food safety programs and services. Municipalities, school boards and post-secondary institutions often also have arrangements with health authorities with regard to delivering services that contribute to food safety.

3.0 PRINCIPLES

There are a number of principles that can be used to guide the direction of policies, procedures and operating practices of a food safety program. These principles include:

- Collaborative working relationships with the food industry, food establishments, municipalities, other government agencies and departments (including the federal government), non-governmental organizations and the community at large.
- Consistent, positive support and direction to the food services industry.
- Reasonable equity and consistency in delivering services from one part of a health authority to another, and between health authorities.
- Responsiveness to local needs and issues.
- Focus on prevention, protection and promotion.
- Consistent leadership while encouraging innovation.
- A culture of continuous quality improvement.
- Enforcement of provincial legislation and regulations, as necessary.
- Ongoing education of the industry and the public.

4.0 GOALS AND OBJECTIVES

The overall goal of the food safety program is to improve the health of the population by minimizing the incidence of foodborne illnesses and outbreaks. The objectives of the food safety program are to:

- Prevent foodborne illnesses by providing a food inspection program.
- Minimize the negative impacts of any foodborne illness outbreaks that may occur by conducting foodborne illness investigations and seizing contaminated products.
- Increase knowledge about food safety and improve food safety practices among the food industry and the public by providing food safety education.
- Provide surveillance and ongoing evaluation of all aspects of food safety within the health authority.

5.0 MAIN COMPONENTS AND SUPPORTING EVIDENCE

5.1 Introduction

The four major program components for food safety are:

- A Food Premises Inspection Program.
- Foodborne Illness Investigations, Food Seizures and Recalls.
- Food Safety Education.
- Surveillance and Evaluation of Food Safety.

It should be noted that while the term "inspection" is still used commonly to describe the "food premises inspection programs," there was a strong feeling, from some health authorities, that "assessment, education and enforcement" were more appropriate terms to characterize this component and that, in fact, these were the key elements to successful "inspection."

5.2 Food Premises Inspection Programs

Food premises inspection programs should include the following elements:

- An up-to-date inventory of all food premises in the region, where a "food premises" means "any place where food intended for public consumption is sold, offered for sale, supplied, handled, prepared, packaged, displayed, served, processed, stored, transported or dispensed."
- A "risk-based inspection" strategy based on the categorization and ranking of risk factors for each food premises.
- The principles of a Hazard Analysis Critical Control Point (HACCP) system incorporated into food safety management plans in each food service establishment.
- A food premises inspection program, which includes both unscheduled inspections as well as scheduled inspections, with variable inspection frequencies based on categories and degrees of risk.
- Policies and guidelines to promote progressive enforcement strategies to ensure that follow-up and compliance procedures are effective in dealing with critical hazards in a timely manner.
- Implementation of progressive enforcement strategies to achieve compliance with the provisions of the Food Premises Regulation. For example, it is important to ensure that: each food premises develops a written and approved food safety management plan; each operator has a sanitation plan that identifies handling procedures for chemicals and processes for cleaning and sanitizing; and every operator of a food services establishment, and a minimum number of staff, hold a certificate for the successful completion of the food handler training program known as FOODSAFE or its equivalent, and if an operator is absent from the establishment, at least one employee trained in FOODSAFE is present.

While some of the above elements are dictated by legislative requirements, there is also a strong base of evidence for many of the above elements. For example, risk categorization of food premises allows for a better management of resources. A Seattle-King County study identified that food inspection programs resulted in a lowering of foodborne illness rates (Irwin, Ballard, Grendon, and Kobayashi 1989). Another study by Allwood and colleagues found that worse inspection scores occurred among those establishments which were inspected at a lower frequency, i.e., less frequent inspections resulted in a higher risk of foodborne illnesses (Allwood, Lee, and Borden-Glass 1998). Mathias et al. (1995) also evaluated inspection frequencies of restaurants in relation to inspection scores. They found that the longer the time since the last inspection, the less satisfactory the inspection score.

5.3 Foodborne Illness Investigations, Food Seizures and Recalls

Health authorities need to have clearly articulated policies and procedures around foodborne illness investigations. These policies and procedures should include:

- Taking case histories of those who are ill or who are at risk of being ill.
- Conducting investigations in a timely manner, identifying epidemiological associations based on this information and reporting these relationships.
- Taking steps, including appropriate enforcement measures, to prevent the spread of a pathogen or prevent further exposure to contaminated food.
- Making recommendations that might assist in preventing similar occurrences.
- Appropriate consultation with the British Columbia Centre for Disease Control and other regulatory agencies.

Similarly, for food seizures and recall, health authorities need to ensure that the following are in place:

- Policies and procedures around food seizures.
- Working relationships and protocols regarding recalls with the Canadian Food Inspection Agency (CFIA), the Provincial Health Officer and the British Columbia Centre for Disease Control. A food recall may be initiated federally by Ministerial Order under the *Canadian Food Inspection Agency Act* (mandatory recall), provincially by Ministerial Order under BC's *Food Safety Act* (mandatory recall) or voluntarily by a company where there are reasonable grounds to believe that a product poses a risk to public health; and
- Collaboration with the CFIA to notify operators of food establishments and the public, in a timely manner, of the details of the food recall.

Again, there is evidence that the above approaches are effective. A British study concluded that one rapid and successful investigation, which cost about $15,000, saved the public between $10M and $26M (Roberts 2000). There is also evidence, from the British Columbia Centre for Disease Control, that food recalls are effective in reducing the number of new cases of foodborne illnesses (Naus, unpublished data).

5.4 Food Safety Education

Health authorities should have strategies in place to improve the level of education and understanding of members of the food industry (including both operators and workers) and also the general public.

With respect to members of the food industry, health authorities need to undertake:

- Initiatives to facilitate the provision of FOODSAFE training, or its equivalent, to operators and staff.
- Ongoing or specific training to operators of food premises as needed.
- Provision of materials such as posters, information sheets and food knowledge "aids" such as check sheets, reviews and booklets. The Ministry of Health already provides many of these aids. Where appropriate, multilingual aids or signage that conveys the health protection message graphically should be used, rather than English language words.

Mathias et al. (1995) found that education of the industry does make a difference and that there were lower numbers of violations if managers and staff of food service establishments had some training. Another study, by Cotterchio et al. (1998), found that inspection ratings improved significantly for those premises that were part of a mandatory training program (versus a voluntary training program).

Health authorities should have clear strategies for communicating food safety information to the public. This could include:

- Making FOODSAFE training easily accessible for the public (especially volunteers).
- Facilitating specific and localized courses as needed in the community.
- Providing written and electronic materials in key areas of food safety.
- Posting restaurant inspection results on the health authority website.
- Participating in consumer food safety education such as FightBac (Canadian Partnership for Consumer Food Safety Education).
- Issuing media releases and public service announcements in the areas of emerging issues, food recalls and alerts.

Overall, it was found that a well-informed public showed an increase in the number of safe practices and a decrease in high-risk practices in the areas of time/temperature abuses, personal hygiene, cross-contamination and maintenance.

5.5 Surveillance and Evaluation of Food Safety

Surveillance and evaluation of food safety within the health authorities should include:

- Actively monitoring data for any unusual patterns or trends with respect to food safety; determining (where possible) the underlying reasons behind the trends; and, where appropriate, taking corrective action or working collaboratively with other partners to address the issue.
- Regularly collecting and analyzing information on foodborne illnesses.
- Evaluating the effectiveness, not only of new programs related to food safety that may be implemented in the region, but also evaluating well-established programs from time to time.

6.0 BEST PRACTICES FOR DELIVERING A FOOD SAFETY PROGRAM

There is often no one "best practice" which is generally agreed upon, however, there are practices that may have been successful in other settings and should be considered by health authorities. The terms "promising practices" or "better practices" are often preferred to reflect the evolving and developmental nature of performance improvement. As part of this review, "best" or "promising" practices from other provinces including Alberta, Saskatchewan and Ontario, have been incorporated. Some of these have been identified earlier in the section outlining the program components for a food safety program. Those practices that are based on research evidence that appears to indicate effective program outcomes are as follows:

- Having in place a "risk assessment and categorization" tool and using it across the health authority.
- Using the appropriate hazard analysis/appraisal systems for inspections.
- Having each food service establishment inspected at least once a year. Based on this initial inspection, a risk rating of low, medium or high can be established for each premises. With this information (or information from some other inherent risk rating system), and the compliance history of the premise, the health authority can establish a risk-based inspection frequency schedule for all premises in the region.
- Having policies in place requiring operators of all food service establishments to have FOODSAFE training, or other appropriate training.

Other practices which are considered promising and reflect a consistent agreement among experts, include the following:

- Having policies in place around responding to complaints from the public.
- Having policies in the areas of foodborne illnesses, outbreaks and recalls.
- Having progressive enforcement policies.
- Ensuring operators of food service establishments use their food safety plans and sanitation plans.
- Working with municipalities to have automatic "triggers" to alert health authorities when new licenses are issued.
- Working with new establishments in the planning phases for new food premises.
- Partnering with the food service industry on food safety initiatives.
- Ensuring culturally diverse personnel and information is available, as appropriate.
- Establishing minimum professional requirements for staff members (e.g., membership in CIPHI or some other professional organization).
- Having a policy or mechanism on professional development to ensure staff members maintain professional competency.

- Having in place a system to ensure reliability and consistency of implementing procedures and policies across the health authority.
- Educating the public on food safety through innovative policies and practices.
- Increasing efficiency through the use of new technologies to deliver programs more effectively.
- Encouraging an environment of continuous improvement through active involvement in new research on food safety and the use of research results in program planning.

7.0 INDICATORS, BENCHMARKS AND PERFORMANCE TARGETS

7.1 Introduction

This section presents a number of key indicators or performance measures for a food safety program. The indicators are grouped under each of the three components of the program noted previously. It may be that some of the suggested benchmarks can apply across the province, while other benchmarks may need to be modified to account for key variables such as the geographic size and/or population density of the health authority. Once there is a set of agreed-upon benchmarks, health authorities can use the indicators, benchmarks and performance targets to monitor their own performance and to address any gaps that may exist between the indicators for their regions and the agreed-upon benchmarks. It is anticipated that the Ministry of Health will work with health authorities to develop a greater consensus on key indicators and benchmarks for the food safety program, over time. As well, one or two key performance indicators may be selected to represent overall functioning of the food safety program in the Performance Agreements between the Ministry of Health and health authorities.

It should be noted that one could develop indicators related to the inputs, activities, outputs and outcomes (immediate, intermediate or final) of the food safety program, as per the draft Public Health Logic Model. Thus, it is not necessary to only have outcome-related indicators and benchmarks. Furthermore, indicators need to be understood within a broader context. For example, a low per capita cost for a food safety program could reflect on the efficiency and effectiveness of the program, or it may reflect a program that is under-resourced. Thus, it would also be desirable to consider indicators based on logic models, which are often part of a Treasury Board mandated results-based management framework. Key elements of such logic models are inputs, activities, outputs and outcomes. In general, it is best to consider a number of indicators, taken together, before formulating a view about a given food safety program. Indicators and benchmarks work best as flags to indicate a variance from accepted norms and standards. Further investigation is usually required to determine the causes of any given variance from such norms or standards.

It is also important to define what one means by the terms *indicators, benchmarks* and *performance targets*. An indicator is a numerical representation of something which is seen to constitute an important reflection of some aspect of a given program or service. Indicators also need to be standardized in some manner so that they can be compared across different organizational entities such as health regions. For example, an indicator related to the rate of inspection of food services establishments might relate to the average, annual number of inspections of low-risk establishments. If one were simply to record the number of such inspections one could not compare risk-based inspection rates across health authorities because the number would only reflect the number of establishments, and the number of inspections, in a health region. To standardize this number one would want to look at the number of annual inspections per low-risk establishment (that is, the number of inspections ÷ the number of establishments). Thus, if there were 800 inspections for 1,000 establishments, the inspection rate would be 0.8 (i.e., 800/1,000). Conversely, one could also look at time spent in higher risk establishments as an indicator.

Benchmarks are essentially also numerical representations. However, they are representations on which there is a consensus, or acceptance, that the representation is reflective of "best" or "better" practices for delivering the service, and thus they represent performance targets or objectives. For example, a benchmark for the average number of annual inspections of low-risk food services establishments could be one inspection per low-risk food services establishment per year (e.g., 1,000 inspections / 1,000 establishments). The actual level of performance achieved will be a reflection of current practice, existing policy and the balance of resources provided compared to the work to be undertaken.

Benchmarks are determined by: reviewing the literature; reviewing the best practice experience in other jurisdictions; or by determining "consensus" opinion of leading experts and practitioners in the field. Performance targets, on the other hand, are locally determined targets that represent a realistic and achievable improvement in performance for a local health authority. When no provincial benchmarks are available for a certain program indicator, then it is reasonable for a health authority to determine its own performance target. A health authority could determine its performance target by assessing its current (and perhaps historical) level of performance and then, based on a consideration of local factors (e.g., capacity, resources, new technology, staff training and so on), it could establish a realistic performance target. This performance target would be consistent with the goal of performance improvement but would be "doable" within a reasonable period of time.

Initially, health authorities will set performance targets for a number of indicators. However, over time—and particularly if consistent data collection methods and definitions are applied—it would be realistic for health authorities to share information related to their performance targets and then develop a consensus with other health authorities to determine a provincial benchmark for these indicators. In other words, locally developed performance targets, over time, could lead to the development of additional provincial benchmarks.

7.2 Indicators for the Food Premises Inspection Program

Table 1 presents some potential indicators, and the definitions of these indicators. In some cases, benchmarks are currently not available but may be determined over time between the Ministry of Health and the health authorities.

Table 1: Indicators for the Food Premises Inspection Program

Indicator	Definition/Description	Benchmark
1.1 Inspection frequency of food service establishments categorized by: i. High risk ii. Medium risk iii. Low risk	The number of annual inspections for each risk category, divided by the number of establishments in that risk category x 100.	90 – 100% inspection frequency achieved, for each food service establishment category: i. High risk: 3 time per year ii. Medium risk: 2 time per year iii. Low risk: 1 time per year*
1.2 Percentage increase, or decrease, in the number of critical food safety hazards identified per year.	The annual number of critical food safety hazards identified, divided by number of critical food safety hazards identified in the previous year x 100.	No benchmark available** Monitor trends over 5 years.
1.3 Proportion of total critical hazards corrected on a quarterly basis.	Percentage of total critical hazards corrected (per total number of critical hazards originally identified) in follow-up inspections within a 3-month period (total number of critical hazards originally identified, divided by the number corrected x 100).	80 – 100% correction***

* This inspection frequency is the benchmark used by both Alberta and Ontario. While a health authority can set its own performance target, for province-wide comparisons, it is recognized that there is a need to standardize the Food Premises Risk Assessment Tool.

** There is little information on the current number of critical hazards identified, and no accepted benchmarks; therefore, it will be necessary for health authorities to determine their own reasonable performance targets. For province-wide comparisons, it is recognized that there is a need to standardize a list of Critical Food Safety Hazards.

*** 80% or higher is the benchmark used in Alberta.

7.3 Indicators for Foodborne Illness Investigations, and Food Seizures and Recalls

An important aspect of the Food Safety Program is to prevent foodborne illnesses outbreaks and to deal effectively with them when they do occur. This intervention is done through foodborne illness investigations and food seizures and recalls. Table 2 presents potential indicators related to this component of the Food Safety Program.

Table 2: Indicators for Foodborne Illness Investigations, and Food Seizures and Recalls

Indicator	Definition/Description	Benchmark
2.1 Percentage of investigations of outbreaks started within 24 hours of the time of identification of the outbreak.	Number of outbreak investigations started within 24 hours of identification ÷ total number of outbreaks x 100 (e.g., 75 investigations started in 24 hours for 100 outbreaks = 75% of outbreaks investigated within 24 hours of notification [75÷100 = .75 x 100 = 75%]).	95 – 100%*
2.2 The British Columbia Centre for Disease Control will forward to the health authorities, information on food recalls and health hazard alerts within one hour of receipt.	Percentage of alerts/recalls where the health authorities are notified within one hour by the British Columbia Centre for Disease Control.	90 – 100%

* Proposed by experts in British Columbia.

7.4 Indicators and Benchmarks for Food Safety Education

Preventive activities related to the area of food safety education can be quite important in reducing the number of foodborne illnesses and outbreaks. Table 3 presents potential indicators related to this component of the Food Safety Program.

Table 3: Indicators for Food Safety Education

Indicator	Definition/Description	Benchmark
3.1 Percentage of food service establishment operators who have passed the first level of the FOODSAFE education program per year.	At any point in time, the number of food services operators who have passed FOODSAFE Level 1, divided by total number of food services operators.	95 – 100%* Monitor trends over 5-year period.
3.2 Level of knowledge about food safety among the public.	Percentage of people who indicate a moderate or high level of knowledge about food safety (a scale score from a regularly conducted survey [every 2 to 4 years]).	No benchmark available**

* While 100% is required in BC legislation, turnover rates and training delays impact the achievability of this goal.

** No data currently available: a survey instrument will be necessary to establish baseline data and health authorities will need to determine reasonable performance targets to increase public knowledge over time.

7.5 Indicators and Benchmarks for Food Safety Surveillance

Potential indicators related to the surveillance of food safety are described in Table 4. It is recognized that the outcomes linked to these indicators cannot be controlled by the food safety program, but they can provide useful information about the overall level of food safety.

Table 4: Food Safety Surveillance and Evaluation

Indicator	Definition/Description	Benchmark
4.1 Annual number of foodborne (enteric) outbreaks per year per 100,000 population.	Total population ÷ 100,000 = population per 100,000 inhabitants. Number of outbreaks per 100,000 inhabitants. (e.g., a population of 500,000 ÷ 100,000 = 5 population per 100,000 inhabitants. If there are 200 outbreaks in one year then the number of outbreaks per year per 100,000 population is 40 [200÷5=40]).	No benchmark available.*
4.2 Annual number of foodborne (enteric) cases per 10,000 population.	Total population ÷ 10,000 = population per 10,000 inhabitants. Number of illnesses per 10,000 inhabitants. (e.g., a population of 500,000 ÷ 10,000 = 50 population per 10,000 inhabitants. If there are 1,000 illnesses in one year then the number of outbreaks per year per 10,000 population is 20 [1,000÷50=20])	No benchmark available.*
4.3 Annual number of reportable enteric cases per 10,000 population.	Total population ÷ 10,000 = population per 10,000 inhabitants. (e.g., 500,000 ÷ 10,000 = 50. For 2,000 enteric diseases per year 2000 ÷ 50 = 40 enteric diseases per year per 10,000 population).	British Columbia Centre for Disease Control continues to work on establishing a benchmark.

* No provincial data currently available; health authorities will need to examine current levels in order to identify increases or decreases over time (Note: some health authorities currently keep records of the number of illness outbreaks, and the number of illnesses).

7.6 Indicators for the Overall Food Safety Program

A number of indicators, presented in Table 5, could apply to the overall Food Safety Program.

Table 5: Indicators for the Overall Food Safety Program

Indicator	Definition/Description	Benchmark
5.1 Percentage of food service establishments that are using a food safety plan.	Number of food service establishments that demonstrate use of a food safety plan during inspection, divided by the number of establishments x 100.	75 – 100% use the plans*
5.2 Percentage of food service establishments that are using a food sanitation plan.	Number of food service establishments that demonstrate use of a food sanitation plan during inspection, divided by the number of establishments x 100.	75 – 100% regularly use the plans**
5.3 Total number of best/promising practices implemented in the following categories (based on the best/promising practices noted in section 6 of this paper): • fully implemented/in place • partially implemented • not implemented or in planning	Total number of "best" and "promising" practices in each the following categories (based on the practices noted in section 6 of this paper): • fully implemented/in place • partially implemented • not implemented or in planning	No benchmark available*** Monitor the trends in the number of "fully implemented" best and promising practices.

* While the presence of a food safety plan is in legislation, gradual increases are necessary to achieve 100% usage of the plan. Note: In 2004, 75% had food safety plans in place, and 42% were using the plans. Also, it is recognized that there is currently no legal authority to require operators to use these plans.

** While the presence of a food sanitation plan is in legislation, gradual increases are necessary to achieve 100%. Note: In 2004, 63% had food sanitation plans in place; there was no data on usage. Also, it is recognized that there is currently no legal authority to require operators to use these plans.

*** It is anticipated that this indicator will provide a "self-assessment" guideline that will assist health authorities in their planning processes.

Finally, as noted above, it is important when using indicators to be aware that an individual indicator will rarely be a sole determinant of a high quality food safety program. Some of the indicators above describe possible outcomes from the food safety program; others describe the effectiveness and efficiency of the program, while others simply provide information, which should be of interest to the program and to the senior management of the health authority. However, if a cluster of indicators are examined collectively and, in addition, trends over time are also examined, it should be possible to determine an overall assessment of the program. As a minimum, such an assessment would provide guidance to where further inquiries may need to be made in a health authority.

Also, it is anticipated that health authorities will use the indicators to identify their "gaps" in service by analyzing their current level of performance (reflected by the indicators), and then determining their performance targets in light of the benchmarks (where these are available) and their specific priorities, available resources and anticipated demands. A "gap analysis" phase is planned following completion of the core program paper.

This document has identified a large number of indicators for consideration by the health authorities. Experts in the field have identified several indicators as the most significant to consider in assessing the overall performance of a food safety program:

- Inspection frequency of food service establishments categorized by high risk, medium risk and low risk.
- The percentage of investigations of foodborne illness outbreaks started within 24 hours of notification of the outbreak.

8.0 EXTERNAL CAPACITY AND SUPPORT REQUIREMENTS

8.1 Key Success Factors/System Strategies

The previous sections of this paper outlined the main components and best practices that health authorities could include in their food safety programs. However, it must be emphasized that successful implementation of a high quality food safety program will also depend on having in place overall system strategies/key success factors. These include:

- Strong support from the Board and management of the health authorities regarding the importance of the food safety program in their region and the role it plays in protecting the health of the population.
- Health authorities should allocate sufficient resources to meet the priority needs identified in their health improvement plan.
- Well-trained and competent staff with the necessary policies and tools to carry out their work efficiently.
- An information system that provides staff with the support they need, provides the public with access to food safety inspection information and provides management with the information it needs to drive good policy and decisions.
- High quality and competent management of the food safety program, including monitoring of performance measures.
- Clear mechanisms of reporting and accountability to the health authority and external bodies.

It is important to highlight that an information system is a critical component to the future success of a food safety program. As consensus develops around key indicators, there needs to be a clear identification of the data requirements: what is currently collected, and what information could additionally be collected without taxing resources too heavily. Furthermore, there needs to be a close linkage between the data needs of health authorities in the area of food safety and the BC Public Health Information Project.

8.2 Intersectoral Collaboration and Integration/Coordination

Intersectoral collaboration is strongly supported by the Ministry of Health, and health authorities are encouraged to take this approach, especially in areas such as food safety. It is important to recognize that an effective food safety program can only be implemented with strong collaboration and support from other key agencies, including other government agencies (both provincial and federal), municipalities, the food industry, food premises, community groups and non-governmental organizations. Health authorities should have in place a clear set of understandings and agreements with key partners (and internally within the health authority) to ensure maximum coordination of effort and to achieve optimum results.

Integration is also important. The food safety program needs to be fully integrated and coordinated with other programs provided by the health authority. Primary care, emergency care

and hospital systems are just some examples that highlight the need for food safety programs to work in an integrated fashion within each health authority. In any new, large organizational structure, such as a health authority, actions need to be taken to ensure that programs do not work in isolation of each other. For example, the food safety program should be integrated/coordinated with the communicable disease control program, drinking water protection program, healthy living/healthy eating and the food security program of the health authority.

As noted in the previous section, it will be important for health authorities to review their existing information and monitoring systems with respect to integrating and coordinating the measurement and monitoring of performance indicators. It may be necessary to: establish new policies and procedures for some activities to ensure that the necessary records are kept; acquire additional software to facilitate the process of recording and monitoring data; and plan regular survey or sampling projects, either individually or in partnership with other health authorities, to assess performance on certain indicators. For example, the level of knowledge about food safety among the public will likely only be available through conducting a survey to gather baseline data, and repeating the survey at a later date to determine any differences over time. Such surveys may be conducted by each region or be developed as a joint project.

9.0 CONCLUSION

In addition to outlining the core elements required for a food safety program, a very important objective of this paper is to support the goal of performance improvement by the health authorities. It is recognized that health authorities will need to consider their capacity, and their current and future environments, when developing these plans and strategies. However, by setting benchmarks and performance targets, and developing plans and strategies to achieve these targets, each health authority will be taking concrete steps towards improvement of their food safety program.

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APPENDIX 1: THE EVIDENCE BASE FOR A MODEL CORE PROGRAM FOR FOOD SAFETY

The evidence paper on food safety was prepared by the British Columbia Centre for Disease Control. A literature search on food safety practices was conducted by the Ministry of Health Library using PubMed, the database of the National Library of Medicine in the United States, as well as several other related databases. The citations located were supplemented by extensive resources available within the British Columbia Centre for Disease Control.

Research indicates that foodborne illness is a significant health problem in BC. Based on available data, the estimated annual number of cases of foodborne illness in BC is between 208,980 and 652,248, or between 1 in 19 and 1 in 6 residents. Based on these estimates, the cost of foodborne illness was estimated to be $988 per case (in 2003 Canadian dollars), with an overall cost of foodborne illness in BC ranging from $204,472,240 to $644,421,020 annually, or between 0.14% and 0.45% of the 2003 GDP.

Based on Canadian, Ontario and United States data, food service establishments are identified as the most significant and common cause of foodborne illness, followed by private homes/residences. The greatest risk to food safety is shown to arise from microbial hazards. Certain food processing practices create a higher risk for food contamination. The decisions regarding these food-processing practices are generally made by food workers. It is also important to note that high protein foods are the cause of a high proportion of foodborne incidents.

The research indicates that effective interventions for food premises inspection programs should include risk categorization of food premises. Food premises inspections should be conducted, as the evidence suggests that inspections do lower the likelihood of occurrence of food safety risk factors and thus should lower the risk of foodborne illness. Also, food premises inspections should include inspection of critical points that have been identified as risk factors for foodborne illness.

When a foodborne illness outbreak occurs, two elements of food safety strategy are generally implemented: a foodborne illness investigation and/or a food recall. The evidence suggests that these actions are effective in protecting public health through the reduction of new outbreaks both in the short and long term. It is also noted that successful outbreak investigation programs require trained and dedicated public health workers and adequate support resources.

It has been reported in the literature (and referenced above) that foodborne illness is predominantly caused by hazards brought about by the behaviour and practices of food handlers. Therefore, it is significant that evidence indicates adequate and appropriate training can alter food handler behaviour. Training can be delivered through a variety of media and methods. However, it is important to consider studies that indicate that certain factors can contribute to improved training for food handlers in the industry and in the home. For example, training is more effective when it is part of an overall strategy for food safety, rather than an isolated intervention. Overall, it is evident that people preparing food for others must be knowledgeable in food safety in order to prevent hazards and protect public health.

APPENDIX 2: PROGRAM SCHEMATIC - MODEL CORE PROGRAM FOR FOOD SAFETY

Objective: To improve the health of the population by minimizing the incidence of foodborne illness and outbreaks.

Main Components	Implementation Objectives (Best Practices)	Outputs	Linking Constructs	Short-term Outcomes	Long-term Outcomes
Food Premises Inspection Programs	• Establish an up-to-date inventory of all food premises in the region. • Implement a risk-based inspection strategy based on categorization and ranking of risk factors for each food premises. • Conduct unscheduled and scheduled inspections on a risk-based variable frequency schedule based on categories and degrees of risk. • Incorporate HACCP into food safety management plans in each food premises. • Implement progressive enforcement policies and guidelines to ensure effective follow-up and compliance in a timely manner. • Establish strategies to ensure food premises compliance with the Regulations, i.e. o an approved food safety management plan; o a sanitation plan for chemical handling and cleaning; o operators and a minimum number of staff hold a certificate in FOODSAFE. • Collaborate with other agencies with a mandate in food safety.	• Number of food premises inspected each year, based on the following risk categories: i. High risk ii. Medium risk iii. Low risk	• Percentage of critical hazards corrected in follow-up inspections (per the number originally identified. • Percentage increase, or decrease, in the number of critical food safety hazards identified per year.	• Reduced incidence of foodborne illness and outbreaks.	Reduced incidence of foodborne illness and outbreaks. Improved population health.
Foodborne Illness Investigations, Food Seizures and Recalls	• Establish and consistently apply policies and procedures for foodborne illness outbreak investigations[1]. • Establish and consistently apply food recalls[2] policies and procedures. • Make recommendations to assist in preventing similar occurrences. • Establish working relationships with other food safety agencies to avoid duplication and gaps in service, and to identify lead responsibilities.	• Percentage of outbreak investigations started within 24 hours. • Number of seizures. • Number of recalls.	• Reduced exposure of the public to foodborne illness.	• Increased prevention of foodborne illness and outbreaks. • Reduced impact of foodborne illness and outbreaks.	
Food Safety Education Programs	• Facilitate FOODSAFE training, or its equivalent, for operators and staff. • Provide ongoing or specific training to operators. • Provide educational and information materials and knowledge aids.	• Percentage of operators/staff who have passed FOODSAFE. • Number of knowledge aids provided to the public.	• Increased knowledge about food safety among the food industry and the public.	• Improved food safety practices among the food industry and the public. • Decrease in violations.	
Surveillance and Evaluation of Food Safety	• Monitor data for any unusual food safety patterns or trends. • Collect and analyze information on foodborne illnesses. • Evaluate the effectiveness of food safety programs.	• Number of foodborne outbreaks per year. • Number of foodborne cases per year.	• Improved analysis of foodborne illness and food safety programs.	• Increased ability to take corrective action and improve effectiveness.	

[1] These include: taking case histories of those who are ill or who are at risk of being ill; identifying epidemiological associations based on case histories; and taking steps to prevent the spread of a pathogen or prevent further exposure to contaminated food.
[2] These include: working relationships and protocols with Canadian Food Inspection Agency, Provincial Health Officer, and British Columbia Centre for Disease Control; voluntary or mandatory recalls; and notification of the public in a timely manner.