Healthy Eating Pattern Development
Proposed Methodology

Pre-conference workshop
Canadian Nutrition Society Annual Conference
Halifax
May 3, 2018

Objective of the presentation

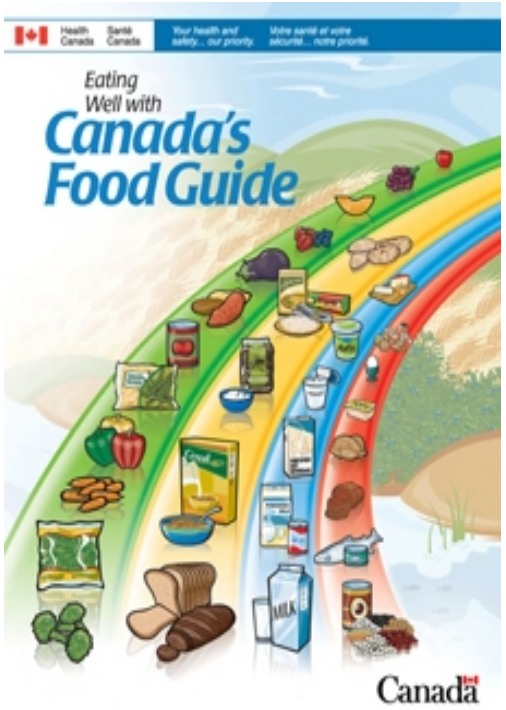
- Share the proposed methodology to develop the healthy eating pattern for the Revision of CFG

Outline

- Food Guide Revision process
- Development of the healthy eating pattern
  - International scan
  - Objectives and considerations
  - Methodology overview
    - Step 1: Mathematical optimization using representative foods
    - Step 2: Simulated diets using individual foods
- Communicating the methods and process
- Communicating the pattern
- Questions/Comments

Transforming Canada's Food Guide into a Suite of products to meet the needs of different users

Current guidance communicated in "all-in-one" tool



Updated guidance communicated in different products

New tools & resources launching throughout 2018 and 2019

Canada's Dietary Guidelines

1) Policy on healthy eating

-Provides general guidance on healthy eating for health professionals and policy makers.

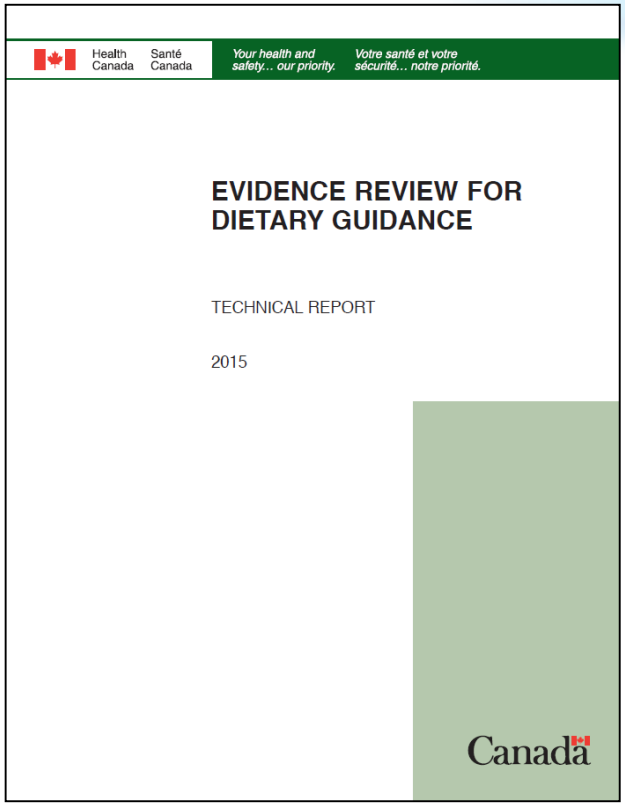
-Forms the foundation of Canada's Food Guide.

2) Healthy Eating Pattern

Builds on and complements the Dietary Guidelines Policy by providing specific guidance :

-on amounts and types of foods

-for different life stages



1) 2015 Evidence Review for Dietary Guidance Reports – Released Fall 2016

https://www.canada.ca/en/health-canada/services/publications/food-nutrition/evidence-review-dietary-guidance-summary-results-implications-canada-food-guide.html

2) 2015-2018 Updated Evidence Scan on food and health

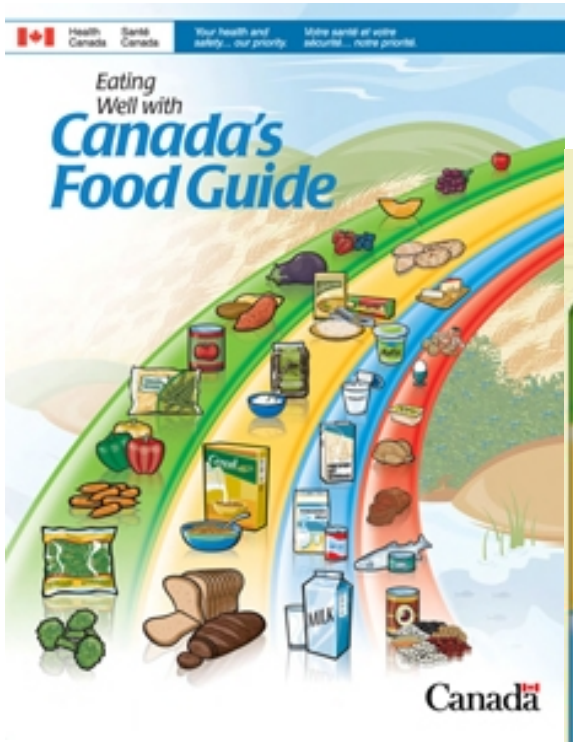
3) Overall findings on food and health (2006-2018) will be released in 2018 as a supplement to the Evidence Review Technical Report

What is an eating pattern?

"Quantities, proportions, variety or combinations of different foods and beverages in diets, and the frequency with which they are habitually consumed"[1]

[1]U.S. Department of Agriculture. Scientific Report of the 2015 Dietary Guidelines Advisory Committee. 2015. Available at: https://health.gov/dietaryguidelines/2015-scientific-report/PDFs/Scientific-Report-of-the-2015-Dietary-Guidelines-Advisory-Committee.pdf

2007 Eating Well with Canada's Food Guide Healthy Eating Pattern



Recommended Number of Food Guide Servings per Day

	Children			Teens		Adults			
Age in Years	2-3	4-8	9-13	14-18		19-50		51+	
Sex	Girls and Boys			Females	Males	Females	Males	Females	Males
Vegetables and Fruit	4	5	6	7	8	7-8	8-10	7	7
Grain Products	3	4	6	6	7	6-7	8	6	7
Milk and Alternatives	2	2	3-4	3-4	3-4	2	2	3	3
Meat and Alternatives	1	1	1-2	2	3	2	3	2	3

Make each Food Guide Serving count...
wherever you are – at home, at school, at work or when eating out!

- **Eat at least one dark green and one orange vegetable each day.**
  - Go for dark green vegetables such as broccoli, romaine lettuce and spinach.
  - Go for orange vegetables such as carrots, sweet potatoes and winter squash.
- **Choose vegetables and fruit prepared with little or no added fat, sugar or salt.**
  - Enjoy vegetables steamed, baked or stir-fried instead of deep-fried.
- **Have vegetables and fruit more often than juice.**
- **Make at least half of your grain products whole grain each day.**
  - Eat a variety of whole grains such as barley, brown rice, oats, quinoa and wild rice.
  - Enjoy whole grain breads, oatmeal or whole wheat pasta.
- **Choose grain products that are lower in fat, sugar or salt.**
  - Compare the Nutrition Facts table on labels to make wise choices.
  - Enjoy the true taste of grain products. When adding sauces or spreads, use small amounts.
- **Drink skim, 1%, or 2% milk each day.**
  - Have 500 mL (2 cups) of milk every day for adequate vitamin D.
  - Drink fortified soy beverages if you do not drink milk.
- **Select lower fat milk alternatives.**
  - Compare the Nutrition Facts table on yogurts or cheeses to make wise choices.
- **Have meat alternatives such as beans, lentils and tofu often.**
- **Eat at least two Food Guide Servings of fish each week.***
  - Choose fish such as char, herring, mackerel, salmon, sardines and trout.
- **Select lean meat and alternatives prepared with little or no added fat or salt.**
  - Trim the visible fat from meats. Remove the skin on poultry.
  - Use cooking methods such as roasting, baking or poaching that require little or no added fat.
  - If you eat luncheon meats, sausages or prepackaged meats, choose those lower in salt (sodium) and fat.

Special Article

April 2007: 155–166

Eating Well with Canada's Food Guide (2007): Development of the Food Intake Pattern

Stefa W. Katamay, MHSc, RD, Krista A. Esslinger, MSc, RD, Michel Vigneault, MSc, Janice L. Johnston, PhD, MSc, Beth A. Junkins, MSc, Linda G. Robbins, BHEc, Isabelle V. Sirois, MSc, RD, Elaine M. Jones-McLean, MSc, Anne F. Kennedy, MHSc, Mary A.A. Bush, MSc, RD, Danielle Brulé, PhD, RD, and Chantal Martineau, MSc, RD

A food intake pattern specifying amounts and types of food was created for Canada's revised food guide, Eating Well with Canada's Food Guide (2007)*, using a two-step modeling process. In step one, food composites were manipulated to develop a food intake pattern. The second step used the step one food intake pattern to create 500 simulated diets for each of 16 age and gender groups. The resulting nutrient content distributions were evaluated relative to Dietary Reference Intake reference values. The modeling cycled between these two steps until a satisfactory pattern was achieved. The final pattern reflects modeling, a review of associations between foods and chronic disease, and input received during consultation.*

Key words: Canada's food guide, DRI assessment, food intake patterns, modeling

doi: 10.1301/nr.2007.apr.155–166

BACKGROUND

The federal Health Department introduced Canada's first food guide, called *Canada's Official Food Rules*, in 1942. Since then, the Food Guide has been transformed many times and has adopted new names, new looks, and new messages, yet has never waivered from its original purpose of guiding food selection and promoting the nutritional health of Canadians.[1]

Since *Canada's Food Guide to Healthy Eating* was released in 1992, science concerning the relationship between diet and health has evolved. To examine whether Health Canada's guidance was consistent with the latest science and well understood by its users, a review of the Food Guide was undertaken in late 2002. The review included an assessment of diets that follow a pattern of eating recommended by the Food Guide, a review of changes in the food supply, an evaluation of the use and understanding of the Food Guide by teachers, dietitians, and public health personnel, and a national

International scan of approaches to healthy eating pattern development







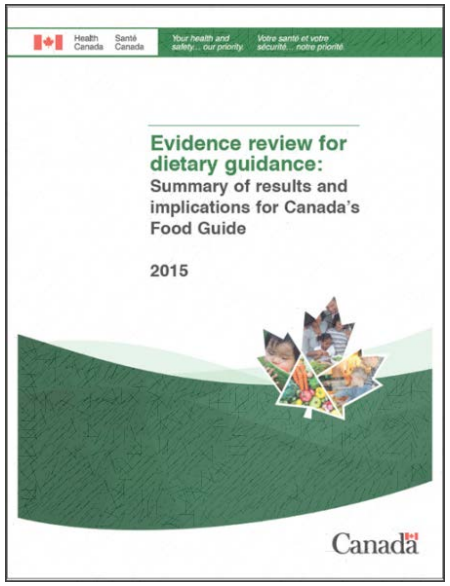

Findings from international scan

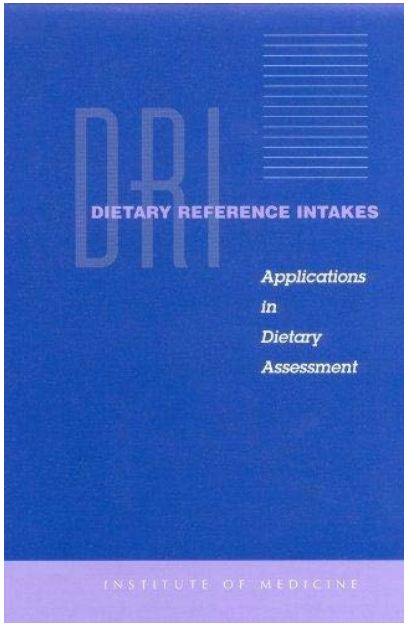
Approaches to Developing Healthy Eating Patterns – An International Perspective. Davis *et al.*
Submitted for publication in Nutrition Reviews

Most common approach consists of the following components:
• Create **food groups** and classify foods
• Establish **parameters**
• Develop **representative foods**
• **Establish draft pattern** (initial number of servings for each food group or sub-food group using ***representative foods)***
• **Evaluate** proposed pattern **with individual foods**
• **Adjust** pattern, **as required**

Proposed Canadian Approach

Healthy Eating Pattern





Objectives

- Reflect **convincing associations** between **dietary patterns, foods, nutrients** and risk of certain nutrition-related **chronic diseases** and conditions
- Stay within **calorie** limits to reduce risk of unhealthy weight gain
- Be **nutritionally** adequate

Healthy Eating Pattern

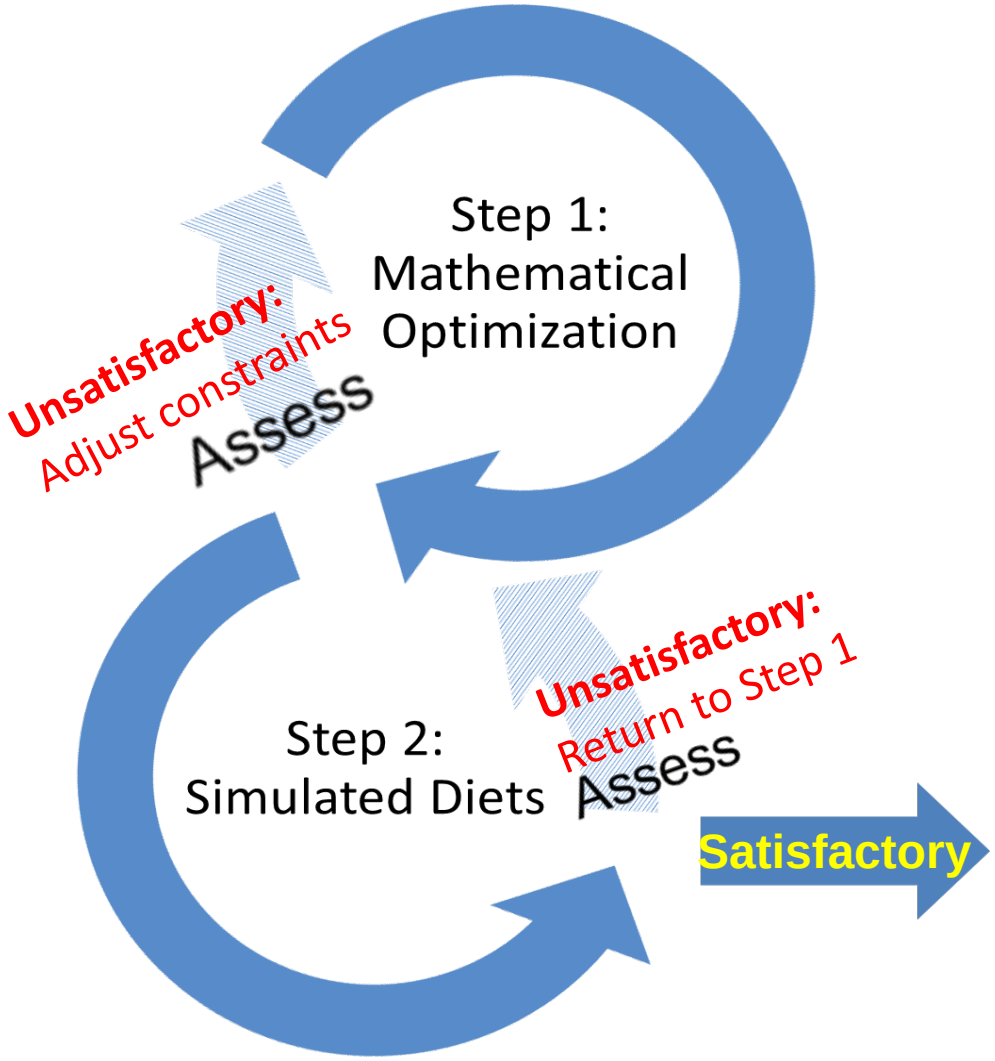
Canadian Community Health Survey

Statistics Canada

Considerations

- **Flexible**
- **Relevant** to Canadians
- **Health equity**
- Impact on **oral health**
- **Cost** of foods

Healthy Eating Pattern method:
a 2 step process



Step 1: Obtain a draft health eating pattern using representative foods (composites)

Step 2: Test the draft pattern with individual foods

Final Healthy Eating Pattern

Example of modelling food groupings

High-level	Mid-level	Low-level
Vegetables	Non-starchy Vegetables	Dark green vegetables
		Deep yellow or orange vegetables
		Other vegetables
	Starchy vegetables	Starchy vegetables

Step 1. Mathematical Optimization

Components of mathematical optimization	Our goal is…
Constraints (Requirements)	• To incorporate convincing evidence on food , nutrients and health (Evidence Review Cycle findings)
Objective function (function to be minimized or maximized)	• To ensure the pattern is relevant and includes a variety of foods. • To identify which dietary changes are needed to help Canadians eat healthier

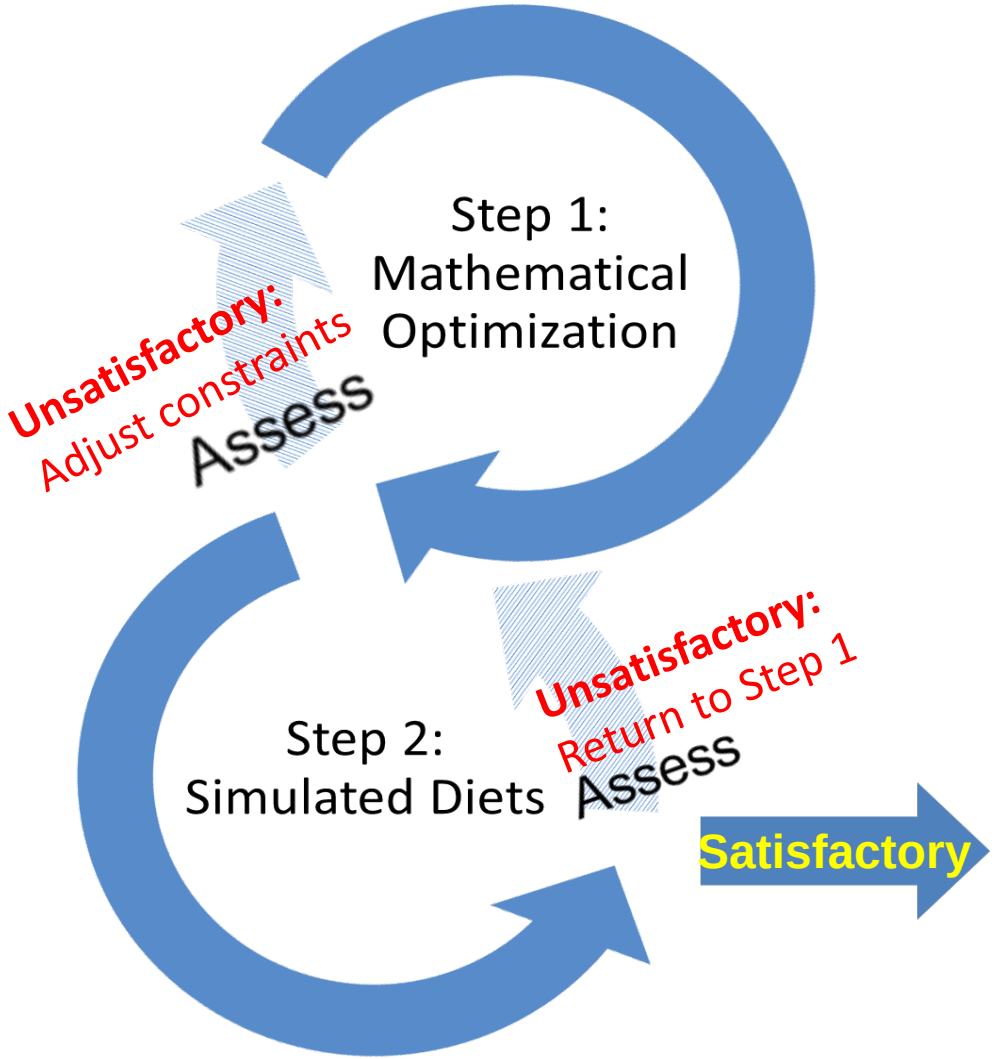
Estimated Energy Requirements (EER)

Adults 19 years and older Estimated Energy Requirements (kcal/day) = Total Energy Expenditure	
Men	EER = 662 - (9.53 x age [y]) + PA x { (15.91 x weight [kg]) + (539.6 x height [m]) }
Women	EER = 354 - (6.91 x age [y]) + PA x { (9.36 x weight [kg]) + (726 x height [m]) }

Considerations	Examples of how considerations will be addressed in the development of the healthy eating pattern (Step 1)
Flexibility Relevance Health equity	**Combine groupings of food** as much as possible to allow for more general (less prescriptive) guidance
	Test pattern by **removing certain subgroups in Step 1** to help inform additional guidance, as required e.g. remove fish, meat or dairy
Relevance	Some **food-based constraints** will be determined based on data from our **national nutrition survey** (CCHS 2015) i.e. to establish acceptability constraints
Oral health	**Constraints on free sugars**
Cost of foods Health equity	**Constraints on overall cost** of the pattern (while minimizing impact on other considerations e.g. flexibility and relevance)
Environmental impact	Where possible, consider the **environmental impact** of healthy eating

Considerations will also be addressed through the communication of the pattern

Proposed method:
a 2 step process



Step 1: Obtain a draft health eating pattern

- Mathematical optimization using representative foods (composites)

Step 2: Test the draft pattern

- Simulate diets using individual foods

Final Healthy Eating Pattern

How will the simulated diets be assessed (Step 2)?

Energy and nutrient distributions	Benchmark: Content of simulated diets
Energy	**Median energy content** of simulated diets approximate the **median** reference **EER range**
Macronutrients with an Acceptable Macronutrient Distribution Range (AMDR): Carbohydrate, fat and protein	**≥80%** of the simulated diets should have macronutrient content **within the lower and upper bounds of the AMDRs**
Micronutrients with an Estimated Average Requirement (EAR): magnesium, zinc, phosphorus, vitamin A, vitamin C, niacin, folate, thiamin, riboflavin, vitamin B6, vitamin B12, vitamin D	**< 10% of simulated diets** should have a nutrient content **< EAR**
Micronutrients with a Tolerable Upper Intake Level (UL): Calcium, iron, phosphorus, sodium, zinc, vitamin C, vitamin B6, vitamin D *excluding ULs that apply to supplemental sources only: niacin, magnesium, folic acid, vitamin A*	**0** simulated diets **≥ the ULs**
Nutrients with an Adequate Intake (AI) : potassium, fibre, linoleic acid, linolenic acid	The **median nutrient content** of the simulated diets should approximately **equal the AI**

How will the simulated diets be assessed (Step 2)?

Nutrient distributions with no DRIs	Benchmark: Content of simulated diets
Saturated Fat	**< 10% of total energy** (FAO 2010)
Free sugars (estimates)	**< 10% of total energy** (WHO 2015)
Polyunsaturated fatty acids (PUFA)	Approx. **6-11% of total energy** (FAO 2010)
EPA/DHA	Approximate **250mg/day** (FAO 2010)

Dietary Pattern Analyses

Objectives

- To describe predominant dietary patterns in the diets of Canadians

- To determine if predominant dietary patterns vary by sociodemographic, clinical and lifestyle factors

Dietary Pattern Analysis

Relevance for Healthy Eating Pattern

Dietary patterns analysis describes which foods are eaten together in the Canadian population.

- Has the potential to strengthen food pattern modelling work by confirming the relevance of resulting Food Guide pattern(s)
- Predictors may demonstrate potential socioeconomic and health disparities across dietary patterns, which may inform plans for communication of the food pattern model.

CFG 2007 *vs* Proposed methodology for CFG Revision		
	2007 CFG	**Revision of CFG**
Survey Data	2001 Food Expenditure Survey, Federal-Provincial food and nutrition surveys	-CCHS 2015 survey data, -Explore use of data sets for Indigenous populations
Food composition data	1997 Canadian Nutrient File (CNF)	-2015 CNF
Step 1 Establish initial number of servings using food composites	• Use of trial-and-error • Check for consistency re: evidence on food & chronic disease	• Use mathematical optimization • Integrate current evidence on food & chronic disease into pattern development (use quantitative amounts, where possible) • Test results of the pattern when certain subgroups are excluded (to inform additional messaging) • Consider dietary patterns analysis findings, where appropriate
Step 2 Using Step 1 pattern, create 500 simulated diets for each age/sex group using individual foods	Assess distribution of nutrient and energy content of simulated diets	Assess distribution of nutrient and energy content of simulated diets

Communicating methodology and process

- **Peer-review papers:**
  1. International scan (submitted for publication)
  2. Methods, process and high level results

- **Technical report**

Communicating the pattern

- *Canada's Healthy Eating Pattern for Health Professionals and Policy Makers:* a report providing guidance on amounts and types of foods as well as life stage guidance
- Messages and resources related to the healthy eating pattern for Canadians will be integrated into Canada's Food Guide online web application. Information could include messages and resources related to:
  - Different ways of depicting amounts of food (such as frequency and/or proportionality
  - Vitamin/mineral supplement recommendations
  - Life-stage guidance

Developing a healthy eating pattern: rigorous, evidence-based approach

- Complements **Canada's Dietary Guidelines for Health Professionals and Policy Makers**
- Builds on the findings of our **international scan**
- Based on the **convincing findings** in the 2015 Evidence Review for Dietary Guidance (ERC) and 2015-2018 update
- Considers **Canadian context** to ensure healthy pattern is relevant and useful (CCHS 2015)
- Incorporated national and international **expert advice**

Canada's Food Guide Suite of Resources

Tool	Canada's Dietary Guidance Policy Report	Tools and Resources	Canada's Healthy Eating Pattern	Enhancements to the Tools and Resources
When	2018	2018	2019	2019
Who	Policy makers & health professionals	Canadians	Policy makers & health professionals	Canadians

Questions? Comments?

Thank you!