

# MENU PLANNING In Long Term Care

And **Canada's Food Guide** (2019)

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# HIGHLIGHTS

Over 200,000 individuals live in long term care (LTC) residential homes in Canada and many other older Canadians live in supportive and retirement/assisted living.

This document is intended primarily for facilities providing 24-hour care to frail elderly with functional and/or cognitive limitations that increase risk of malnutrition.

## This guidance document is:

- Intended to assist Registered Dietitians, Nutrition Managers and menu planners to prepare a cycle menu to meet LTC residents' overall nutritional needs.
- **Not** intended as a complete guide to menu planning in LTC, which is a complex process requiring foundational knowledge in nutrition, food production, culinary skills, and geriatrics as well as operation-specific knowledge of the clientele and operational capacity.

## Menus for LTC homes

- Must be based on in-depth knowledge of the residents' preferences and needs.
- Should meet Dietary Reference Intakes (DRIs) standards for ensuring nutritional quality, establishing required quantities of specific nutrients that should be offered on a daily basis.
- A “food first” approach is recommended, where the menu items provided meet the nutritional needs of the majority of the residents, and nutrient-dense foods and beverages are used to meet individual needs. “Nutrient-dense” refers to menu items that are high in nutritional quality relative to the portion size.
- Menu reviews and analyses based on *actual* food production (recipes and purchased products) and dining service practices in the LTC home are needed to ensure accuracy.

# PURPOSE

*This guidance document is not intended to be a complete guide to menu planning.*

- Menu planning is a complex process that requires knowledge of nutrition, geriatrics, culinary skills, and food production. Menu planners are expected to have the foundational knowledge to develop a varied menu for regular diets as well as texture modifications, and nutrition interventions for individualized care.
- All menus must be based on in-depth knowledge of the residents' preferences and needs.
- It is recognized that interpretation and judgement on whether a menu is meeting provincial/territory requirements is ultimately the role of the provincial/territorial government. This guidance document is intended to support menu planning but cannot replace legislative authority. (See [Policy Recommendations to Support Effective Food Provision in LTC](#)).

# BACKGROUND

Historically, LTC menu planning has complied with guidance as provided by Canada's Food Guide (CFG) and provincial/territorial standards and regulations. (See [Appendix 1 CFG Requirements in Provincial Regulations and Standards](#) that refer to use of CFG to plan menus.) In 2019, Health Canada released an updated version of CFG. (1)

- During the extensive consultative process, Dietitians of Canada, CMTF, OPDQ and other groups noted that CFG lacks specificity for institutional environments, including long term/residential care (LTC), related to the vulnerability of these populations that are often frail, at nutrition risk, and/or malnourished. People residing in LTC often have multiple conditions and require complex care.
- Other countries (e.g. Australia, Denmark) have recognized the need to adapt population level dietary guidance for residential care, and frail elderly. (2)(3)(4)
- Although specific guidance for older adults in LTC is not provided in CFG, Canada's Dietary Guidelines 2019 recognize that older adults can be vulnerable to poor dietary intake, which is "affected by physiological changes, such as poor oral health, diminished appetite, sensory changes, altered digestive processes, chronic health issues, and the effects of medication". The Dietary Guidelines further note that "Individuals with specific dietary requirements, including those receiving care in a clinical setting, may need additional guidance or specialized advice from a dietitian." (1)
- CFG and Canada's Dietary Guidelines are intended to provide an overall pattern of eating but were never intended to provide a rigid application of daily menu servings. CFG 2019 aims to reduce risk of diet-related chronic diseases and conditions including obesity, cardiovascular disease, type 2 diabetes, certain types of cancer and osteoporosis. (1) This is in stark contrast to the primary nutrition issues of concern in LTC of malnutrition and management of chronic diseases.
- CFG is noted in many of the provincial standards for menu planning in LTC ([see Appendix 1](#)). The previous versions of CFG included serving sizes and recommended number of servings from each food group, which were used to plan and evaluate menus in health care institutions (e.g. 7 servings of grains, 2 – 3 servings of meat and alternatives, etc.). CFG 2019 does not include the same specific serving recommendations.
- Menus planned with the 2007 version of CFG resulted in a common observation among providers that the volume of food being provided to residents was often much larger than they could consume, resulting in extensive food waste and increased costs. (5) Since CFG 2019 is less prescriptive, there is more flexibility to meet nutritional needs and preferences in a smaller volume of food.

# PROFILE OF LONG TERM CARE RESIDENTS

*Over 200,000 individuals live in LTC in Canada and many other older Canadians live in supportive and retirement/assisted living. (6)*

- There is a range of age and functional capacity of adults living in long term care; some residents are focused on rehabilitation or maintenance of function, and promotion of health is relevant, while others are at the end of life where quality of life is paramount.
- A typical Canadian LTC resident is:
  - 80+ years of age
  - likely to have dementia (62% of residents diagnosed, 32% with severe cognitive impairment)
  - likely to have neurological conditions (e.g. 20% of residents CVA/stroke, 6% Parkinson's disease)
  - diagnosed with health conditions with specific dietary requirements (e.g. 26% diagnosed with diabetes, 22% with gastrointestinal diseases, 10% with renal disease) (6)
- Common nutritional challenges in this population include:
  - malnutrition
  - constipation
  - digestive problems
  - dysphagia
  - poor dentition
  - dementia
  - dehydration
  - pressure injuries
  - challenges with independently eating due to functional or cognitive limitations
  - food allergies/intolerances
  - diminished appetite
  - need for therapeutic diets and/or modified textures

All of these challenges result in increased risk of protein-energy malnutrition, and micronutrient inadequacy. (7) These are key variables that impact food intake and can be managed by appropriate general menu planning and individualized nutrition care interventions. (8)(9)

# IMPORTANCE OF MENU PLANNING AND A FOOD FIRST APPROACH

*LTC provides a supportive social and healthcare environment that promotes the maintenance of function and health. Quality of life drives care in these settings.*

- A “food first” approach is recommended, where the menu items provided meet the nutritional needs of the majority of the residents, and nutrient-dense foods and beverages are used to meet individual needs. (13) A food first approach is intended to meet nutrient needs, instead of or in addition to oral nutritional supplements (ONS), such as Ensure® or Resource®, or individual nutrient supplementation.
- Regular use of ONS may contribute to compensatory reduced food intake and residents may tire of the available flavours. (10)
- A menu based on nutrient-dense, culturally appropriate and traditional foods promotes and optimizes nutrient intake. Fortified foods (enhanced with added energy and nutrients) for individualized care or as part of the menu can be a cost-effective strategy to increase nutrient intake without increasing volume of food and beverages. (11 - 14)

## Nutrients of Concern in LTC Menus

Research has shown that LTC menus do not provide sufficient amounts of key nutrients. (8, 9, 15 - 17)

Regular menus have been shown to be low in:

- vitamin B6
- vitamin D
- vitamin E
- vitamin K
- calcium
- folate
- magnesium
- potassium
- zinc
- dietary fibre

Modified texture menus may be even lower in these same nutrients, and also in protein and energy content. (18)(19)

# CANADA'S DIETARY GUIDELINES (2019) AND RECOMMENDED MODIFICATIONS FOR LTC

Canada's Food Guide, including Canada's Dietary Guidelines, are resources for developing nutrition policies, programs, and educational resources for Canadians two years of age and older.

- “Individuals with specific dietary requirements, including those receiving care in a clinical setting, may need additional guidance or specialized advice from a dietitian”. (1) Most residents in LTC meet this definition.
- The evidence review for Canada's Dietary Guidelines states “the content has to be related to the prevention—not the management—of a nutrition-related chronic disease or condition (such as type 2 diabetes), or a nutrition-related risk factor (such as hypercholesterolemia). The content also has to be in line with Health Canada's federal role in nutrition, which includes promoting the nutritional health and well-being of the population.” (1) This illustrates the potential gaps between the evidence used to create the dietary guidance, and the evidence needed to plan appropriate menus for LTC residents, as prevention of chronic disease is often not the goal in LTC settings.

The following three guidelines are excerpts from Canada's Dietary Guidelines; these are followed by suggested modifications for LTC developed by the authors of this document based on the most up-to-date evidence and the experience of nutrition and foodservice professionals in LTC.

Guidelines	Considerations
<p><b>Guideline 1</b></p> <p>Nutritious foods are the foundation for healthy eating.</p> <ul style="list-style-type: none"> <li>• Vegetables, fruit, whole grains, and protein foods should be consumed regularly. Among protein foods, consume plant-based more often.           <ul style="list-style-type: none"> <li>• Protein foods include legumes, nuts, seeds, tofu, fortified soy beverage, fish, shellfish, eggs, poultry, lean red meat including wild game, lower fat milk, lower fat yogurts, lower fat kefir, and cheeses lower in fat and sodium.</li> </ul> </li> <li>• Foods that contain mostly unsaturated fat should replace foods that contain mostly saturated fat.</li> <li>• Water should be the beverage of choice.</li> </ul>	<p><b>Nutritious foods to encourage</b></p> <ul style="list-style-type: none"> <li>• Nutritious foods to consume regularly can be fresh, frozen, canned, or dried.</li> </ul> <p><b>Cultural preferences and food traditions</b></p> <ul style="list-style-type: none"> <li>• Nutritious foods can reflect cultural preferences and food traditions.</li> <li>• Eating with others can bring enjoyment to healthy eating and can foster connections between generations and cultures.</li> <li>• <b>Traditional food</b> improves diet quality among Indigenous Peoples.</li> </ul> <p><b>Energy balance</b></p> <ul style="list-style-type: none"> <li>• Energy needs are individual and depend on a number of factors, including levels of physical activity.</li> <li>• Some <b>fad diets</b> can be restrictive and pose nutritional risks.</li> </ul> <p><b>Environmental impact</b></p> <ul style="list-style-type: none"> <li>• Food choices can have an impact on the environment.</li> </ul>

Source: <https://food-guide.canada.ca/en/guidelines/appendix-b-summary-of-guidelines-and-considerations/>

## Guideline 1: Recommended Modification for LTC/Residential Care

- Due to the high risk of malnutrition and increased need for protein, animal-based products that are nutrient dense and easy to consume (e.g. dairy) or increased use of soy-based fortified products are needed.
- Due to challenges in eating, beverages (e.g. milk, soy beverage, vegetable or fruit juice) are important contributors to energy and nutrient intake for residents.

Guidelines	Considerations
<p><b>Guideline 2</b></p> <p>Processed or prepared foods and beverages that contribute to excess sodium, free sugars, or saturated fat undermine healthy eating and should not be consumed regularly.</p>	<p><b>Sugary drinks, confectioneries and sugar substitutes</b></p> <ul style="list-style-type: none"> <li>▪ <b>Sugary drinks and confectioneries</b> should not be consumed regularly.</li> <li>▪ Sugar substitutes do not need to be consumed to reduce the intake of free sugars.</li> </ul> <p><b>Publicly funded institutions</b></p> <ul style="list-style-type: none"> <li>▪ Foods and beverages offered in publically funded institutions should align with Canada's Dietary Guidelines.</li> </ul> <p><b>Alcohol</b></p> <ul style="list-style-type: none"> <li>▪ There are health risks associated with alcohol consumption.</li> </ul>

Source: <https://food-guide.canada.ca/en/guidelines/appendix-b-summary-of-guidelines-and-considerations/>

## Guideline 2: Recommended Modification for LTC/Residential Care

- Whether prepared in-house or purchased, all menu items should be evaluated for nutrient density and contribution to resident satisfaction and preferences.
- Food is a significant source of pleasure in LTC, and menus need to include a range of foods and beverages to support both nutrient needs and quality of life.
- Foods and beverages with higher sugar and/or fat content can support weight maintenance and may represent a high percentage of familiar foods for residents; these may be the only foods some residents will choose to eat. Menu planners need to determine the appropriate amounts of these foods and beverages in the menu (see [Q&A on Menu Planning](#)).
- LTC menus should emphasize high quality protein and nutrients of concern for the resident population.
- Residents are offered choice to promote autonomy and quality of life; prepared/processed food options are commonly requested and/or are popular with residents, and inclusion on the menu should be based on resident input.
- Processed and ready-prepared purchased foods are a strategy to manage the limited labour and food budgets available in LTC while meeting resident expectations. Until budgets and policies support provision of quality food as well as adequate numbers of professionally trained cooks and food service staff are mandated in all provinces/territories, use of prepared foods will continue to be a strategy to meet current resident expectations within the limits of care funding. (See [Policy Recommendations to Support Effective Food Provision in LTC](#))
- Whether made in-house or purchased ready-prepared, menu items' nutrition profiles, taste, quality, and acceptance should be evaluated.

<p><b>Guideline 3</b></p> <p>Food skills are needed to navigate the complex food environment and support healthy eating.</p> <ul style="list-style-type: none"> <li>▪ Cooking and food preparation using nutritious foods should be promoted as a practical way to support healthy eating.</li> <li>▪ Food labels should be promoted as a tool to help Canadians make informed food choices.</li> </ul>	<p><b>Food skills and food literacy</b></p> <ul style="list-style-type: none"> <li>▪ Food skills are important life skills.</li> <li>▪ Food literacy includes food skills and the broader environmental context.</li> <li>▪ Cultural food practices should be celebrated.</li> <li>▪ Food skills should be considered within the social, cultural, and historical context of Indigenous Peoples.</li> </ul> <p><b>Food skills and opportunities to learn and share</b></p> <ul style="list-style-type: none"> <li>▪ Food skills can be taught, learned, and shared in a variety of settings.</li> </ul> <p><b>Food skills and food waste</b></p> <ul style="list-style-type: none"> <li>▪ Food skills may help decrease household food waste.</li> </ul>
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Source: <https://food-guide.canada.ca/en/guidelines/appendix-b-summary-of-guidelines-and-considerations/>

### Guideline 3: Recommended Modification for LTC/Residential Care

- Adequate numbers of qualified cooking staff are required to prepare high-quality nutrient-dense products.
- Adequate numbers of staff to serve and assist residents at meals and snacks are required to optimize food and fluid intake.
- Standardized recipes for palatable and acceptable nutrient-dense foods with reasonable costs are needed.
- Ensure opportunities for residents to engage in menu planning and choose preferred foods and beverages at meals to increase satisfaction and intake.
- Review food labels for nutrition information and suitability of ingredients for specific diet types and allergies.

## The Dietitians' Role in LTC Menu Planning

- Dietitians involved in planning or reviewing/approving LTC menus must keep a **client/resident focus** on nutrition and quality of life as primary objectives. Recommendations exist to **liberalize therapeutic diets** in LTC, unless specifically required. More restrictive diets are associated with reduced food intake and risk of undernutrition. (20)
- Menus should align the residents' **nutrition needs** with their **food preferences** within the **budgetary and operational capacity** of the LTC home. The dietitian must also ensure that menu planning principles include consideration of residents' self-feeding/eating ability, and that a planned approach to collect and act on resident and staff feedback, are incorporated into the menu planning process.
- A dietitian should be included or consulted on decisions to purchase any computerized menu program/software, to **verify accuracy** of the information in the recipes, menus and nutritional information.
- Each LTC home requires the expertise of dietitians, nutrition/foodservice managers, foodservice supervisors, cooks, and dietary staff to develop a menu **uniquely suited to a specific resident population**.
- **Menu reviews and analyses based on actual food production (recipes and purchased products) and dining service practices in the LTC home are needed to ensure accuracy.**

# OVERALL RECOMMENDATIONS FOR LTC MENU PLANNING

*Best practice guidelines recommend that nutrition and hydration care should be individualized and comprehensive, and consider intake, nutritional status, clinical outcomes, and quality of life. (21,22)*

- Micronutrient intake levels recommended for healthy adults should also be used for frail residents, unless specific deficiencies are identified. (22)
- The Dietary Reference Intakes (DRIs) are a primary guidance tool for ensuring nutritional quality and establishing required quantities of specific nutrients that should be offered on a daily basis. Suggested targets for select nutrients may need to be adjusted for the home's menu by the dietitian for specific home context/demographics (i.e. sex, average age, average weight).
- A skilled menu planner will translate the DRIs to the needed portions and types of foods provided at meals and snacks. The goal is for the assessed menu to provide >75% of the RDA/AI on any specific day, while achieving an average of 100% of the RDA/AI over the duration of the menu for specific nutrients of concern.
- Select nutrients may be challenging to meet through diet alone, and specifically those that are at risk of deficiency in older adults (e.g. vitamin D) could warrant supplementation.
- Limitations of nutrient databases should also be considered when evaluating the planned menu's achievement of RDA/AI for specific nutrients.
- Establishing portion sizes is a key part of meeting nutrient targets for menus. Portion sizes should be planned with input from residents to provide adequate intake and to minimize food waste (such as small, energy- and nutrient-dense servings).
- Food-based fortification, snacks, finger foods, texture-modified enriched foods and oral nutrition supplements promote adequate intake for those at risk of malnutrition and with swallowing and/or chewing difficulties.(22)

## Nutrients of Concern in LTC Menu Planning and Suggested Daily Menu Targets (including meals and between-meal snacks and beverages)

*Suggested Facility Menu Targets for Nutrients of Concern*

NUTRIENT	SUGGESTED DAILY MENU TARGET
Energy	2000 kcal minimum
Fluid	2000 ml
Protein	100 g
Fat	30 – 35% of calories
Dietary Fibre	30 g
Sodium	<3500 mg
Vitamins and Minerals	> 75% RDA/AI daily and 100% average over full menu cycle

\*Note that these values are for the overall facility menu; the dietitian develops individualized targets if needed as part of the nutrition care process.

**Energy:** Minimum of 2000 kcal/day minimum in order to meet nutrient targets and sufficient energy for weight maintenance for a majority of clients/residents. (22) **This may need to be adjusted by the dietitian based on the overall profile of the residents.** Total energy lower than 2000 kcal/day in the planned menu makes it difficult to achieve micronutrient targets. A menu that is planned to provide significantly higher amounts (e.g. 3000 kcal/day) increases the probability of food waste and increased cost without providing nutritional benefits.

**Protein:** Average of 100 g/day over the duration of the menu. This is based on the higher range of the AMDR (10 – 35% of calories from protein) and availability of protein foods throughout the day at meals and snacks. This increases the opportunities for residents to ingest protein and meet their individual needs. (22, 33, 34, 35)

**Fat:** 30 - 35% of calories from fat is recommended to increase energy density and palatability of the menu. Restriction of overall fat content to the lower level of the AMDR (10% of calories) is not recommended. Trans fats should be minimized.

**Fibre:** 30 g/day based on the Adequate Intake for males aged 70+ years; this will exceed the needs of female residents but meets the recommended 14 g/1000 kcal for the overall menu.

**Fluids:** Offer minimum 2000 mL as a daily target on the menu; this includes offering choice of beverages (both nutrient-containing such as milk and juice, and non-nutritive such as water, coffee, tea) at and between meals based on resident preferences and needs.

**Micronutrients:** The menu should meet DRIs (EAR or AI) for all micronutrients. Some nutrients (e.g. vitamin D, vitamin E) are difficult to achieve through menu alone. See Appendix for more information on DRI targets and food sources.

**Sodium:** There is no longer a Tolerable Upper Level (UL) for sodium in the DRIs; instead a Chronic Disease Risk Reduction Intake (CDRR) has been set. "For sodium, the CDRR is the intake above which intake reduction is expected to reduce chronic disease risk within an apparently healthy population. Among adults, further reductions in sodium intake below the CDRR have demonstrated a lowering effect on blood pressure, but the effect on chronic disease risk could not be characterized." The CDRR for individuals > 70 years of age was extrapolated from the adult value as reducing intakes if above 2,300 mg/d. (23)

Typical LTC menus contain 3000 - 3500 mg sodium per day. Efforts to significantly reduce overall sodium content of the menu have been associated with reduced meal satisfaction and concerns for palatability and quality of life. (20)(24)

Based on resident preferences and the sodium content of the current food supply reducing the sodium content of the menu to meet the CDRR does not appear feasible.

Efforts to manage high-sodium foods should still be made, as well as changes in recipes or purchased products where appropriate to reduce sodium content, while maintaining palatability and acceptance.

Salt and pepper shakers, and salt substitutes, should be available for residents to season their foods to improve intake.

The dietitian must assess whether an individual will benefit from sodium restriction beyond the levels in the menu and plan individualized interventions.

# NUTRIENT ANALYSIS OF MENU

*A detailed nutrient analysis of the menu is best practice to ensure that the menu offers the recommended levels of each nutrient. This is a time-consuming process that requires attention to detail, and thorough knowledge of food products and production systems. A standardized procedure for analysis should be followed.*

- Nutrient analysis software should be chosen that has the most complete database of food items and ability to add items and recipes.
- Manufacturers' data should be used where possible for purchased prepared foods, acknowledging that this may not include all nutrients of concern.
- Menu day analysis should be based on the actual foods and beverages in the standard portion sizes to be offered.
- Where choice of items in a menu category is offered, separate analysis should be completed to compare the daily nutrient content.
- Analysis of texture-modified and therapeutic diet menus, using actual food products and standardized recipes, will identify shortfalls in nutrients that are particularly important for this vulnerable population.
- Accurate nutrient analysis requires detailed knowledge of the food products, recipes, portion sizes, food preparation practices, and serving practices of the home.
- Nutrient analysis of the planned menu is only accurate if staff prepare standardized recipes and serve planned portion sizes matching the data used for analysis.
- A written menu that meets nutrient targets is only valuable if it is prepared and served accurately, and if the foods and beverages are acceptable to the resident. Meeting nutrient targets in a reasonably-eaten volume of food is especially important for LTC to reduce risk of malnutrition and avoid food waste.
- If a full nutrient analysis is unable to be completed, at minimum the analysis should include nutrients of particular concern (energy, protein, dietary fibre, fluid, sodium, calcium).

# QUESTIONS AND ANSWERS

## OVERALL MENU PLANNING Q&A

### **Without CFG requirements for Food Guide serving sizes and number of servings from each food group, how should the menu be structured?**

The ultimate goal is to provide a menu that meets the nutrient requirements for the resident population, based on DRIs and nutrient targets. The gold standard for determining this is a full nutrient analysis based on the actual menu items, production processes, and standard portion sizes served. However, many homes do not have access to required software or expertise at this time, and many provinces do not currently require nutrient analysis of the menu. For those unable to access an accurate nutrient analysis, it is important to pay specific attention to the nutrients of particular concern as outlined above.

Every food service operation requires standardized portions in menu planning for food cost management, purchasing, nutrition management, quality control and resident satisfaction.

CFG previously specified recommendations for amounts of food per day that were adapted by most homes to successfully meet many of the DRI targets. These recommended amounts may continue to be used but also may be modified according to the individual home's residents' needs while meeting the nutrient targets. Resident feedback and monitoring of food waste should be used to determine appropriate serving sizes for individuals.

Examples of commonly used portion sizes:

- Soup: 125 mL to 180 mL
- Protein Foods:
  - 60 - 90 g (2 to 3 oz) cooked meat/poultry/fish per serving per meal
  - 2 eggs
  - 60 g (2 oz) cheese
  - plant-based protein serving size is variable based on protein content of the product. Aim for a minimum of 10 g protein content per main course serving, and augment with complementary foods to reach total 20 - 30 g per meal. (refer to protein section)
- Grains: 125 - 180 mL or 1 slice bread
- Fruits and vegetables: 125 mL, salad 180 - 250 mL
- Juice, milk, water: 125 - 250 mL

Texture-modified diets may have other serving sizes based on standardized recipes and resident tolerance for volume and preferences. Texture-modified diets should aim to have the same nutritional value as the regular menu and should meet the DRIs. Homes may use a meal day pattern to ensure that the desired number of portions for each food group is met each day. A sample meal day pattern can be found in the [Appendix 3: Sample Menu Pattern](#) that considers the [CFG Eat Well Plate](#) and can meet the DRIs for key nutrients. An experienced menu planner will identify which foods best contribute to a nutritious menu that meets preferences of the particular homes' residents.

A sample menu audit tool can be found in [Appendix 4](#). An audit is useful to determine probable adequacy of key nutrients in the absence of full nutrient analysis.

### **What is meant by processed and prepared foods and beverages?**

Canada's Dietary Guidelines state that "Processed or prepared foods that contribute to excess sodium, free sugars or saturated fat that undermine healthy eating should not be consumed regularly."

Processed foods and beverages are defined as products that are canned, cooked, frozen, dried or otherwise processed to extend preservation, food safety, and quality in transportation, distribution and storage. (25)

Prepared foods and beverages are defined as products that are prepared by restaurants and other similar establishments, and those prepared at home. Prepared products can also contain processed ingredients. (1)

Highly processed or ultra-processed foods (e.g. chips, soft drinks, hotdogs, pastries) are generally higher in energy and lower in nutrients, so are not foundational foods for menu development. (1)(26) However, these foods and beverages can contribute to resident satisfaction and quality of life; the ultra-palatability of these foods can be beneficial for malnourished residents or those with limited appetite to promote food intake and weight maintenance. Attention must be paid to overall nutrient density and targets for nutrients of concern (e.g. protein, dietary fibre).

### **Should meals planned for LTC match the image of the new CFG Eat Well Plate model?**

The "Eat Well Plate" of the 2019 CFG provides a visual reference to support the selection of foods that should be eaten at each meal. The new guide focuses on proportion of the meal (1/2 vegetables and fruits, 1/4 protein foods, 1/4 whole grain foods) instead of a fixed portion size for various foods. The Eat Well Plate is intended as tools for public health promotion and was not designed for institutional menu planning.

For LTC menu planning, the proportions of the meal may be assessed by considering the whole meal rather than just the main plate. This means the soup, appetizer, side dishes and dessert can also count in achieving the recommended proportions of protein foods, vegetables/fruits and whole grain foods. Also, it should not be a stringent requirement to comply with the plate model for every single meal since it is not necessary as long as nutrient targets are met. Also, nutrient targets are daily averages over the course of the menu (not per meal), although adequate protein should ideally be provided per meal (i.e., 25 to 30 g). In LTC, a larger proportion of protein may be appropriate based on the increased needs of the residents.

Nutrient analysis of sample menus with estimated portion sizes based on the plate model have shown that most nutrients can be met using this method for constructing the menu. Calcium targets are difficult to meet without milk products or fortified non-dairy products. Protein targets may be difficult to meet with plant-based entrees, requiring consideration of the protein content of the entire meal (e.g. higher protein soups, side dishes, and desserts). Details of the nutrient analysis and process are found in [Appendix 5](#).

### **Is there a level of processed and prepared items that are acceptable on a menu?**

Canada's Dietary Guidelines state that "Processed or prepared foods that contribute to excess sodium, free sugars or saturated fat that undermine healthy eating should not be consumed regularly."

All menu items should be evaluated for nutritional content, taste, cost, and acceptability to residents, whether they are made in-house from scratch ingredients or purchased ready to heat and serve. Processed and prepared foods may or may not be poor nutrition choices.

The decision to use a processed or prepared product or a made-in-house product should be made after evaluating product options and staff capacity to prepare in-house. LTC kitchens must work within the given resources, e.g. the number of cooks, their skills and work hours, so there will be a mix of food prepared in-house and processed or prepared food items. Menu planners should consider adding more made-in-house food to the menu if possible.

Choice and flexibility are very important to meet individual homes' preferences and needs. The amount of processed and prepared items versus homemade has to be practical for the capacity of the food production. The daily range for sodium, fat, sugar should be considered when using processed foods. Limiting sodium, fat and sugar may be detrimental to those residents with poor food intake overall.

Menu planners should aim to distribute higher sodium food items throughout the week instead of serving numerous higher sodium items on one day. Offering a lower sodium choice at each meal will allow for individual preference and meeting of nutrient targets.

Carbohydrate distribution should be considered for residents with diabetes following a liberalized diet, aiming for consistent carbohydrate content at each meal (e.g. similar carbohydrate at breakfast each day).

### **Should the menu include fortified, enhanced, enriched and/or nutrient-dense foods to increase energy and nutrient content?**

The terms fortified, enhanced, and enriched are often used interchangeably, in general to mean foods and beverages that have ingredients added to increase the energy and/or nutrient content. Energy-dense and nutrient-dense foods are important in LTC menus to maximize intake in a smaller volume of food.

**Fortification** of food products in our food supply is based on federal government oversight to ensure benefit without harm. Examples of **mandatory fortification** include vitamin D fortification of cow's milk and vitamin C fortification of fruit drinks. (27) Examples of **voluntary fortification** include B vitamins added to breakfast cereals, and vitamin D added to goat's milk and plant-based beverages other than soy-based beverage. (28) Fortification from purchased food items has been an effective strategy to increase intakes of key nutrients and food components. (28)

**Enhanced or enriched** foods can be made by adding ingredients to other foods to improve nutrient intake without increasing the volume of food consumed. (11,21,22,29-31) This increases the nutrient density of the item and is consistent with the "food first" philosophy which may help decrease use of ONS. Energy, protein, calcium, and vitamin D are often the nutrients most impacted.

Dietary fibre intake can also be enhanced by adding finely processed dietary fibres (such as flax, legumes, pea hull fibre and wheat bran) to appropriate foods in the LTC menu. Evidence suggests that adding 4 - 14g of fibre per day may be effective in increasing stool frequency and/or decreasing laxative use.(3)

Homes may decide to include certain enhanced menu items for all residents and/or enhanced foods may be provided to specific residents based on individualized assessments.

*Examples of Foods that can be Enhanced with Protein, Fat and Micronutrients*

<b>FOOD CATEGORIES</b>	<b>INGREDIENTS TO ADD FOR ENHANCED NUTRIENT PROFILE</b>
Hot or cold cereals	Skim milk powder, cream, butter/margarine, dried fruit
Cream soups or entrees	Grated cheese, cream, butter/margarine, milk powder, croutons
Appetizers	Chopped boiled eggs, diced meat/fish, cheese cubes
Mashed potatoes	Sour cream, cream, milk powder, butter/margarine
Pastas	Cheese, butter/margarine, cream, hard-boiled egg or omelet pieces
Desserts	Cream, honey, chocolate syrup, nut butters
Fruit juice	Milk powder, honey, yogurt (smoothie)
Foods requiring thickening	Infant cereal instead of using modified starch-based thickeners

*Suggested Nutrient Targets for Enhanced Foods*

<b>MENU CATEGORY</b>	<b>SUGGESTED SERVING SIZE</b>	<b>NUTRIENT TARGETS</b>
Hot cereal	150 – 180 ml	130 kcal, 10 g protein
Soup	150 – 200 ml	150 kcal, 8 g protein
Mashed potato	90 – 125 ml	100 kcal, 3 g protein
Dessert	90 – 125 ml	120 kcal, 5 g protein
Snack	varies	120 kcal, 5 g protein

## PROTEIN FOODS Q&A

### How often should plant-based proteins be offered on the menu?

Resident preferences and feedback should determine the menu items offered. There is no specific frequency recommended. Depending on cultural preferences, plant-based entrees may be appropriate daily, or much less frequently. For homes that are not currently offering plant-based meals, gradual introduction of plant-based proteins can be considered.

As a starting point, consider:

- Offering 1 or 2 plant-based main course choices per week, based on resident preference
- Incorporating plant-based proteins into traditional recipes, e.g., in soups, salads, or main courses
- Adding plant-based proteins to meat dishes, such as replacing ground beef in pasta sauce fully or partially with lentils, can be a well-accepted strategy to maintain traditional taste and texture of foods

### How many grams of protein should be provided on the daily menu?

An average of 100 grams of protein should be provided on the daily menu. This target was set considering the AMDR of protein intake (10 - 35% of calories), and target of 25 – 30 g/meal over the day. (32)

Protein from meals and snacks should be included in this total. Providing protein sources at each meal and snack maximizes the opportunities for intake, resulting in potential for higher protein intake overall. An equitable distribution of protein throughout the day is a goal for long term/residential care menus because it may promote optimal protein synthesis and reduces the risk of sarcopenia, which is an issue in this population. In particular, increasing the amount of protein at breakfast compared to the usual LTC menu may be important. (33) (34)

*Suggested Distribution of Protein Over the Day*

MEAL	AMOUNT OF PROTEIN
Breakfast	20 - 25 g
Morning beverage/snack	5 g
Lunch	25 - 30 g
Afternoon beverage/snack	10 g
Supper	25 - 30 g
Evening beverage/snack	10 g

The menu depends on entrees to provide the majority of protein in a meal, and plant-based entrees in typical serving sizes may have a lower amount of protein compared to animal protein sources. A target of minimum 10-15 g protein per entrée serving for plant-based foods is suggested. Smaller amounts of protein will also come from soups, grains, vegetables, salads and some desserts for a target of 25 to 30 g protein per meal.

Sample Protein Content of Menu Items (Canadian Nutrient File)

MENU ITEM	PROTEIN CONTENT
60 g cooked meat, fish, or poultry	14 g (approx.)
125 ml lentils or 175 ml baked beans	9 g
15 ml peanut butter	4 g
1 egg	6 g
250 ml cow's milk	8 g
250 ml soy beverage	7 g

Sample Meals Meeting Protein Target

<b>Breakfast 21 g protein</b>	125 mL apple juice 180 mL cream of wheat 2 pc pancakes 15 mL syrup 1 boiled egg 250 mL 2% milk	<b>Breakfast 26 g protein</b>	125 mL cranberry juice 180 mL oatmeal 1 egg omelette 2 sl. whole wheat toast 250 mL 2% milk
<b>Lunch/Supper 30 g protein</b>	125 mL orange juice 60 g pork roast 125 mL potatoes 125 mL corn niblets 125 mL sliced pineapple 1 sl. whole wheat bread 5 mL margarine 125 mL 2% milk	<b>Lunch/Supper 20 g protein</b>	175 mL bean soup 4 cheese & potato perogies 30 mL sour cream 125 mL tossed salad 15 mL dressing 125 mL baked custard 5 mL margarine 125 mL 2% milk

Sample Snacks with Protein Content

<b>Snack 10 g protein</b>	Peanut butter and jelly sandwich 125 mL 2% milk	<b>Snack 8 g protein</b>	2 plain cookies 125 ml fruit smoothie made with yogurt
<b>Snack 8 g protein</b>	25 g cheddar cheese 4 crackers 125 ml water	<b>Snack 10 g protein</b>	60 ml hummus 4 crackers 125 ml soy beverage

## What are the differences between animal and plant proteins?

All animal sources of protein contain all 9 essential amino acids in adequate amounts to optimize muscle synthesis. Examples of animal sources of protein are meat, poultry, fish, eggs, milk, cheese and yogurt. These are called complete proteins and provide high biological value. Soy is also considered a complete protein.

Most plant proteins are lacking at least one of the 9 essential amino acids or do not provide all of the essential amino acids in optimal ratios. They are considered to be incomplete proteins and provide low biological value. Plant proteins include beans, legumes, grains, nuts, and seeds. Vegetables and fruit also contain smaller amounts of protein. Plant proteins offer other benefits including fibre, various vitamins and minerals as well as phytochemicals and antioxidants. For those that consume a vegetarian diet (especially vegan), it's important to offer a variety of different plant-based protein sources to ensure that all essential amino acids are consumed in adequate amounts.

*Example Comparison of Plant and Animal Protein Foods*

<b>½ CUP COOKED GROUND BEEF</b>	<b>½ CUP COOKED BLACK BEANS</b>
19 g protein	8.1 g protein
0 g fibre	8 g fibre
2.1 mg iron	1.9 mg iron
14 mg calcium	25 mg calcium
15 mg magnesium	64 mg magnesium

*Source: Canadian Nutrient File*

## VEGETABLES AND FRUITS Q&A

### **With juice no longer considered as a fruit serving in CFG 2019, should LTC homes remove or reduce juice from their menu?**

Juice does not need to be removed from the menu. However, it is considered a beverage for hydration purposes and does not contribute to daily intake of fruit and/or vegetables, or to the proportion of vegetables and fruit if assessing a meal for alignment with the “Eat Well Plate”. Juice provides energy, carbohydrates, and Vitamin C. Attention should be paid to oral care to prevent dental caries when juice is the preferred beverage of a resident.

### **With juice no longer considered as a fruit serving in CFG 2019, how can we incorporate “plenty of vegetables and fruits,” on the menu?**

There should be a minimum of 2 vegetable and/or fruit choices at each meal. Vegetables and fruits can be offered in soups, salads, chopped, shredded, marinated salads, jellied salads, other side dishes and desserts. Cold salad plates on the Spring-Summer menu can include 2-3 vegetable choices. Fruits can be offered as a snack option between meals or as a dessert option at mealtimes. Brightly coloured vegetables and fruits provide additional antioxidants and phytochemicals. Examples include berries, sweet potato, and red peppers.

### **The plate model of Canada’s Food Guide shows half the plate consisting vegetables and fruits. Is this appropriate for residents who are at risk for poor intake, or who have higher nutrition requirements?**

CFG’s plate model depicts  $\frac{1}{2}$  the plate as vegetables and fruit,  $\frac{1}{4}$  protein and  $\frac{1}{4}$  whole grain foods. This can be used to plan home menus but is not meant to be specific to meet the needs of residents with various nutrition issues. Residents should be assessed by a dietitian to determine nutritional requirements and any specific recommendations required to meet nutrient needs.

For LTC meal planning, the proportions of the meal can be assessed by considering the whole meal rather than just the main plate. This means the soup, appetizer, side dishes, beverages and dessert can also count in achieving the recommended proportions of protein foods, vegetables and fruits and whole grain foods. See [Appendix 5](#) for more information on using the plate model, and details of nutrient analysis of various meals created using the plate model.

## WHOLE GRAIN FOODS Q&A

### Can any refined grains be included on the menu since CFG 2019 states “choose whole grains” rather than the previous guideline of at least half whole grains?

While menu planners should be working towards offering a variety of whole grain foods, menu items with refined grains can still be included on the menu to respect resident preferences (e.g. Rice Krispies, blueberry muffins, vanilla cake). Attempts should be made to incorporate more whole grain options, while monitoring resident feedback.

### How can I introduce more whole grain foods on the menu?

Note that “whole grains” refer to grains that contain all three parts of the kernel (the bran, the endosperm, and the germ). Products made with whole grains have the words “whole grain” followed by the name of the grain as one of the first ingredients. In Canada, 100% whole wheat flour is not considered a whole grain. This is because much of the germ is removed when wheat is milled. Though 100% whole wheat foods may not be considered whole grains, they are nutritious choices that provide dietary fibre. (35)

To increase whole grains on the menu, incorporate foods that have the word “whole grain” followed by the name of the grain as one of the first ingredients. “Multi-grain” foods may or may not be made with whole grains, so it is important to check the ingredient list.

### What grain foods can be used to increase dietary fibre in the menu?

- Whole grain hot or cold cereals
- Muffins or other baked goods made with whole grain ingredients
- Wheat germ or ground flax seed added to hot cereals
- Soups with whole grains such as brown rice
- Whole grain crackers
- Whole grain and multi-grain bread/toast, rolls, hamburger/hotdog buns
- Brown rice and whole-grain pasta
- Ancient grains such as quinoa, buckwheat and millet
- High fibre cookies
- Fruit crisps with oatmeal topping

## FATS Q&A

### Should we be restricting saturated fat on the menu?

The CFG recommends that foods containing mostly unsaturated fat replace foods containing mostly saturated fat for cardiovascular health. Canada's Dietary Guidelines 2019 clarifies that the intent is not to reduce total fat in the diet. To achieve this aim, CFG recommends that "patterns of eating that include animal-based foods should emphasize more plant-based foods, and promote animal-based foods that are lower in saturated fat, such as lean red meat including wild game, lower fat milk, lower fat yogurts, lower fat kefir, and cheeses lower in fat and sodium." A thoughtful product selection process will decrease/eliminate trans fats and emphasize unsaturated fats on the menu.

Although there is evidence of potential benefit to cardiovascular health related to healthier fat composition of the diet in older adults, some guidelines suggest that dietary interventions to improve cardiovascular risk factors should be avoided in those who are at high risk of malnutrition. (21)(36)

Fat is not generally restricted in the LTC menu because many residents may benefit from energy-dense foods, consistent with a liberalized diet philosophy. (36) Some international nutrition standards for menus aimed at individuals at risk for undernutrition, aim for a higher proportion of calories from fat to optimize caloric density per serving size (e.g. 40% energy from fat in Danish menu standards)(20). Intervention studies in the frail elderly used energy dense meals achieved by the addition of mainly fat (butter, cream, cheese) in meals for the frail elderly have found an improvement in energy intake and function. (4)

## BEVERAGES Q&A

### Which beverages should be promoted?

The menu should be planned to provide a minimum of 2000 mL per day. This includes offering choice of beverages (both nutrient-containing such as milk and juice, and non-nutritive beverages such as water, coffee, tea) at, and between meals, based on resident preferences and needs. (22)

The best way to promote hydration is to have a choice of preferred nutritive and non-nutritive beverages, since a beverage is only hydrating if it is consumed. Offer water, milk, fortified plant-based beverage, 100% fruit or vegetable juice, coffee and tea every meal and between meals to ensure hydration. See the [Sample Menu Pattern template \(Appendix 3\)](#) for suggested beverage distribution. A protocol for hot weather, requiring increased fluids, may also be needed.

On an individual basis, be aware of the nutritional requirements and consumption to determine which fluid sources are best for an individual, for example consider risk for dental caries with beverages high in sugar content and for those at risk of malnutrition, consider that calorie-, protein- and nutritive-rich beverages are easy to consume throughout the day and can help to promote adequate intake.

### Is milk required to be served, since there is no longer a milk and alternatives food group, and dietary guidance suggests water as the beverage of choice?

Including milk or fortified soy beverages on the menu with meals or between meals is important to meeting DRI targets for calcium and vitamin D. This does not mean that all residents must have milk served to them, if they do not wish to have it. For individuals who do not consume milk, alternate sources of these nutrients are important, some of which can be incorporated into the overall menu and some as individualized plans.

Milk has not been removed from CFG. It is included as a protein food and continues to be recommended as a practical way to help meet protein, calcium and vitamin D needs. Yogurt and cheese are also important for inclusion in meals and snacks.

Three cups (750 mL) of milk provides 900 mg of calcium (RDA is 1200 mg) and 300 IU vitamin D (RDA is 800 IU).

Three cups of fortified plant-based beverage (e.g. soy, almond, rice, oat) may provide a range of nutrients. Nutrient content of plant-based beverages varies and should be evaluated for individual nutrient intake. In particular, protein content of plant-based beverages other than soy is quite low.

Health Canada recommends 400 IU vitamin D supplementation daily for all adults over 50 years of age. (37) The Canadian Osteoporosis Guidelines further recommend that LTC residents at high risk of fracture receive 800 IU to 2000 IU vitamin D<sub>3</sub> daily, and those who cannot meet intake of 1200 mg of calcium through dietary intake receive supplemental calcium of up to 500 mg per day. (38)

# POLICY RECOMMENDATIONS TO SUPPORT EFFECTIVE FOOD PROVISION IN LTC

*These policy recommendations are included in this guidance document in recognition of the important role of policy in food and nutrition practices for LTC settings. Best practices for menu planning, food service, and nutrition care require adequate resources for implementation.*

1. Provide specified funding for a raw food allocation, or a minimum food expenditure per resident, to support a healthful menu.
2. Provide sufficient funds towards skilled labour allocation to decrease reliance on highly processed or prepared foods of poor nutritional quality and to promote more healthful foods made in-house tailored to residents' needs and preferences.
3. Support and acknowledge the importance of standardized menu planning in regulations.
4. Ensure standards/regulations include a menu planner, such as a dietitian or nutrition manager, that has appropriate education, knowledge and skills to plan a nutritious and varied menu that meets the needs of residents.
5. Provide resources to support nutrient analysis of the menu to guide menu planning.
6. Shape audit or inspection processes with input from stakeholders to demonstrate that best practices in menu planning, food service, and nutrition care are being met.

# REFERENCES

1. Canada. Health Canada. Canada's dietary guidelines for health professionals and policy makers. [Internet]. [cited 2019 Sep 4]. p. 55. Available from: <https://food-guide.canada.ca/en/guidelines/>
2. Victoria (Australia) Nutrition Standards for Hospitals and Residential Aged Care Facilities [Internet]. Available from: [http://www.health.vic.gov.au/archive/archive2011/patientfood/nutrition\\_standards.pdf](http://www.health.vic.gov.au/archive/archive2011/patientfood/nutrition_standards.pdf)
3. Nutrition and Menu Workgroup. Queensland Health Nutrition Standards [Internet]. 2018. Available from: [https://www.health.qld.gov.au/\\_\\_data/assets/pdf\\_file/0030/156288/qh-nutrition-standards.pdf](https://www.health.qld.gov.au/__data/assets/pdf_file/0030/156288/qh-nutrition-standards.pdf)
4. The Diet Manual (Denmark) [Internet]. Available from: <https://kosthåndbogen.dk/>
5. Ducak K, candidate M, Keller HH. Perspectives in practice Perspectives pour la pratique Toward Resident-centred Menus. *Can J Diet Pract Res*. 2011;72(2).
6. CIHI. ccrs-quick-stats-2017-2018-en-web [Internet]. Available from: <https://www.cihi.ca/en/quick-stats>
7. Keller HH, Lengyel C, Carrier N, Slaughter SE, Morrison J, Duncan AM, et al. Prevalence of inadequate micronutrient intakes of Canadian long-term care residents. 2018 [cited 2020 Feb 14]; Available from: <https://doi.org/10.1017/S0007114518000107>
8. Vucea V, Keller HH, Morrison JM, Duizer LM, Duncan AM, Carrier N, et al. Modified Texture Food Use is Associated with Malnutrition in Long Term Care: An Analysis of Making the Most of Mealtimes (M3) Project. *J Nutr Heal Aging*. 2018 Oct 1;22(8):916–22.
9. Lam IT, Keller HH, Duizer L, Stark K. Micronutrients on the menu: Enhancing the quality of food in long-term care for Regular, nontherapeutic menus. Vol. 76, *Canadian Journal of Dietetic Practice and Research*. Dietitians of Canada; 2015. p. 86–92.
10. Lam I, Keller H, Duizer L, Stark K, Duncan A. Nothing ventured, nothing gained: acceptability testing of micronutrient fortification in long-term care *J Nurs Home Res* [Internet]. 2015 [cited 2019 Dec 30];1:18–27. Available from: <http://www.jnursinghomeresearch.com/434-nothing-ventured-nothing-gained-acceptability-testing-of-micronutrient-fortification-in-long-term-care.html>
11. Cave DP, Abbey KL, Capra SM. Can foodservices in aged care homes deliver sustainable food fortification strategies? A review. *Int J Food Sci Nutr* [Internet]. 2019 Aug 28 [cited 2019 Dec 30];1–9. Available from: <https://www.tandfonline.com/doi/full/10.1080/09637486.2019.1658722>
12. Hugo C, Isenring E, Miller M, Marshall S. Cost-effectiveness of food, supplement and environmental interventions to address malnutrition in residential aged care: A systematic review. Vol. 47, *Age and Ageing*. Oxford University Press; 2018. p. 356–66.
13. Forbes C. The 'Food First' approach to malnutrition. *Nurs Resid Care*. 2014 Aug 2;16(8):442–5.
14. Keller HH, Carrier N, Slaughter SE, Lengyel C, Steele CM, Duizer L, et al. Prevalence and Determinants of Poor Food Intake of Residents Living in Long-Term Care. *J Am Med Dir Assoc*. 2017 Nov 1;18(11):941–7.
15. Wendland BE, Greenwood CE, Weinberg I, Young KWH. Malnutrition in institutionalized seniors: The iatrogenic component. *J Am Geriatr Soc*. 2003 Jan 1;51(1):85–90.
16. Viveky N, Thorpe L, Alcorn J, Hadjistavropoulos T, Whiting SJ. Report Rapport 84 Revue canadienne de la pratique et de la recherche en Challenges in Planning Long-term Care Menus That Meet Dietary Recommendations. *Can J Diet Pr Res* [Internet]. 2013 [cited 2020 Jan 2];74:84–7. Available from: <https://dcjournal.ca/doi/pdfplus/10.3148/74.2.2013.84>
17. Wright-Thompson A, Piche L. Nutritional Analysis of a Long-Term Care Menu Before and After an Increase in the Raw Food Cost Allowance. 2011 [cited 2020 Jan 2];141–5. Available from: <http://www.hc-sc-gc-ca/fn-an/>

18. Vucea V, Keller HH, Morrison JM, Duncan AM, Duizer LM, Carrier N, et al. Nutritional quality of regular and pureed menus in Canadian long term care homes: an analysis of the Making the Most of Mealtimes (M3) project. *BMC Nutr.* 2017 Dec;3(1).
19. H Niezgodka AMLCHK. Issues and challenges of modified-texture foods in long-term care: A workshop report. *Ann Long-Term Care.* 2012;20:22–7.
20. Position of the American Dietetic Association: Liberalization of the diet prescription improves quality of life for older adults in long-term care. *J Am Diet Assoc.* 2005;
21. Volkert D, Beck AM, Cederholm T, Cereda E, Cruz-Jentoft A, Goisser S, et al. Management of Malnutrition in Older Patients—Current Approaches, Evidence and Open Questions. *J Clin Med.* 2019 Jul 4;8(7):974.
22. Volkert D, Beck AM, Cederholm T, Cruz-Jentoft A, Goisser S, Hooper L, et al. ESPEN guideline on clinical nutrition and hydration in geriatrics. *Clin Nutr.* 2019 Feb 1;38(1):10–47.
23. Reinders I, Volkert D, de Groot LCPGM, Beck AM, Feldblum I, Jobse I, et al. Effectiveness of nutritional interventions in older adults at risk of malnutrition across different health care settings: Pooled analyses of individual participant data from nine randomized controlled trials. *Clin Nutr.* 2019 Aug 1;38(4):1797–806.
24. Dietitians of Canada. In Practice-Based Evidence in Nutrition (PEN). Do older adults (65 years of age or older) with chronic disease (diabetes, chronic kidney disease, hypertension) in long-term care settings who follow a diet prescription have better outcomes than those who do not? [Internet]. Available from: <https://www.pennutrition.com/KnowledgePathway.aspx?kpid=2541&pqcatid=146&pqid=3773&kppid=28073&book=Evidence&num=3#Evidence>
25. Province of British Columbia. Sodium Reduction in Health-Care Facilities: B.C.'s Experience [Internet]. [cited 2020 Jan 6]. Available from: [www.gov.bc.ca/gov/content/health](http://www.gov.bc.ca/gov/content/health)
26. Bleiweiss-Sande R, Chui K, Evans EW, Goldberg J, Amin S, Scheck J. Robustness of Food Processing Classification Systems. *Nutrients* [Internet]. 2019 Jun 14 [cited 2020 Jan 7];11(6):1344. Available from: <https://www.mdpi.com/2072-6643/11/6/1344>
27. Gupta S, Hawk T, Aggarwal A, Drewnowski A. Characterizing ultra-processed foods by energy density, nutrient density, and cost. *Front Nutr.* 2019 May 28;6.
28. Canadian Food Inspection Agency. Foods to Which Vitamins, Mineral Nutrients and Amino Acids May or Must be Added [D.03.002, FDR] - Reference Information - Food label requirements - Canadian Food Inspection Agency [Internet]. [cited 2020 Jan 9]. Available from: <https://www.inspection.gc.ca/food-label-requirements/labelling/industry/nutrient-content/reference-information/eng/1389908857542/1389908896254?chap=1>
29. Nikooyeh B, Neyestani TR, Zahedirad M, Mohammadi M, Hosseini SH, Abdollahi Z, et al. Vitamin D-fortified bread is as effective as supplement in improving Vitamin D Status: A randomized clinical trial. *J Clin Endocrinol Metab.* 2016 Jun 1;101(6):2511–9.
30. Lam ITY, Keller HH, Pfisterer K, Duizer L, Stark K, Duncan AM. Micronutrient Food Fortification for Residential Care: A Scoping Review of Current Interventions. *J Am Med Dir Assoc.* 2016 Jul 1;17(7):588–95.
31. Mills SR, Wilcox CR, Ibrahim K, Roberts HC. Can fortified foods and snacks increase the energy and protein intake of hospitalised older patients? A systematic review. *J Hum Nutr Diet.* 2018 Jun 1;31(3):379–89.
32. Dahl WJ, Mendoza DR. Is Fibre an Effective Strategy to Improve Laxation in Long-Term Care Residents? Lupwayi N, editor. *Can J Diet Pract Res* [Internet]. 2018 Mar [cited 2020 Jan 9];79(1):35–41. Available from: <http://dcjournal.ca/doi/10.3148/cjdp-2017-028>
33. Paddon-Jones D, Campbell WW, Jacques PF, Kritchevsky SB, Moore LL, Rodriguez NR, et al. Protein and healthy aging. *Am J Clin Nutr.* 2015;101(6):1339S-1345S.
34. Phillips SM, Chevalier S, Leidy HJ. Protein “requirements” beyond the RDA: implications for optimizing health. *Appl Physiol Nutr Metab.* 2016;41(5):565–72.
35. Murphy CH, Oikawa SY, Phillips SM. Dietary Protein to Maintain Muscle Mass in Aging: A Case for Per-meal Protein Recommendations. *J frailty aging.* 2016;5(1):49–58.

36. Goyal FA, Mehta JL. Management of dyslipidemia in the elderly population. *Ther Adv Cardiovasc Dis.* 2010;4(6):375–83.
37. Odlund Olin A, Armyr I, Soop M, Jerstrom S, Classon I, Cederholm T, et al. Energy-dense meals improve energy intake in elderly residents in a nursing home. *Clin Nutr.* 2003;22(2):125–31.
38. Health Canada. Vitamin D - Canada.ca [Internet]. [cited 2020 Jan 9]. Available from: <https://www.canada.ca/en/health-canada/services/nutrients/vitamin-d.html>

# APPENDICES

## Appendix 1: CFG Requirements in Provincial Regulations and Standards

	CFG REQUIREMENTS	REGULATION OR STANDARD REFERENCE
<b>BC</b>	<p>A licensee must ensure that each menu provides</p> <p>(a) for each day, a nutritious morning, noon and evening meal, with each meal containing at least 3 food groups as described in Canada's Food Guide,</p> <p>(b) for each day, at least 2 nutritious snacks, with each snack containing at least 2 food groups as described in Canada's Food Guide.</p> <p>A licensee must ensure that each person in care receives adequate food to meet their personal nutritional needs, based on Canada's Food Guide and the person in care's nutrition plan.</p>	Regulation 62 under Community Care Residential Living Regulation
<b>AB</b>	<p>Does not specifically refer to CFG but includes requirements for "food groups".</p> <p>An operator shall prepare all meals to meet basic diet requirements in accordance with Canada's Food Guide as approved by the Canadian Council on Nutrition.</p>	<p>Section 13 of LTC Accommodation Standards</p> <p>Regulation 15(1) under the Nursing Homes Act</p>
<b>SK</b>	Meal and snack services are supporting the nutritional needs of the resident and shall be based on Eating Well with Canada's Food Guide and Dietary Reference Intake as approved by Health Canada.	Section 13.6 of Guidelines for Special Care Homes
<b>MB</b>	The meals, nourishments and supplements served to each resident (i) meet the resident's nutritional needs, taking into account the recommended daily allowances set out in Canada's Food Guide to Healthy Eating.	Section 28(2) of Personal Care Homes Regulations
<b>ON</b>	The licensee shall ensure that each menu, <p>(a) provides for adequate nutrients, fibre and energy for the residents based on the current Dietary Reference Intakes (DRIs) established in the reports overseen by the United States National Academies and published by National Academy Press, as they may exist from time to time; and</p> <p>(b) provides for a variety of foods, including fresh seasonal foods, each day from all food groups in keeping with Canada's Food Guide as it exists from time to time. O. Reg. 79/10, s. 71 (2).</p>	Section 71 (2) of regulations under LTC Homes Act
<b>QC</b>	The operator of a private seniors' residence that provides meal services to residents must offer varied menus in accordance with Canada's Food Guide published by Health Canada and adapted to the specific nutritional needs of seniors.	Chapter S-4.2, r. 0.01, section 53 Regulation respecting the certification of private seniors' residences Health and Social Services Act

	CFG REQUIREMENTS	REGULATION OR STANDARD REFERENCE
<b>NS</b>	Menus are balanced according to Canada's Food Guide and provide flexibility to meet nutrition guidelines and interventions as identified for residents' specific needs and preferences.	LTC Program Requirements Section 6.5 (3)
<b>NB</b>	To comply with section 23 of the Regulation 85-187 which states: "An operator shall ensure that the service of food in a nursing home is in accordance with the following requirements: (a) the basic daily dietary requirements for each resident shall be provided in accordance with the nutritional standards developed by the Department of National Health and Welfare and known as Canada Food Guide, and shall be supplemented to meet the nutritional needs of the individual residents;  From inspection form: The menu meets the requirements of Canada's Food Guide to Healthy Eating and: <ul style="list-style-type: none"> <li>- nutritional and dietary needs and problems are satisfied</li> <li>- snack lists are up to date and complement the menu</li> <li>- all menus and snacks are approved by a Dietitian</li> </ul>	Nursing Home Standards Manual Section B-X-2
<b>PEI</b>	Meals and nourishments are planned in advance, according to the recommendations of Eating Well with Canada's Food Guide (Food Guide). Menus may be prepared in multi-week cycles and are reviewed and approved annually by the Dietetic Services Consultant, Department of Health and Wellness. The Consultant is notified of any permanent modifications made to the menus throughout the year. Meals fulfill nutrient, fluid, and calorie requirements, as indicated by current Dietary Reference Intakes (DRI) as they relate to residents' age, sex, weight, physical activity, physiological function, and therapeutic needs. Each day the resident is provided with a variety of foods, based on the Food Guide. The recommended number of Food Guide servings are based on individual gender and age requirements, unless otherwise indicated in the residents' care plan	Private Nursing Home operational care and service standards 4.6.1, 4.6.2, 4.6.6
<b>NL</b>	The resident is provided with menus and meals according to the Canada Food Guide, and in consideration of his/her preferences.	LTC in Nfld and Labrador operational standards

## Appendix 2: RDA/AI for Older Adults and Food Sources

### Vitamins

KEY VITAMINS	MALE >70 YEARS RDA/AI (UNIT/DAY)	FEMALE >70 YEARS RDA/AI (UNIT/DAY)	FOOD SOURCES
<b>Vitamin A</b>	3000 IU	2333 IU	Milk / Dairy Products Green leafy vegetables Yellow fruits
<b>Vitamin D</b>	600 IU (51 – 70yrs) 800 IU (> 70yrs)	600 IU (51 – 70yrs) 800 IU (> 70yrs)	Fortified Milk & beverages Eggs Fatty/Canned Fish
<b>Vitamin E</b>	15 mg	15 mg	Olive Oil Vegetable Oils Peanuts, Almonds Wheat Germ Fatty Fish
<b>Vitamin K</b>	120 mcg*	90 mcg*	Green vegetables (leafy, cabbages) Oils (canola, soybean, olive) Herbs (fresh, dried) Avocado
<b>Vitamin C**</b>	90 mg	75 mg	Citrus Fruits Melons Leafy vegetables Potatoes
<b>Vitamin B1 (Thiamin)</b>	1.2 mg	1.1mg	Beans Nuts Whole Grains
<b>Vitamin B2 (Riboflavin)</b>	1.3 mg	1.1 mg	Milk / Dairy Products Green leafy vegetables Whole Grains
<b>Niacin***</b>	16 mg	14 mg	Meat, Fish and Poultry Nuts

KEY VITAMINS	MALE >70 YEARS RDA/AI (UNIT/DAY)	FEMALE >70 YEARS RDA/AI (UNIT/DAY)	FOOD SOURCES
<b>Vitamin B6</b>	1.7 mg	1.5 mg	Meat, Fish and Poultry Legumes Bananas
<b>Vitamin B12****</b>	2.4 mcg	2.4 mcg	Meat, Fish Poultry, Eggs Dairy Products
<b>Folic Acid</b>	0.4 mg	0.4 mg	Green leafy vegetables Nuts Whole Grains

**Symbol Notes:**

\* Recommended value represents an Adequate Intake (AI) as there is insufficient evidence to establish RDA.

\*\* Recommended value for Vitamin C based on non-smokers; smokers require additional 35mg / day related to increase oxidative stress and metabolic turnover of vitamin C in those individuals who smoke.

\*\*\* Recommended value expressed as niacin equivalents (NE). The daily recommended value of niacin depends on the quantity of the tryptophan (an amino acid) in the diet and the efficiency of tryptophan converted to niacin, commonly referred to as the conversion factor, where 1mg NE = 1mg niacin or 60 mg tryptophan.

\*\*\*\* Mild deficiencies of vitamin B12 may occur in older adults (10-30% of individuals over the age of 50 may malabsorb food-bound B12), either because of poor diet or because they have less stomach acid, which the body needs to absorb vitamin B12. To help older adults achieve their RDA provide foods fortified with B12 or a supplement containing B12.

## Minerals

KEY MINERALS	MALE >70 YEARS RDA/AI (UNIT / DAY)	FEMALE >70 YEARS RDA/AI (UNIT / DAY)	FOOD SOURCES
<b>Calcium</b>	1000 mg (51 – 70yrs) 1200 mg (> 70yrs)	1200 mg (51 – 70yrs) 1200 mg (> 70yrs)	Milk / Dairy Products Fortified beverages (soy, almond, orange juice etc.) Almonds
<b>Phosphorus</b>	700 mg	700 mg	Meat, Fish Poultry, Eggs Milk / Dairy Products
<b>Magnesium</b>	420 mg	320 mg	Legumes / Beans Nuts Whole Grains
<b>Potassium</b>	3400 mg * (3.4 grams)	3400 mg * (3.4 grams)	Fruits (banana, oranges, cantaloupe, apricots etc.) Vegetables (potato, beets, yams, cooked broccoli Dried Fruit (raisins, prunes)
<b>Iron**</b>	8 mg	8 mg	Meat, Fish Poultry, Eggs Whole Grains bread and cereals
<b>Zinc**</b>	11 mg	8 mg	Oysters Meat, Poultry, Eggs Whole Grains bread and cereals
<b>Selenium</b>	55 mcg	55 mcg	Seafood Poultry, Meat Brazil Nuts

### Symbol Notes:

\* Recommended value represents an Adequate Intake (AI) as there is insufficient evidence to establish RDA. Benefits of potassium occur mainly from consuming fruits and vegetables. Potassium supplement should only be provided under medical supervision.

\*\* Requirements for both Iron and Zinc is higher in individuals who follow a vegetarian meal plan due to lower bioavailability in major food staples (whole grains, legumes and fruits and vegetables) of a vegetarian diet. Requirement for Iron is 1.8 times higher and for Zinc it may be as much as 50% greater.

## Appendix 3: Sample Menu Pattern

MEAL	SUGGESTED SERVING SIZE	FLUID CONTENT	COMMENTS
<b>Breakfast</b>			
1 svg fruit	125ml		
1-2 svgs bread + 1 cereal	2 sl/175ml		Residents with larger appetites may prefer 2 slices of toast/bread.
1 svg protein	1 - 2 eggs		
Milk or fortified plant-based beverage	250ml	250ml	
Butter/margarine and spread	5ml		
Choice of beverages tea/coffee/juice	200ml	200ml	
Water	125ml	125ml	
<b>Snack</b>			
Choice of beverage	125ml	125ml	Milk, juice, other hot or cold drinks.
Snack	varies		Preferably including a protein choice.
Water	125ml	125ml	

MEAL	SUGGESTED SERVING SIZE	FLUID CONTENT	COMMENTS
<b>Lunch</b>			
Soup or beverage	180 or 125ml	125ml	Consider carbohydrate/protein content of soup to balance meal.
Entrée - 1 svg protein	60-90g		Protein may be plant or animal based.
2 svg vegetable	125ml each		
1-2 svg grain	125 ml/1 slice		A full sandwich or $\frac{3}{4}$ of a sandwich may be offered.
Butter/margarine	5ml		
1 svg fruit dessert	125ml		Recommend one fruit dessert choice, the other a baked item or milk- based dessert.
Milk or plant-based beverage	125ml	125ml	
Tea/coffee	200ml	200ml	
Water	125ml	125ml	
<b>Snack</b>			
Choice of beverage	125ml	125ml	
Snack	varies		Preferably including a protein choice.
Water	125 ml	125ml	

MEAL	SUGGESTED SERVING SIZE	FLUID CONTENT	COMMENTS
<b>Dinner</b>			
Soup or beverage	180 or 125ml	125ml	
entrée - 1 svg protein	60-90g pro		
1 svg grain	125ml		
2 svg vegetable	125ml each		
1 svg butter/margarine	5 ml		
1 serving dessert	varies		Recommend one fruit dessert, the other a baked item or milk-based dessert.
Milk or plant-based beverage	125ml	125ml	
Tea/coffee	200 ml	200ml	
Water	125ml	125ml	
<b>Snack</b>			
Milk or plant-based beverage	125ml	125ml	
Snack - varies	varies		Recommend approx. 10 g protein
Beverage	125 ml	125ml	
<b>TOTAL FLUIDS</b>		<b>2475ml</b>	

## Appendix 4: Sample Menu Audit Tool

MENU PLANNING CONSIDERATION	Y = YES N = NO	COMMENTS
Menu cycle length is at least 21 days duration.		
The menu cycle is reviewed and updated at least annually (recommendation to review and update seasonally).		
A daily menu pattern is used to develop menu cycle with 3 meals and minimum of 2 snacks (afternoon, evening) and 3 between-meal beverages (morning, afternoon, evening). Morning snacks added based on resident needs and preferences and timing of meals.		
Second main entree choice option (cold or hot) for all meals is pre-planned and always available; planned alternate choices for other meal components are included based on resident needs, preference, and resources available.		
A variety of desserts are offered daily including nutrient-rich desserts.		
Appropriate condiments are included on the menu for menu items.		
Plant-based protein entrees are included at least twice per week or based on documented preferences of resident population.		
The planned menu includes a minimum of 2000 ml beverages per day (both nutrient-containing and non-nutritive) at and between meals.		
The menu includes a source of protein at each meal and snack to meet daily requirements and menu target of 100 g protein per day on average over the menu.		
A minimum of 20 – 30 grams protein is provided in each meal combination (entree, sides, beverages, dessert).		
Fish is offered at least twice per week, unless changed based on documented preferences of the resident population.		
A variety of dairy and non-dairy calcium-fortified plant-based alternatives are offered in quantity adequate to meet calcium requirements.		
Modified textured menus follow the main menu as closely as possible and provide equivalent nutrients.		

MENU PLANNING CONSIDERATION	Y = YES N = NO	COMMENTS
The menu includes at least one to two vegetables at each lunch and supper.		
The menu includes a variety of vegetables especially brightly coloured vegetables (e.g., sweet potato, broccoli, red peppers, etc.).		
The menu includes a minimum of three fruits each day. Fruit juice is not included in this minimum number.		
The menu includes a variety of fruit in various forms (fresh, frozen, canned).		
Grain products are included daily to meet energy and nutrient targets for the menu and resident preferences.		
The menu includes mostly whole grain foods unless changed based on documented preferences of the resident population.		
The cultures/ethnicities of the resident population are considered during menu planning and appropriate cultural foods are included on the menu.		
The snack menu is planned at the same time as the meal menu and follows the same menu planning principles including a variety of nutrient-dense and preferred items.		
There is a documented planned approach to monitoring resident satisfaction with meals, including plate waste, surveys, etc.		
There is a documented approach to ensure resident input into menu planning process (e.g., by review of meeting minutes from the Resident Council and/or Resident Food Committee).		
The menu includes mainly nutrient-dense foods that are easily consumed, taking into consideration common eating related barriers (e.g., poor oral health, low appetite, early satiety, fatigue, taste and sensory changes).		
<p>If there is a nutrient analysis of the menu (recommended), it meets these average daily nutrient targets (based on full menu cycle average)</p> <p>Energy – 2000 kcal                      Protein – 100 g                      Dietary fibre – 30 g                      Fluid – 2000 ml                      Sodium – 3500 mg or less                      Vitamins and Minerals – 100% of DRIs</p>		

## Appendix 5: Gordon Food Service Menu Plating Experiment

### Background

Provincial legislation for long-term care (LTC) in most jurisdictions across Canada requires menus to be developed to meet Canada's Food Guide (CFG). However, the 2019 CFG as released, has significant changes from the previous guide, raising questions about whether it can be followed in this setting while still meeting the nutrient needs of residents.

The most significant changes from the 2007 CFG to the 2019 CFG, that have quantifiable impacts for menu planning in LTC are:

- The elimination of serving sizes and number of servings, replaced by the plate proportion method
- The removal of juice as a fruit or vegetable
- The removal of the milk and alternatives food group and its incorporation into the protein foods category
- The recommendation that water is the beverage of choice

A well-designed menu following the 2007 CFG typically provides adequate nutrition, often in excess of the resident Dietary Reference Intakes (DRIs). The following plating experiment was completed to determine the nutritional impact of changing from menu planning with the 2007 CFG to the 2019 CFG.

### Methodology

A total of 13 different meals were plated according to both the 2007 CFG and the 2019 CFG methods. When plating to the 2007 CFG, portion sizes specified on the guide were used. With the 2019 CFG, the food was plated using the plate proportion method to visually show that 50% of the plate was vegetables and fruit, 25% of the plate was grains, and 25% of the plate was protein foods. The food from the plate proportion method was subsequently measured by either volume or weight.

The 13 plated meals had various combinations of protein foods, fruits and vegetables, and grains. These meals were included in the creation of 21 distinct menu days. Meals and menu days were chosen strategically to maximize potential differences between days and plating methods. The 21 menu days were entered into nutrient analysis software and analyzed for nutritional adequacy and comparison to the 2007 CFG.

The following rules were adhered to throughout the experiment:

- Only food items on the actual plate were adjusted according to the 2019 CFG.
- Desserts, soups and snacks were left unchanged from the 2007 CFG method to the 2019 CFG method because they do not typically reside on the plate, and would likely be served regardless, due to resident preference.
- Beverages with meals were all changed from juice or milk to water.
- Nutrient analyses included all food and beverages that would be served throughout the day, not only what was on the plate.
- A single slice of bread was considered to take up  $\frac{1}{4}$  of a plate.
- The plate used had a 7" diameter presentation area and food was only plated within the presentation area.
- Breakfast was only changed once to determine the serving sizes when plating using the 2019 CFG. The same breakfast was then used for all subsequent analyses.
- Nutrient analyses were compared to nutrition goals for women and men 70 years of age or older.

### Results

When comparing plated meals from following the 2019 CFG and the 2007 CFG, it became apparent that vegetable and fruit amounts generally increased with the 2019 guide, protein foods on the plate stayed relatively the same and grain amounts generally decreased. These trends resulted in an overall decrease in every nutrient analyzed (Table 1).

The most significant decrease observed was with calcium. The 2007 CFG provided an average of 1479mg per day, while the 2019 CFG provided an average of only 909mg per day. This falls short of the calcium DRI of 1200mg/day. This reduction was assumed to be largely a result of the substitution of water for milk at meals. Due to this finding, dairy foods such as milk, cheese and yogurt were added to the menu days which were lacking calcium. With the reintroduction of dairy foods to achieve a minimum of three servings per day, the average daily amount jumped back up to 1435mg of calcium. In addition, the average amounts of all evaluated nutrients increased to be similar to the 2007 CFG amounts (Table 1).

The lone nutrient that did not meet nutrition goals was fibre. The 2019 CFG with dairy modification provided an average of 29g of fibre which meets the needs of a female over 70 years of age but falls short of the 30g nutrition goal for men over the age of 70.

## Conclusion

The data suggest that the 2019 CFG plate proportion method can be used for LTC menu planning, with some modifications. Calcium content of the menu must be considered. Although dairy and alternatives is no longer its own food group, in this experiment, at least three dairy servings per day were required in order to meet the DRI for calcium. After dairy servings were added, almost all nutrition goals were met with the exception of fibre.

## Limitations

- The software used does not provide information for all nutrients. Nutrients evaluated included: kilocalories, protein, carbohydrate, fat, fibre, sugars, saturated fats, sodium, calcium, iron and potassium
- The methods employed to obtain these results have subjectivity and margins of error. Two individuals plating "50% vegetables or fruit" even when using the same size of plate, would likely arrive at slightly different amounts
- The meals and menu days tested will not account for all possible menu combinations

Table 1: Nutrient Analysis Averages of the 21 Menu Days Created

Nutrient	Nutrition Goals over 70 years F - Female M - Male	2007 CFG	2019 CFG (without dairy modification)	2019 CFG (with dairy modification)
Calories		2737kcal	2250kcal	2418kcal
Protein	10-35% of kcal	120g (18%)	98g (17%)	119g (20%)
Carb	45-65% of kcal	365g (53%)	290g (52%)	293g (48%)
Fat	20-35% of kcal	96g (32%)	81g (32%)	90g (33%)
Fibre	21g (F) 30g (M)	32g	30g	29g
Sugars		129g	102g	112g
Saturated Fats		31g	24g	31g
Sodium	2300mg	3073mg	2520mg	2730mg

Nutrient	Nutrition Goals over 70 years F - Female M - Male	2007 CFG	2019 CFG (without dairy modification)	2019 CFG (with dairy modification)
Calcium	1200mg	1479mg	909mg	1435mg
Iron	8mg	10.4mg	8.9mg	9.2mg
Potassium	2600mg (F) 3400mg (M)	3841mg	3077mg	3505mg

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