

# Fortification and Enrichment

## What and Why?



Wheat Retreat  
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# Presentation Outline

- Why do we fortify and enrich foods?
- What is fortification and enrichment?
- How does this connect to wheat?
- What are the benefits of fortification and enrichment?
- Questions and discussion



# Why do we fortify and enrich foods?

To enable “substitute”  
foods to be more  
equivalent (add)

To restore nutrients that  
are lost in food  
processing (add back)

To address public health  
issues (add)



# Fortification and Enrichment Canadian Definitions and Rules



# Fortification

**Fortification** is a process by which vitamins, mineral nutrients and amino acids are added to foods to provide consumers with sufficient but not excessive amounts of certain nutrients in their diet

Fortification framework is set by the *Food and Drug Regulations*

- Food Standards
- Which foods are required to be fortified
- Which foods are permitted to be fortified
- The acceptable conditions

Health Canada. <https://inspection.canada.ca/food-labels/labelling/industry/fortification-of-food/eng/1468504433692/1468504697186>



# Enrichment

**Enrichment** is a process by which the originally present nutrients are added back into processed foods for which the processing resulted in the loss of those nutrients.

Enrichment is a type of  
Mandatory Fortification



# Mandatory Fortification

**Mandatory fortification** is the requirement of certain foods to be fortified with certain vitamins, minerals and/or amino acids.

Skim milk  
requires the  
fortification of  
vitamin A and  
vitamin D

Salt requires  
the  
fortification  
of iodine

Flour requires the  
fortification of thiamine,  
riboflavin, niacin, folic  
acid, iron

<https://inspection.canada.ca/food-labels/labelling/industry/fortification-of-food/eng/1468504433692/1468504697186>



# Voluntary Fortification

**Voluntary fortification** is the allowance of certain foods to be fortified with certain vitamins, minerals and/or amino acids.

Margarine is permitted to fortify with vitamin E

Water is permitted to fortify with fluoride

Flour is permitted to fortify with vitamin B6, pantothenic acid, calcium, magnesium





# Wheat Focus: Terminology

Food	Vitamin, mineral nutrient or amino acid
Flour, white flour, enriched flour or enriched white flour	<b>Mandatory:</b> Thiamine, riboflavin, niacin, folic acid, iron  <b>Voluntary:</b> Vitamin B6, d-pantothenic acid, calcium, magnesium

<https://inspection.canada.ca/food-labels/labelling/industry/grain-and-bakery-products/eng/1623965206880/1623965322041#s9c2>



# Wheat Focus: Terminology

The common name of flour sold on its own or in the list of ingredients may be declared as "flour", "white flour", "enriched flour" or "enriched white flour".

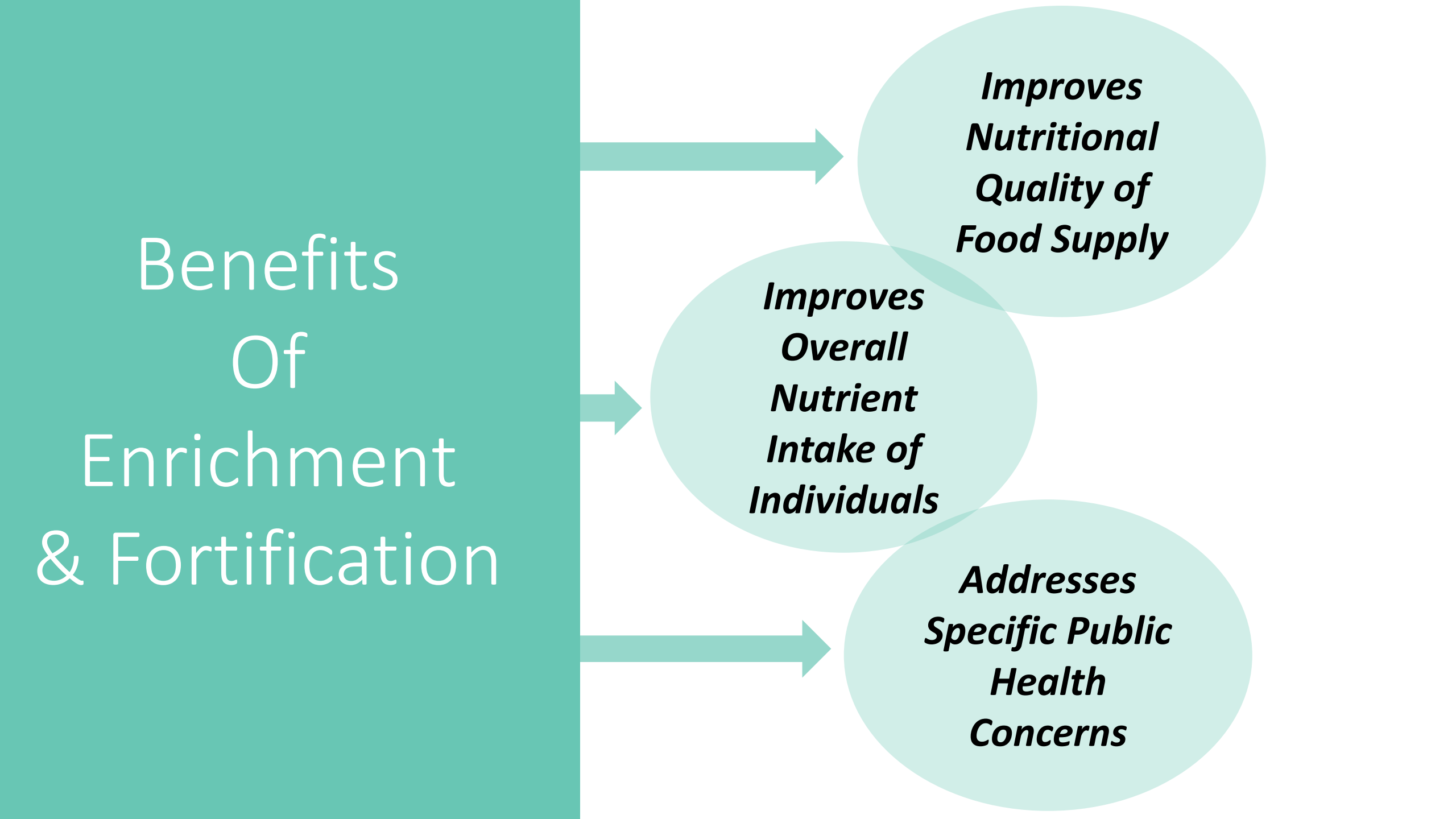


# Mandatory Fortification of Flour in Canada

## **Prohibition against the sale of unenriched white flour and products containing unenriched flour**

The mandatory enrichment of white flour with B vitamins, iron and folic acid is a cornerstone of Canada's fortification program aimed at helping to prevent nutrient deficiencies and maintain or improve the nutritional quality of the food supply. Flour enrichment is used as a public health tool because of its widespread use in foods consumed regularly by a large majority of the population.

# Benefits Of Enrichment & Fortification



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graph LR; A[Benefits Of Enrichment & Fortification] --> B(Improves Nutritional Quality of Food Supply); A --> C(Improves Overall Nutrient Intake of Individuals); A --> D(Addresses Specific Public Health Concerns);
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Nutritional  
Quality of  
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***Improves  
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Individuals***

***Addresses  
Specific Public  
Health  
Concerns***



# Improves Nutritional Quality Of The Food Supply

## Increases Access to Essential Nutrients

- *As part of the enrichment program, flour requires the fortification of thiamine, riboflavin, niacin, folic acid & iron*
- *Used as a public health tool because of its widespread use in foods consumed regularly by a large majority of the population.*
- *Equal access across populations*



	White bread 1 slice (36 g, one serving)	100% Whole grain bread 1 slice (33g, one serving)	Whole wheat bread slice (36g, one serving)
Calories	94	86	93
Carbohydrates (g)	18	15	16
Protein (g)	3	4	4
Fat (g)	1	1	1
Fibre (g)	1	2.1	2.3
<b>Minerals</b>			
Sodium (mg)	185	178	213
Iron (mg)	1.3	0.8	0.9
Calcium (mg)	28	33	26
Magnesium (mg)	14	25	27
Phosphorus (mg)	39	74	77
Potassium (mg)	40	71	74
Zinc (mg)	0.31	0.59	0.6
<b>Vitamins</b>			
Folic acid (DFE)	64	11	11
Niacin (NE)	2.1	1.7	1.9
Riboflavin (mg)	0.12	0.04	0.05
Thiamin (mg)	0.16	0.09	0.09
Vitamin B6 (mg)	0.018	0.05	0.05
Vitamin C (mg)	0	0	0
Vitamin D (IU)	0	0	0
Vitamin E (mg)	0.08	0.12	0.96



# Improves Overall Nutrient Intake

- Helps prevent Nutrient deficiencies
- Makes it easier to meet the daily recommended intake of certain nutrients.
  - *Grain-based foods, including breakfast cereals, bread, & tortillas have been shown to contribute  $\geq 10\%$  of fiber, iron, zinc, folate, niacin, & thiamin to US dietary patterns.*

*According to findings of the National Health & Nutrition Examination Survey (NHANES), “significant amounts of numerous essential nutrients originate from fortified & enriched foods, prompting researchers to conclude that documented nutrient shortfalls in Americans are further exacerbated without fortification & enrichment practices”*



# Enrichment & Fortification Help

## Meet Recommended Intakes

MEAL	FOOD	Nutrient	Day #1 (w/oatmeal)	Day #1 (w/bran flakes)
BREAKFAST	1 cup oatmeal w/1 diced apple & cinnamon	Calories	~2,000	~2,000
		Fiber	24 grams	27 grams
LUNCH	<b>Greek Yogurt Bowl</b> – ( $\frac{3}{4}$ cup Greek yogurt, $\frac{3}{4}$ cup blueberries, chopped almonds, 1 tbsp mini chocolate chips, 1 tbsp honey); 3 cups Smart Pop white cheddar popcorn	Thiamin	45% DV	220% DV
		Riboflavin	89% DV	332% DV
		Niacin	138% DV	327% DV
SNACK	1 Banana	Iron	39% DV	160% DV
DINNER	4 ounces sauteed white fish, 1 $\frac{1}{4}$ cups rice, 8 roasted asparagus spears	Folate / Folic Acid	20% DV	245% DV
SNACK	$\frac{3}{4}$ cup ice cream			

\* Based on 2,000 calorie diet with needs met for ~275 grams carbohydrate, 60 grams protein & 65 grams fat





# Enrichment & Fortification Help

## Meet Recommended Intakes

MEAL	FOOD	Nutrient	%DV
BREAKFAST	1½ cups Cinnamon Toast Crunch cereal w/1¼ cups 2% milk	Calories	~2,000
		Fiber	21 grams
LUNCH	Peanut Butter & Jelly Sandwich (2 slices white bread, 2 tbsp PB, 1 tbsp jelly), 1-ounce Doritos, 1 chocolate chip granola bar, 1 orange	Thiamin	186% DV
		Riboflavin	199% DV
		Niacin	240% DV
DINNER	1 ½ cups spaghetti with marinara sauce, 3 oz ground beef, ½ cup cooked carrots, 1 dinner roll w/butter	Iron	103% DV
		Folate/Folic Acid	110% DV
SNACK	1 medium brownie		

\* Based on 2,000 calorie diet with needs met for ~275 grams carbohydrate, 60 grams protein & 65 grams fat



# Can Address Specific Public Health Concerns



## ***Neural Tube Defects***

- Adding folic acid to white flour to address prevention of neural tube defects



## ***Iron Deficiency***

- Adding iron to white flour to address prevention of iron deficiency



# Folic Acid Fortification has resulted in a significant reduction in the prevalence of neural-tube defects

- ***In Canada***, the prevalence of neural-tube defects decreased from 1.58 per 1000 births before fortification to 0.86 per 1000 births during the full-fortification period, a 46% reduction.
  - *The decrease was greatest in areas in which the baseline rate was high.*
  - *Geographical differences almost disappeared after fortification began*



## Take-Away

*Enriched & fortified grain products are important for public health, providing essential nutrients that may be lost during processing or are not naturally present in sufficient quantities. These programs play a crucial role in meeting recommended nutrient intakes & have been shown to significantly reduce the risk of certain health conditions, such as neural tube defects.*