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# An assessment of the rural consumer food environment in Newfoundland and Labrador

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# Disclosure Statement

- I have no affiliation (financial or otherwise) with a pharmaceutical, medical device or communications organization.

Rural retail food environments

# RURAL

≠ Flip side of urban



≠ Agricultural



≠ Remote



≠ Traditional



≠ Disconnected



≠ Wild



## Rural retail food environments

# What do we know about rural exposures?



SPATIAL FACTORS: Rural and remote stores expected to have poorer objective availability, quality, and price

***NOTE >> may reflect supply chain infrastructure, or economic factors?***



STORE FACTORS: Comparable to urban environments, e.g., supermarkets expected to stock wider variety of items, at lower prices

***NOTE >> may reflect chain/independent, store size?***



PRODUCT FACTORS: Differences in availability, quality, and price disproportionately affect healthier options (e.g., fresh produce)

***NOTE >> may reflect perishability, rather than nutrient composition?***





CONTEXT: NEWFOUNDLAND AND LABRADOR—  
RESOURCE DEPENDENT ECONOMY,  
SUPPLY CHAIN CONSTRAINTS





## METHODS (rural consumer FE, NL, 2015)

- Census of rural Avalon peninsula (n=78 stores, our provincewide inventory)
- Adaptation of a NEMS (Nutrition Environment Measures Survey) tool for NL, collaboration with regional health authority informed by market basket metric—this analysis on **70** food items; 14 measures = product categories
- EXPOSURES: Availability, price, quality; food items coded to Canadian Nutrient File 2015, derived price variables (unit, serving, energy)
- Covariates: Rurality (NL remoteness index, highway access), store characteristics (type, size)

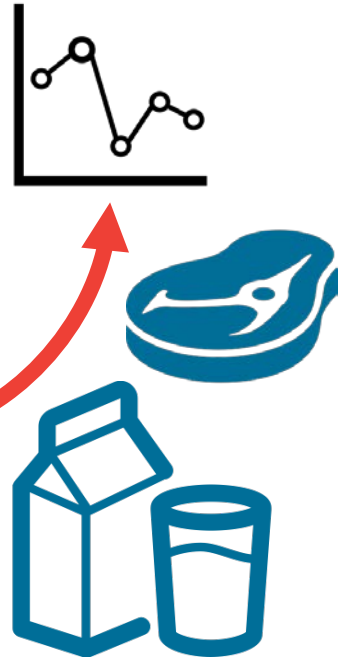
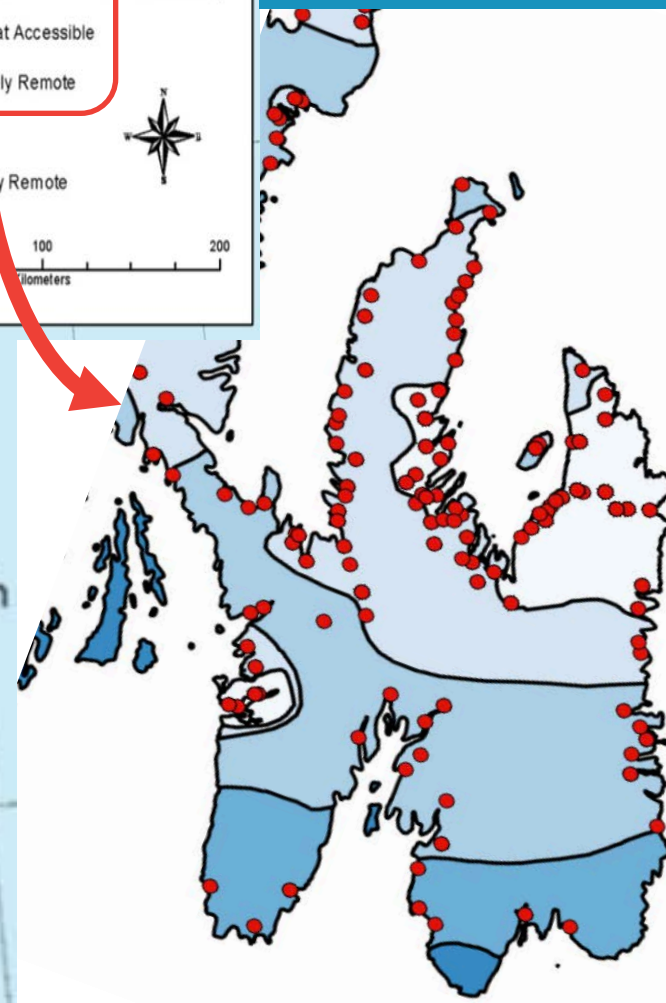
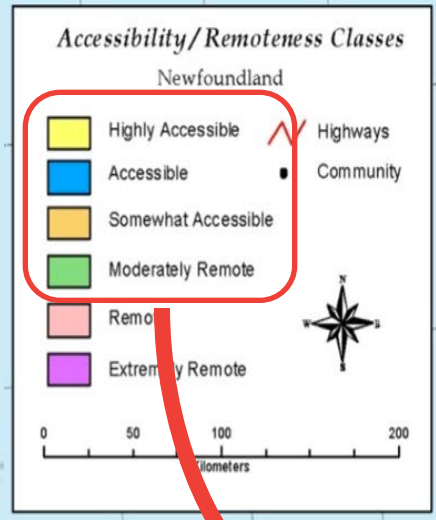
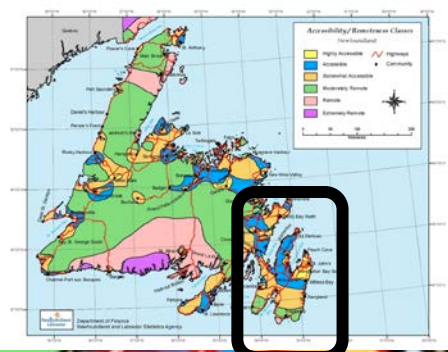
	n	%
<b>All Stores</b>	78	100
<b>Store Type<sup>1</sup></b>		
Supermarket	18	23
Convenience	44	56
Gas station	16	21
<b>Ownership<sup>2</sup></b>		
Independent	55	71
National chain	17	22
Provincial chain	6	8
<b>Remoteness<sup>3</sup></b>		
Highly accessible	8	10
Accessible	44	56
Somewhat accessible	17	22
Moderately remote	9	12
Remote	0	0
Very remote	0	0
<b>Store Size<sup>4,5</sup></b>		
One checkout	49	65
Two checkouts	19	25
More than two checkouts	8	11

### METHODS NOTE: **Rural Avalon data comparison**

DMTI vs. NL provincial government food premise inspection data, ground-truthed during consumer environment audits

DMTI dataset **missing** 49 of 61 convenience stores; 15 of 17 grocery stores

Objectives: Assess rural store food availability, quality; explore predictors of availability & price



# NEMS-NL on the rural Avalon, 2015 (n=78)

## OVERALL AVAILABILITY

UNHEALTHY  
CHECKOUTS:  
97% of stores



- Most stores carried a range of **fresh vegetables and fruits**, including convenience stores, but availability of healthier alternatives was limited for other product categories.
- Half of stores (50%) had no **frozen vegetables** and 77% had no **frozen fruit**.
- Single audited item available in all stores was **regular potato chips** (not soda!)
- **Less healthy processed meats** available in a greater proportion of stores (hot dogs, bologna, salt beef: 86%, 78%, 71% of stores respectively) than healthier fresh/frozen (e.g., ground beef: 71%)
- **Shelf-stable meat alternatives readily available** (e.g., yellow split peas: 94% of stores)





Rurality and availability

AVAILABILITY: No relationship with degree of rurality for any item/category audited, except for **fresh milk**



Aligns with field notes—what we heard from store owners

QUALITY: **No clear pattern** related to the quality of vegetables, or meat, in communities classified to different categories of accessibility-remoteness



## THE PRICE PROBLEM

PRICE: For the vast majority of food items/categories, **considerable variability in store prices**, but:

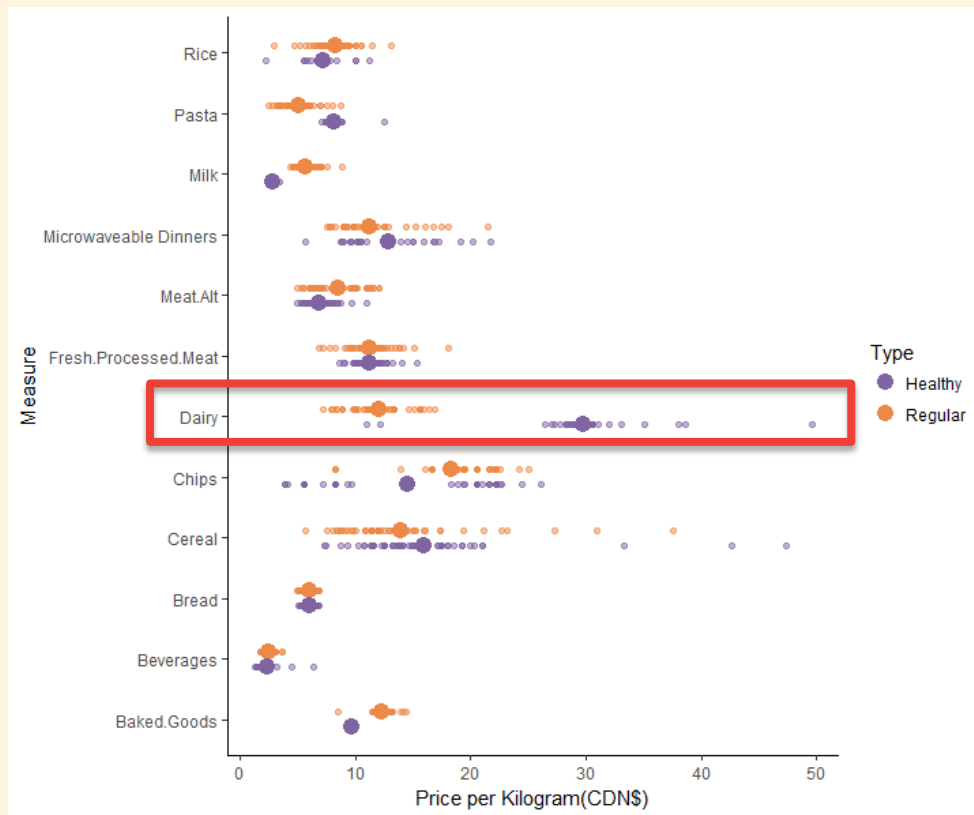
- **SPATIAL FACTORS: No relationship to spatial attributes (rurality; highway access)**  
Exception: stores >1km from a main highway appeared to have higher mean energy prices (\$/kcal), compared to stores 1km or less (perishables?)
- **STORE FACTORS: No relationship to store type (supermarket/convenience, store size)**  
Exception: supermarkets had lower prices (unit, serv, energy) for **regular meat alternatives (peanut butter)**, adjusting for rurality, availability, and store size ( $p < 0.01$ )

*For all price analyses, tested three measures: unit price (\$/kg); serving price (\$/serv); energy price (\$/kcal)*



# Do healthy foods cost more?

No difference in mean prices for healthier in comparison to regular (less healthy) items, **except dairy products (yoghurt, cheese)**

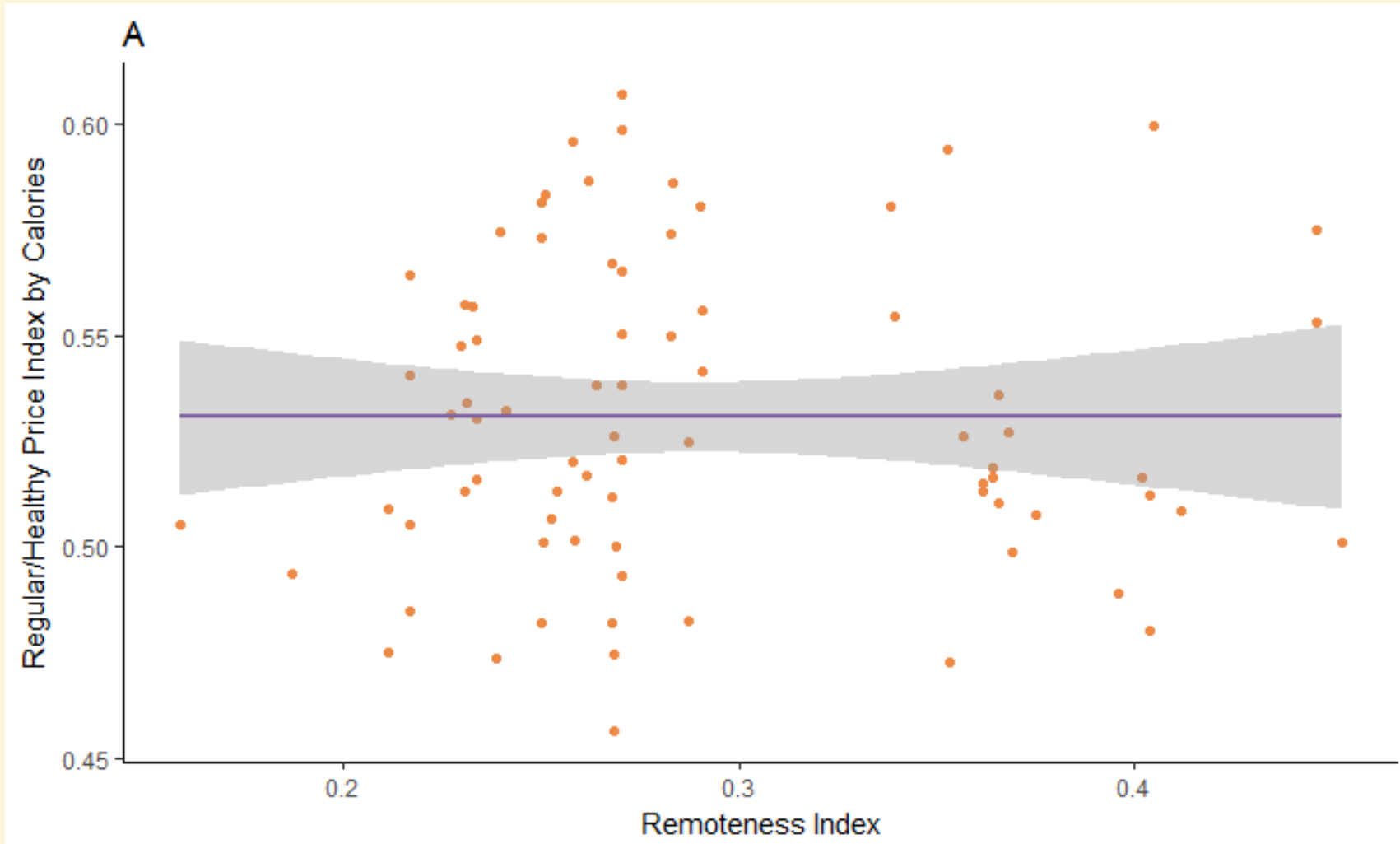


- Notice the **range** of prices in each category
- Mean prices can obscure unpredictability of prices for any given store/community
- Overall, considerable variability in prices and suggests **store level prices represent factors at the store level (or nested in supply chain)** that are not explained by product characteristics (such as healthy/perishable)





Do more remote stores have higher prices?



Great deal of variability in prices—no relationship with rurality

Healthy Food Price Index = Mean Price of Regular Options / Mean Price Healthier Options

(0.5 = price of healthier items roughly double that of regular items)

## DISCUSSION AND POTENTIAL LIMITATIONS

In conclusion, with apologies to Tolstoy ...

*All stores are alike; each unhealthy store is unhealthy in its own way*

- Availability and price not clearly about **product factors**
- Attention to existing nutrition interventions that **do not align** with store environments; challenge of **subjective** environments, social norms
- Objective measures and transparent definitions important especially for rural research where there may be **greater heterogeneity among stores** classified to similar spatial attributes or store characteristics
- Need further research into consumer nutrition environment, especially **store-level determinants** of price >> retailer discretion!



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### LIMITATIONS

- **NEMS checklist audit**—may not be representative of whole-of-store, whether accessibility or exposure based on consumption (sales, diet)
- New ways to adjust for **availability**?
- **Cross-sectional study**—considerable seasonal variation in grocery—original data collection in August, so if anything overestimates availability and underestimates price e.g. for fresh produce





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### STRENGTHS

- Emphasis on **rural** and not remote context, in a region with variability in rurality—densely populated for NL, but not in comparison to literature
- Census of stores captures all potential rural exposures (but does not account for potential **substantial travel** for food shopping in rural areas!)
- Price analyses tested **three measures** (unit price \$/kg, serving price \$/serving, energy price \$/kcal)





# Thanks to all of our collaborators and to Mah Food Policy Lab student researchers involved in this research!



Food First NL, Eastern Health, and students Nathan Taylor, Rebecca Hasdell, Rebecca Harris, Stephanie Pomeroy, Bruce Knox, Lisa Woodrow, and Brian Harnett



**Figure 1. Mean Unit, Serving, and Energy Prices (n=78 stores).** Mean prices for healthier (teal) and regular (purple) items (*except for fruit and vegetables, regular = healthier*), per product category measure (colored circles), grand mean for all stores (black line).

