How do we get from Postal Code to Socioeconomic Status?

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Lecture Overview

- Postal Codes
- Postal Code Conversion
- Standard Geographic Classification
- Ways to utilize postal codes in research

A little about Postal Codes

Postal Codes

- Many health records contain postal codes
- Canadian Postal Codes are in the form ANA NAN
  - First three characters is FSA
  - Second three characters is LDU
- Can translate postal codes into census geography

Forward Sortation Area

- The first character is a letter that identifies the province or territory
- The second character is a numeral that identifies whether the area is urban (NE 0) or rural (=0)
- The third character identifies a more precise geographic district—a specific rural region, an entire medium-sized city or a section of a major metropolitan area like Vancouver

Local Delivery Unit

- In population centres, a single postal code may correspond to the following types of LDU:
  - a block-face (one side of street between inters.)
  - a community mailbox
  - an apartment building (or select floors of a building)
  - a business building
  - a federal government department, agency or branch
  - a mail delivery route (rural, suburban or mobile)
  - general delivery at a specific post office
  - one or more post office boxes.

GEOCODES PCCF+

- **Automated software converting PCs to Census Geography**
  - **Uses population weights**
    - **Many PCs serve more than on DA**
    - **Some PCs are used by businesses/Post Offices**
    - **Codes vintage postal codes/census geography**
  - **Provides diagnostics**
    - **Creates problem files to notes potential issues**
  - **Provides imputations**
    - **Best possible code given the PC provided**

Limitations of GeoCodes PCCF+

- **Rural postal codes are non-specific (25% of pop)**
  - **System leads to random misclassification of DA and what ever you information you use based on that DA**
  - **Lowers measures of association in rural areas**
  - **This is effect medication and not confounding**
    - **Best to stratify analysis by urban and rural to check for any differences**

APPENDIX D:
SAMPLE OUTPUTS
FROM THE *PCCF+* PACKAGE

SUMMARY OF AUTOMATED CODING RESULTS USING GEOCODES/PCCF VERSION 5

RECORDS	PERCENT	PROB	MESSAGE	ACTION
3996	100.00	TOTAL RECORDS INPUT FROM HLTHDAT (ID + PCODE)		
131	3.28	0	ERROR: NO MATCH TO PCCF	---CHECK PCODE/ADDRESS &OR CODE MANUALLY
5	0.13	1	ERROR: LINKED TO PO GEOG	--CODE MANUALLY IF RESID ADD AVAILABLE
3	0.08	2	WARNING: NON-RESIDENTIAL	--CHECK PCODE/ADDRESS (LEGITIMATE RES?)
3	0.08	3	WARNING: BUSINESS BLDG	----CHECK PCODE/ADDRESS (LEGITIMATE RES?)
241	6.03	4	WARNING: COMMERC/INSTITU	--CHECK PCODE/ADDRESS (LEGITIMATE RES?)
65	1.63	5	WARNING: RETIRED PCODE	----CHECK PCODE/ADDRESS IF OLD DMT UNKNOWN
1	0.03	6	NOTE: MULT MATCH CSD-PCCF	-DISTRIBUTED AMONG APPLIC DA/BLK/BLKF
535	13.39	7	NOTE: MULT MATCH CSD-WCF	--DISTRIBUTED BY POP WEIGHTS OBSERVED
3012	75.38	9	NO PROB (ERR,WARN,NOTE)	---NO ACTION REQUIRED
8	0.20	NOT CODED AT ALL		
39	0.98	PARTIALLY CODED TO PR ONLY		
2	0.05	PARTIALLY CODED TO PR + (CD OR CMA)	--& APPROX LAT LONG	
12	0.30	PARTIALLY CODED TO PR+CD+CMA	--AND APPROX LAT LONG	
8	0.20	PARTIALLY CODED TO PR+CD+CMA+CSD	--AND APPROX LAT LONG	
3927	98.27	FULLY CODED TO PR+CD+CMA+CSD+CT+BLK	--AND DA/BLK/BLKFACE LAT LONG	

A little about Standard Geographic Classification (SGC)

Census Geography

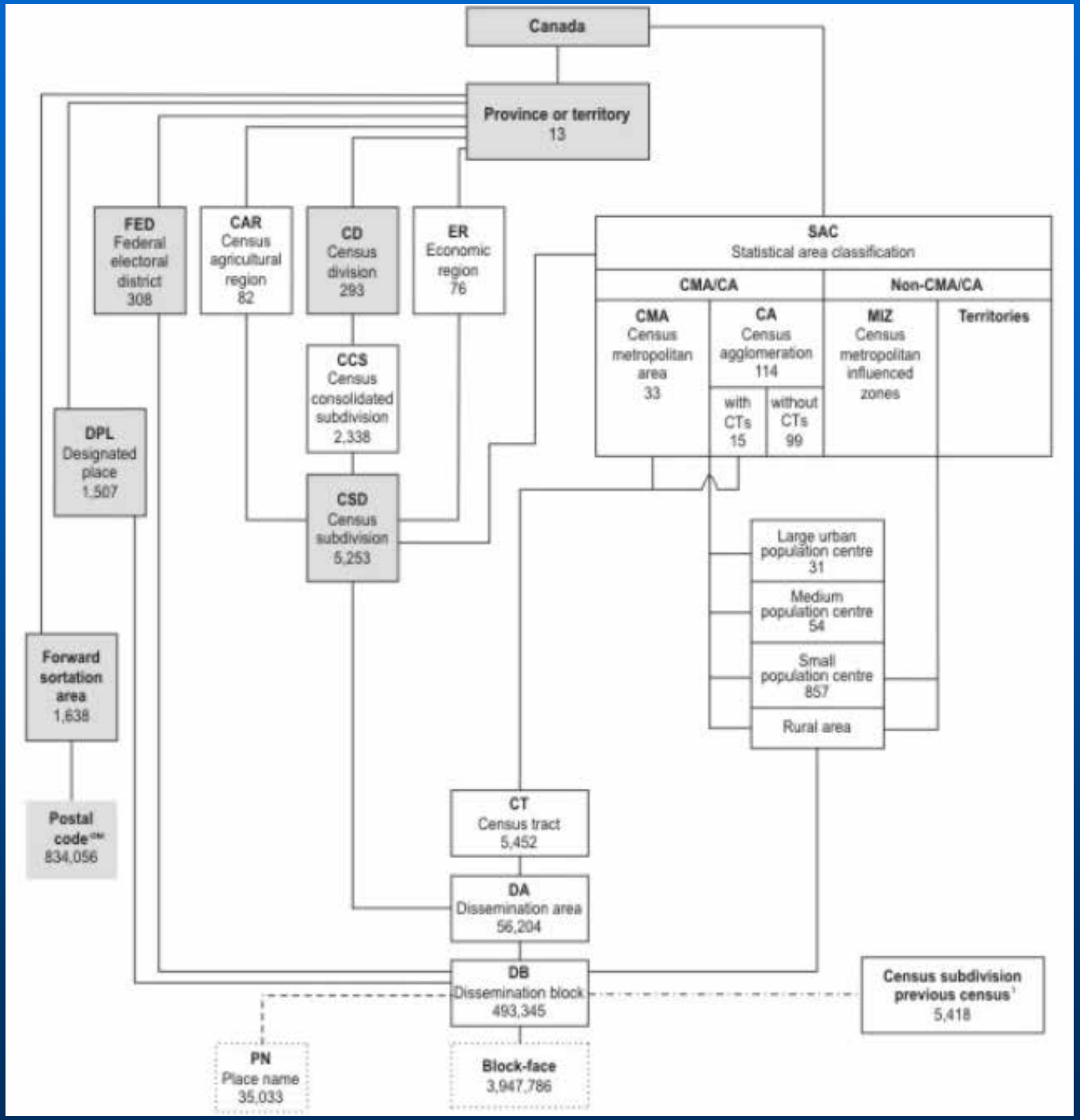
- **Two main geographical systems**
  - **Administrative**
    - **Defined by Federal and Provincial Statues**
  - **Statistical**
    - **Defined by Statistics Canada**
    - **Used to collect and disseminate data**

Administrative

- Nested geography
  - Province (PR)
  - Census Division (CD)
    - Counties / regional districts
    - N=293
  - Census Sub-Division (CSD)
    - municipality
    - N=5162
  - Federal Electoral District (FED)
    - N=338

Statistical

- **Semi-Nested**
  - Census Metropolitan Area (CMA)
    - N=35 / Pop.: >100,000 with 50,000 in core
  - Aggregate Dissemination Area (ADA)
    - N=5,386 / Pop.: > 5,000
    - Respect PR/CD/CMA/CT
  - Census Tract (CT)
    - N=5,721 / Pop.: 2,500 (only in urban areas)
    - Respect CMA/PR not CSD
  - Dissemination Area (DA – EA)
    - N=56,590 / Pop.: 400
    - Respect CSD/CT


Canada
Province or territory
13
FED
Federal electoral district
308
CAR
Census agricultural region
82
CD
Census division
293
ER
Economic region
76
SAC
Statistical area classification
CMA/CA
Non-CMA/CA
CMA
Census metropolitan area
33
CA
Census agglomeration
114
with CTs
15
without CTs
99
MIZ
Census metropolitan influenced zones
Territories
CCS
Census consolidated subdivision
2,338
DPL
Designated place
1,507
CSD
Census subdivision
5,253
Large urban population centre
31
Medium population centre
54
Small population centre
857
Rural area
Forward sortation area
1,638
Postal code
834,056
CT
Census tract
5,452
DA
Dissemination area
56,204
DB
Dissemination block
493,345
Census subdivision previous census
5,418
PN
Place name
35,033
Block-face
3,947,786

So what now?

What can you do?

- Neighbourhood SES
  - QAIPPE (Quintile of Annual Income Per Person Equivalent)
  - CAN-Marg
- Distance Calculations (straight-line and others)

- Administrative areas (LHIN, school districts)
- Utilize other GIS Tools
  - Air pollution, water supply, built environment, travel time/distance
- Follow people over time (updated PCs)

Quintile of Annual Income Per Person Equivalent

- Area measure of neighbourhood income per person equivalent
- Based on average income for DA
- Adjusted for household size
  - The single person equivalents
    - 1.00 for 1 person living in a household
    - 1.25 for 2 persons
    - 1.55 for 3 persons
    - 1.95 for 4 or 5 persons
    - 2.44 for 6 or more persons sharing the same household
- Quintiles are area based (CMA and CA)

CAN-Marg

Development of the Canadian Marginalization Index: A New Tool for the Study of Inequality

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ABSTRACT

Objectives: Area-based measures of socio-economic status are increasingly used in population health research. Based on previous research and theory, the Canadian Marginalization Index (CAN-Marg) was created to reflect four dimensions of marginalization: residential instability, material deprivation, dependency and ethnic concentration. The objective of this paper was threefold: to describe CAN-Marg; to illustrate its stability across geographic area and time; and to describe its association with health and behavioural problems.

Methods: CAN-Marg was created at the dissemination area (DA) and census tract level for census years 2001 and 2006, using factor analysis. Descriptions of 18 health and behavioural problems were selected using individual-level data from the Canadian Community Health Survey (CCHS) 3.1 and 2007/08. CAN-Marg quintiles created at the DA level (2006) were assigned to individual CCHS records. Multilevel logistic regression modeling was conducted to examine associations between marginalization and CCHS health and behavioural problems.

Results: The index demonstrated marked stability across time and geographic area. Each of the four dimensions showed strong and significant associations with the selected health and behavioural problems, and these associations differed depending on which of the dimensions of marginalization was examined.

Conclusion: CAN-Marg is a census-based, empirically derived and theoretically informed tool designed to reflect a broader conceptualization of Canadian marginalization.

Key words: Socio-economic status; health; methods; marginalization; inequities

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CAN-Marg

- Based on Census information for the DA
  - 18 neighbourhood characteristics used
- Calculates Four Related Measures
  - Residential Instability
  - Material Deprivation
  - Dependency
  - Ethnic Concentration
- Can be used separately or in summary
- Publicly available

Distance Calculations

- $D = 6{,}370{,}997 * \arccos(\sin(LAT1) * \sin(LAT2) + \cos(LAT1) * \cos(LAT2) * \cos(LONG1-LONG2))$

where

D	=	distance (in metres);
LAT1	=	latitude of point 1 (in radians);
LONG1	=	longitude of point 1 (in radians);
LAT2	=	latitude of point 2 (in radians);
LONG2	=	longitude of point 2 (in radians);
arcos	=	arc cosine ;
cos	=	cosine;
sin	=	sine;

and 6,370,997 is the radius of the sphere (in metres).

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