An Analysis of Demographic Patterns and Frequent Combinations of Drug Misuse in Canada

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Thank You!

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Introduction

Background

Research Question

Background

- Prescription drug misuse is a serious problem

- Data collected from Survey of Non-Medical Use of Prescription Drugs (NMURx) Program

- Variables dictionary
  - Survey administration variables
  - Demographics of respondent (i.e. age, gender, income, residence, etc.)
  - Prescription Pain Relievers
  - Prescription and Non-Prescription Codeine
  - Other Prescription Drugs- (i.e. benzodiazepines, stimulants, etc.)
  - End of Survey Questions- (i.e. other risk factors, illicit drug use, etc.)
  - DAST-10 Questionnaire
  - Summary Variables- derived variables from dataset to aid in analysis

Research Question

1. To explore the **demographic** and **behavioral** pattern of general and specific drugs misuse

2. To investigate the **combinations** of drugs that tend to be misused together

Methods

Generalized Linear Mixed Model

Generalized Linear Model

Descriptive Statistics

Generalized Linear Mixed Model

Response Variable: Misuse or not (O or 1)
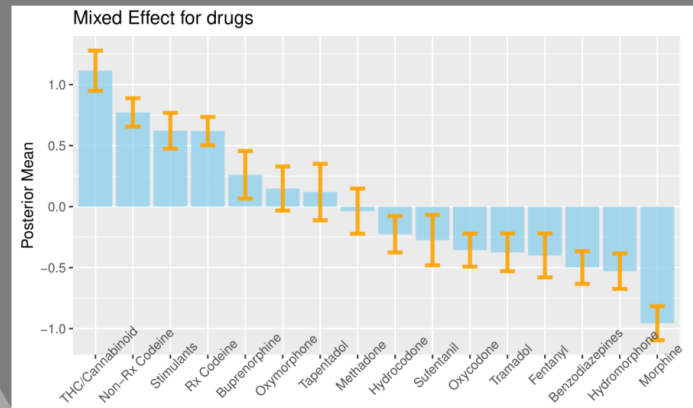Predictors: Demographic Variables and Behavioral Variables.

Fixed Effect

Random Effect

Fixed Effect

Table 1: The Summary Table of Coefficients

Coefficient Parameter	Estimated Median odds ratio	95% Credible Interval Lower Bound (0.025 quantile)	95% Credible Interval Upper Bound (0.975 quantile)
(Intercept)	1.039	0.779	1.385
Age	0.984	0.982	0.986
Sex (Female)	0.795	0.743	0.852
Income	0.954	0.941	0.967
Crack Cocaine (In last week)	2.876	1.984	4.168
Crack Cocaine (In last 30 days)	3.698	2.498	5.473
Crack Cocaine (In last 12 months)	3.811	2.475	5.868
Crack Cocaine (Yes, during my lifetime)	1.739	1.475	2.050
Tobacco Use (Occasionally)	1.091	0.959	1.240
Tobacco Use (Not at all)	0.780	0.715	0.851
Alcohol Use (4 to 5 times a week)	0.908	0.782	1.054
Alcohol Use (2 to 3 times a week)	0.889	0.782	1.010
Alcohol Use (Once a week)	0.841	0.731	0.967
Alcohol Use (2 to 3 times a month)	0.744	0.648	0.855
Alcohol Use (Once a month)	0.760	0.644	0.898
Alcohol Use (Less than once a month)	0.634	0.554	0.724
Alcohol Use (Never)	0.712	0.621	0.815
DAST_3	0.607	0.563	0.656
DAST_5	1.365	1.230	1.514
DAST_8	1.788	1.551	2.062

DAST_3 : Are you able to stop using drugs when you want to? (yes)
DAST_5: Do you ever feel bad or guilty about your drug use? (yes)
DAST_8: Have you engaged in illegal activities in order to obtain drugs? (yes)

Random Effect

Mixed Effect for drugs

Generalized Linear Model

1. Prescription Codeine product
  + effect:
      • crack use(within last week),
      • tobacco/alcohol use frequency,
      • engaged in illegal activities to obtain drugs
  - effect:
      • age,
      • gender(female),
      • higher income level,
      • able to stop using drugs if want to

2. Non-prescription Codeine product
  + effect:
      • crack use(within last week),
      • tobacco/alcohol use frequency,
      • engaged in illegal activities to obtain drugs
  - effect:
      • age,
      • gender(female),
      • higher income level,
      • able to stop using drugs if want to

3. THC
  + effect:
      • alcohol use frequency,
      • engaged in illegal activities to obtain drugs
      • ever feel guilty
  - effect:
      • age,
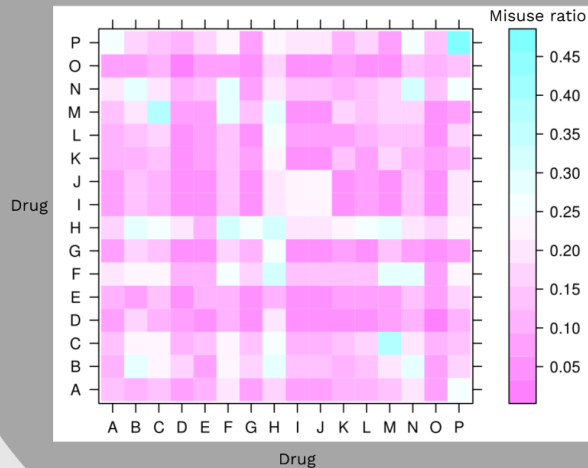   • higher education

4. Stimulant
  + effect:
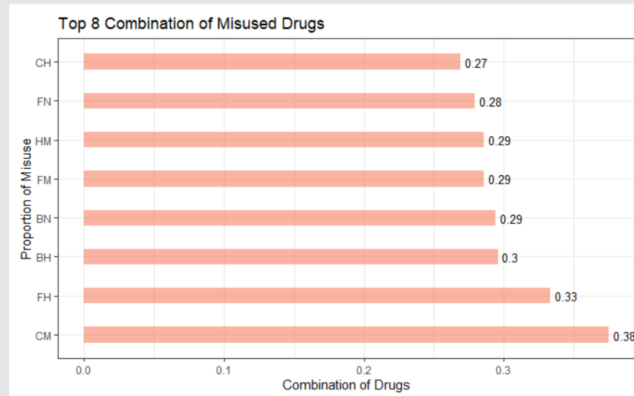   • ever feel guilty
  - effect:
      • age

Descriptive Statistics

Heatmap of proportion of misuse

A - Fentanyl
B - Buprenorphine
C - Methadone
D - Morphine
E - Oxycodone
F - Oxymorphone
G - Tramadol
H - Tapentadol
I - Rx Codeine
J - Non-Rx Codeine
K - Hydrocodone
L - Hydromorphone
M - Sufentanil
N - Stimulants
O - Benzodiazepines
P - THC/Cannabinoid

Misuse ratio

Drug

Drug

A B C D E F G H I J K L M N O P

Top-8 combination

Top-8 Combination

CH - Methadone and Tapentadol
FN - Oxymorphone and Stimulants
HM - Tapentadol and Sufentanil
FM - Oxymorphone and Sufentanil
BN - Buprenorphine and Stimulants
BH - Buprenorphine and Tapentadol
FH - Oxymorphone and Tapentadol
CM - Methadone and Sufentanil

Top 8 Combination of Misused Drugs

Discussion

Application:
- Help in regulations or physician questionnaires

Future work:
- Demographics for multiple drug misuse
- Add weight parameter if time permitted