Alcohol Tax Policy & Related Mortality

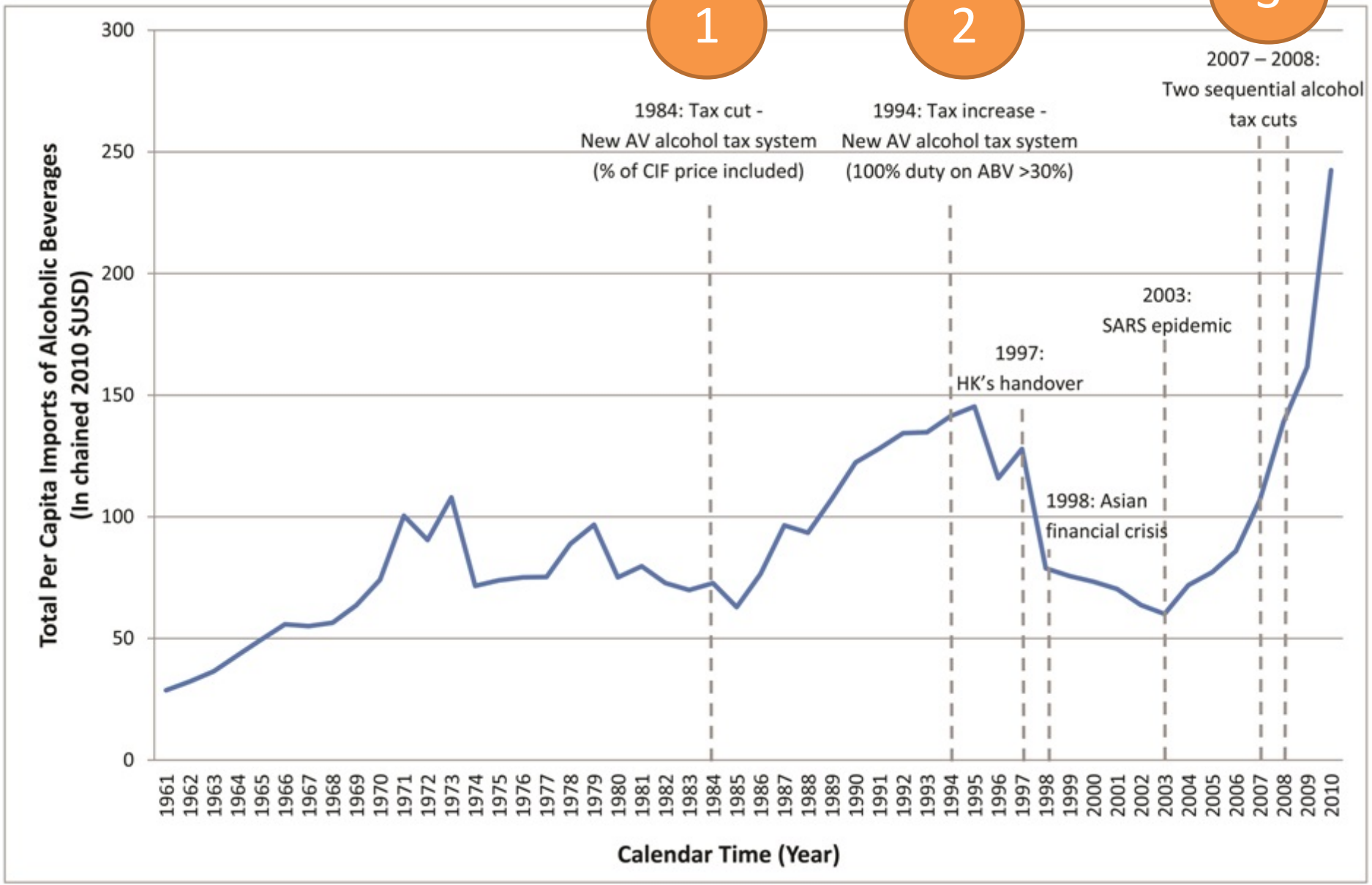
An age-period-cohort analysis of a developed Chinese population, 1981-2010

Dr. Roger Y Chung

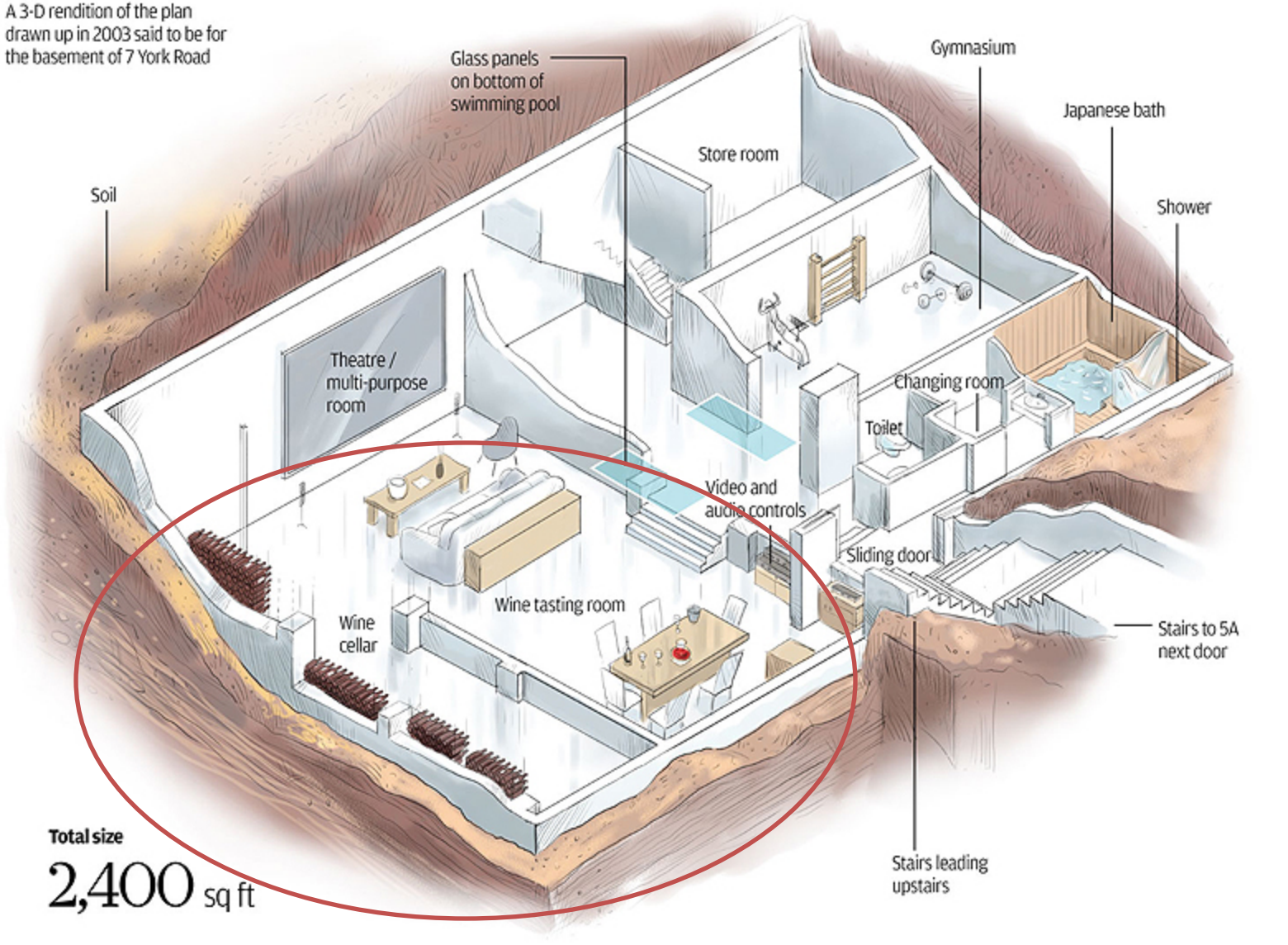
School of Public Health & Primary Care
The Chinese University of Hong Kong

香港中文大學 CUHK
公共衛生及基層醫療學院
School of Public Health and Primary Care

History of Hong Kong's Alcohol Tax Policy Changes



A 3-D rendition of the plan drawn up in 2003 said to be for the basement of 7 York Road



SCMP GRAPHIC

Primary Outcome

- Outcome:
  - Alcohol-related mortality, 1981-2010
    - Chronic causes
    - Acute causes
    - All causes
  - Defined according to the US Centers for Disease Control and Prevention (USCDC), Alcohol-related Disease Impact (ARDI) criteria
    - Alcohol attributable fractions: estimates the proportion of deaths from various causes that are attributable to alcohol

Chronic and acute alcohol-related causes by AAF

Chronic

Cause	ICD-9	ICD-10
100% Attributable		
Alcoholic psychosis	291	F10.3-F10.9
Alcohol abuse	305.0, 303.0	F10.0, F10.1
Alcohol dependence syndrome	303.9	F10.2
Alcohol polyneuropathy	357.5	G62.1
Degeneration of nervous system due to alcohol	Nil	G31.2
Alcoholic myopathy	Nil	G72.1
Alcohol cardiomyopathy	425.5	I42.6
Alcoholic gastritis	525.3	K29.2
Alcoholic liver disease	571.0-571.3	K70-K70.4, K70.9
Fetal alcohol syndrome	655.4, 760.71	Q86.0
Fetus and newborn affected by maternal use of alcohol	Nil	P04.3, O35.4
Alcohol-induced chronic pancreatitis	Nil	K86.0
Direct Alcohol-Attributable Fractions Estimate		
Acute pancreatitis	577.0	K85
Chronic pancreatitis	577.1	K86.1
Epilepsy	345	G40, G41
Esophageal varices	456.0-456.2	I85, I98.20, I98.21
Gastroesophageal hemorrhage	530.7	K22.6
Liver cirrhosis, unspecified	571.5-571.9	K74.3-K74.6, K76.0, K76.9
Portal hypertension	572.3	K76.6
Spontaneous abortion	634	O03
Indirect Alcohol-Attributable Fractions Estimates (English et al. and Ridolfo and Stevenson cut points)		
Breast cancer, females	174	C50
Cholelithiases	574	K80
Chronic hepatitis	571.4	K73
Esophageal cancer	150	C15
Hypertension	401-405	I10-I15
Ischemic heart disease	410-414	I20-I25
Laryngeal cancer	161	C32
Liver cancer	155	C22
Low birth weight, prematurity, intrauterine growth retardation or death	656.5, 764, 765	O36.5, O36.4, P05, P07
Oropharyngeal cancer	141, 143-146, 148, 149	C01-C06, C09-C10, C12-C14
Psoriasis	696.1	L40.0-L40.4, L40.8, L40.9
Superventricular cardiac dysrhythmia	427.0, 427.2, 427.3	I47.1, I47.9, I48
Indirect Alcohol-Attributable Fractions Estimates (Corrao et al. and Bargnardi et al. cut points)		
Stroke, ischemic	433-435, 437, 362.34	G45, I63, I65-I67, I69.3
Stroke, hemorrhagic	430-432	I60-I62, I69.0-I69.2
Prostate cancer	185	C61

Acute

Cause	ICD-9	ICD-10
100% Attributable		
Alcohol poisoning	980.0, 980.1, E860.0, E860.1, E860.2, E860.9	X45, Y15, T51.0, T51.1, T51.9
Suicide by and exposure to alcohol	Nil	X65
Excessive blood level of alcohol	790.3	R78.0
Direct Alcohol-Attributable Fractions Estimates		
Air-space transport	E840-E845	V95-V97
Aspiration	E911	W78-W79
Child maltreatment	E960-E968	X85-Y09, Y87.1
Drowning injuries	E910	W65-W74
Fall injuries	E880-E888, E848	W00-W19
Fire injuries	E890-E899	X00-X09
Firearms	E922	W32-W34
Homicide	E960-E969	X85-Y09, Y87.1
Hypothermia	E901	X31
Motor-vehicle nontraffic crashes	E820-E825	V02.0, V03.0, V04.0, V09.0, V12-V14(.0-.2), V19.0-V19.3, V20-V28(.0-.2), V29.0-V29.3, V30-V39(.0-.3),V40-V49(.0-.3), V50-V59(.0-.3), V60-V69(.0-.3), V70-V79(.0-.3), V81.0, V82.0, V83-V86(.4-.9), V88.0-V88.8, V89.0
Motor-vehicle traffic crashes	E810-E819	V02(.1, .9), V03(.1, .9), V04(.1, .9), V09.2, V12-V14(.3-.9), V19.4-V19.6, V20-V28(.3-.9), V29.4-V29.9, V30-V39(.4-.9), V40-V49(.4-.9), V50-V59(.4-.9), V60-V69(.4-.9), V70-V79(.4-.9), V80.3-V80.5, V81.1, V82.1, V83-V86(.0-.3), V87.0-V87.8, V89.2
Occupational and machine injuries	E917-E920	W24-W31, W45
Other road vehicle crashes	E800-E807, E826-E829	V01, V05-V06, V09.1, V09.3, V09.9, V10-V11, V15-V18, V19.3, V19.8-V19.9, V80.0-V80.2, V80.6-V80.9, V81.2-V81.9, V82.2-V82.9, V87.9, V88.9, V89.1, V89.3, V89.9
Poisoning (not alcohol)	E850-E869, E924.1	X40-X49 (except X45)
Suicide	E950-E959	X60-X84, (except X65) Y87.0
Water transport	E830-E838	V90-V94

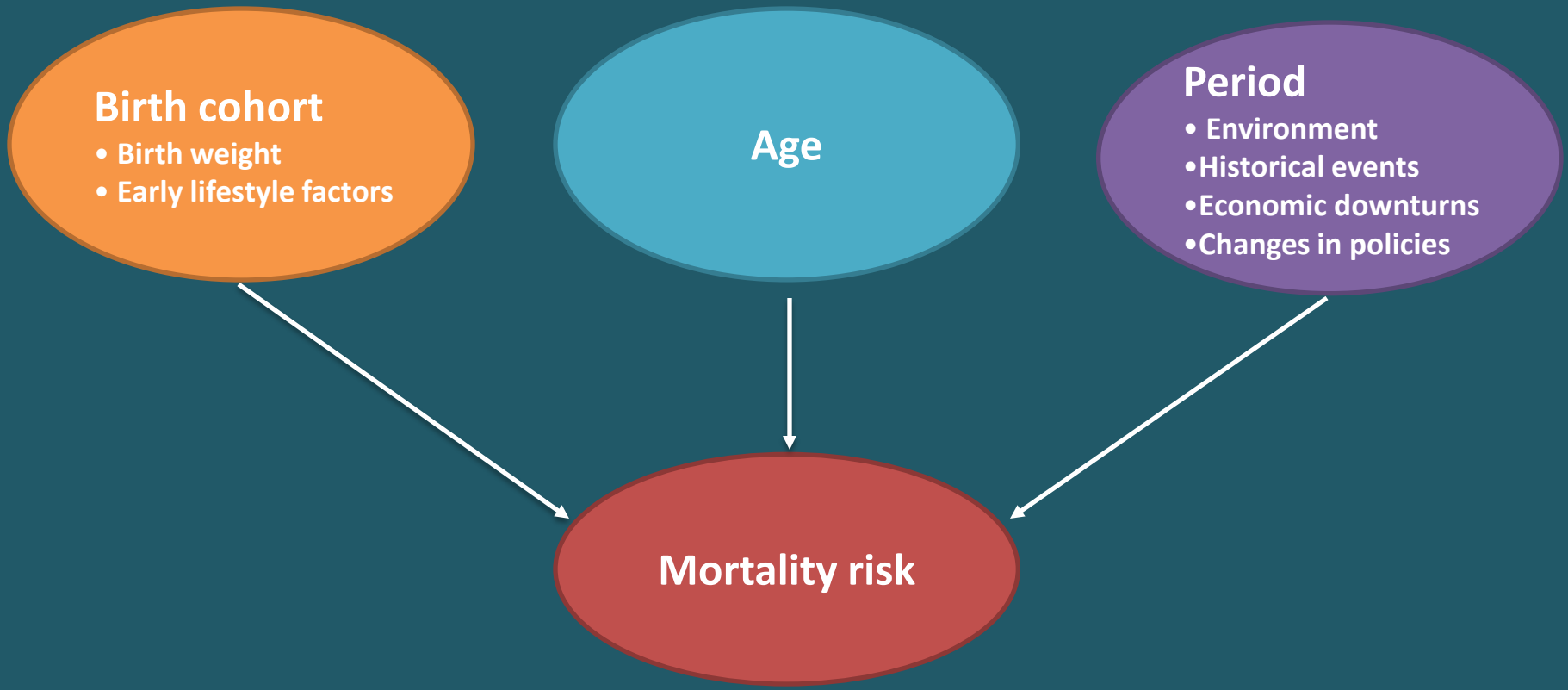
Data Sources

- Mortality Data, 1981-2010
  - Hong Kong Census and Statistics Department
- Population Data, 1981-2010
  - Hong Kong Census and Statistics Department

Methods – Age-Period-Cohort Modeling

Factors affecting a group of people born around the same time

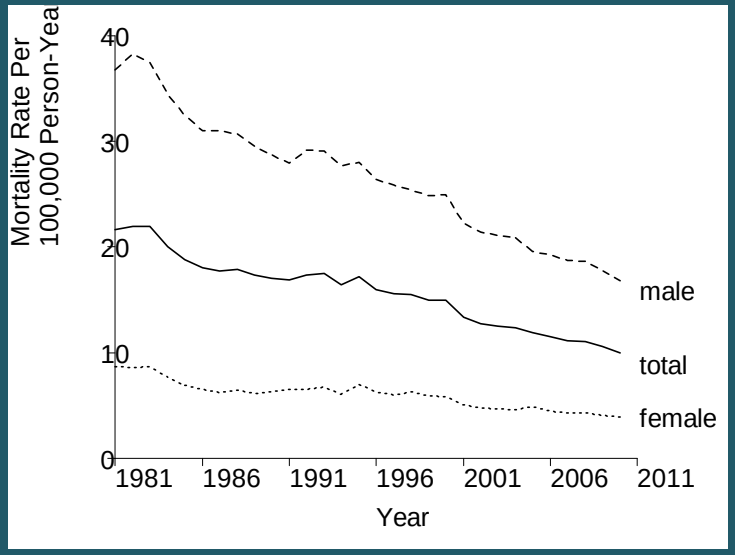
Temporal effects which apply to all people at a certain point in time



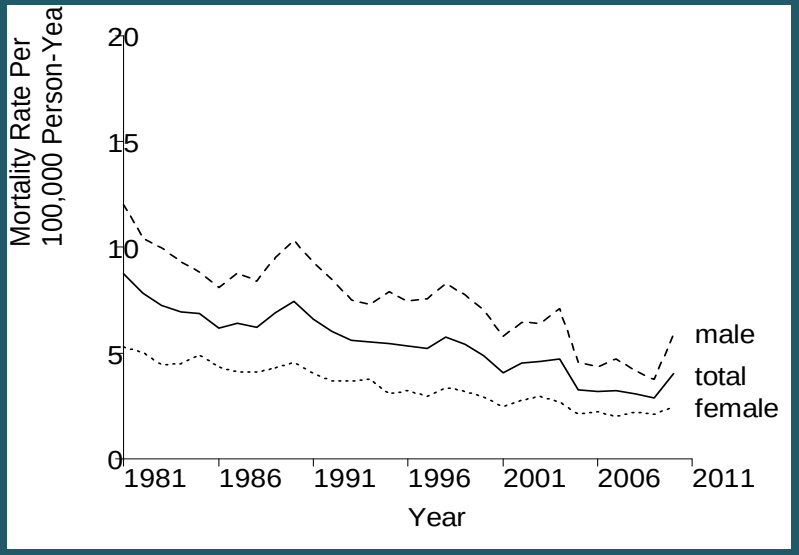
INTERPRET CHANGE IN SLOPES ONLY!

Results – Age-standardized mortality rate

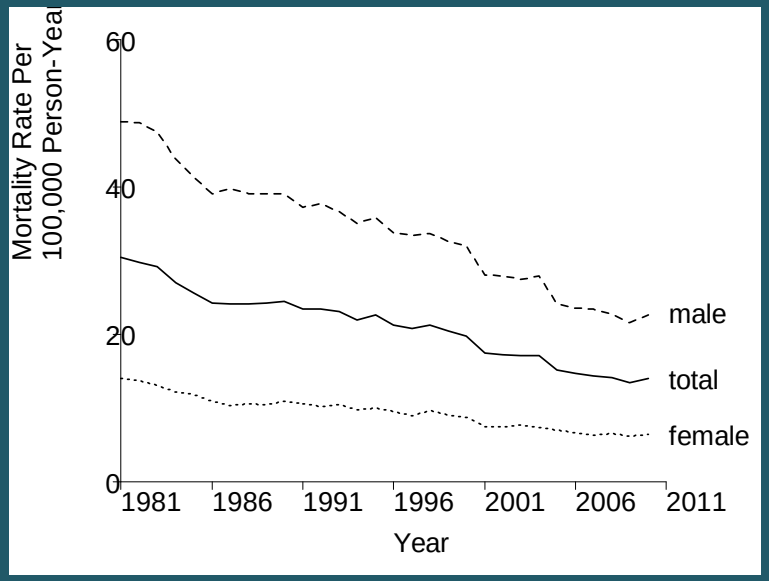
Chronic



Acute

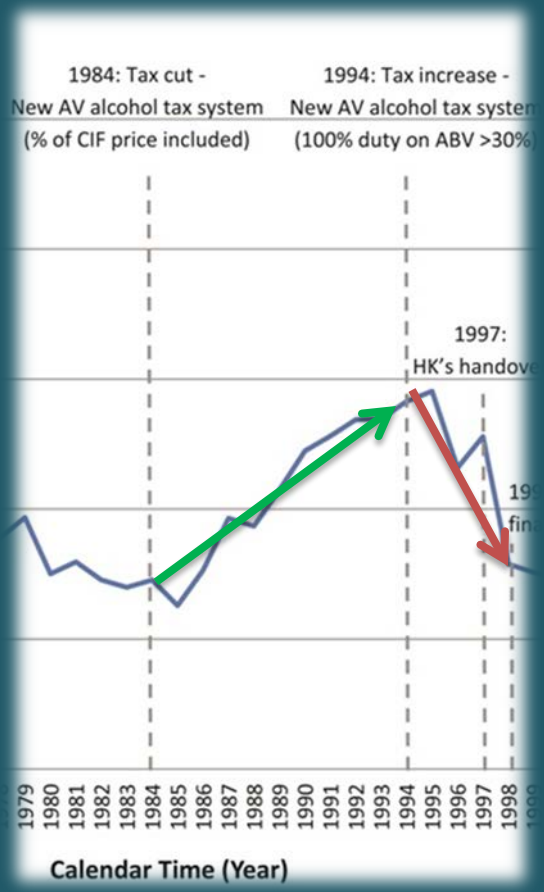


All (Chronic + Acute)

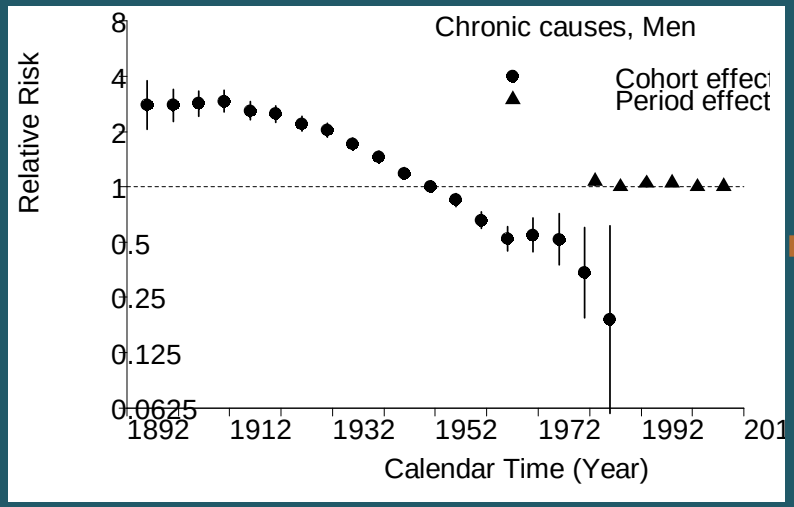


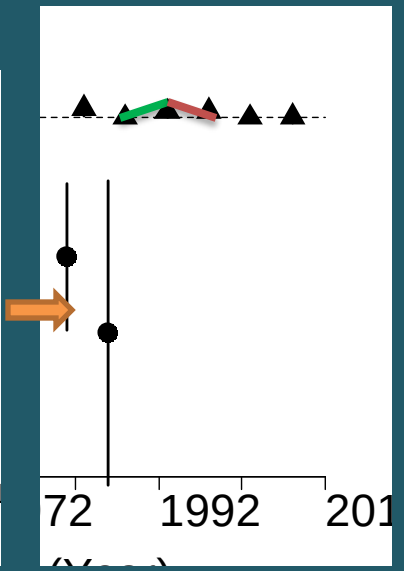
Results – Period Effects (Chronic)

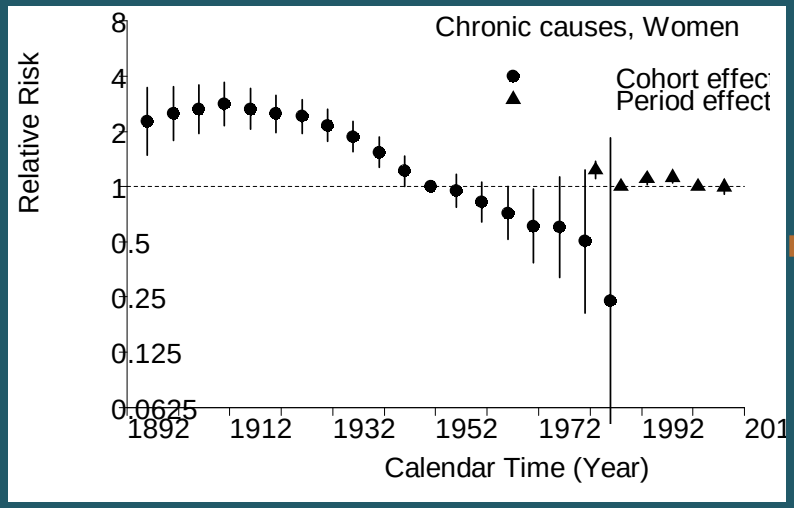
Policy History

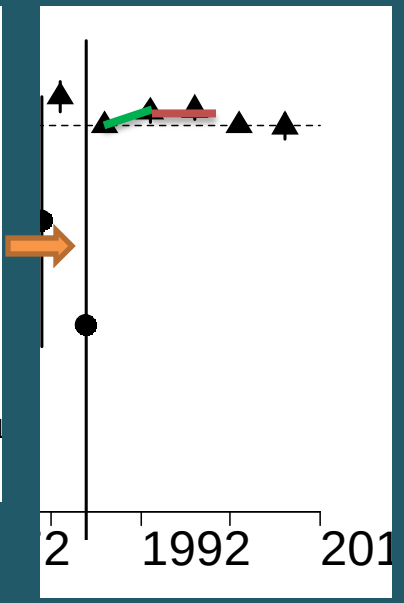


APC



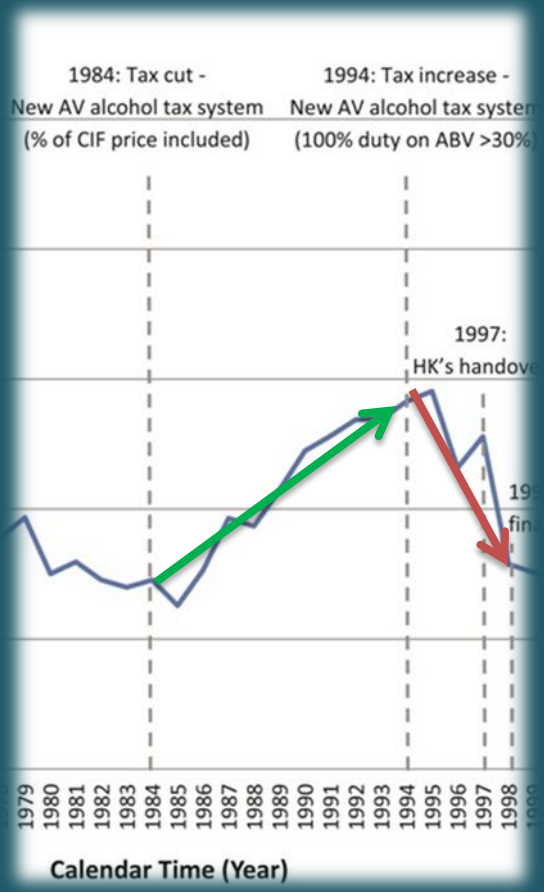




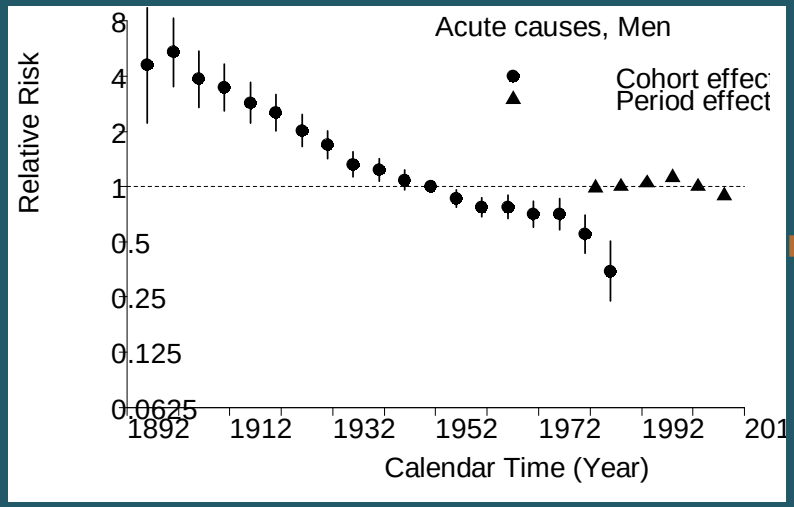


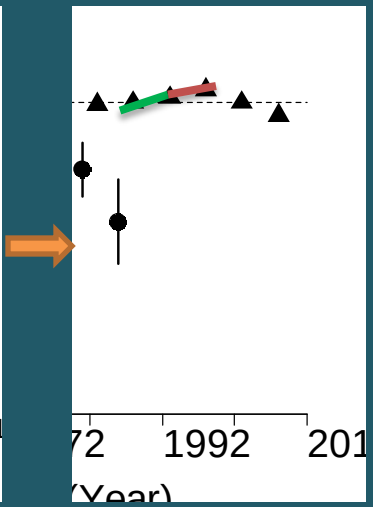
Results – Period Effects (Acute)

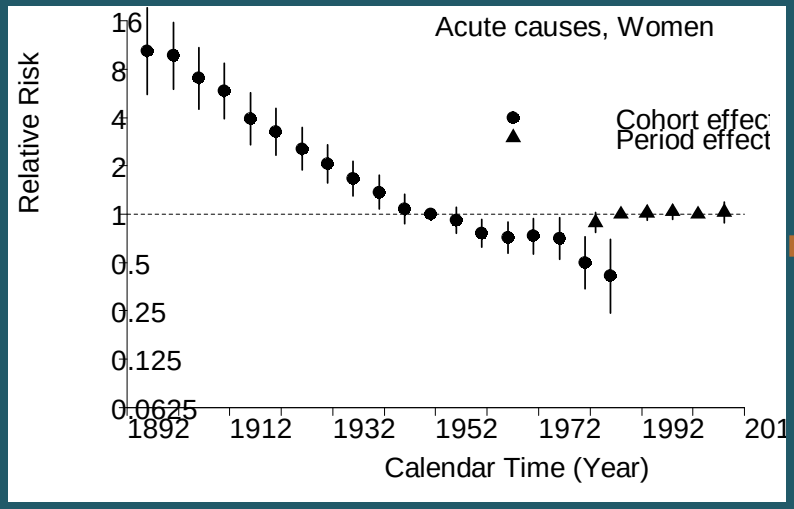
Policy History

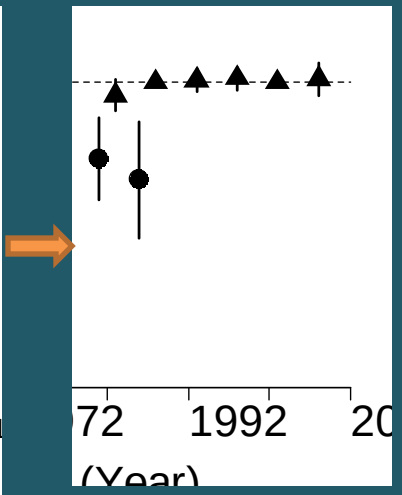


APC



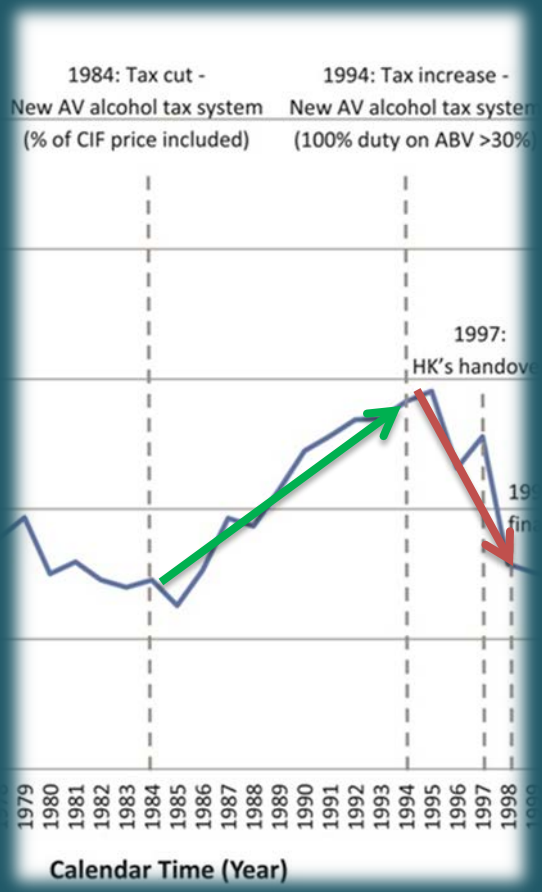




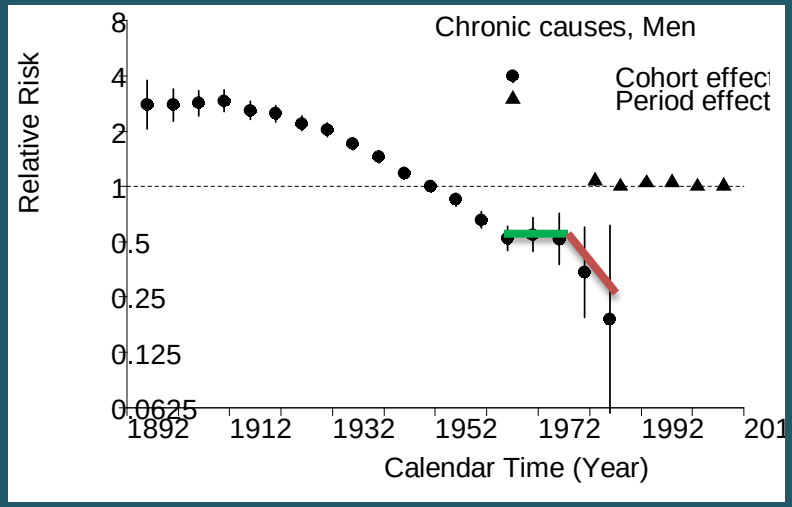


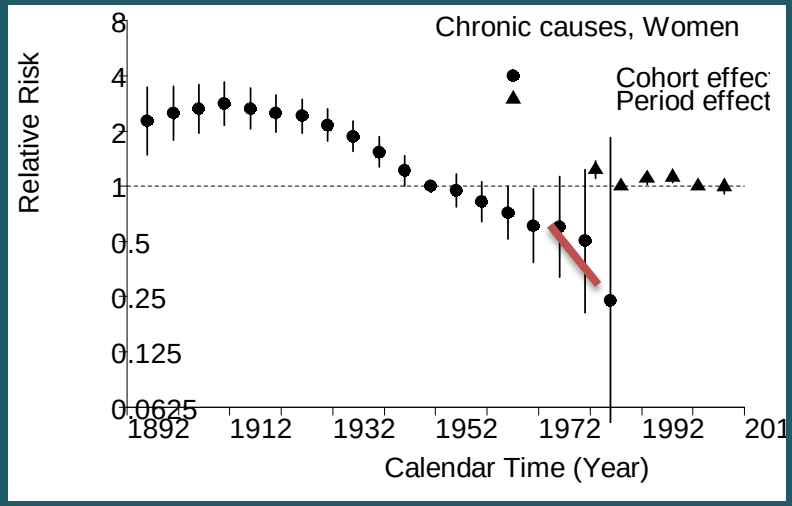
Results – Cohort Effects (Chronic)

Policy History



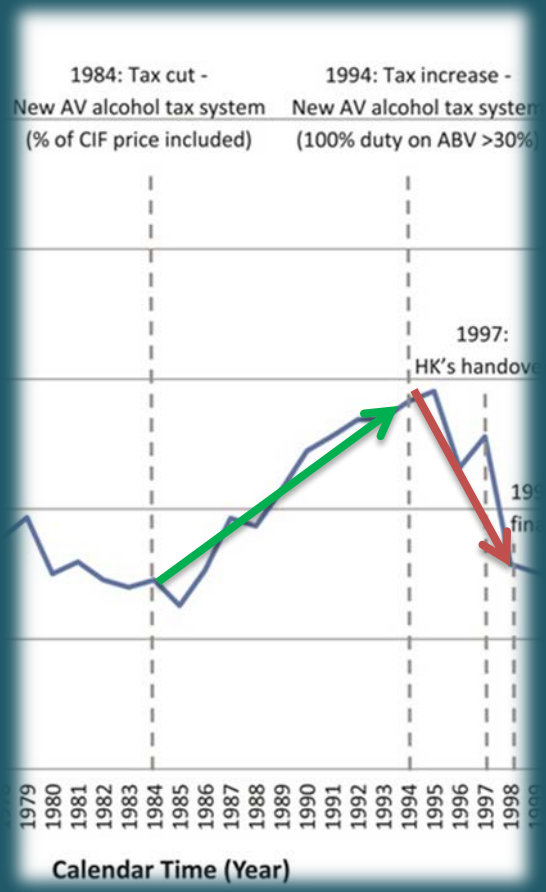
APC



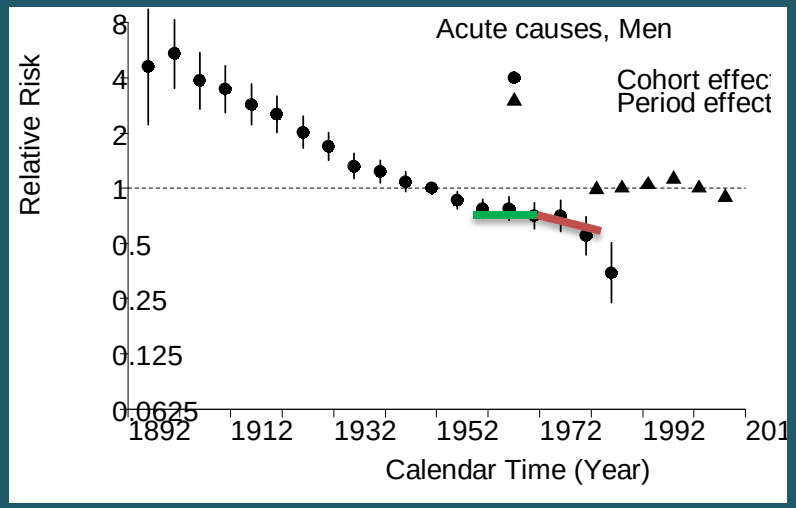


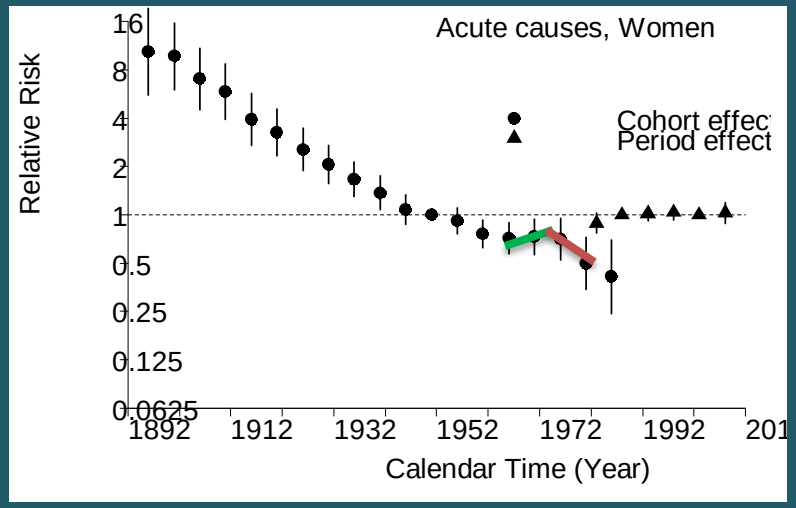
Results – Cohort Effects (Acute)

Policy History



APC



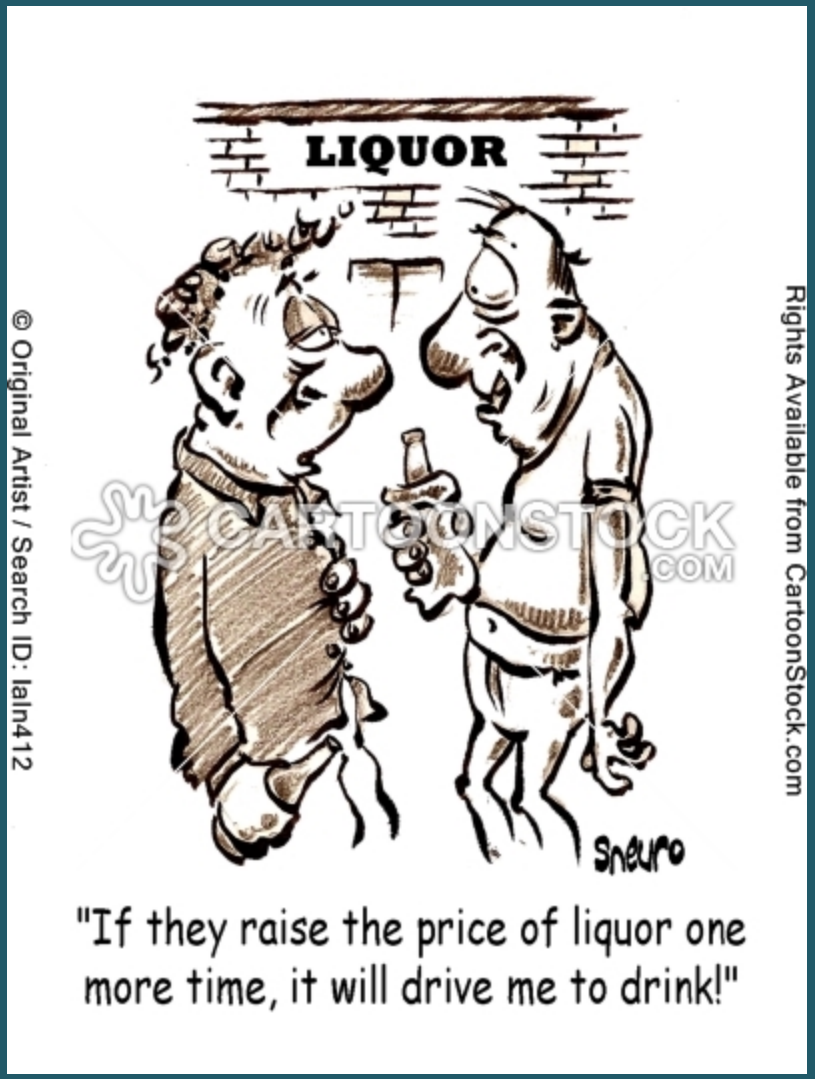


Limitations

- APC
  - An ecological design
  - Descriptive analysis → speculation of macro-environmental factors
  - Wider confidence intervals towards the younger cohorts
  - Dependent on mortality data (incidence data not available)
    - Obesity and diabetes not common cause of death
    - Ischemic vs. hemorrhagic stroke

Conclusion & Implications

- First study to demonstrate the impact of changing alcohol policy on alcohol-related mortality by age, period and cohort effects in a Chinese population of traditionally low alcohol consumption level
- Change of alcohol duties had explicit population-wide as well as generational impact on the risk of alcohol-related mortality
- Attention to generations coming of drinking age during the 2007-2008 duty reduction



Thank you!

Email: rychung@cuhk.edu.hk