



**Institute of
Actuaries of India**
Statutory body under an Act of Parliament



**20th Global
Conference of Actuaries**

4th - 6th March, 2019 | Mumbai, India

Critical Illness Survey 2012–2015

John Ferguson
Regional Chief Actuary
Gen Re

Session # P2
5 March 2019

I. Overview

II. Analysis of Policies

III. Analysis of Claims

IV. Traditional Acceleration Product

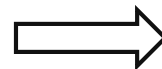
V. BMI & Regional Differences In China



Historical Development of Gen Re's Critical Illness Survey

		No. Markets	No. Companies	No. Claims	Lives In-force
1	1990-1994	3		4,600	
2	1993-1997	3		7,000	3 million
3	1996-2000	3	31	16,000	4 million
4	2000-2004	6	48	263,000	41 million
5	2004-2008	10	95	750,000	~ 70 m
6	2008-2012	7	82	~1,000,000	~ 100m
7	2012-2015	4	39	~1,200,000	~ 110m

- Shorter period
- Fewer markets
- Fewer companies
- Major products



- Faster results
- Better data quality
- More perspectives for analysis



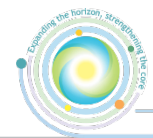
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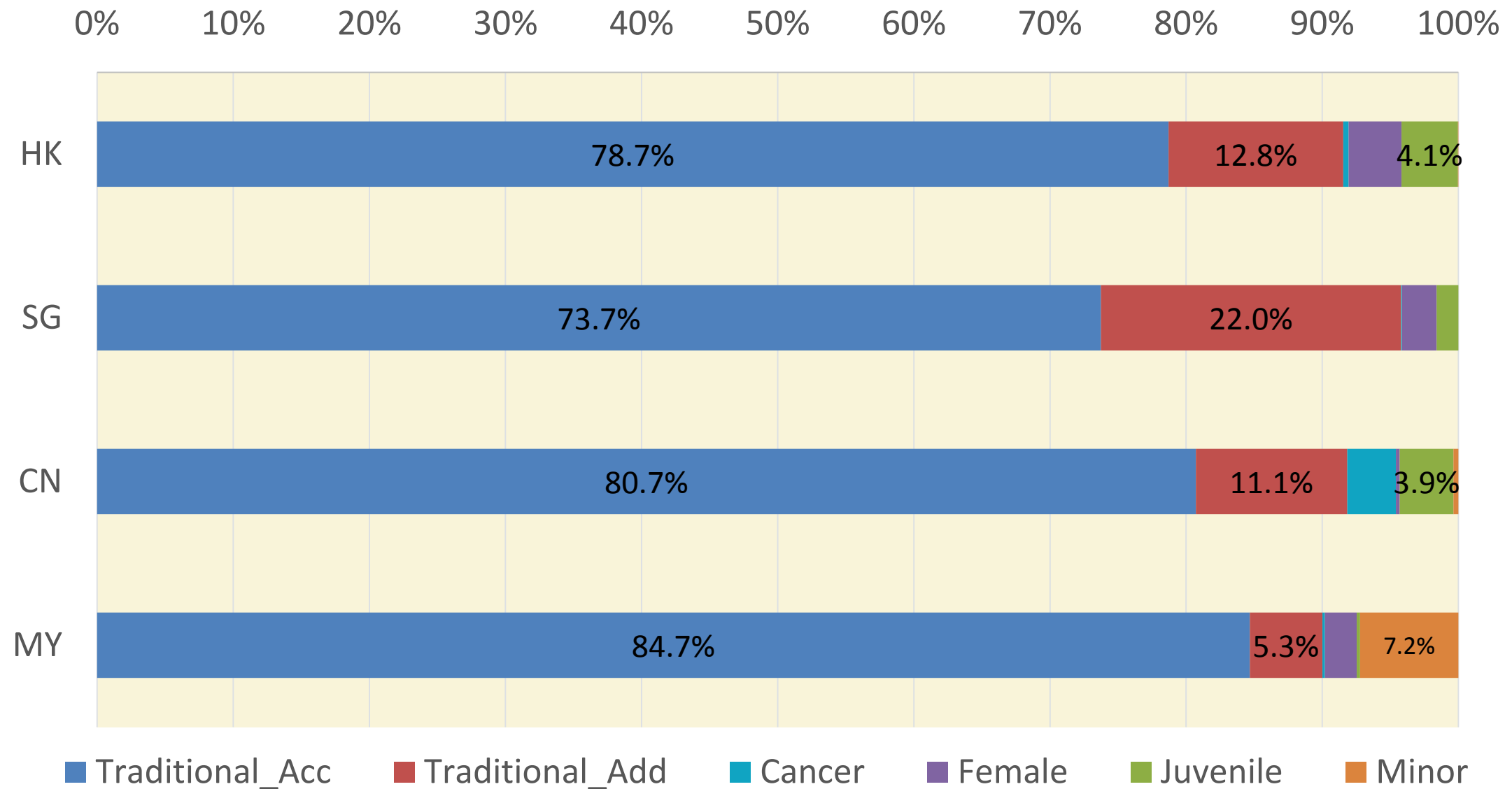
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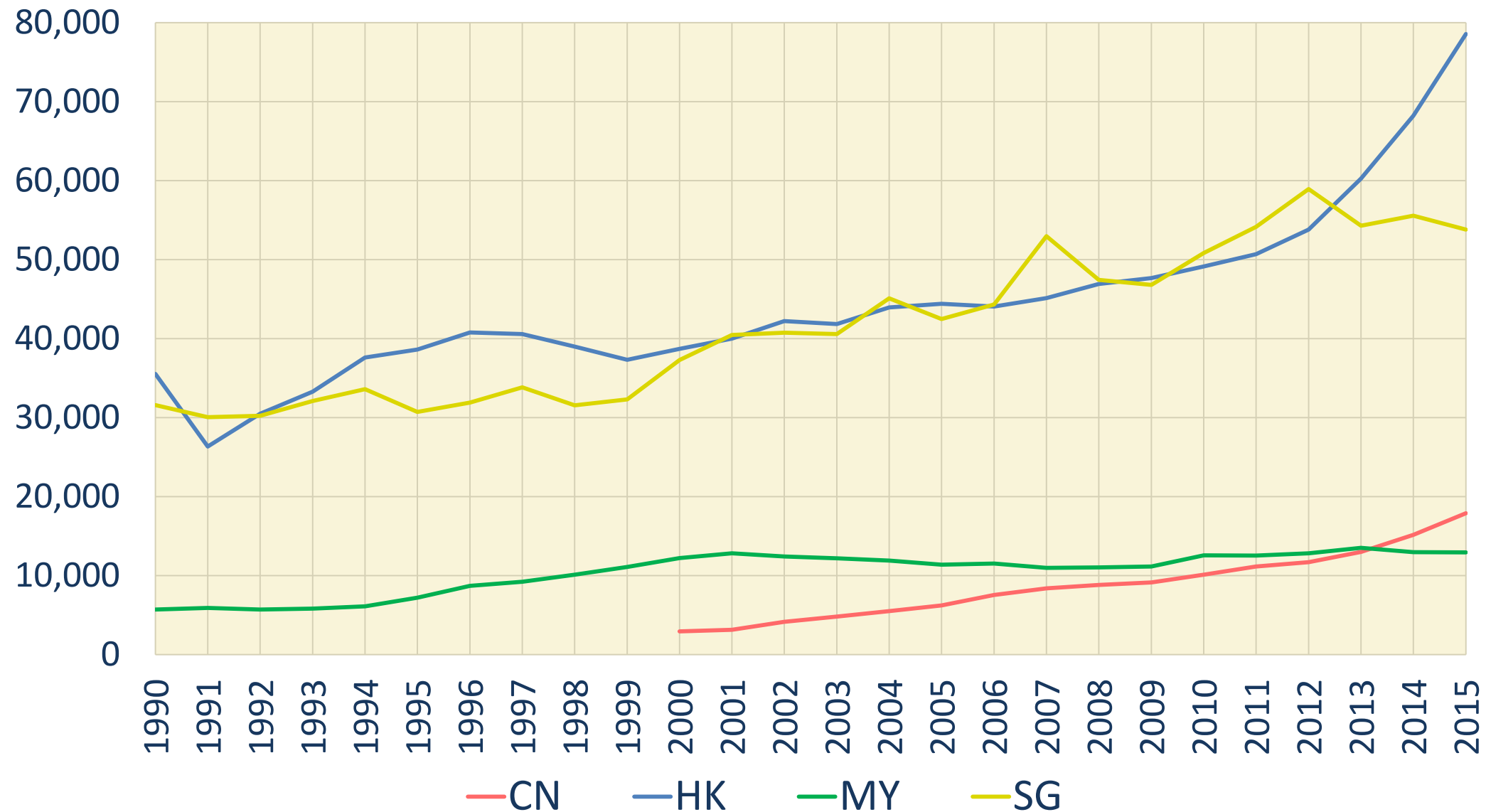
Distribution of Inforce by Product Type

All products



Average Sum Assured by Issue Year

Traditional Products/Currency US\$

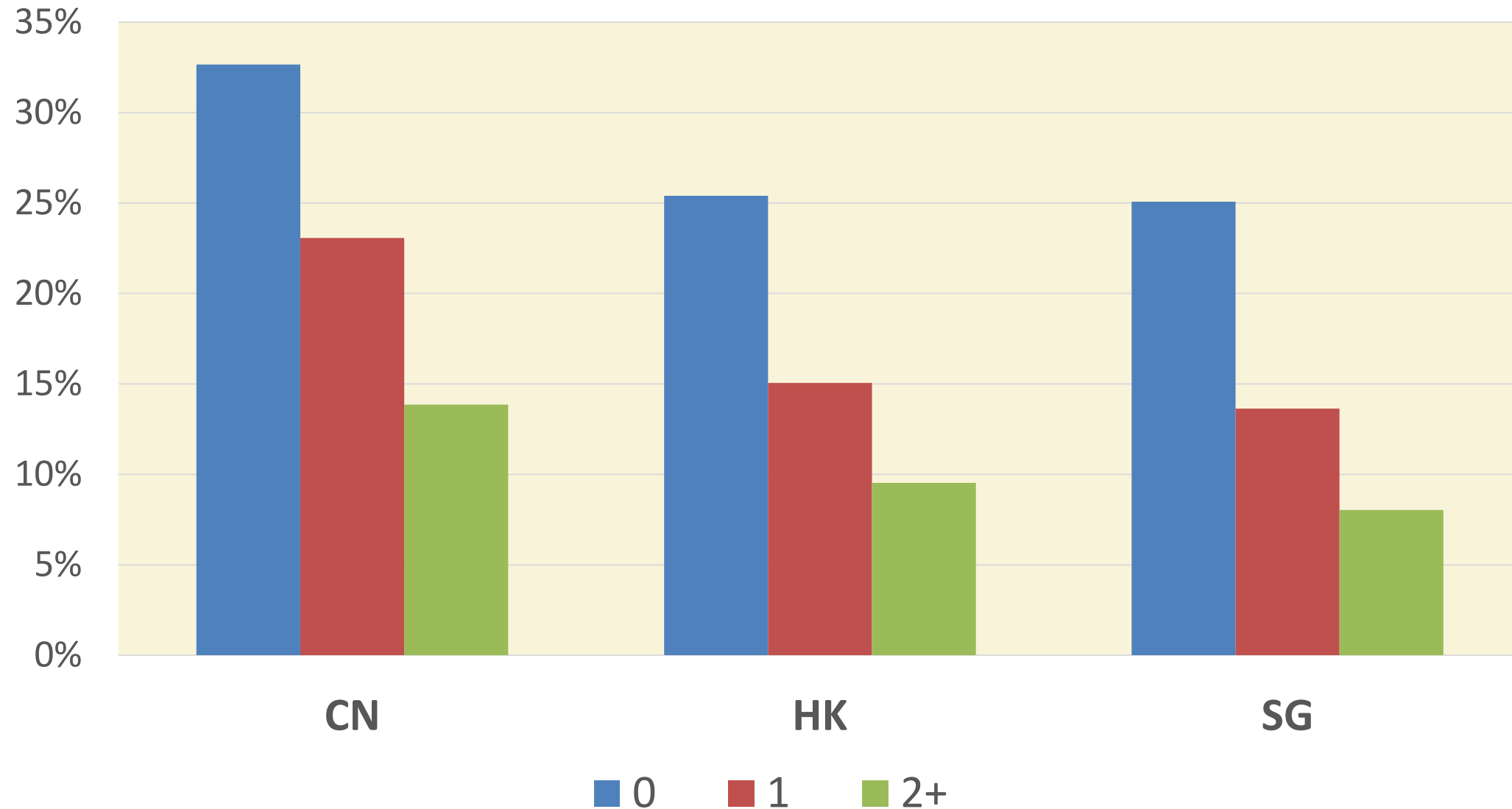


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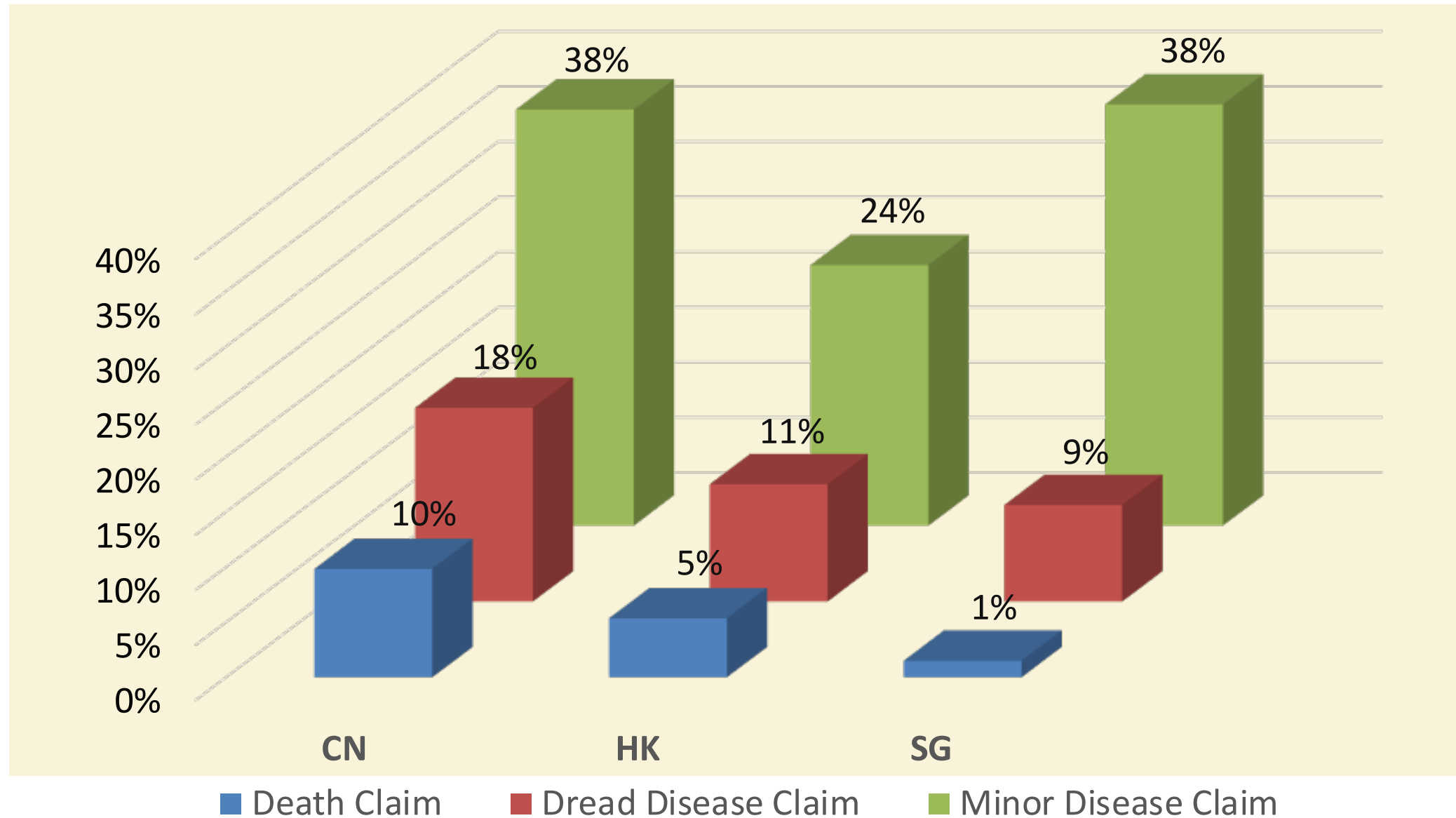
Declinature Rate by Duration

Traditional Products, All durations



Declinature Rate by Benefit Type

Traditional Products, All durations



Main Claim Causes - Male

Traditional Products, All durations

	CN		HK		MY		SG	
Cancer	47.3%	1	56.9%	1	38.7%	1	45.2%	1
Heart Attack	16.1%	2	9.3%	3	19.1%	2	25.2%	2
Angioplasty and Related	0.1%	25	9.9%	2	2.0%	8	2.5%	7
Accidental Death	6.2%	4	1.2%	9	8.5%	3	3.2%	5
Stroke	11.6%	3	7.0%	4	7.7%	4	6.8%	3
Coronary Artery Bypass Graft	2.2%	8	1.8%	6	4.8%	5	3.7%	4
Other Serious Artery Disease	0.1%	27	2.6%	5	4.7%	6	3.1%	6
Chronic Kidney Failure	3.3%	5	1.8%	8	4.7%	6	1.9%	8
Suicide	0.5%	16	1.8%	6	0.7%	11	0.8%	11
Sudden Death	2.9%	6	0.4%	15	0.2%	25	0.2%	21
Possible Suicide	2.3%	7	0.5%	12	1.4%	9	0.3%	16
Heart Valve Surgery	0.6%	14	1.0%	10	0.9%	10	1.2%	9
Sudden Death - Cardiac	1.1%	9	0.1%	24	0.6%	13	0.2%	20
Liver Failure	0.9%	10	0.4%	13	0.7%	12	0.4%	15
Parkinson's Disease	0.1%	31	0.2%	22	0.3%	19	1.1%	10
Top 10	93.8%		93.4%		92.6%		94.0%	
Top 20	98.4%		97.1%		97.6%		98.3%	



Main Claim Causes - Female

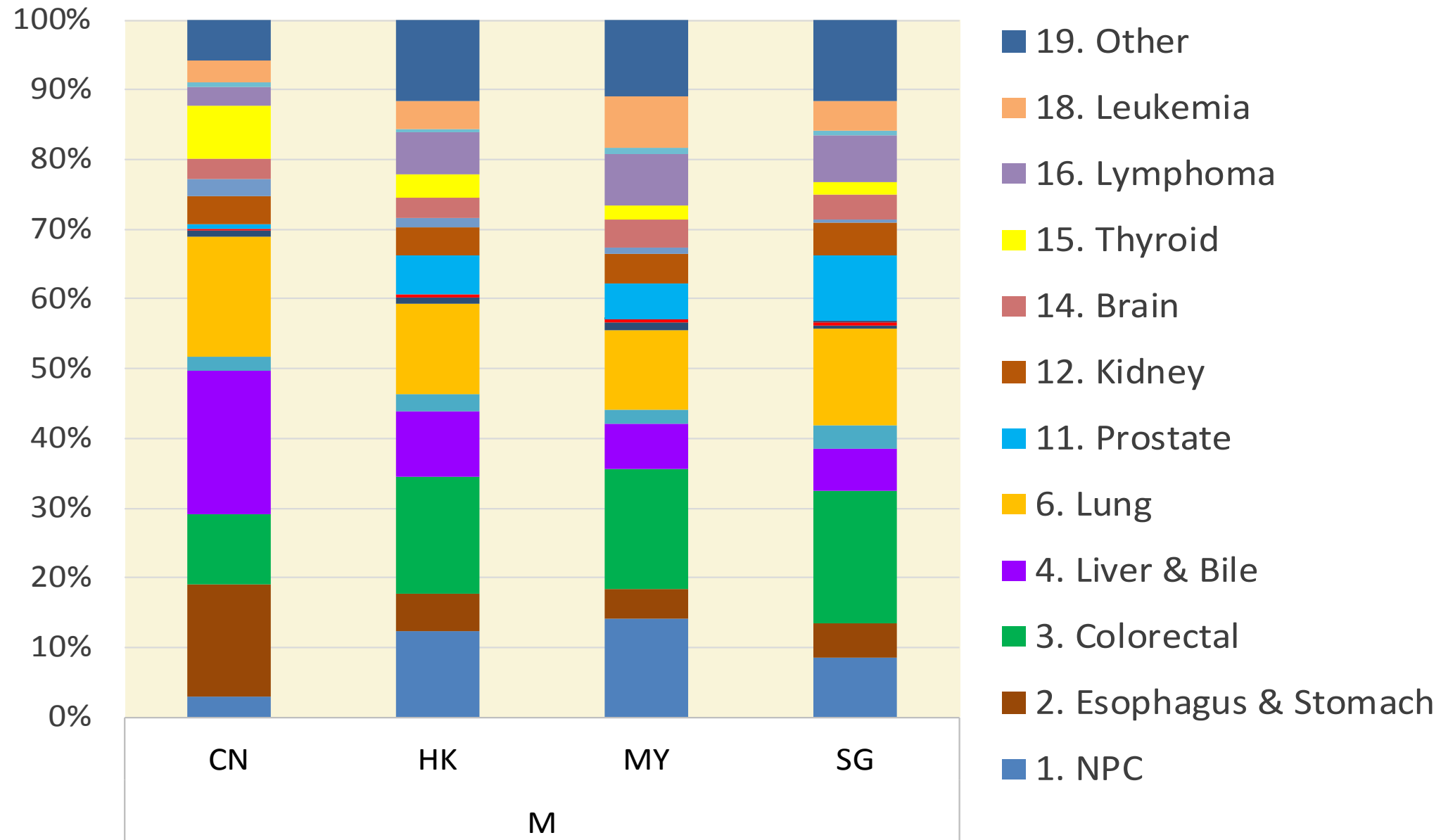
Traditional Products, All durations

	CN		HK		MY		SG	
Cancer	73.6%	1	83.4%	1	79.0%	1	82.9%	1
Stroke	7.7%	2	3.4%	2	5.3%	2	4.9%	2
Chronic Kidney Failure	2.4%	5	0.8%	8	3.4%	3	1.8%	4
Heart Attack	4.9%	3	1.1%	6	2.7%	4	3.5%	3
CIS of Breast	0.1%	24	2.0%	3	0.0%	61	0.0%	31
Accidental Death	2.5%	4	0.5%	9	2.6%	5	1.0%	5
CIS of Cervix	0.2%	17	1.8%	4	0.0%	61	0.0%	48
Angioplasty and Related	0.0%	36	1.4%	5	0.5%	7	0.4%	12
Coronary Artery Bypass Graft	0.9%	8	0.1%	21	0.8%	6	0.3%	13
Heart Valve Surgery	0.7%	9	0.4%	11	0.4%	10	0.6%	6
Sudden Death	1.1%	6	0.0%	49	0.0%	39	0.0%	48
Other Serious Artery Disease	0.0%	39	0.3%	14	0.5%	7	0.4%	11
Possible Suicide	0.9%	7	0.1%	23	0.4%	11	0.1%	17
Parkinson's Disease	0.1%	29	0.1%	25	0.3%	14	0.6%	7
Suicide	0.5%	11	1.0%	7	0.2%	17	0.5%	10
Top 10	95.3%		95.9%		95.6%		96.8%	
Top 20	98.4%		98.2%		98.1%		99.0%	



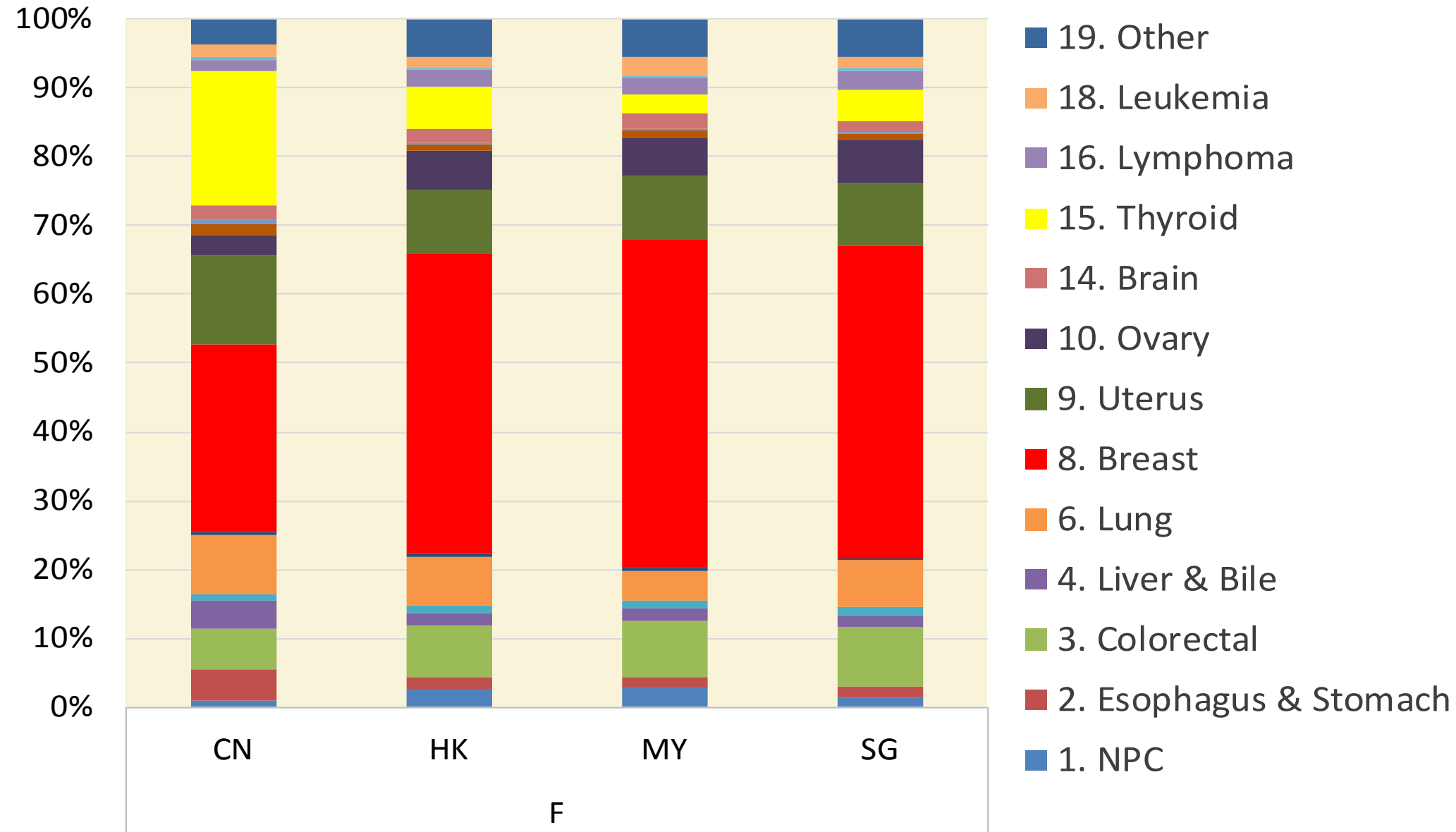
Distribution of Cancer Sites - Male

Traditional Products, All durations



Distribution of Cancer Sites - Female

Traditional Products, All durations



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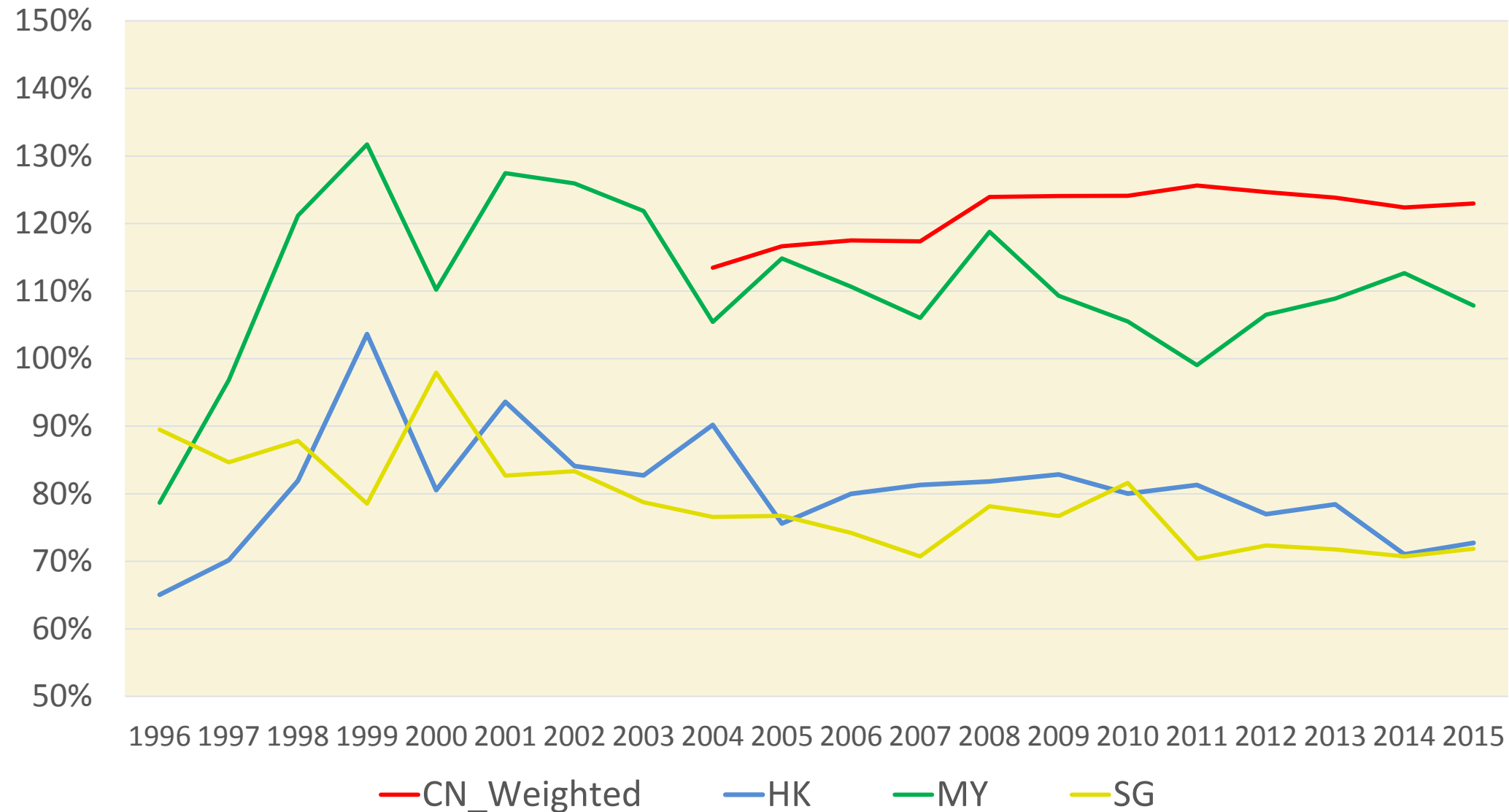
Methodology

- Include all claims for
 - Standard lives
 - Acceleration type Traditional DD products
- Both DD claims and death claims due to the disease are used when calculate incidence rates for individual disease
- Rates are age-standardized using the age structure of insured lives
- Duration 2+ rates are used, unless otherwise shown
- Actual over Expected Ratios (A/E)
 - Number of actual claims divided by number of expected claims
 - Expected claims are calculated using the graduated incidence rates of Death with Acceleration DD for Hong Kong, Malaysia and Singapore from the DD survey 2000-2004
 - Age 20-59
 - Incidence rates are rates per 1,000



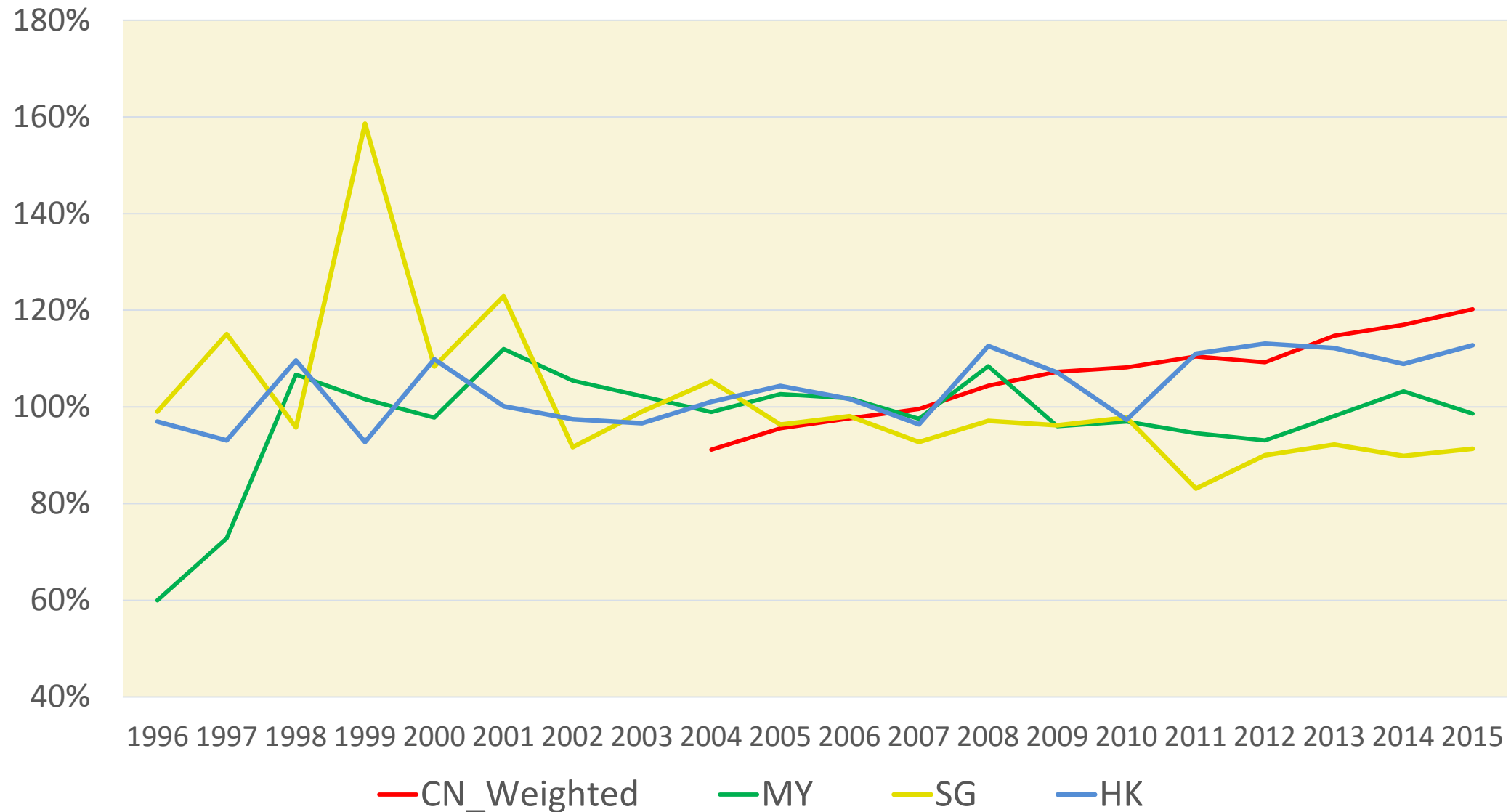
A/E Ratios by Calendar Year - Male

Traditional/Acceleration/Attained Age 20–59/Standard



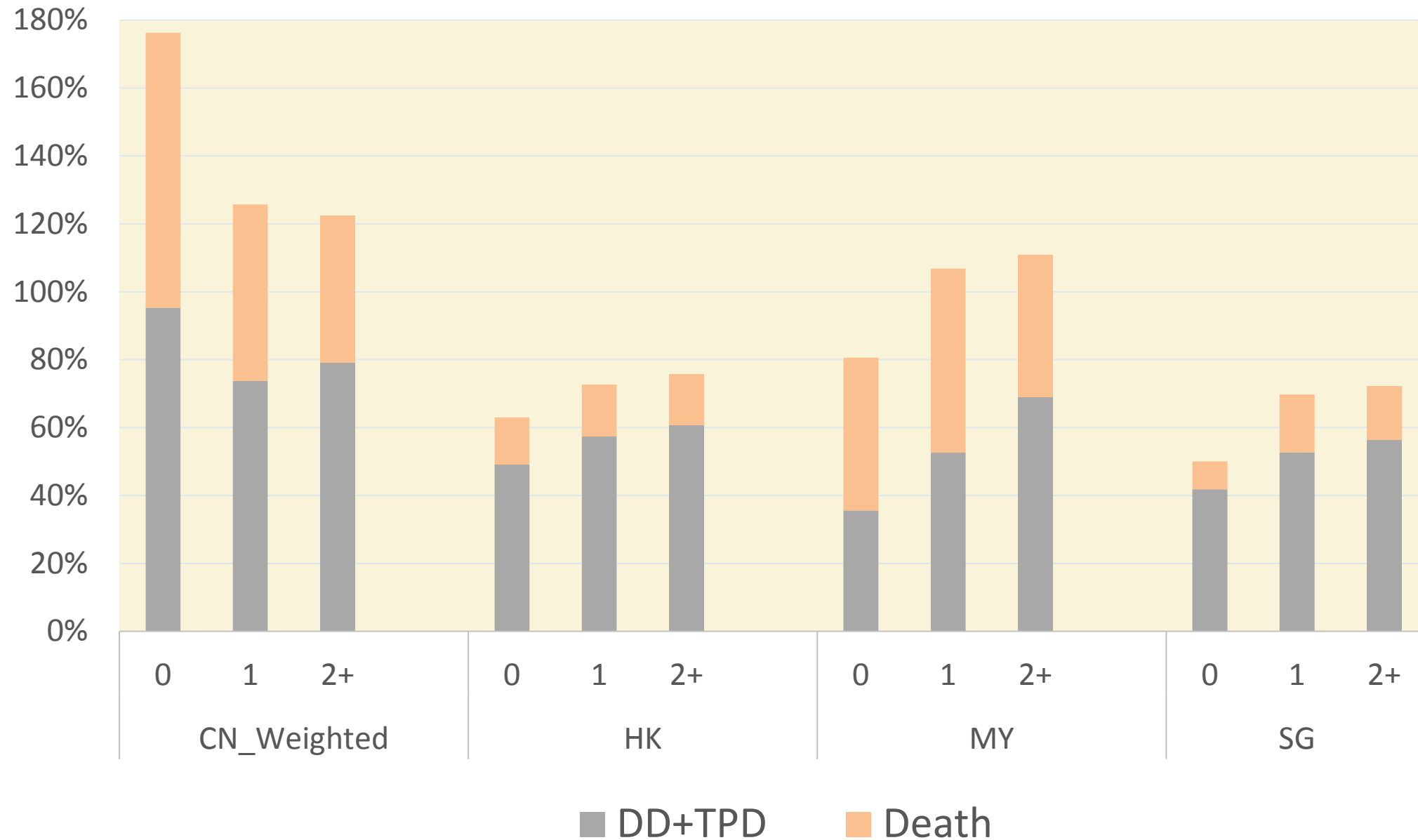
A/E Ratios by Calendar Year - Female

Traditional/Acceleration/Attained Age 20–59/Standard



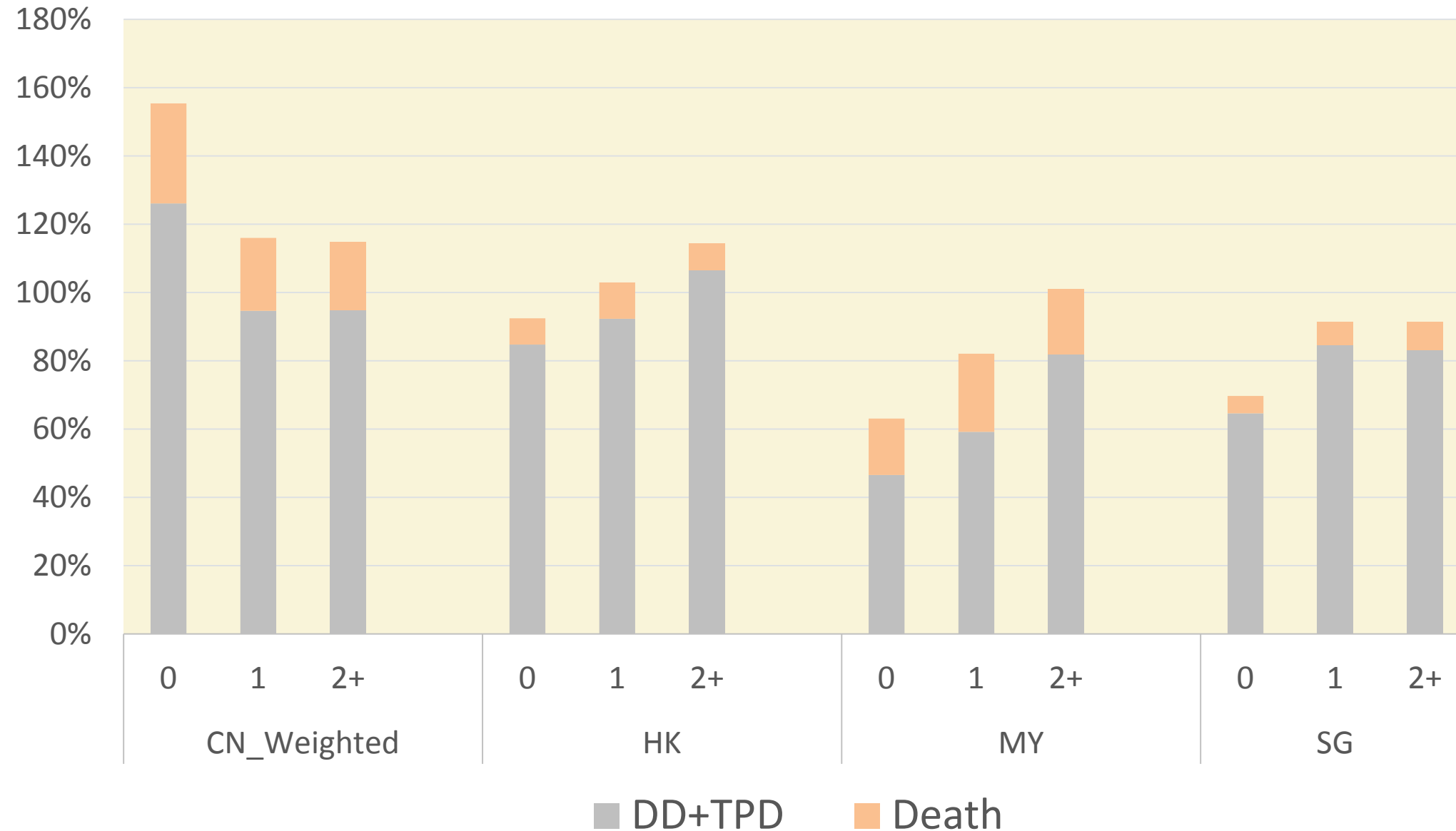
A/E Ratios by Duration - Male

Traditional/Acceleration/Attained Age 20–59/Standard



A/E Ratios by Duration - Female

Traditional/Acceleration/Attained Age 20–59/Standard



Individual Companies A/E Ratios - Comparison

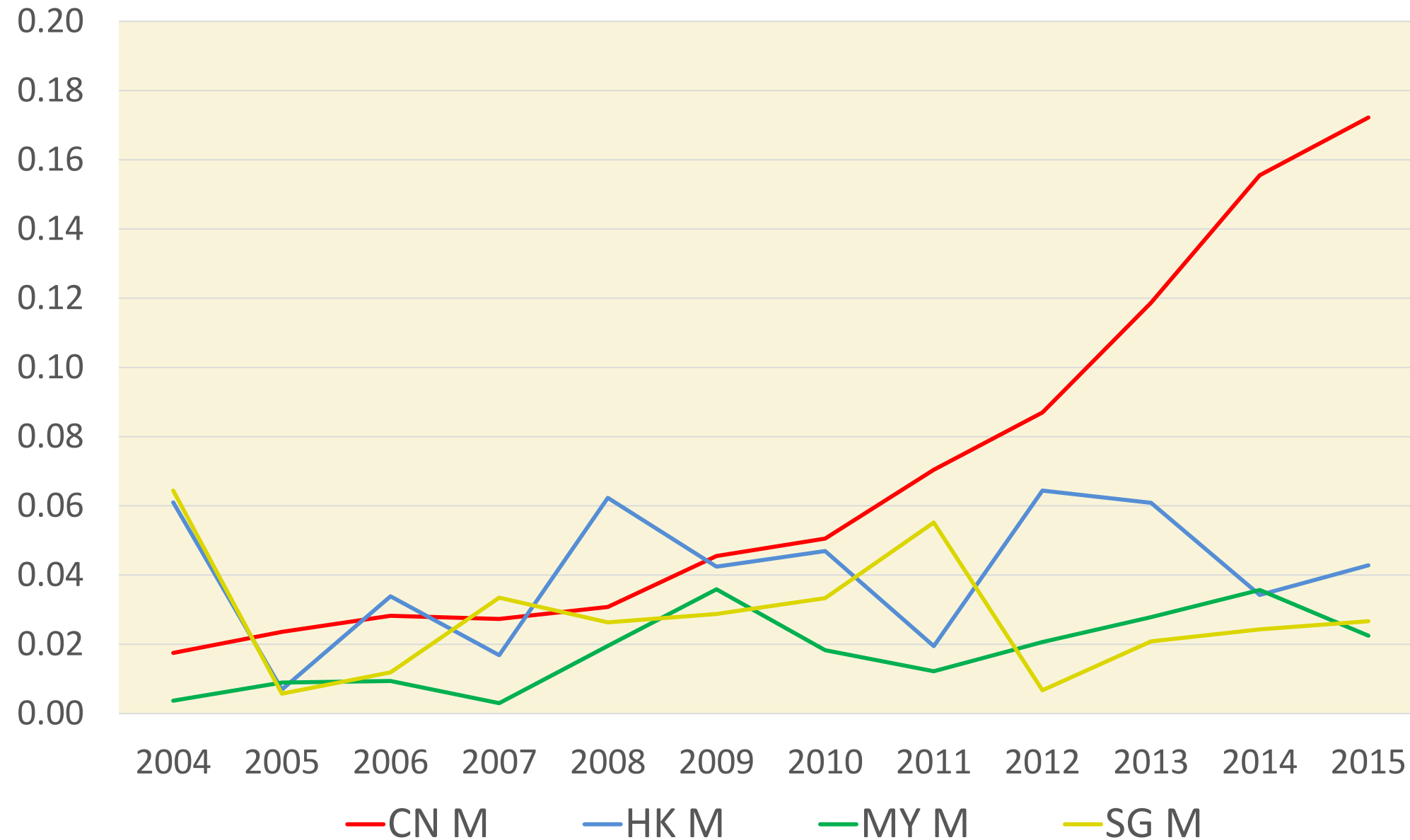
Acceleration/Traditional/Attained Age 20–59/Standard/Duration 2+

		Max	Min	Max/Min
China	Males	136%	83%	1.64x
	Females	157%	102%	1.54x
HK	Males	112%	69%	1.62x
	Females	136%	105%	1.30x
Malaysia	Males	129%	77%	1.68x
	Females	111%	80%	1.40x
Singapore	Males	129%	77%	1.68x
	Females	101%	64%	1.58x



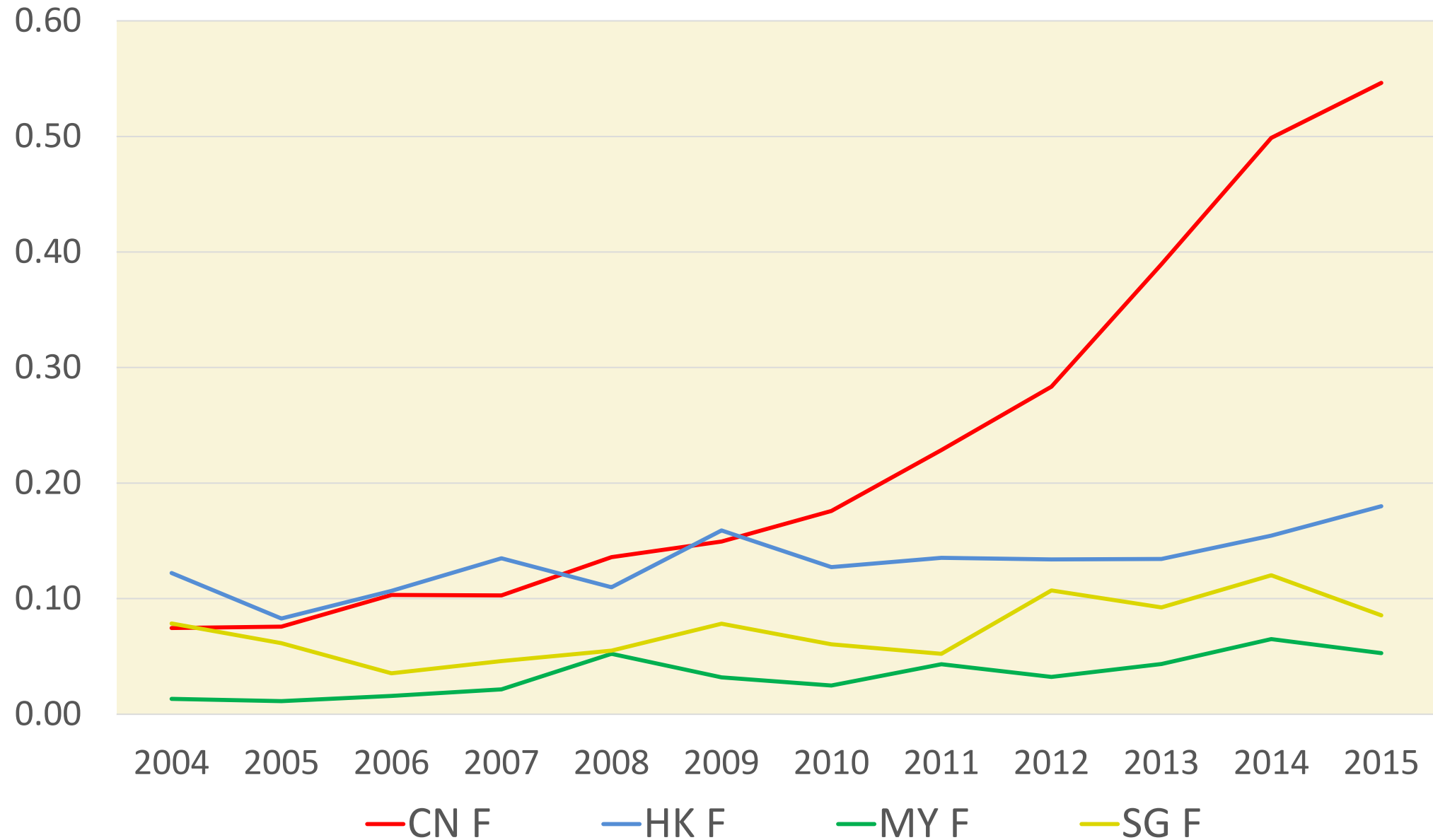
Trend - Thyroid Cancer (Males)

Acceleration/Traditional/Attained Age 20–59/Standard/Duration 2+



Trend - Thyroid Cancer (Females)

Acceleration/Traditional/Attained Age 20–59/Standard/Duration 2+

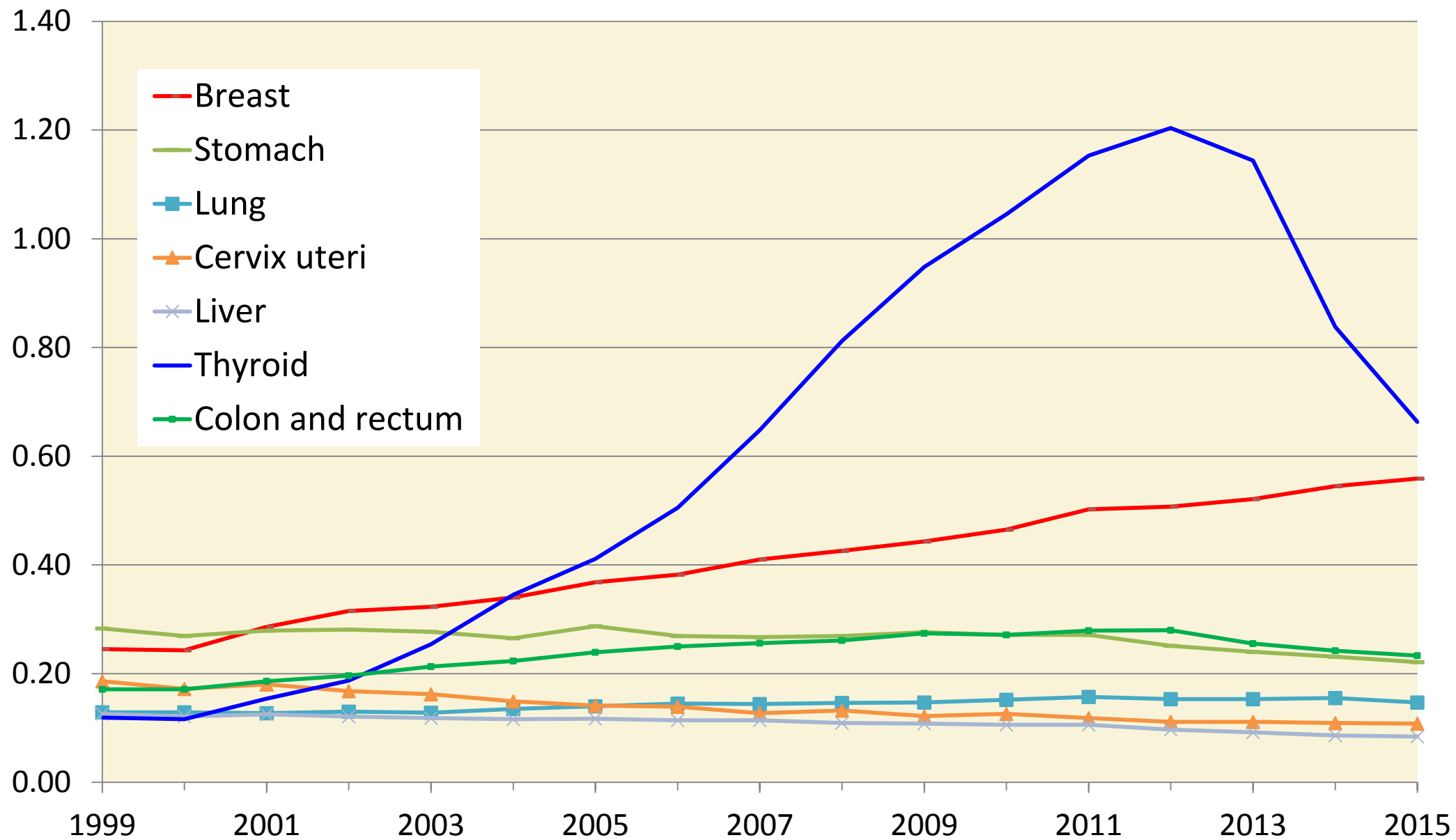


Some Background On Thyroid Cancer

- Thyroid cancer is divided into four types:
 - papillary (85%)
 - follicular (11%)
 - medullary (3%)
 - anaplastic (1%)
- Anaplastic thyroid cancer is associated with the worst prognosis, with most patients dying within a year of diagnosis
- In contrast: papillary cancers have excellent prognosis, especially in patients with nodules <20 mm in diameter (T1 in TNM staging) : 99% of these patients will be alive at 20 years



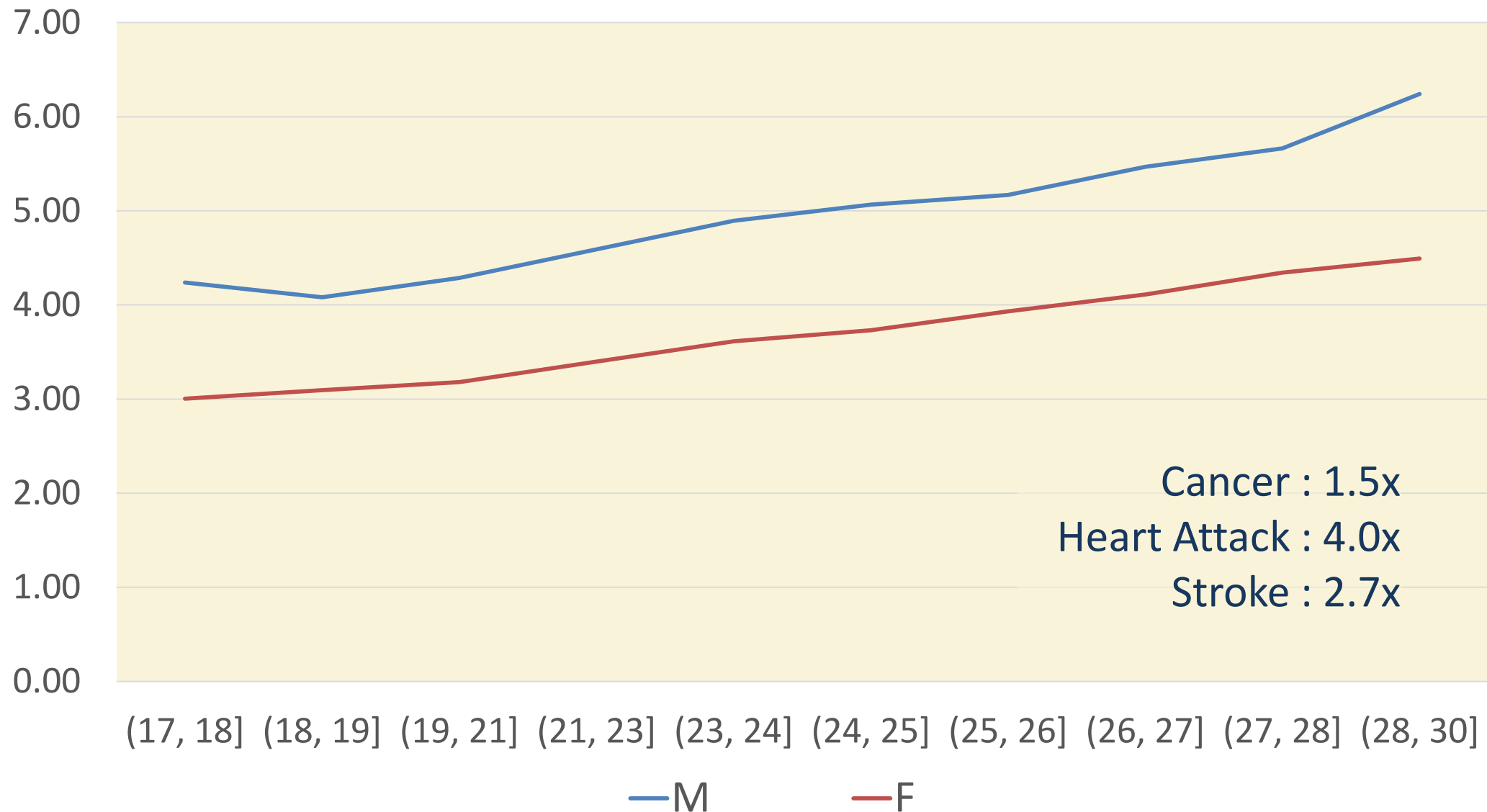
Age Standardised Cancer Rates - Korean Population (Females)



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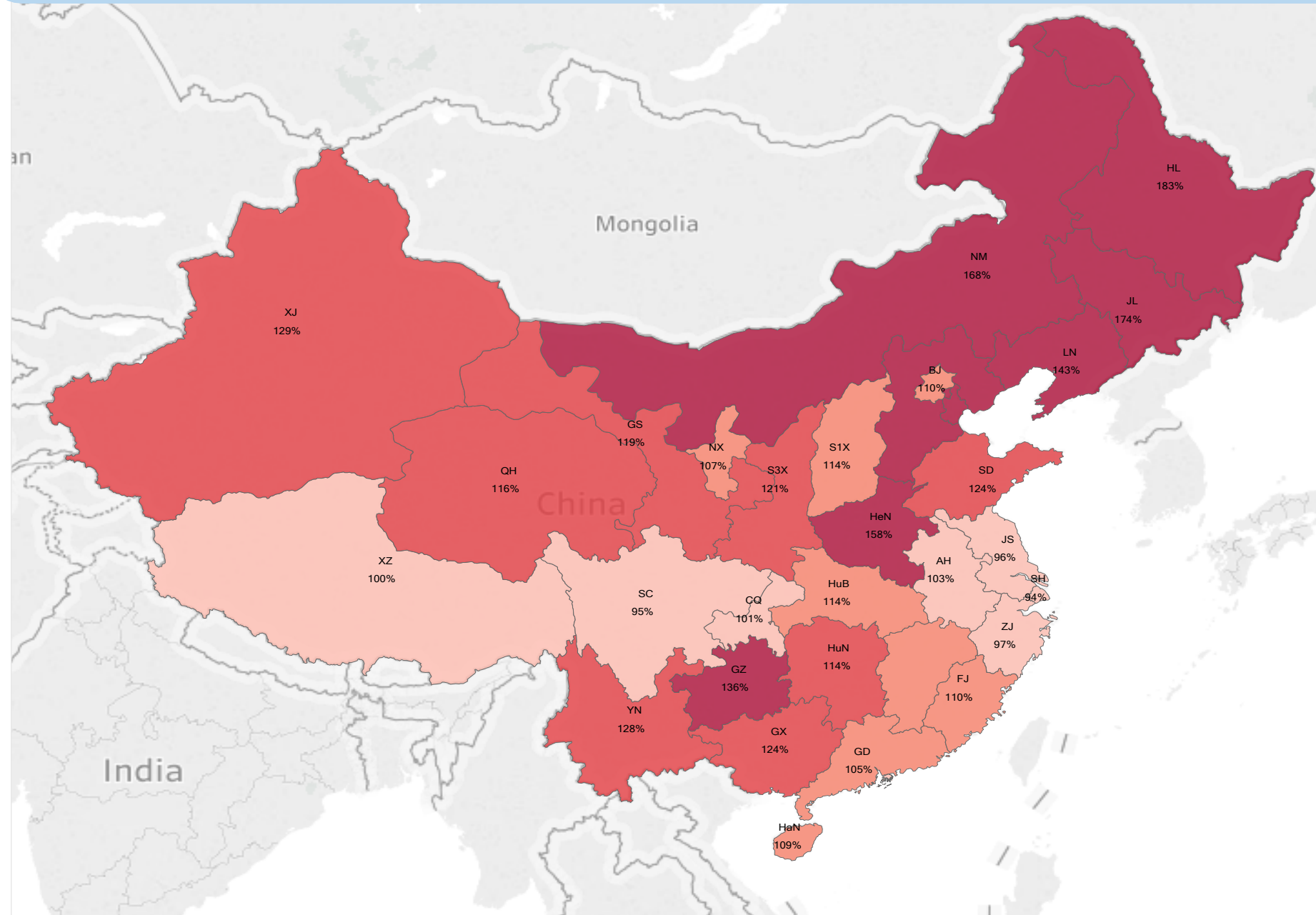
Incidence Rate by BMI Band – China, All Causes

Acceleration/Traditional/Attained Age 20–59/Standard/Duration 2+



CN Regional Difference - A/E Ratio, All Causes, Male

Acceleration/Traditional/Attained Age 20–59/Standard/Duration 2+



Top 3

HL 183%
JL 174%
NM 168%

Bottom 3

SC 95%
SH 94%
HK 76%

Ratio=197%



CN Regional Difference - A/E Ratio, All Causes, Female

Acceleration/Traditional/Attained Age 20–59/Standard/Duration 2+



Top 3

JL 161%
HL 155%
NM 136%

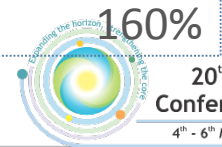
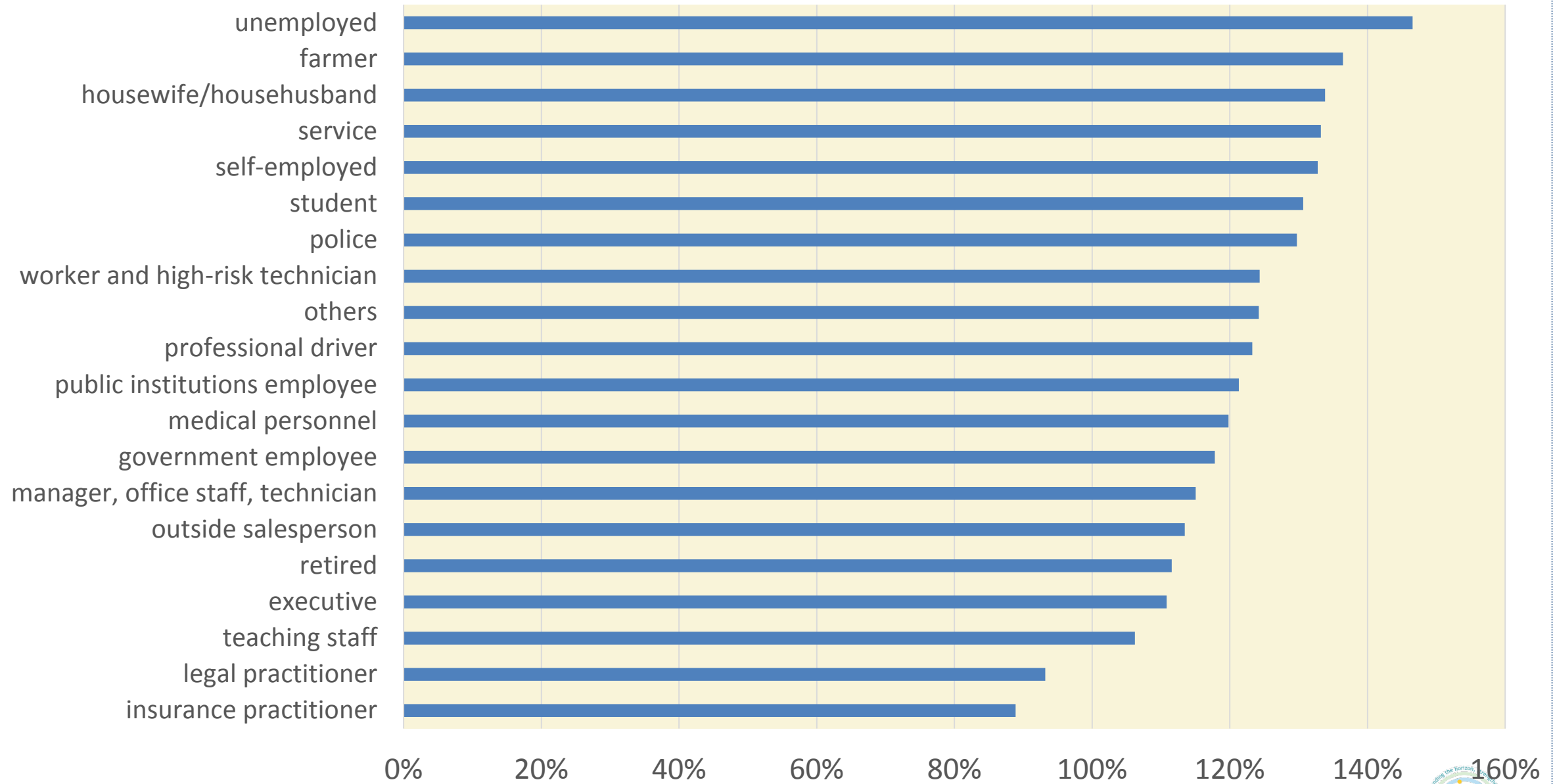
Bottom 3

CQ 90%
SC 89%
QH 88%

Ratio=169%

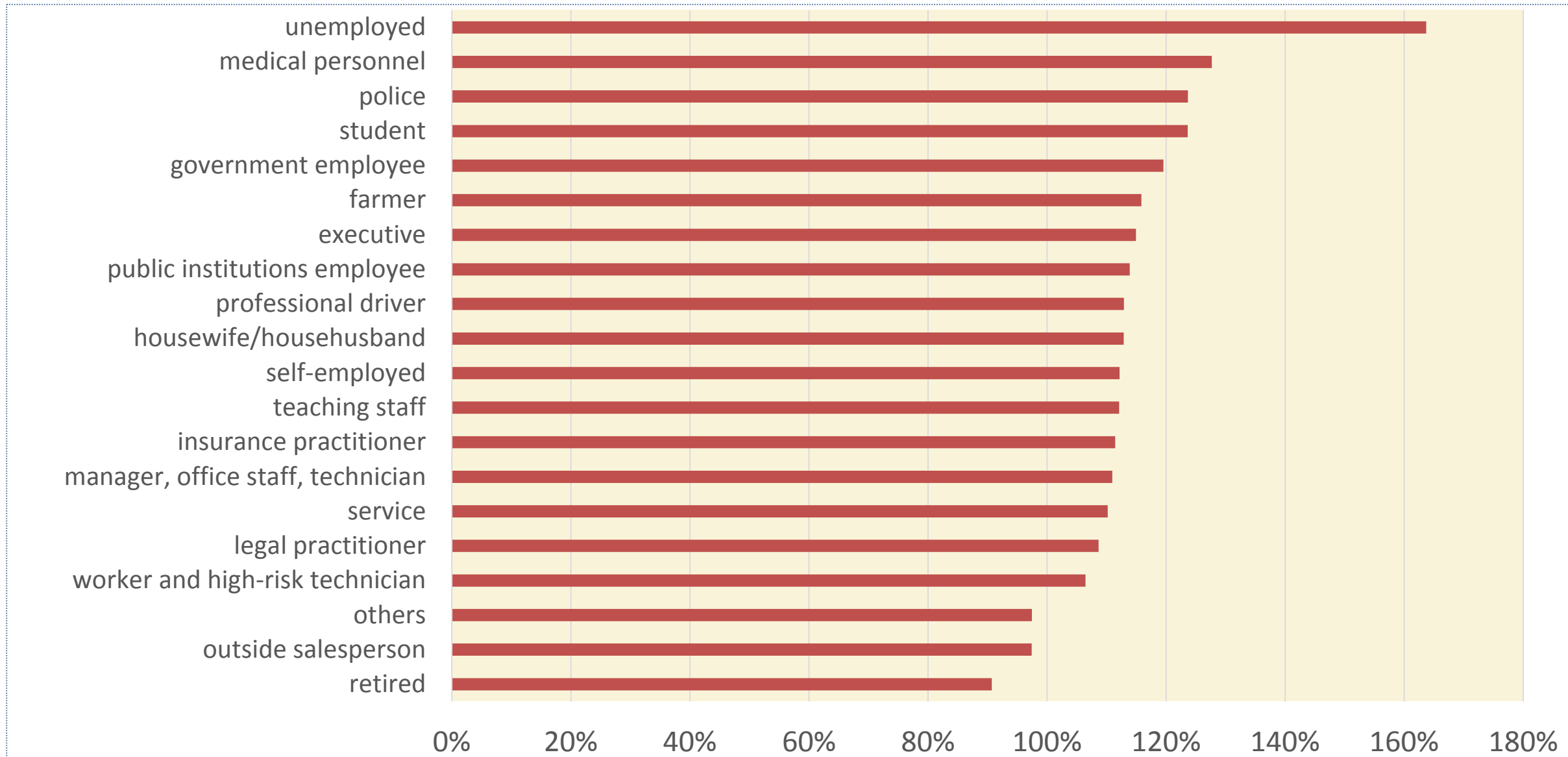
A/E Ratios by Occupation - China, Male)

Acceleration/Traditional/Attained Age 20–59/Standard/Duration 2+



A/E Ratios by Occupation - China, Female

Acceleration/Traditional/Attained Age 20–59/Standard/Duration 2+



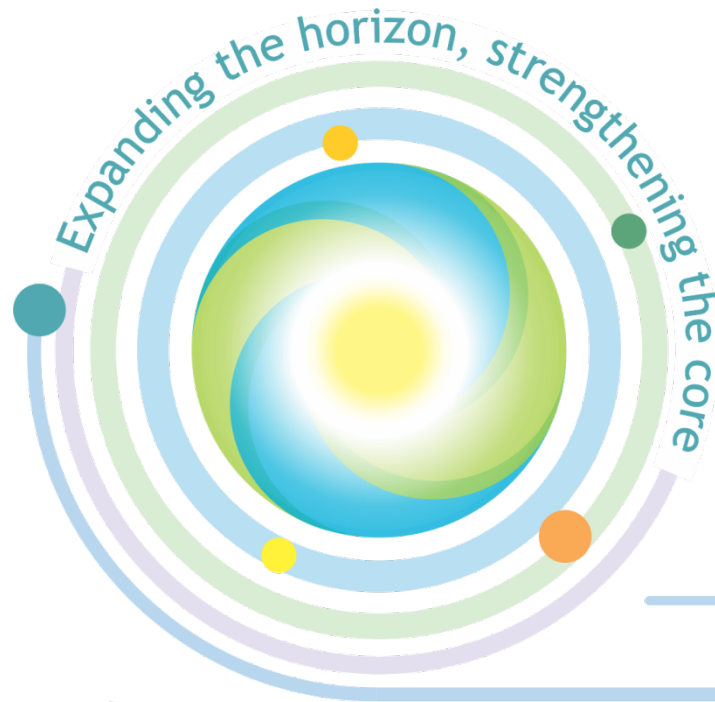
Final Thoughts

1. Critical illness claims are affected not just by underlying incidence rates but also by advances in screening and diagnostic technology and customer behaviour (e.g. thyroid cancer)
2. Within a given market, different companies can still have very different experience. But the reasons can be more complicated than simply the socio-economic group they are targeting.
3. Danger of anti-selection if you cannot / don't want to investigate non-disclosure in early claims (Poor first year experience in China vs other markets)
4. Even within a homogenous population, there can be very different experience from different regions (China)





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THANK YOU

Date or any extra text highlight