

5th Webinar on Life Insurance

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Insights into the Critical Illness Study 2013-19

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Agenda

- Background
- Key Highlights
- Data Snapshot
- Scope and Definitions
- Lag in Claims Reporting
- Graduation
- Comparisons
- Summary

Background



- Professional Collaboration Agreement between IIB, L I Council and IAI enabled industry level mortality and morbidity investigations, with strong support from IRDAI
- AORC (Actuarial Oversight and Review Committee) formed under this Agreement comprises of three actuaries nominated by IAI and two actuaries nominated by L I Council
- While there have been many mortality studies on the assured/annuitant lives, this was the **first time** an attempt was made to study the incidence of morbidity in the **life insurance portfolio** in India.
- The focus of the investigation is on the incidence of Critical Illness (CI) benefits offered by the life insurance companies.

Key Highlights



- Period of Investigation - 2013-2019
- Major CI's covered - I) Heart Attack II) Cancer III) Coronary Artery Bypass Surgery (CABG) IV) Renal Failure V) Stroke and VI) Major Organ Transplant (MOT)
- Includes both Base products and riders (including disease-specific) products.
- Graduation of crude rates has been attempted for all the critical illnesses but was not pursued for some of the categories as they did not pass the statistical tests.
- No separate analysis done for smoker/non-smoker categories & accelerated & additional riders due to inadequate data.
- Though life insurance industry has been selling these benefits for last two decades, the inadequacy of relevant data is a major challenge

Data Snapshot -(1/3)

Critical Illness	No. of Claims	Exposed to Risk(In Years)
Heart Attack	2,353	5,007,032
Cancer	1,783	5,388,837
CABG	687	4,862,436
Renal Failure	531	4,540,705
Stroke	397	4,957,716
Major Organ Transplant (MOT)	105	4,647,626

Data-(2/3)

Base Product / Rider	Exposed to Risk Life Years (%)		No of Claims (%)	
	Base Product	Rider	Base Product	Rider
Heart Attack	20.30%	79.70%	33.50%	66.50%
Cancer	25.70%	74.30%	46.00%	54.00%
CABG	20.00%	80.00%	38.40%	61.60%
Renal Failure	21.20%	78.80%	39.50%	60.50%
Stroke	19.70%	80.30%	30.20%	69.80%
MOT	20.90%	79.10%	25.70%	74.30%

While base products only account for ~20% of the overall exposure, they account for over ~35% in claims

Gender Mix	Exposed to Risk Life Years (%)		No of Claims (%)	
	Base Product	Rider	Base Product	Rider
Heart Attack	76.3%/23.7%	77.6%/22.4%	86.5%/13.5%	88.8%/11.2%
Cancer	74.2%/25.8%	77.3%/22.7%	57%/43%	65.4%/34.6%
CABG	76.2%/23.8%	77.3%/22.7%	89.8%/10.2%	90.1%/9.9%
Renal Failure	76.5%/23.5%	76.8%/23.2%	83.8%/16.2%	81%/19%
Stroke	76.5%/23.5%	77.5%/22.5%	75.8%/24.2%	77.3%/22.7%
MOT	76.6%/23.4%	76.7%/23.3%	74.1%/25.9%	84.6%/15.4%

Male Lives are affected by Cardiovascular diseases (HA, CABG) while Female lives have higher incidence of Cancer

Data-(3/3)

- Validation Checks
 - Validation checks built into the validation program to ensure that every data field of every submitted record is mapped correctly to IIB formats & Drop-downs/Masters
 - Data Field Type, length, missing values etc. checked by the program for correctness
 - Invalid data returned to Insurers for resubmission post rectification
- Statistical/Consistency Checks
 - Statistical checks were performed to ensure the consistency of data across all years.
 - Product UIN wise number of policies and claims were collected from most of AA's to reconcile the data and completeness.
 - Identified the gap between policy data and product master and rectified at insurer level
- Reconciliation
 - Number of Records reconciled with published numbers etc. to ensure completeness of data
 - Insurers' confirmations obtained to the effect

Scope and Definitions



- Period of Investigation of 2013-19 decided basis the claims reporting lag analysis.
- Study is by number of policies. It is possible that a life could have been owning more than one policy.
- Age means Age Last Birthday
- Exposure year means the period for which a member was counted during the Period of Investigation depending on the date of entry into the investigation and date of exit including exit by death
- When a policy or a rider covers multiple illnesses, the same is exposed to risk concurrently for all the covered illnesses and therefore it is included for exposure for each of the illnesses. The waiting period is excluded while calculating exposure.
- All claims are included in the study (including rejected and repudiated)

Lag in Claims Reporting

- Claims reported up to 17 January 2022
- Reporting pattern
 - 93.4% of claims reported within the first year of incidence
 - 97.9% of claims reported within two years of incidence
 - 99.1% of claims reported within three years of incidence

Claims haven't been adjusted for IBNR

Graduation

- Used modified Helligman-Pollard method for graduation
- Various statistical tests performed for assessing goodness of fit, smoothness and heterogeneity
- Formula used *for graduation* $ix = AB^x + \frac{FG^{xH}}{1+FG^{xH}} + Le^{xM}$
- Graduation has been attempted for all 6 CI' s but had to be dropped for some due to data inadequate and completed for following combinations:
 - Heart Attack - Base Product- Male- age - 32-60
 - Heart Attack -Rider- Male- age- 32-60
 - Cancer Rider - Male- age- 30-60
 - CABG Base Product Male - age- 38-61
 - CABG Rider- Male- age- 35-54

Investigation of Select Effect

- A duration-wise analysis of morbidity rates was done for 0, 1, 2, 3, 4, 5, and 6& above durations for Base Product and Rider as well.

Duration	Heart Attack		Cancer		CABG		Renal Failure		Stroke		MOT	
	Base Product	Rider	Base Product	Rider	Base Product	Rider	Base Product	Rider	Base Product	Rider	Base Product	Rider
0	0.84	0.32	0.64	0.21	0.25	0.09	0.33	0.15	0.10	0.06	0.02	0.02
1	0.68	0.33	0.64	0.20	0.22	0.08	0.21	0.10	0.07	0.06	0.03	0.03
2	0.46	0.37	0.51	0.15	0.37	0.09	0.13	0.06	0.06	0.05	0.03	0.01
3	0.49	0.38	0.39	0.19	0.32	0.09	0.15	0.08	0.08	0.07	0.02	0.02
4	0.71	0.41	0.17	0.23	0.15	0.11	0.13	0.08	0.13	0.08	0.00	0.01
5	0.65	0.32	0.43	0.25	0.16	0.12	0.23	0.08	0.13	0.07	0.02	0.02
6 & Over	0.98	0.44	0.64	0.29	0.33	0.13	0.18	0.08	0.19	0.08	0.04	0.02
All Durations	0.78	0.39	0.59	0.24	0.27	0.11	0.22	0.09	0.12	0.07	0.03	0.02

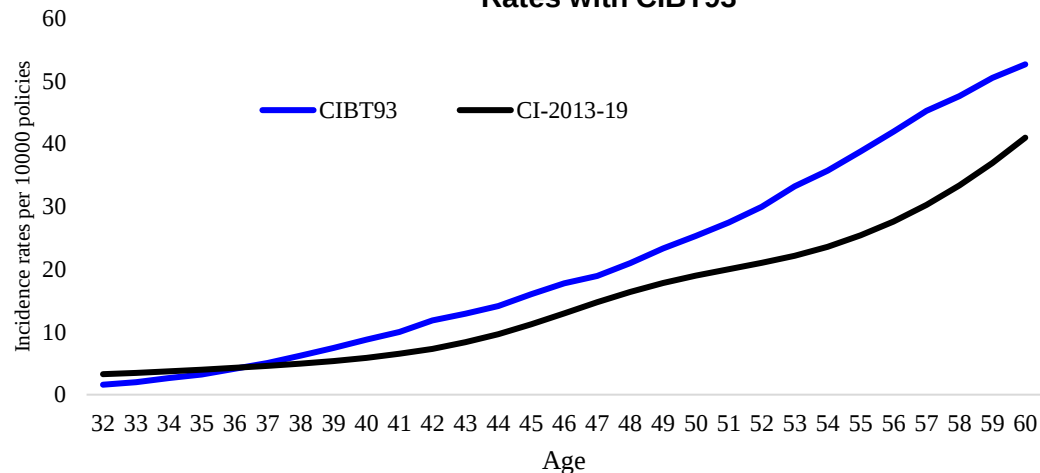
No clear trend could be established for all illnesses due to the lack of credible data.

Hence, the morbidity rates published are for all durations combined

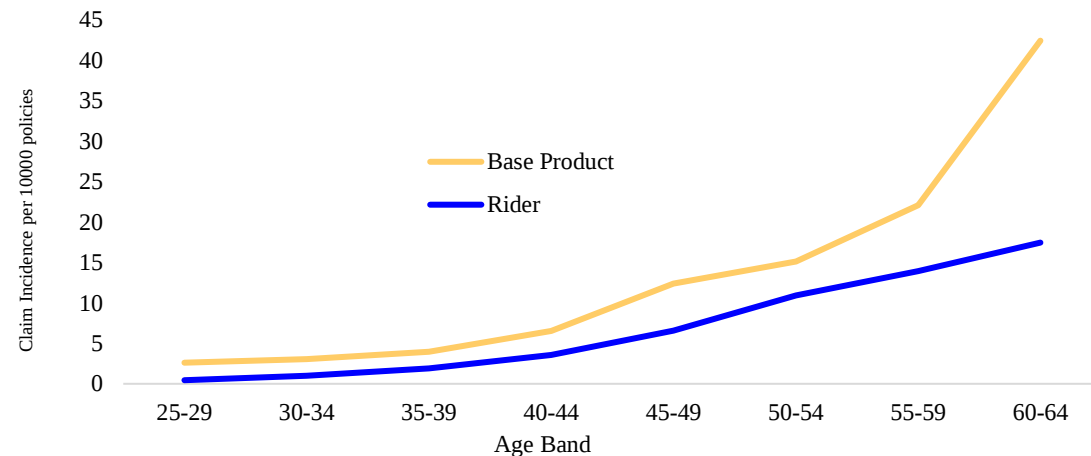
Comparison of Heart Attack rates



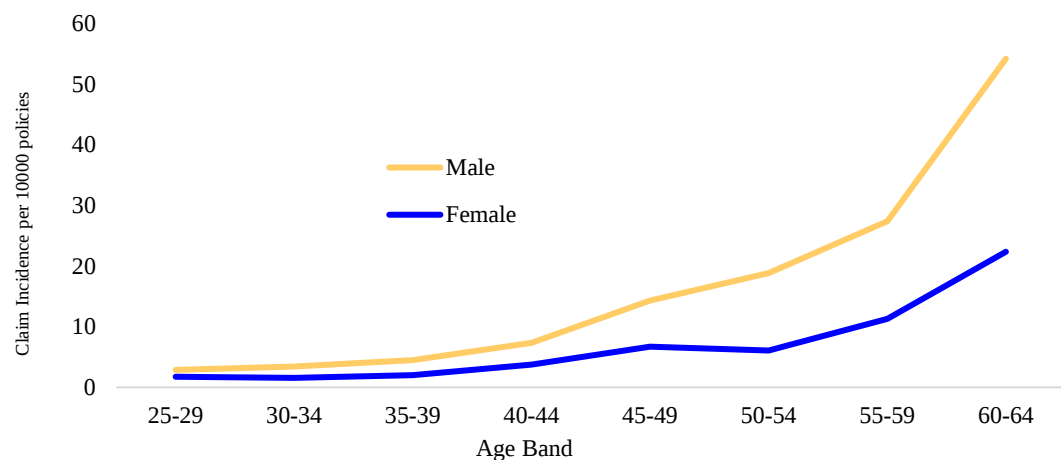
Heart Attack - Male - Base Product - Comparison of 2013-19 Rates with CIBT93



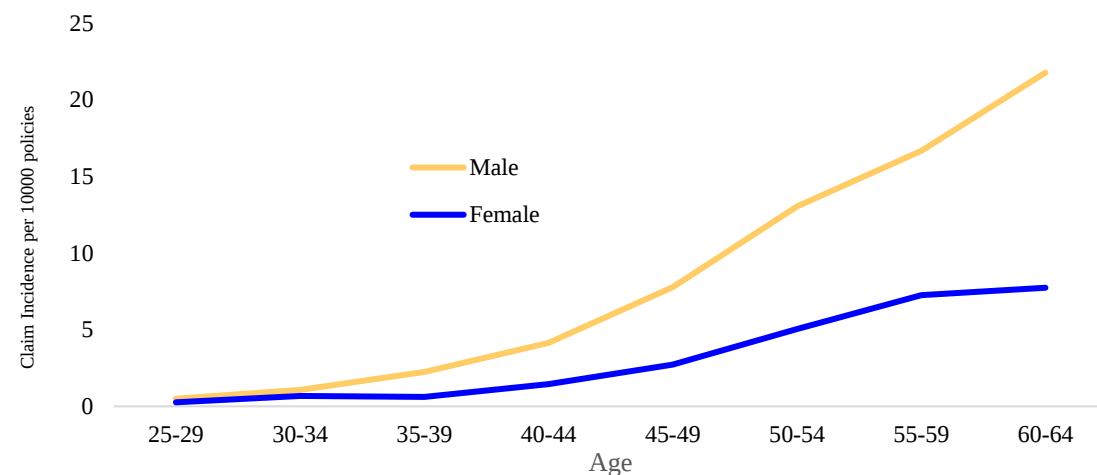
Heart Attack - Base Product Vs Rider - 2013-19



Heart Attack - Base Product - Male Vs. Female - 2013-19



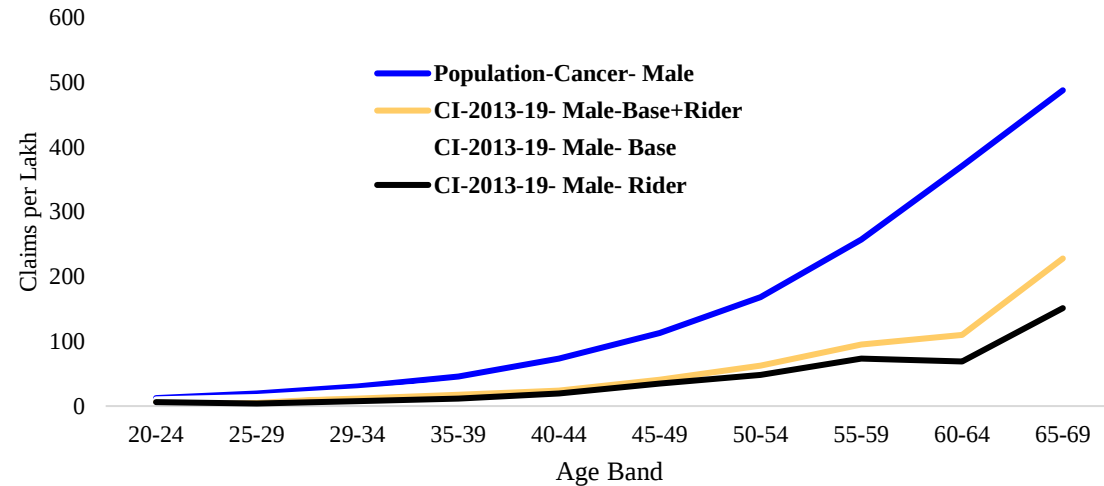
Heart Attack - Rider - Male Vs. Female - 2013-19



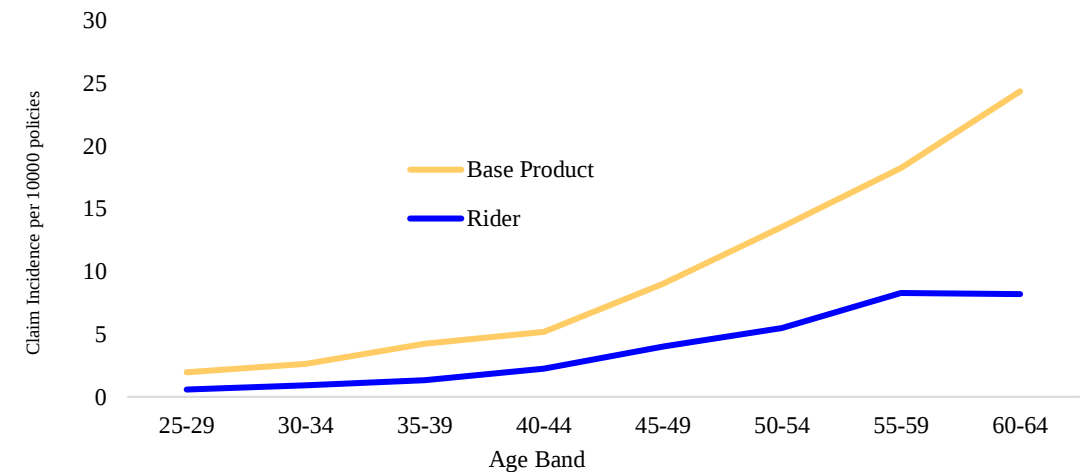
Comparison of Cancer rates



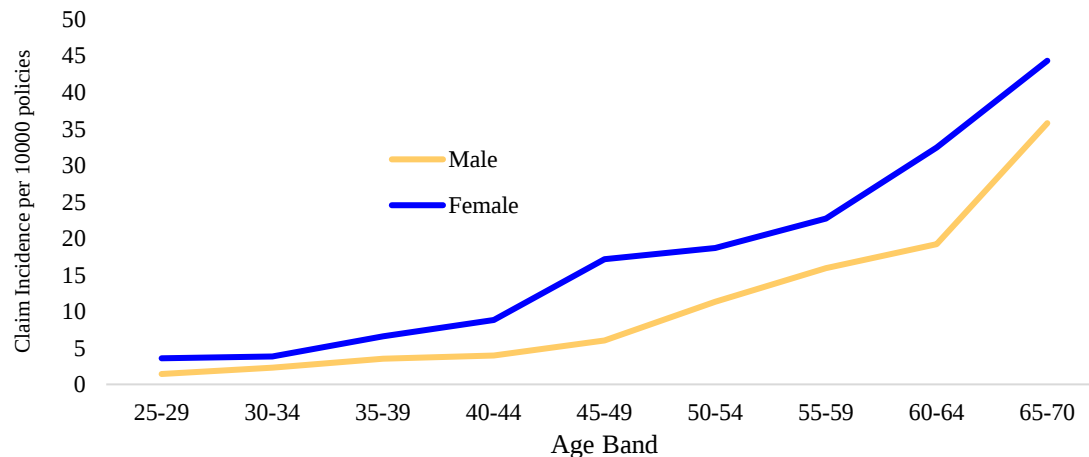
Cancer - Male - 2013-19 Vs Cancer - Male - Population - 2020



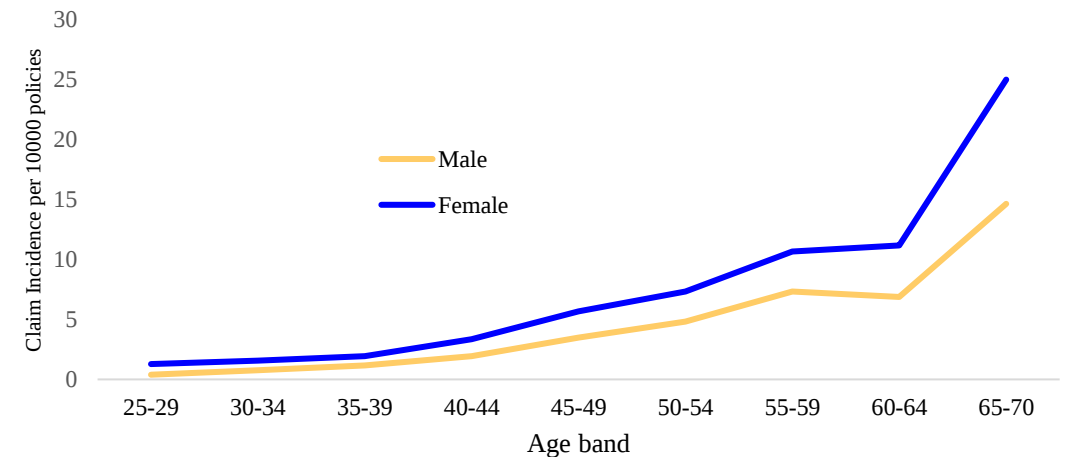
Cancer - Base Product Vs Rider - 2013-19



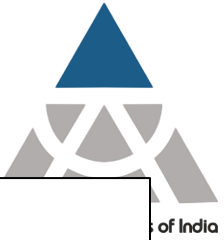
Cancer - Base Product - Male Vs Female - 2013-19



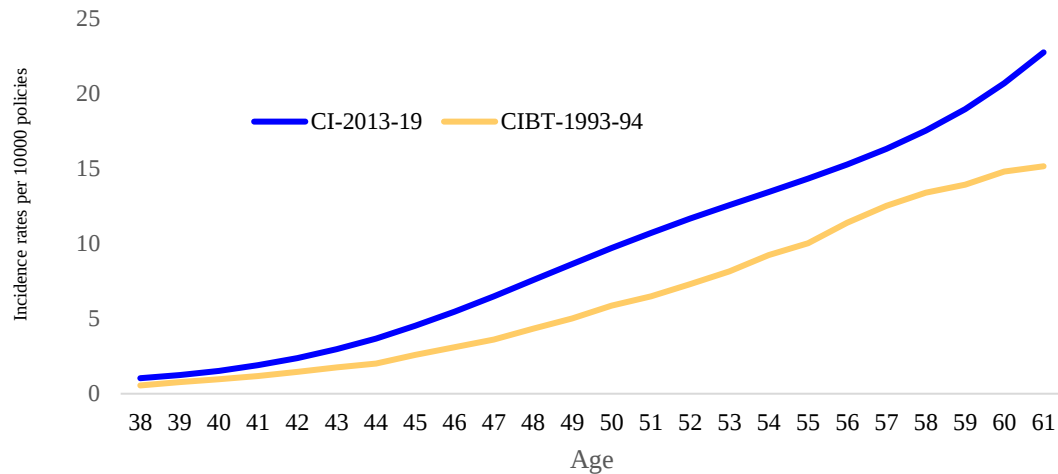
Cancer Rider - Male Vs Female - 2013-19



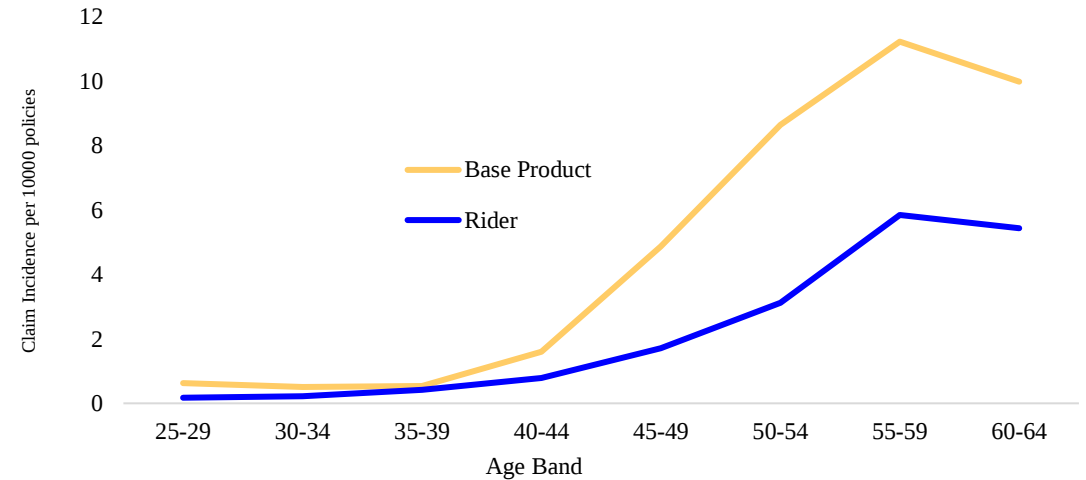
Comparison of CABG rates



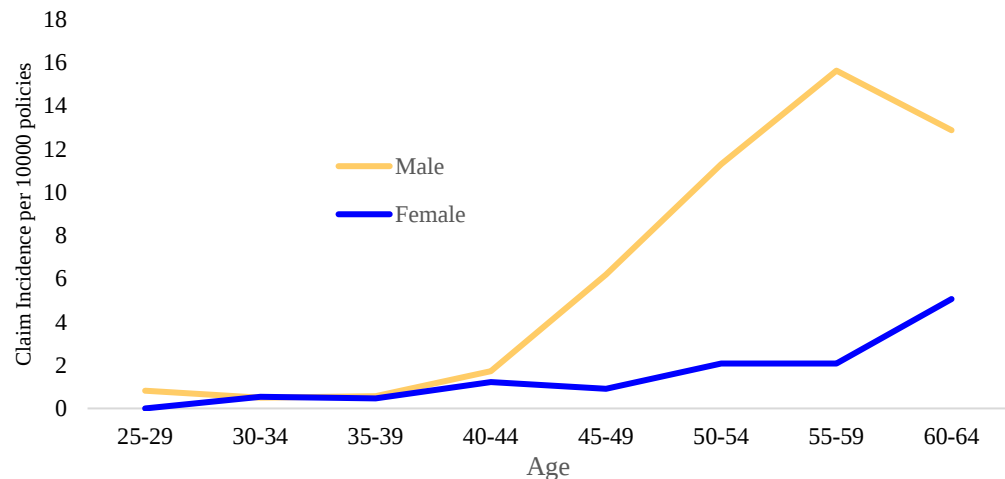
Comparison of CABG Male Base Product with CIBT93



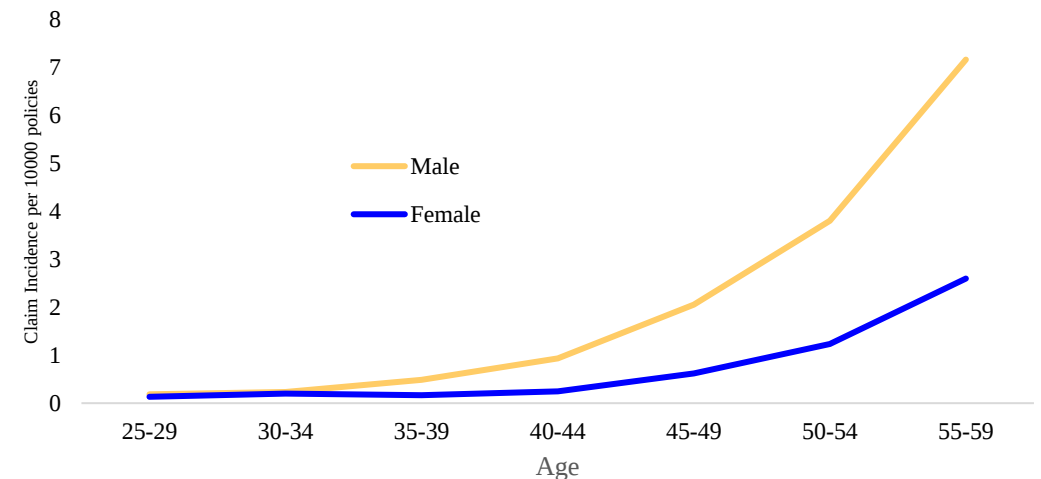
CABG - Base Product Vs Rider - 2013-19



CABG - Base Product - Male Vs Female - 2013-19



CABG - Rider - Male Vs Female - 2013-19



Crude Incidence Rates for other 3 CId

Crude Morbidity rates per 10000									
	Renal Failure				Stroke				MOT
Age	Male Base	Female Base	Male Rider	Female Rider	Male Base	Female Base	Male Rider	Female Rider	Male Base
30	4.99	0.00	0.37	0.00	0.00	0.00	0.42	0.00	0.00
35	1.24	0.00	0.25	0.94	0.31	1.17	0.22	0.29	0.00
40	0.66	1.20	0.42	0.61	0.97	0.00	0.45	0.57	0.00
45	1.77	6.98	0.44	1.43	1.73	0.00	1.01	0.00	1.30
50	4.11	1.84	1.35	0.48	4.00	3.62	1.58	2.75	0.00
55	6.20	2.66	2.30	1.69	1.20	2.62	3.40	2.38	0.00
60	6.58	0.00	6.19	2.81	6.37	0.00	4.48	5.02	0.00

Summary

- The data size is not large enough to support more insightful analysis by various cuts such as by duration of coverage, geographical regions, distribution channels etc.
- Analysis of data of stand-alone CI products and CI riders showed a difference in the incidence rates between the two. Reasons for the same could not be established.
- Definitions of the critical illnesses were standardized in 2013 and modified in 2016. The data covered in this report therefore could be having different definitions for the same illness.
- Comparison of the incidence rates from this study with external rates (CIBT93 and Population Cancer 2020) has to be noted in the context of different periods of investigation and possibly different definitions.

