Institute and Faculty of Actuaries

Too Much, Too Young, Too Early

Carl Padget and Gráinne Hampson
Pacific Life Re

May 2015

Too Much, Too Young, Too Early

- What can we learn about anti-selection by analysing Critical Illness claims data?
- Can we use this data to identify anti-selective Critical Illnesses?
- How can we improve our underwriting to reduce the potential to anti-select?

Too Much, Too Young, Too Early

Too Young?

- Average age at claim

Breast Cancer
Too Young?

Average age at diagnosis:

- POPULATION: 55
- CLAIMANTS: 44

Institute and Faculty of Actuaries

Bowel Cancer

Too Young?

Average age at diagnosis:

- POPULATION: 64
- CLAIMANTS: 47

Institute and Faculty of Actuaries

Too Much, Too Young, Too Early

Too Much, Too Early?

- Population vs. insured incidence
- Average claim amount by duration

Multiple Sclerosis – Proportion of all claims

Too Much?

Multiple Sclerosis incidence as a percentage of all critical illnesses:

Population vs. Insured Claims

Cancer site	Population Incidence*	Insured Claims Incidence	Difference
Multiple Sclerosis (Female)	2.0%	6.3%	+ 210%

***Incidence and prevalence of multiple sclerosis in the UK 1990–2010: a descriptive study in the General Practice Research Database**

Multiple Sclerosis - Cover Amount and Duration

Too Much, Too Early?

Condition \ Policy Duration	Average Claim Amount	Average Claim Amount vs. All Claims	0	1	2	3	4	5+
Death	53,594	94%	108%	104%	105%	87%	84%	75%
Benign Brain Tumour	73,345	129%	131%	136%	146%	125%	163%	93%
Coma	63,288	111%	107%	88%	129%	83%	107%	187%
CABG	54,121	95%	92%	110%	94%	100%	79%	94%
Heart Attack	52,445	92%	99%	100%	88%	86%	104%	81%
HVRoR	69,316	122%	196%	136%	128%	174%	97%	86%
Kidney Failure	55,848	98%	138%	92%	106%	93%	86%	88%
MOT	72,051	126%	132%	103%	125%	14%	58%	143%
MND	74,112	130%	152%	64%	79%	181%	138%	111%
Multiple Sclerosis	65,913	116%	137%	118%	132%	104%	96%	108%
Stroke	55,285	97%	114%	93%	85%	113%	90%	89%
TPD	50,685	89%	95%	132%	72%	85%	95%	84%

Testicular Cancer – Proportion by Cancer Type

Too Much?

Cancer incidence as a percentage of all cancers:

Population vs. Insured Claims

Cancer site	Population Incidence	Insured Claims Incidence	Difference
Breast	37.8%	54.6%	+44%
Testicular	0.8%	13.0%	+1525%
Malignant Melanoma (Males)	4.3%	7.8%	+81%
Leukaemia (Males)	2.7%	6.5%	140%
Hodgkin's Disease (Male/Female)	0.5% / 0.3%	5.7% / 2.9%	+ 1040% / 867%
Brain Tumour (Males)	1.8%	3.4%	+89%

Testicular Cancer - Cover Amount and Duration

Too Much, Too Early?

Cancer Type \ Policy Duration	Average Claim Amount	Average Claim Amount vs. All Claims	0	1	2	3	4	5+
Colon	58,504	94%	130%	95%	132%	87%	76%	94%
Melanoma of skin	74,875	121%	135%	183%	117%	115%	103%	118%
Prostate	58,917	95%	157%	106%	101%	105%	79%	106%
Site not specified	75,457	122%	136%	133%	130%	125%	101%	151%
Testis	75,724	122%	148%	142%	125%	158%	97%	113%
Trachea, bronchus and lung	41,495	67%	110%	80%	44%	81%	53%	68%
Other	61,725	100%	127%	136%	108%	106%	90%	89%
Unknown	54,981	89%	120%	104%	102%	96%	81%	81%

Testicular Cancer - Average Claim Amount

Too Much, Too Early?

Average claim: £57,000

Average testicular cancer claim: £75,000

Average testicular cancer claim PY1: £84,000

Institute and Faculty of Actuaries

Testicular Cancer – What we know

Too Much, Too Early?

Claims data points to evidence of higher than average anti-selection:

- Incidence rate 15 times that of population
- Average claim amount 122% of average Cancer claim
- Highest claim amounts for early duration claims

Potential for anti-selection:

- What are the potential risk factors?
- Can these risk factors be mitigated better?

Institute and Faculty of Actuaries

Testicular Cancer – Risk Factors

Too Much, Too Early?

Cryptochydism:

- **6.3x** increased risk in unilateral cases
- **1.7x** increased risk in the other (descended) testicle
- **1/44** lifetime risk in bilateral cases

Infertility:

- **59%** higher risk in sub-fertile men compared to those with normal fertility levels

Family History:

- **8-10x** increased risk if brother affected
- **75%** increased risk if an identical twin

Institute and Faculty of Actuaries

Too Much, Too Young, Too Early?

What the data tells us

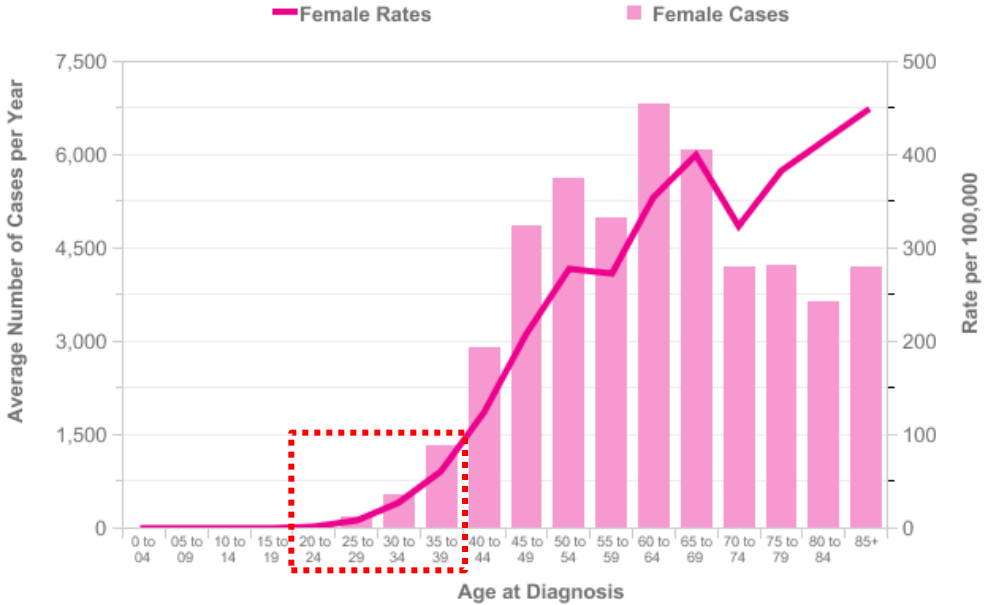
- Evidence of Anti-Selection:
  - Younger age at diagnosis
  - Above average claim amount
  - Higher claim amounts in earlier years
  - Disproportionate proportion of claims compared to population
- Conditions covered:
  - Testicular cancer
  - Breast cancer
  - Colon cancer
  - Multiple Sclerosis

How can we improve claims experience?

Institute and Faculty of Actuaries

Too young….. incidence of breast cancer 2009-2011

Average number of new cases per year and age-specific incidence rates per 100,000 population, females, UK



Approximately 4% of cases with significantly premature presentation of breast cancer

Atypical and suspicious of a dominant genetic issue

Institute and Faculty of Actuaries

Source: Prepared by Cancer Research UK – original data sources are available from http://www.cancerresearchuk.org/cancer-info/cancerstats/

Too young… family history current breast cancer screening

Age	Standard Risk	Moderate Risk
	No family history 1 first degree relative >40	1 first degree relative <40 2 first/second degree relatives with an average age of 50+ 3 first/second degree relatives with an average age of >60
	National Screening Programme	Secondary Care
		Lifetime risk at least 17% but less than 30%
20-29	**No Screening**	**No Screening**
30-39	**No Screening**	**No Screening**
40-49	**No Screening***	**Annual Mammogram**
50+	**3 Yearly Routine Mammogram**	**Annual Mammogram**

*Certain health authorities now invite females aged 47 years for 3 yearly routine breast screening

Institute and Faculty of Actuaries

Source: NHS / NICE guidelines / Macmillan cancer support

Too young..... current breast cancer screening

Age	High Risk		
	Family history over and above that of “moderate” risk, which include: ○ 1 first/second degree relative diagnosed with ovarian cancer at any age and 1 first/second degree relative diagnosed with breast cancer before 50. ○ 2 first/second degree relatives diagnosed with ovarian cancer at any age		
	Lifetime risk at least 30%	>30% BRCA carrier but no test	>30% TP53* carrier but no test
	Specialist genetic clinic		
20-29	No Screening	No Screening	Annual MRI
30-39	Consider Annual Mammogram	Annual MRI Consider Annual Mammogram	Annual MRI
40-49	Annual Mammogram	Annual MRI and Mammogram	Annual MRI

*TP53 = *A gene that carries instructions to make tumour protein p53 (TP53). The protein acts as a tumour suppressor by regulating cell division through stopping cells from growing/dividing too fast or in an uncontrolled way.*

Institute and Faculty of Actuaries

Source: NHS / NICE guidelines / Macmillan cancer support

Family history – case study

Life, Critical Illness and TPD £150,000

Female aged 45 years

Application disclosure:-

- Routine mammogram – normal
- Family history ovarian cancer – diagnosed 39 years

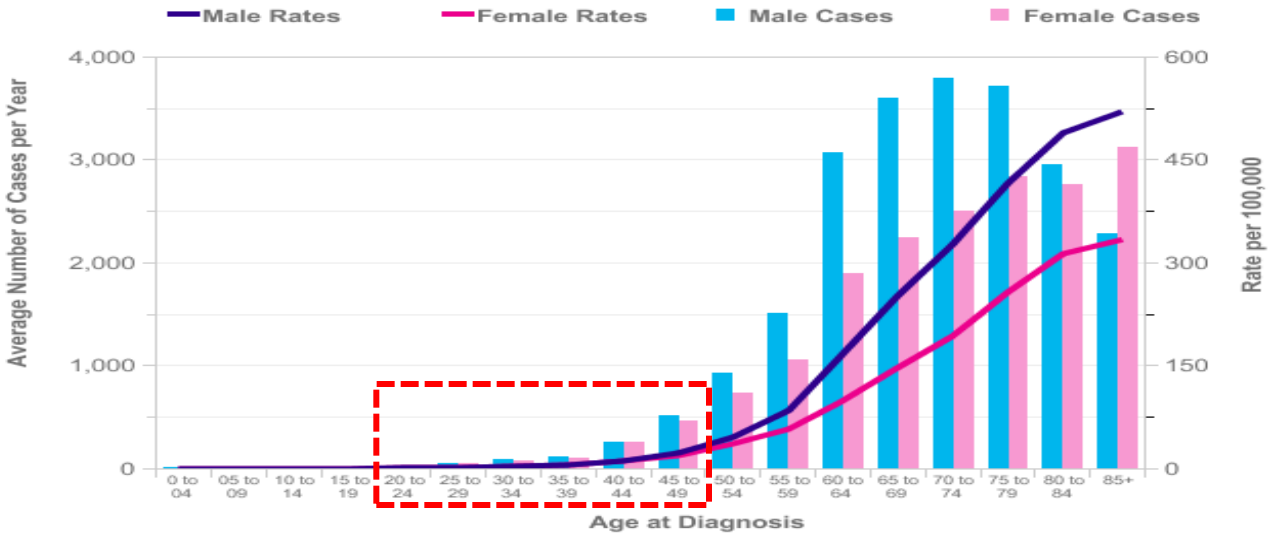
Decision?

PLRE comment:-

- Mammogram performed before the routine screening age
- Reason for mammogram is not known
- Family history of 1st degree relative with ovarian cancer at any age
- Second degree family history not known

Too young. incidence of colon cancer 2009-2011

Average number of new cases per year and age-specific incidence rates per 100,000 population, UK



Approximately 5% of cases with significantly premature presentation of colon cancer

Atypical and suspicious of a dominant genetic issue

Institute and Faculty of Actuaries

Source: Prepared by Cancer Research UK – original data sources are available from http://www.cancerresearchuk.org/cancer-info/cancerstats/

Too young… family history current colon cancer screening

Moderate Family History Risk	Screening	Age at initial screening	Screening interval period
3 first degree relatives none <50	Colonoscopy	50 years	5 yearly to age 75
2 first degree relatives mean age <60	Colonoscopy	50 years	5 yearly to age 75
2 first degree relatives ≥ 60	Colonoscopy	55 years	Once at age 55 no follow up if result normal
1 first degree relative <50	Colonoscopy	55 years	Once at age 55 no follow up if result normal

Routine UK screening is not before the age of 50 years
A colonoscopy is not typically performed for routine UK screening unless the FOB result is abnormal or unclear

Institute and Faculty of Actuaries

Source: British Society of Gastroenterology

Too young… family history current colon cancer screening

High Risk Family History	Screening	Age at initial screening	Screening interval period
HNPCC	Colonoscopy OGD	Colonoscopy from age 25 OGD from age 50	Colonoscopy 18 -24 months OGD 2 yearly
FAP	Colonoscopy or alternating colonoscopy & flexible sigmoidoscopy	Teens	Annual colonoscopy or alternating colonoscopy & flexible sigmoidoscopy until age 30
Peutz-Jeghers Syndrome	Colonoscopy OGD	From age 25	Every 2 years
Juvenile polyposis	Colonoscopy OGD	Colonoscopy from age 15 OGD from age 25	2 yearly colonoscopy and OGD >35 years greater intervals

Institute and Faculty of Actuaries

Source: British Society of Gastroenterology

Too young..... story so far

Atypical Screenings:

- Colon cancer screening before the age of 50 years **– atypical!**
- Screening by colonoscopy **– atypical!**
- Breast cancer screening before the age of 50* years **– atypical!**
- Annual mammogram screening **– atypical!**
- Breast MRI screening **– atypical!**

Atypical investigations:

Investigations or procedures performed indicate medical professionals are concerned regarding possible causes of symptoms – **so should we!**

In particular, further atypical investigations for consideration:

- Mole Mapping
- MRI Brain
- CTA/MRA
- Lumbar Puncture

Too much Too young…Atypical investigations – mole mapping

- Mole mapping is performed when there is an increased risk of melanoma – **this is not routine!**
- If clinicians are suspicious or concerned – **so should we!**
- There is usually a history of:-
  - Previous excision of moles with existing ones present
  - Multiple moles 50-100+
  - Family history of melanoma
  - Sun damaged skin
- What does the applicant know that we don't?

Mole mapping app now available on your phone!

https://play.google.com/store/apps/details?id=com.revsoft.doctormole&hl=en

Too much Too young… atypical investigations – neurological

- MRI/CT scans of the brain are performed for a reason
- They are looking for a cause of symptoms
- They are costly to perform (UK average circa £500)
- It is not a pleasant experience for the patient ☹

What do these terms really mean?

  - Essentially normal
  - No significant abnormality
  - Nil of significance
  - Reassured

- Lumbar puncture or CTA/MRA are usually second line as a follow up to imaging
- They are invasive and unpleasant procedures
- There is a risk of complication to the patient ☹

Therefore, medical professionals will not request these investigations unless they are concerned or suspicious – SO SHOULD WE!

Referral letters should provide a better insight

Institute and Faculty of Actuaries

Too much Too young… vague neurological symptoms

Red Flag	Amber Warning	Green Alert
Optic Neuritis • Diplopia (double vision) • Unilateral temporary blindness • Nystagmus: uncontrolled eye movement (horizontal/vertical) • Pain in the eye	**Dysaesthesia** • Pins and needles • Tingling • Numbness • Burning sensations • Crawling sensations	**Labyrinthitis** **Dizziness** **Vertigo**
Lhermitte's sign / Phenomenon • Electric shock sensation passing down the back when moving the neck	**Balance problems** • Lack of co-ordination • Clumsiness • Gait • Fall / Unsteadiness	**Tinnitus** **Hearing Loss**
Trigeminal Neuralgia • Unilateral or bilateral severe (sharp, stabbing, electric shock sensation) facial pain	**Cognitive difficulties** • Memory / Confusion • Concentration • Attention • Confusion	**Fatigue** **TATT**
Dysarthria/Dysphagia/Dysphasia Difficulties with speech/swallowing/words	**Seizure/Fit** **Collapse / Vasovagal** **Loss of consciousness**	**(Simple) Faint**
Bowel **Incontinence** Male urinary **Incontinence**	**Weakness** • Paresis	Female urinary **Incontinence**
	Visual Disturbance	
	Tremor	

Institute and Faculty of Actuaries

Too much Too young… context is key

KEY	CONTEXT	
Onset	Years ago No changes	Recent onset Changes in presentation
Pre-Presentation	Apparent precipitating cause / factors	No apparent precipitating cause / factors
Presentation Nature of symptoms	Sudden onset No associated symptoms	Gradual onset Associated symptoms Symptoms develop
Duration	Seconds / Minutes / Hours	Hours / Days / Weeks+
Pattern	Acute One off Short lived	Persistent Chronic Intermittent recurrences Constant
Investigations Referrals	Clinical history Clinical exam Bloods	Specialist referral MRI brain/spine CTA/MRA Lumbar puncture
Risk Factors	No family history No associated risk factors	Family history

Institute and Faculty of Actuaries

Too much Too young… asking the right question

Are you awaiting the results of, or have you been advised to have, any medical investigations, tests or scans or have you any expectation of seeking medical advice or treatment in the near future?

Any condition affecting your stomach, oesophagus or bowel, for example crohn's disease, ulcerative colitis?

- Application form questions can be open to interpretation by:-
  - The insurer
  - The consumer
  - The ombudsman
- Terminology potentially impacting on claim experience:
  - Intention or expectation
  - Condition, disease or disorder
  - Problem
  - Suffering or suffered (from)
  - Affecting
  - Medical advice
- There is a growing importance on communication between underwriters and claims
  - Application questions
  - Exclusion wording
  - CI definitions

Too much Too young … critical illness conclusion

When comparing insured lives to the general population, for certain conditions, we are seeing:-

- **Materially higher proportions of claims…**
- **Significantly lower age at diagnosis…**
- **Cover levels purchased being higher than average…**
- **Duration from inception to claim being lower than expected…**

So, what can we learn from this?

Institute and Faculty of Actuaries

Too much Too young… critical illness conclusion

- Evidence suggests CI is at high risk of **anti-selection**
- Technology and medicine have evolved since the CI product was launched so insurers need to remain **one step ahead of the consumer**
- We need to ensure application form questions, terminology and automated underwriting rules **evolve** with ‘real-world’ claims experience

And finally…

- Underwriters continue to play a key role in safeguarding their office experience (and rates) by preventing avoidable claims through:-
  - Identifying potentially **anti-selective** purchase behaviour
  - Detecting **atypical risks**
  - Obtaining the right **evidence** on atypical risks

Questions

Comments

Institute and Faculty of Actuaries