



Society of Actuaries in Ireland

The Impact of the 2009/2010 European Debt Crisis on Mortality Trends

8.03.16

Mortality Trends Working Party

- John Flanagan
- Mary Hall
- Aine Houlihan
- Colin Murphy
- Shane Prendergast

Agenda

- Overview of European Economic Crisis – Mary Hall
- Trends by All Causes of Death– Shane Prendergast
- Trends by Cause of Death – Colin Murphy
- Conclusion – Colin Murphy

Research Review

- Extensive but conflicting research on impact of economy on mortality
- Theory:
 - Economic Boom: increase in certain causes of death – mainly heart disease and accidents
 - Recession: increase in suicides
- Support Theory: Valkonen et al.(2000), Rhum (2003 and 2007), Gerdthán et al.(2006) Granados(2008), Miller et al. (2009)
- Do Not Support Theory: Khang et al. (2005), Murphy et al. (2006). Gordon et al. (2015).

European Financial Crisis 2008-2015

- 2007–2009: Global Financial Crisis
- 2008: Lehman brothers collapse
- 2008: Icelandic banking collapse
- 2010: Irish Bailout
- 2011: Portugal Bailout
- 2011–2012: EU support for Italian and Spanish Economies
- 2010-2015: Ongoing Greek Debt Crisis

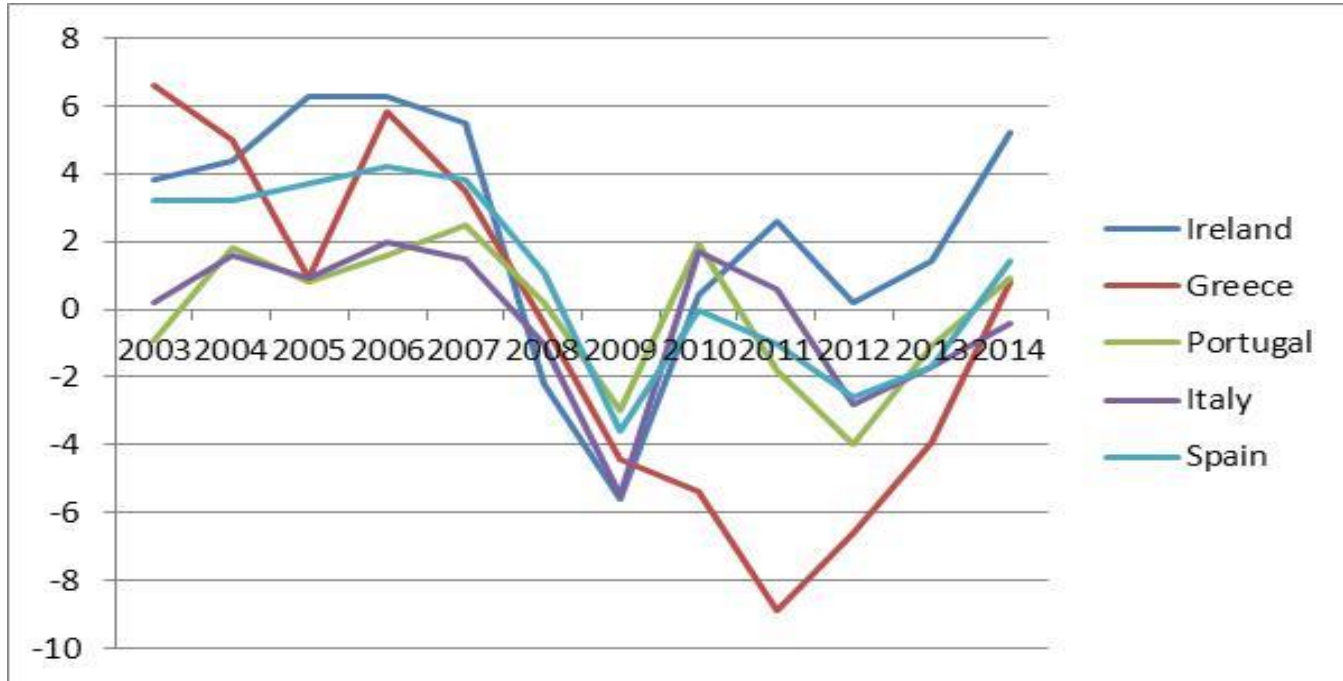
Irish Economic Crisis

- Mid 1990s – 2007: Celtic Tiger
- 2007: Collapse of housing bubble
- 2008: Recession
- 2008-2010: Banking Crisis
 - Sept 2008 - Banking Guarantee
 - Nov 2010 – EU/IMF bailout
- 2013 – Exit EU/IMF bailout programme
- 2014 – Irish GDP growth rate of 4.8%

Grouping of Countries for Analysis

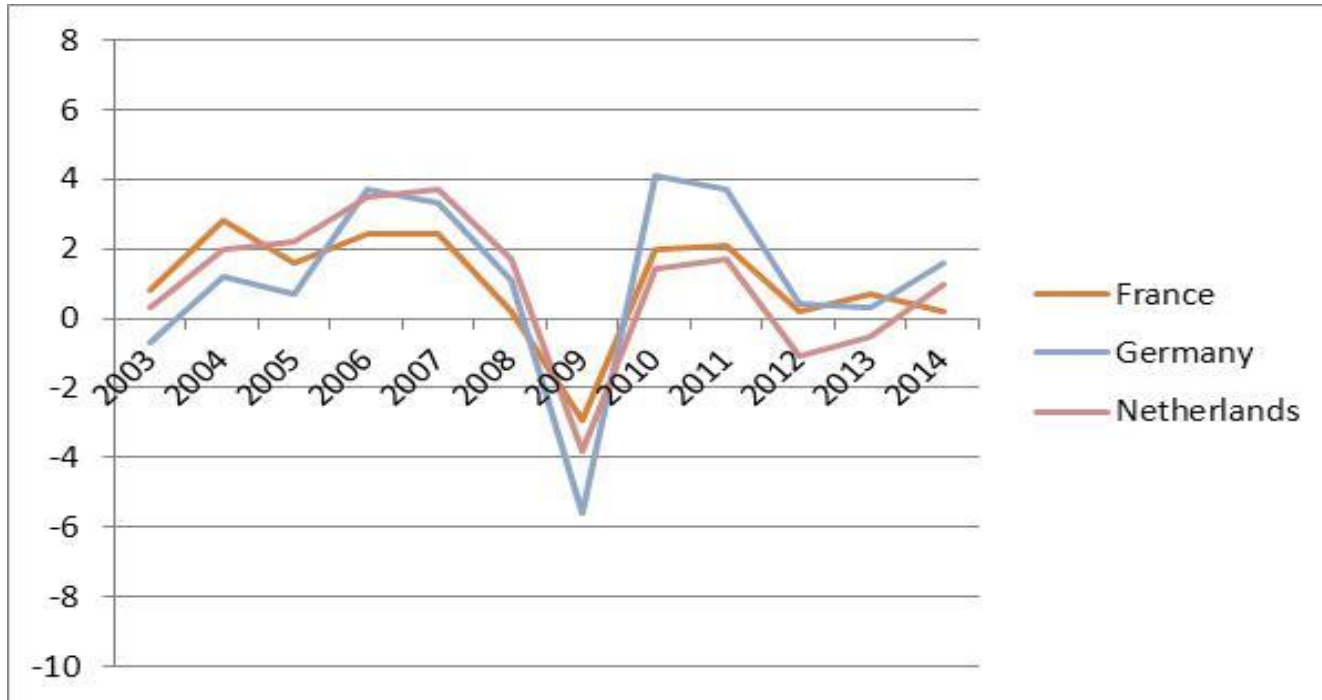
- A = Euro Countries most affected by crisis:
 - Greece, Ireland, Italy, Portugal, Spain
- B = Euro Countries less affected – for comparison:
 - France, Germany, Netherlands
- C = Non Euro Countries – for comparison:
 - Sweden, United Kingdom

Group A – Real GDP Growth Rate



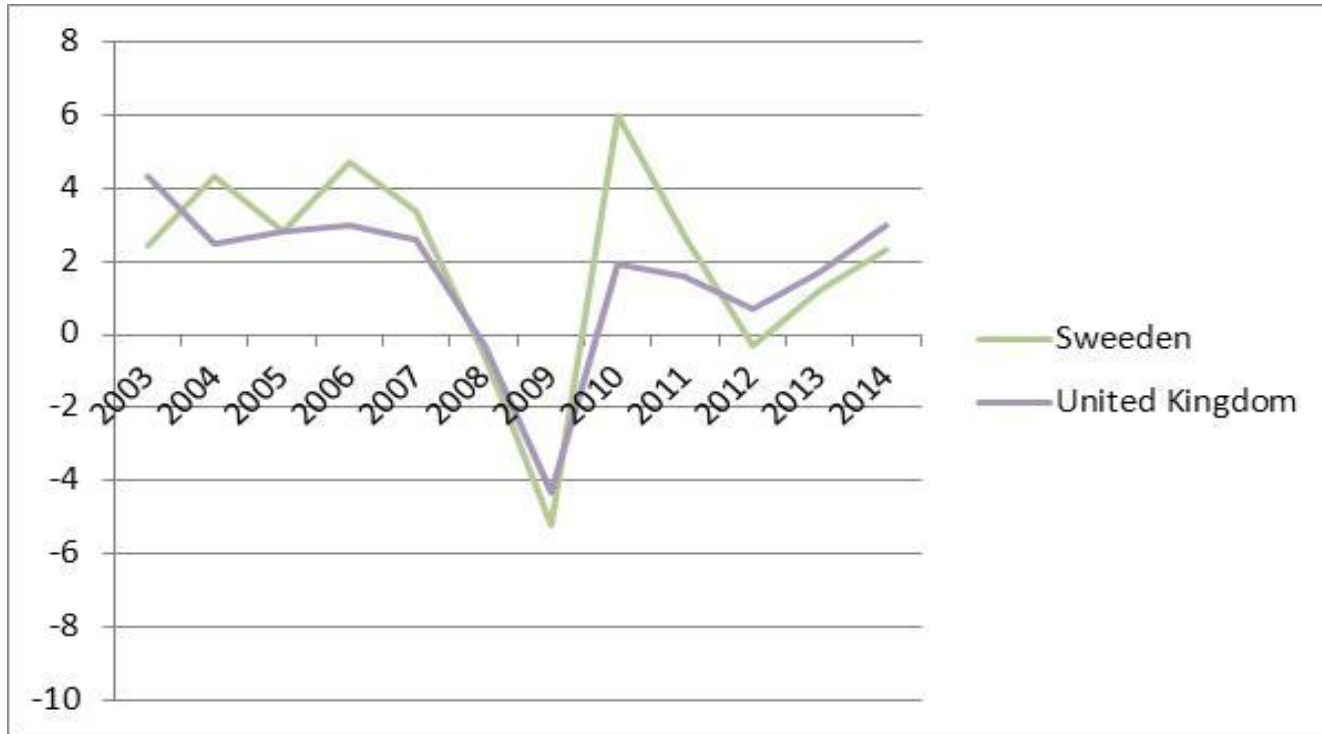
- Source Eurostat

Group B – Real GDP Growth Rate



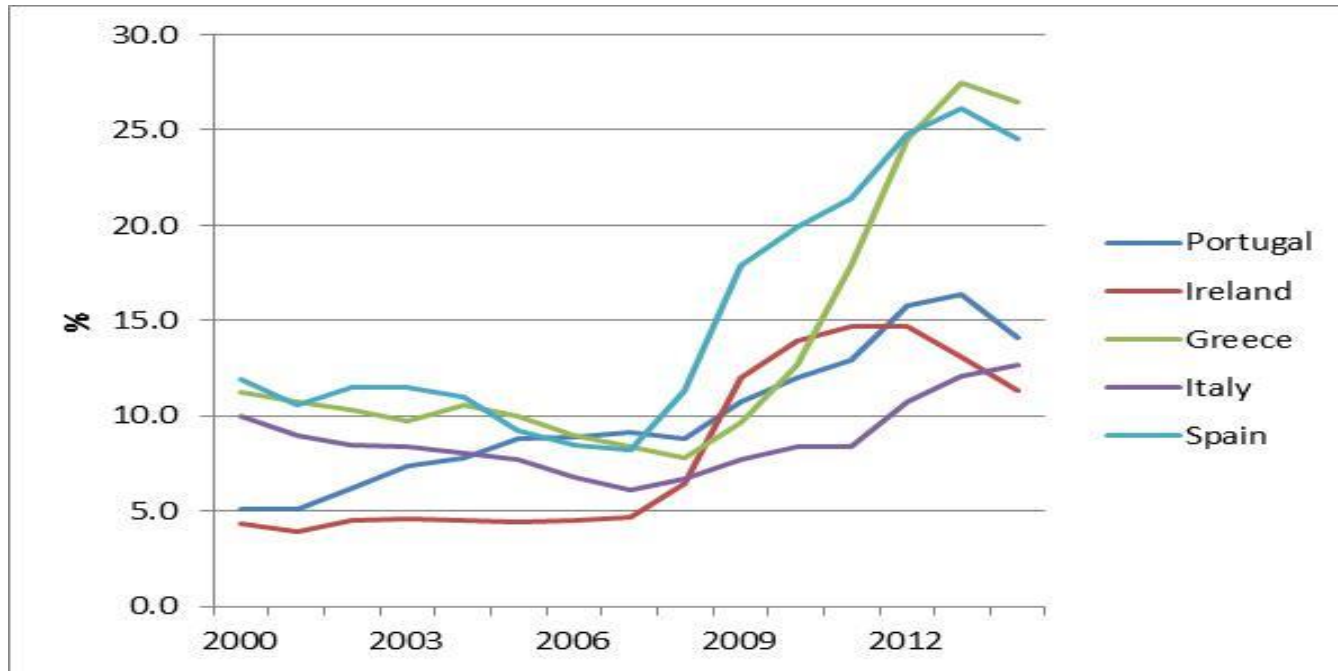
- Source Eurostat

Group C – Real GDP Growth Rate



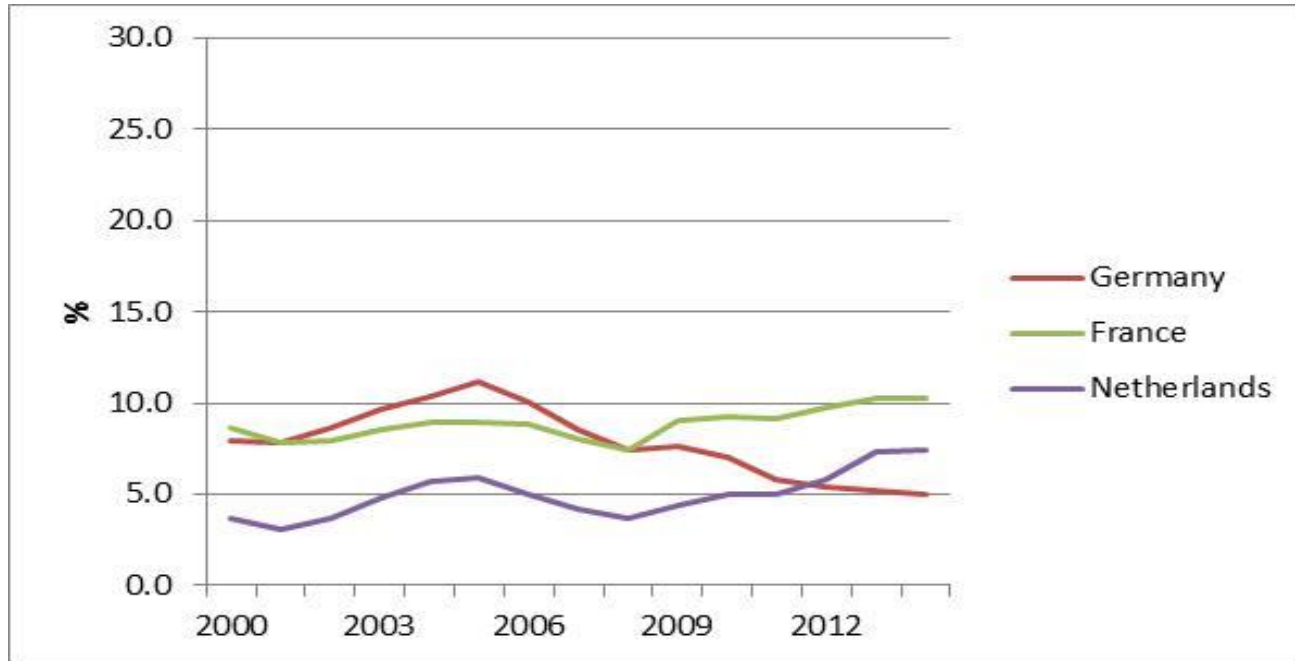
- Source Eurostat

Group A – Unemployment Rate



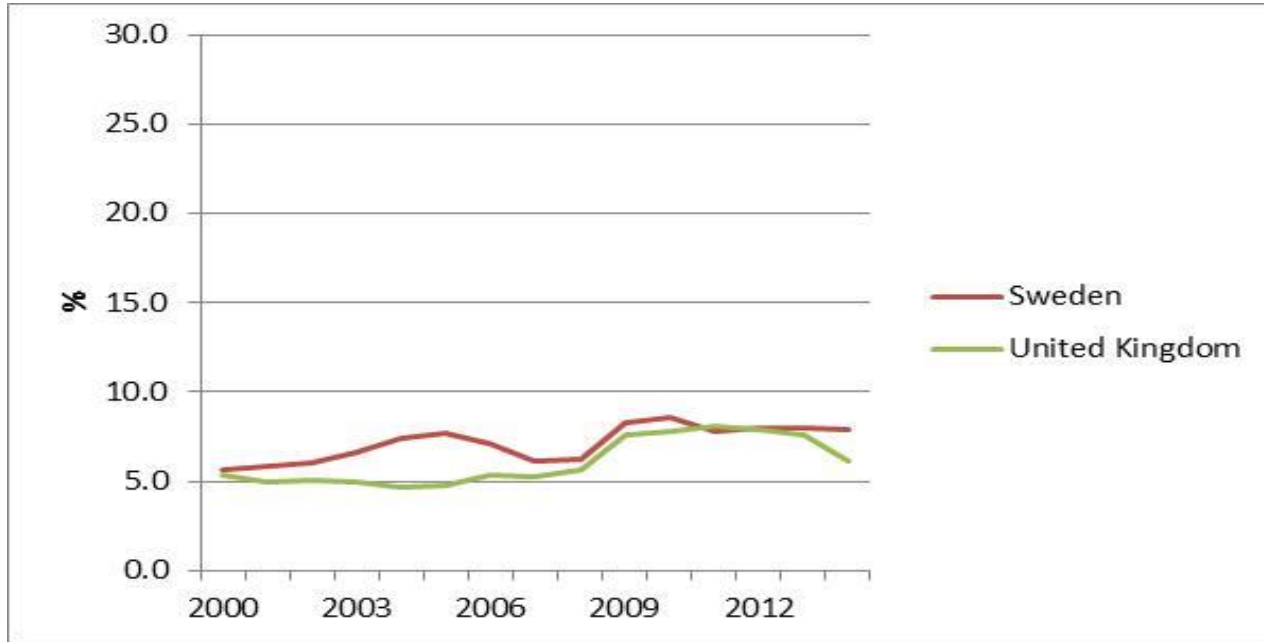
- Source Eurostat

Group B – Unemployment Rate



- Source Eurostat

Group C – Unemployment Rate



- Source Eurostat



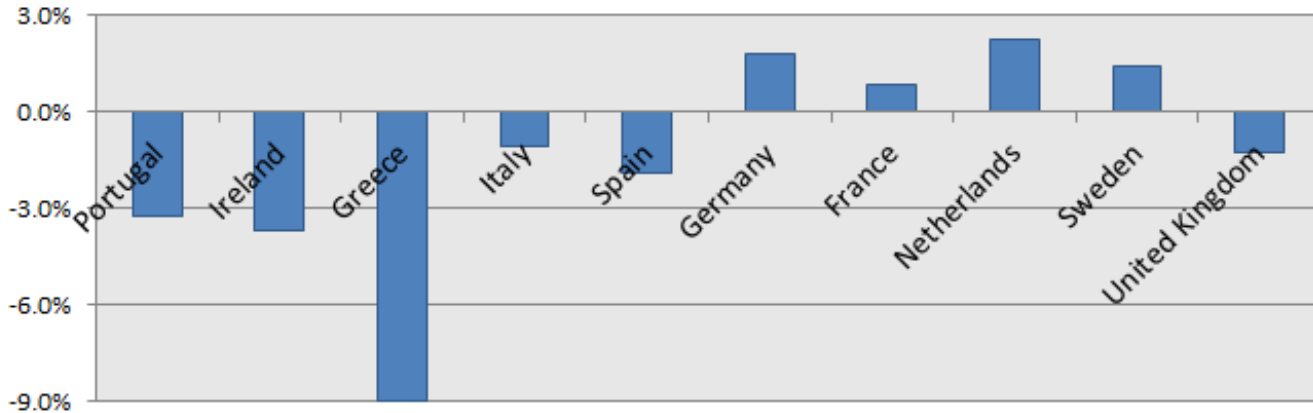
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Trends by All Causes of Death

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Health Care Spending

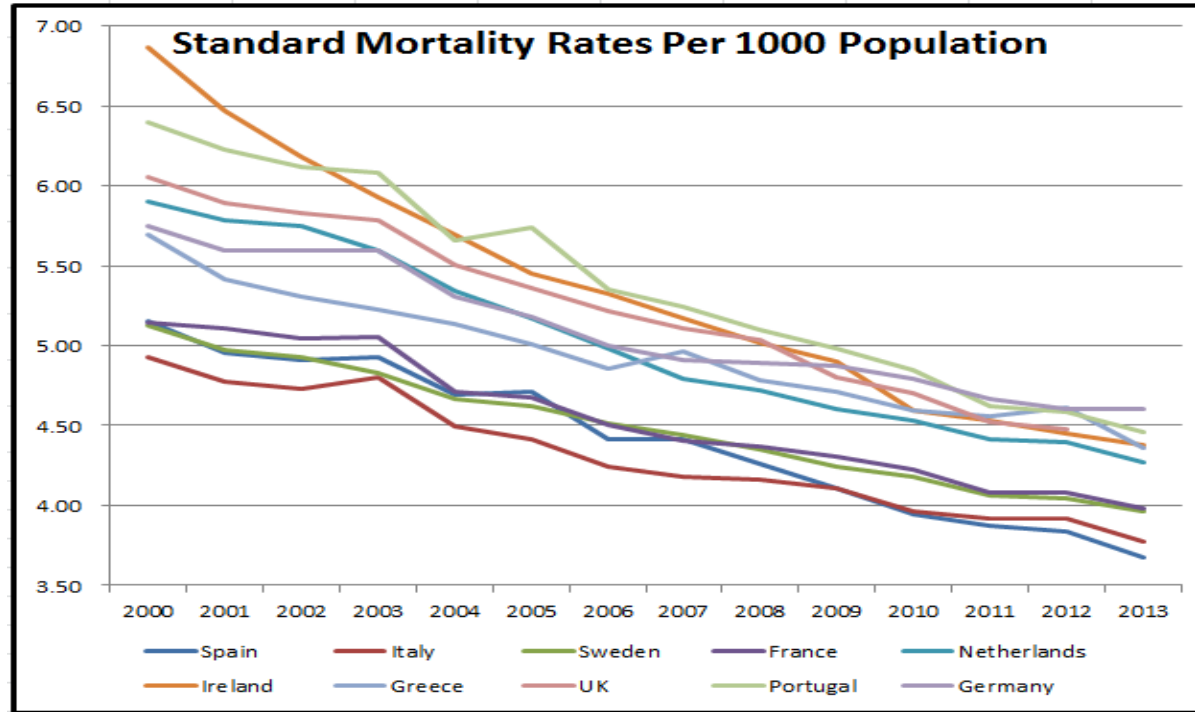
**Average Annual Real Growth in Health Spending
2009 - 2012**



Health care spending has been falling in those countries most hit by the economic recession. The largest falls have been in Greece, Ireland, Portugal, Italy & Spain.

Source: Health at a Glance Europe 2014 (joint publication of the OECD and the European Commission)

Overall Mortality Rates Still Falling



Source: Eurostat, combined standard death rates per 1,000 of population ages 0 to 84

Mortality League Table

Overall Ranking	Country	Mortality Rate Per 1000	Male Rank	Female Rank
1	Spain	3.83	3	1
2	Italy	3.89	2	3
3	Sweden	4.06	1	5
4	France	4.09	7	2
5	Netherlands	4.40	4	9
6	Ireland	4.49	6	8
7	Greece	4.53	8	6
8	UK	4.57	5	10
9	Portugal	4.63	10	4
10	Germany	4.67	9	7

- Lowest combined mortality rates in Spain
- Lowest male rate in Sweden and female rate in Spain
- Highest Mortality rates in Germany
- Highest male rate in Portugal and female rate in the UK
- Largest gender differential in Portugal

Source: Eurostat, average years 2010 -2013 combined standard death rates per 1,000 of population ages 0 to 84

Mortality League Table

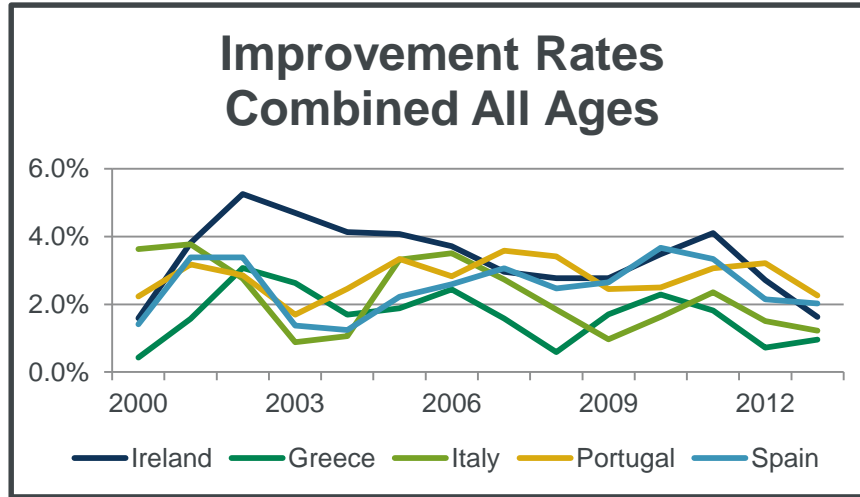
Young / Old Differentials

Overall Ranking	Country	Age 24 -64 Rank	Age 65 -84 Rank
1	Spain	3	1
2	Italy	1	3
3	Sweden	2	4
4	France	10	2
5	Netherlands	4	7
6	Ireland	5	8
7	Greece	7	5
8	UK	6	9
9	Portugal	9	6
10	Germany	8	10

Source: Eurostat, average years 2010 -2013 combined standard death rates per 1,000 of population

- Italy has lowest mortality rates for under 65's, while France has the highest mortality rates for under 65's
- Spain has lowest mortality rates for over 65's, while Germany has the highest mortality rates for over 65's
- Largest differential between young and old in France

Group A – 2 Year Mortality Improvement Rates



- Combined mortality improvement rates have slowed by roughly 1% in Ireland, Italy & Greece
- Improvement rates have remained steady in Portugal & Spain throughout the analysis period

Country	2001-2007 Average Improvement PA	2008-2013 Average Improvement PA	Overall Change	Male Change	Female Change
Ireland	4.1%	2.9%	-1.2%	-1.3%	-1.0%
Greece	2.1%	1.3%	-0.8%	-0.4%	-1.3%
Italy	2.6%	1.6%	-1.0%	-0.7%	-1.3%
Spain	2.5%	2.7%	0.2%	0.5%	-0.1%
Portugal	2.8%	2.8%	0.0%	0.2%	-0.3%

- The lowest rates are in Greece with the more recent improvements being below 1%

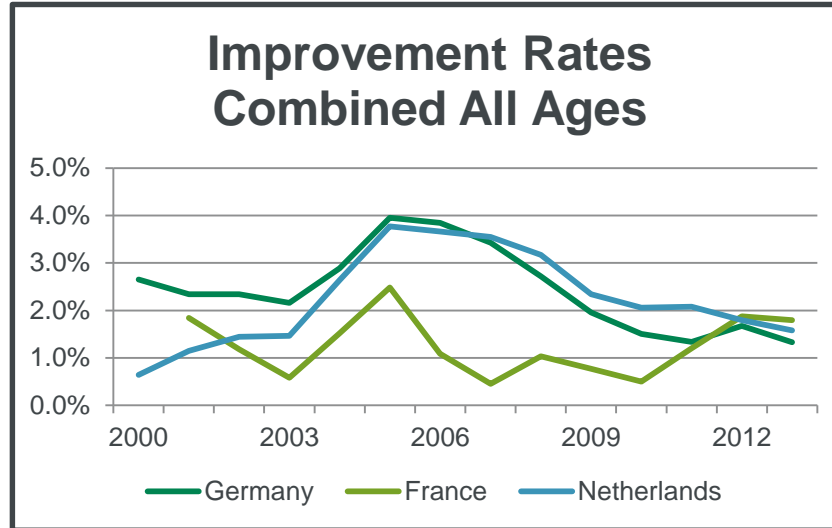
Source: Eurostat ages 0 to 84

Group A – Change in 2 Year Mortality Improvement Rates By Age Band & Gender

Country	Gender	Age Band			
		25-44	45-64	65-74	75+
Ireland	Males	-2.2%	-1.3%	-1.6%	-0.8%
Greece		2.3%	-1.5%	-1.3%	0.2%
Italy		0.3%	-1.0%	-1.9%	0.3%
Portugal		1.2%	-0.3%	-0.5%	0.8%
Spain		1.4%	0.5%	0.4%	0.4%
Ireland	Females	-1.7%	-0.2%	-2.0%	-0.7%
Greece		-1.0%	-1.5%	-1.9%	-1.0%
Italy		-1.4%	-1.3%	-2.0%	-0.6%
Portugal		-0.5%	-1.1%	-0.3%	0.3%
Spain		0.5%	-1.0%	0.5%	0.0%

Source: Eurostat change in annual mortality improvement from 2001 – 2007 average to 2008 – 2013 average

Group B – 2 Year Mortality Improvement Rates



Country	2001-2007	2008-2013	Overall Change	Male Change	Female Change
	Average Improvement PA	Average Improvement PA			
Netherlands	2.5%	2.2%	-0.4%	-0.3%	-0.3%
Germany	2.3%	1.4%	-0.9%	-1.1%	-0.9%
France	2.2%	1.8%	-0.4%	-0.2%	-0.5%

Source: Eurostat ages 0 to 84

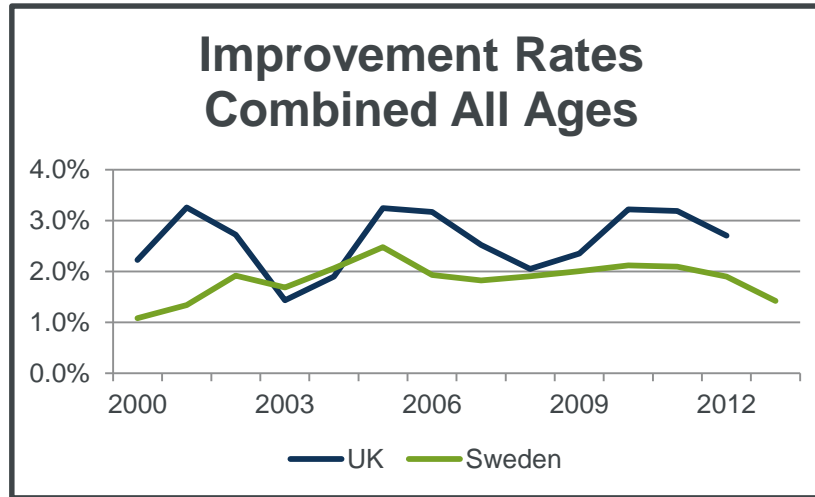
- The slowdown in improvement rates in the core Eurozone countries has been less significant
- Mortality improvement rates have decreased by 0.4% pa in both Netherlands & France
- German rates have fallen by roughly 1% which is more akin to the Group A countries

Group B – Change in 2 Year Mortality Improvement Rates By Age Band & Gender

Country	Gender	Age Band			
		25-44	45-64	65-74	75+
Germany	Males	0.2%	-1.2%	-2.2%	-0.6%
France		-0.7%	-0.1%	-1.1%	0.5%
Netherlands		-1.0%	-0.4%	-0.7%	0.4%
Germany	Females	-0.2%	-1.4%	-3.2%	0.4%
France		0.1%	-0.3%	-1.1%	-0.3%
Netherlands		0.2%	-0.1%	-1.1%	0.3%

Source: Eurostat change in annual mortality improvement from 2001 – 2007 average to 2008 – 2013 average

Group C – 2 Year Mortality Improvement Rates



- Mortality improvement rates have picked up slightly in the UK & Sweden over the analysis period
- Much less volatility in improvement rates for group C countries compared to the other groups
- Very consistent movement in rates across genders

Country	2001-2007	2008-2013	Overall Change	Male Change	Female Change
	Average Improvement PA	Average Improvement PA			
UK	2.6%	2.7%	0.1%	0.0%	0.2%
Sweden	1.9%	1.9%	0.0%	0.1%	0.0%

Source: Eurostat ages 0 to 84

Group C – Change in 2 Year Mortality Improvement Rates By Age Band & Gender

Country	Gender	Age Band			
		25-44	45-64	65-74	75+
UK	Males	1.9%	0.7%	-1.1%	0.5%
Sweden		-1.1%	1.9%	0.0%	0.2%
UK	Females	0.8%	0.4%	-0.7%	0.8%
Sweden		-0.7%	1.9%	-0.1%	-0.3%

Source: Eurostat change in annual mortality improvement from 2001 – 2007 average to 2008 – 2013 average



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Trends by Cause of Death

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International Classification of Disease 10th Revision

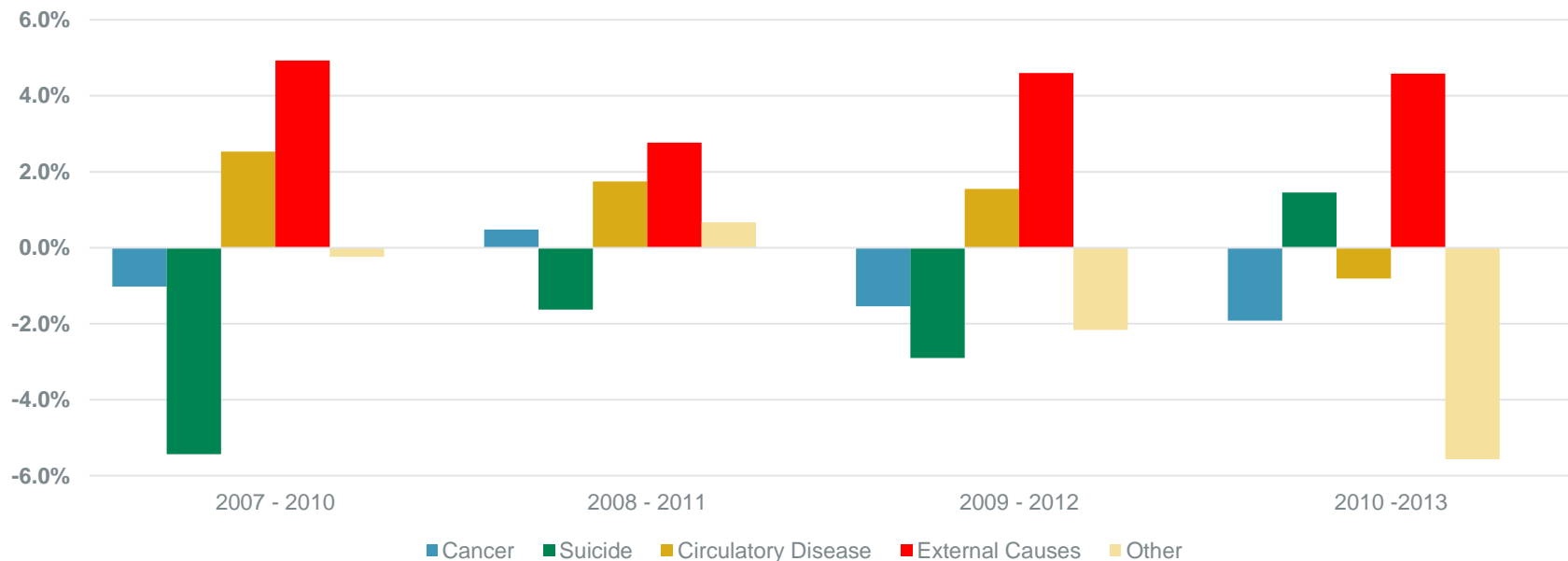
ICD-10 is a medical classification list by the World Health Organisation (WHO), containing codes for differing types of death including suicide, cancer, external causes, etc.

Causes of deaths analysed

- Cancer: C00 – C99
- Suicide: X60 – X84
- Circulatory Diseases: I00 – I99
- External Causes: V01 – X59, X85 – Y99
- Other: All other ICD codes

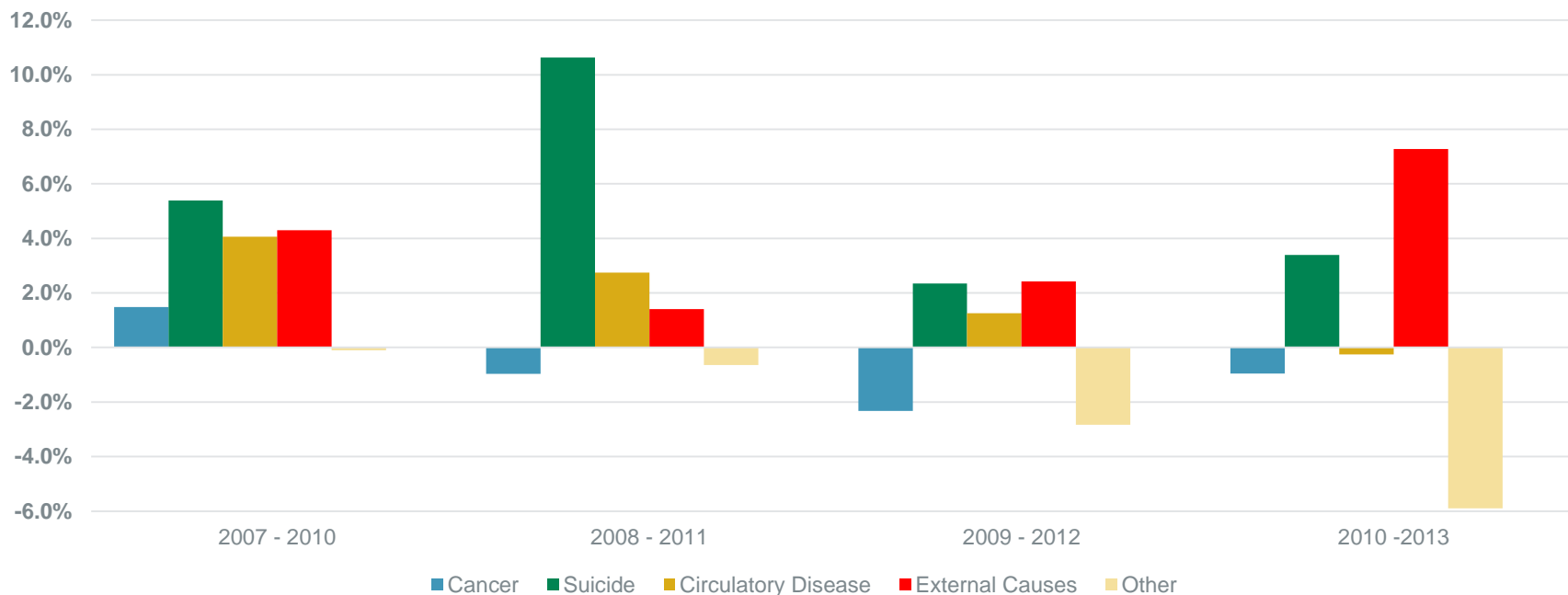


Irish male average improvement rate by cause of death



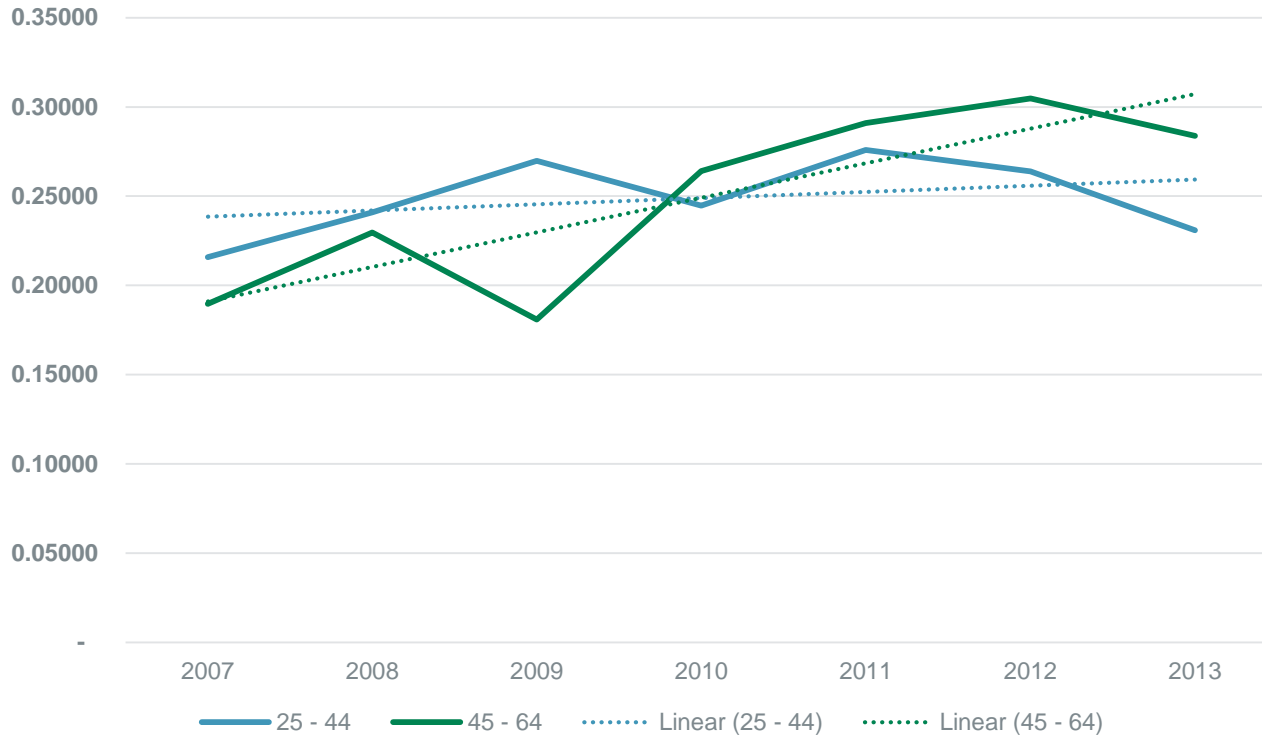
Average Improvement = SQUARE ROOT (Average (Crude Rate Year 'X' + Crude Rate Year 'X-1') / Average (Crude Rate Year 'X-2' + Crude Rate Year 'X-3'))

Irish female average improvement rate by cause of death



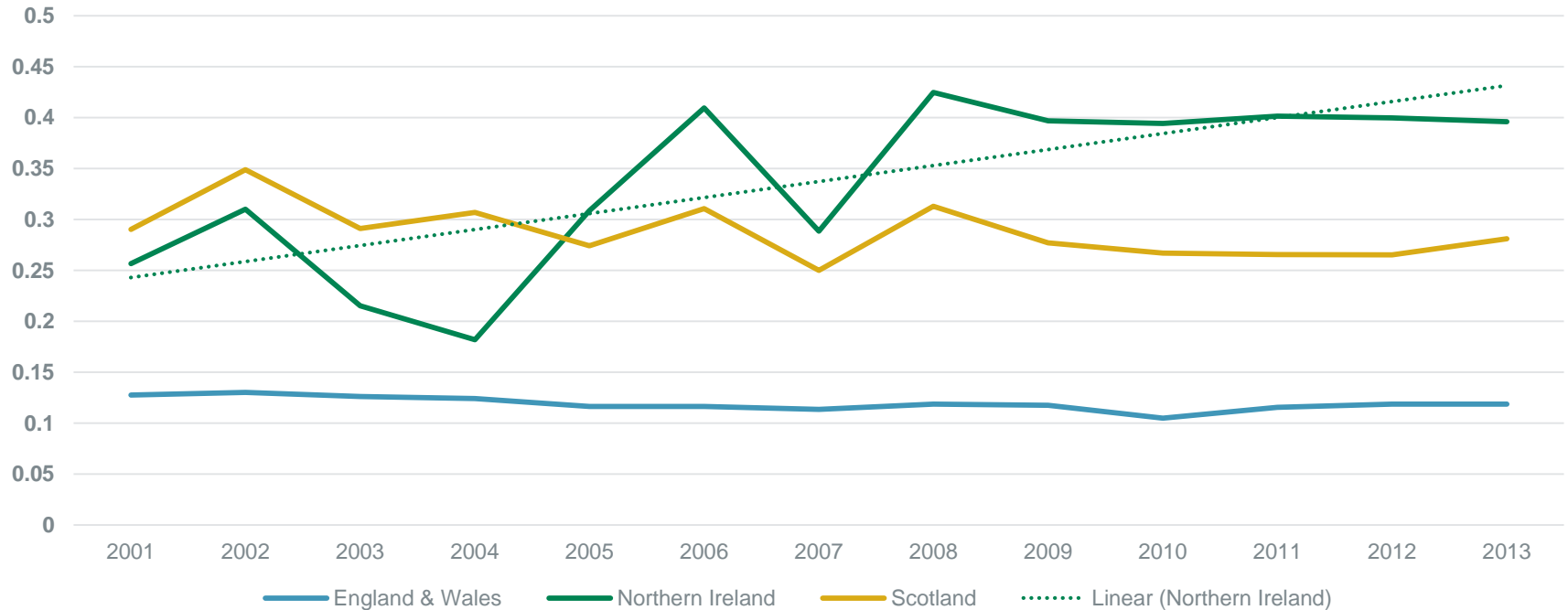
Average Improvement = SQUARE ROOT (Average (Crude Rate Year 'X' + Crude Rate Year 'X-1') / Average (Crude Rate Year 'X-2' + Crude Rate Year 'X-3'))

Irish male suicide death rate per thousand by age band



- Average suicide rate for 25 to 64 years olds is 0.249 deaths per thousand.
- Peak Death rates in 2011 for 25 – 44 year olds and 2012 for 45 -64

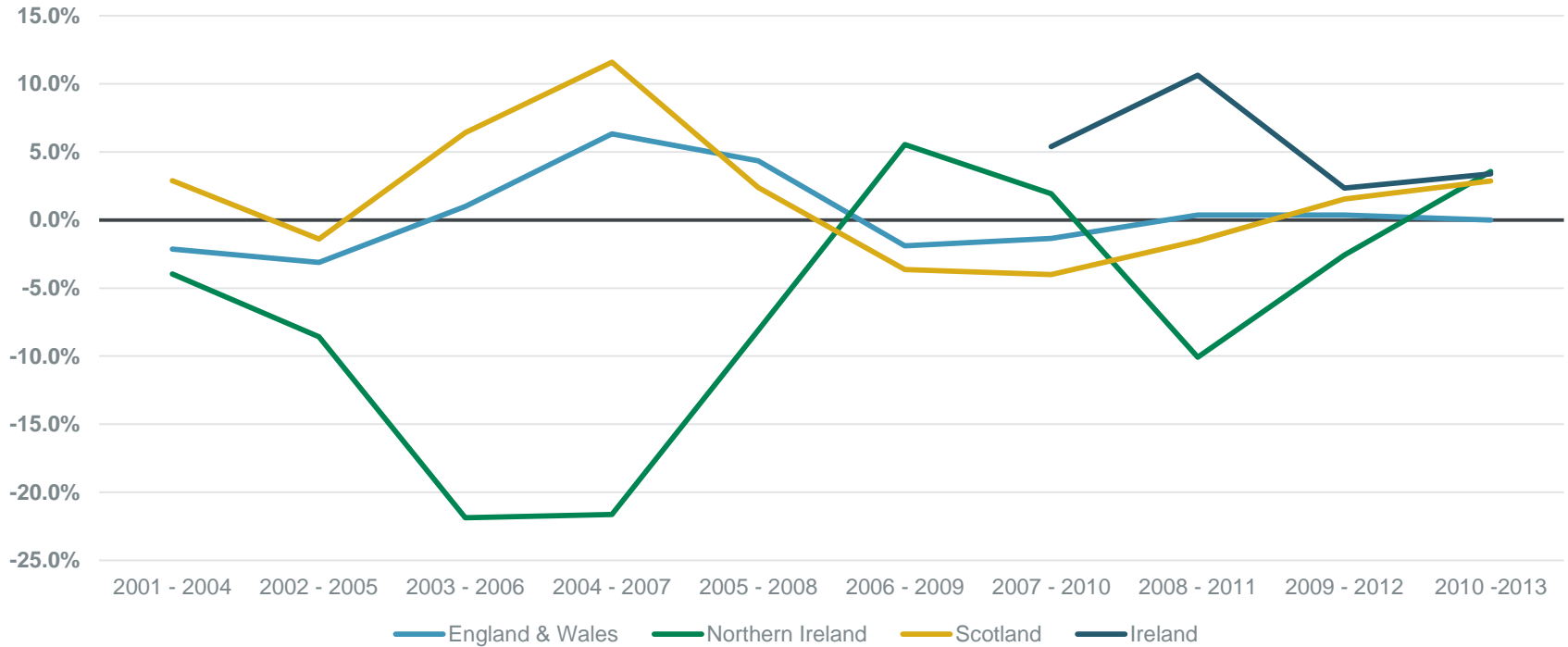
Male 25 - 44 suicide death rate per thousand



Male 45 - 64 suicide death rate per thousand

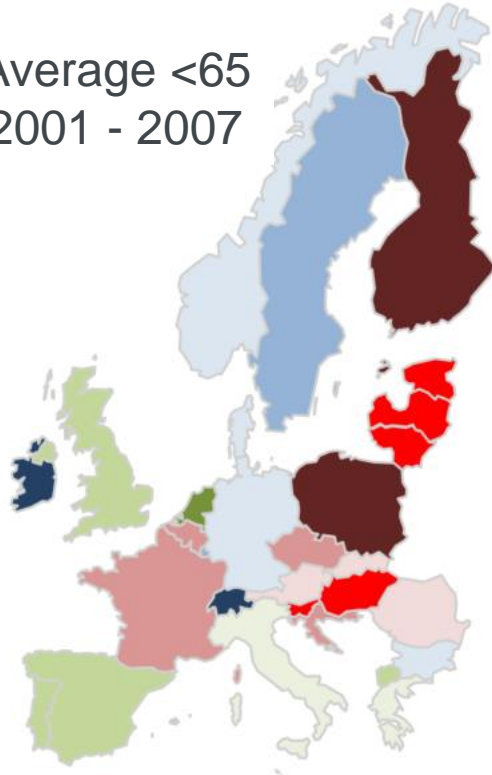


Average female suicide improvement rates



What are male suicide rates across Europe?

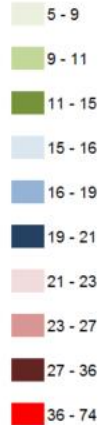
Average <65
2001 - 2007



Average <65
2008 - 2012



Rates per 100,000

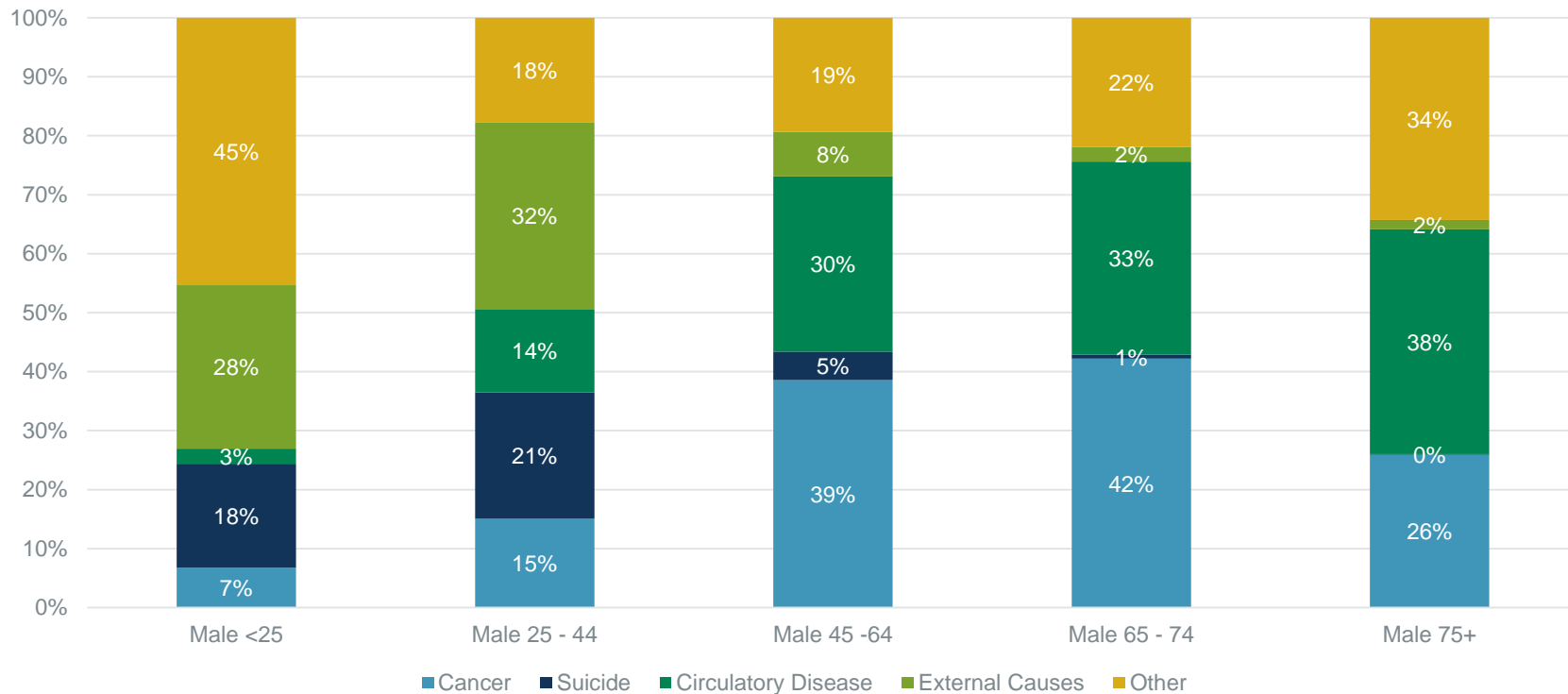


Source: Eurostat

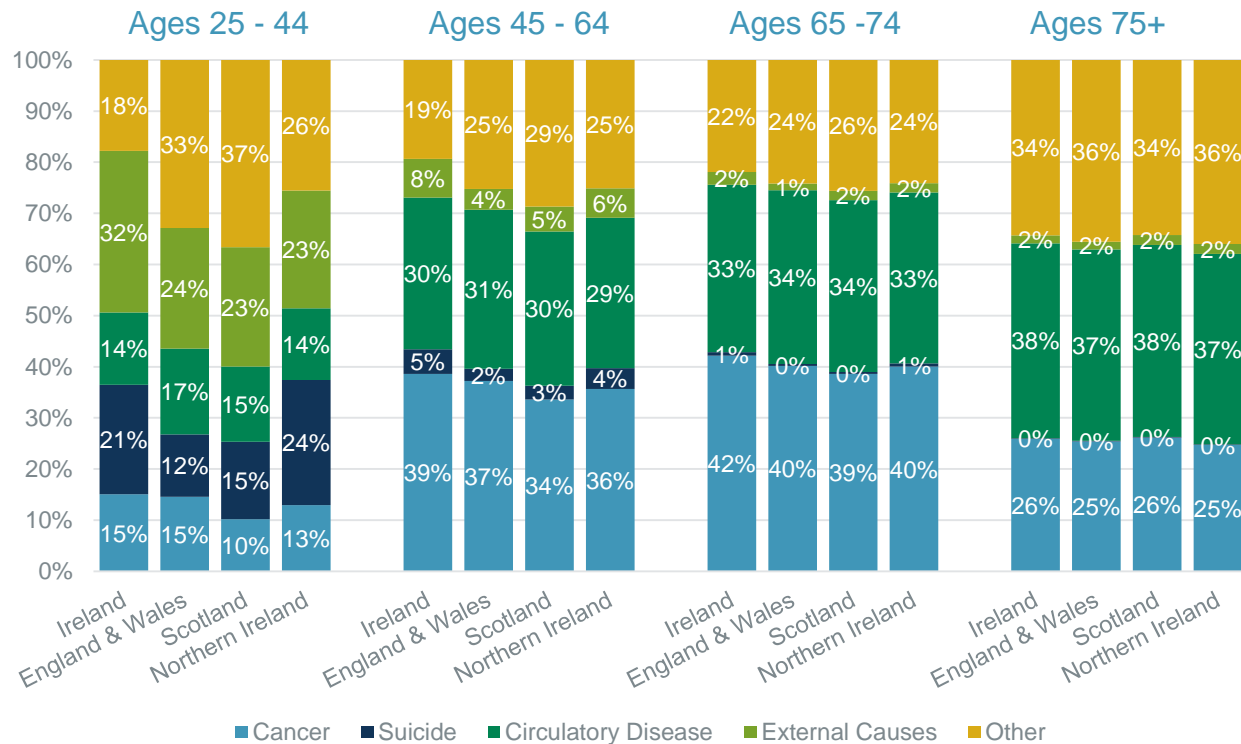
How are people dying in Ireland?



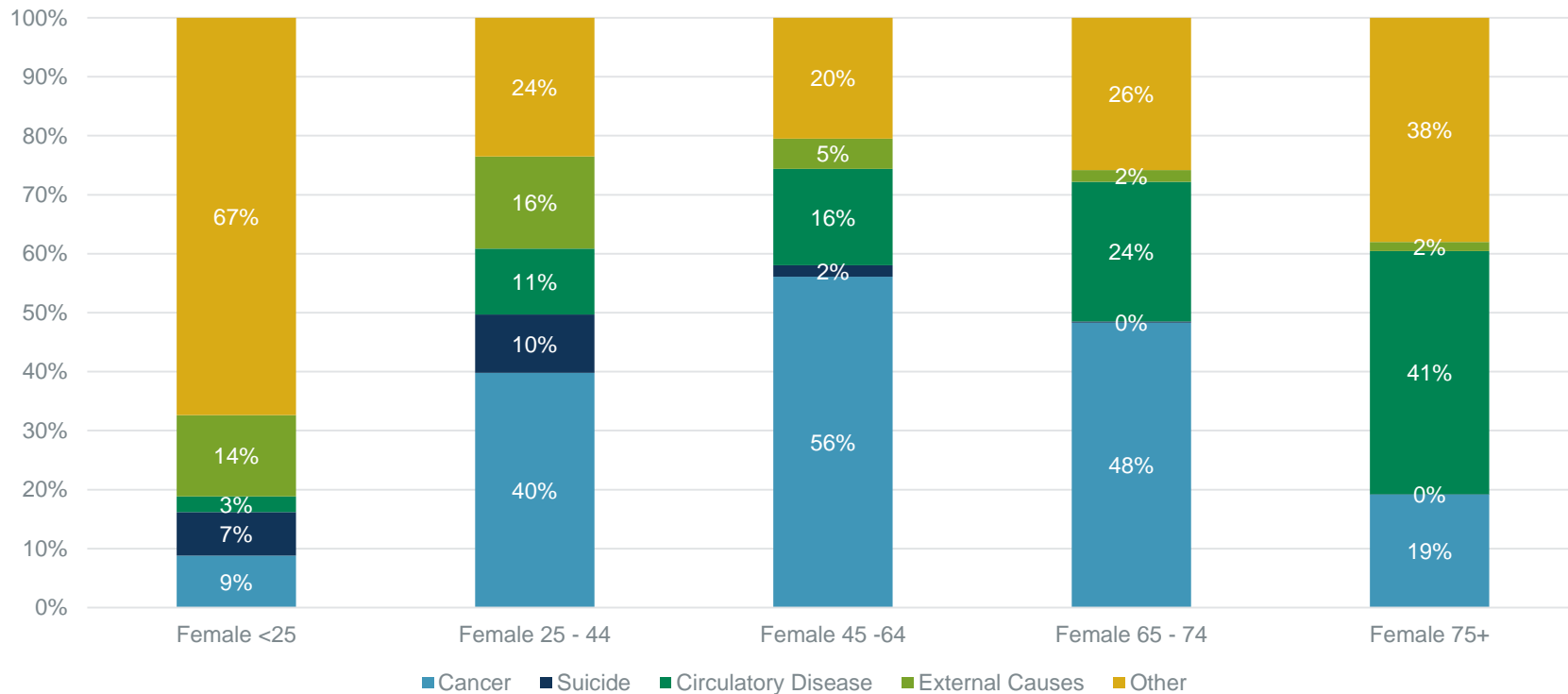
Proportionate Male deaths by age band 2007 - 2013



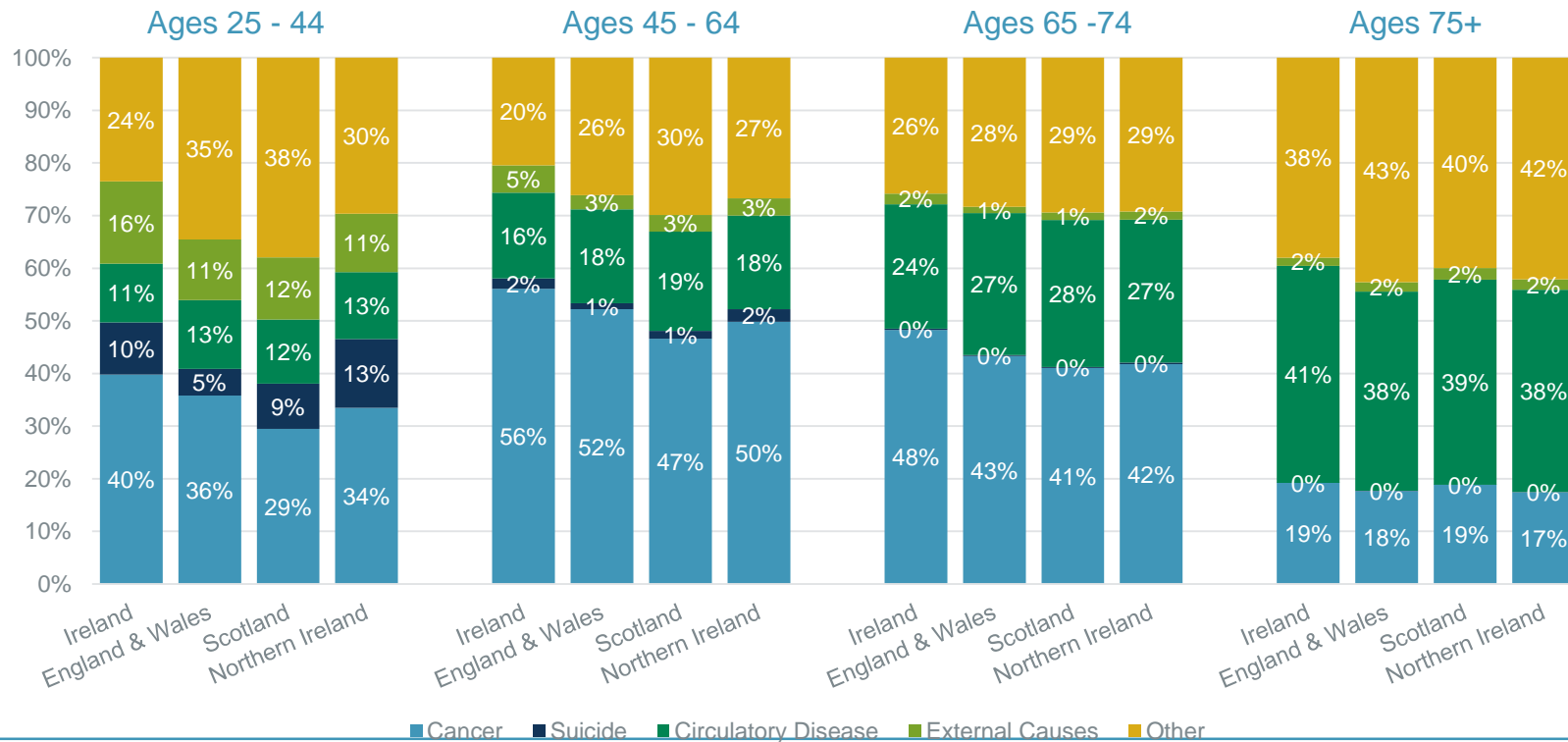
Average 2001 - 2013 Male proportionate deaths by age band versus the British Isles



Proportionate Female deaths by age band 2007 - 2013

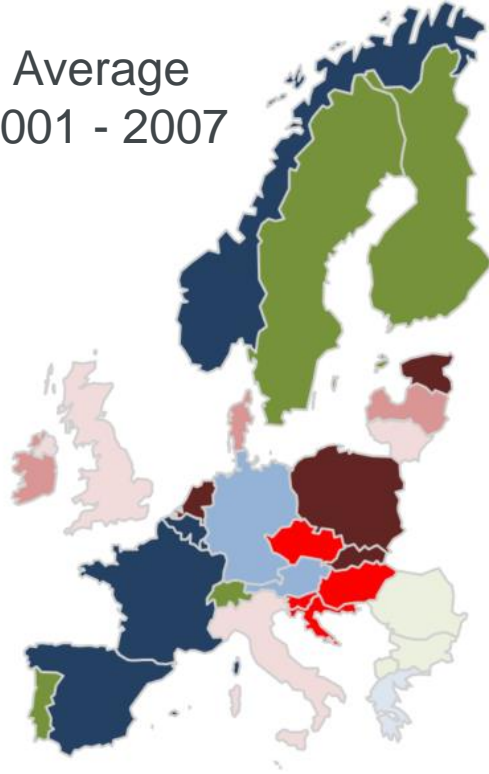


Average 2001 - 2013 Female proportionate deaths by age band versus the British Isles

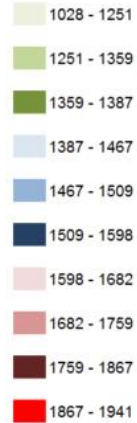


Male over 65 cancer rates across Europe

Average
2001 - 2007



Rates per 100,000



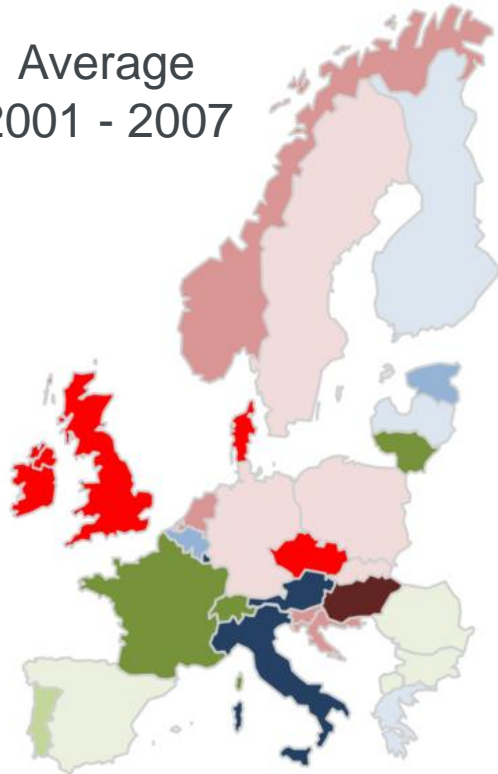
Source: Eurostat

Average
2008 - 2012

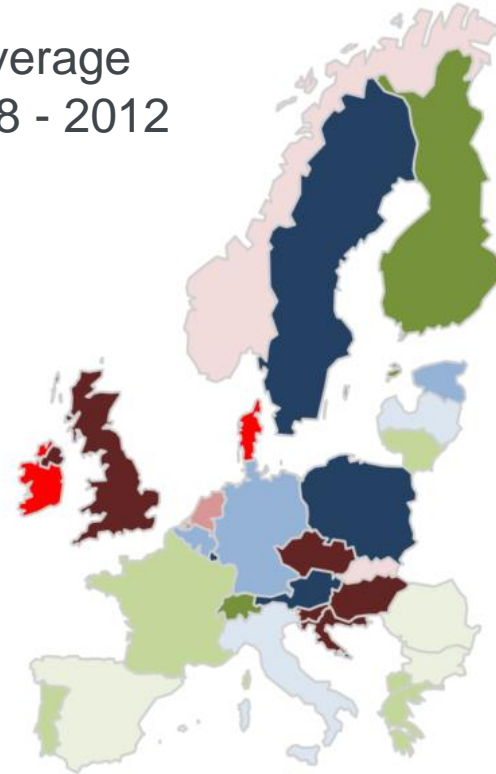


Female over 65 cancer rates across Europe

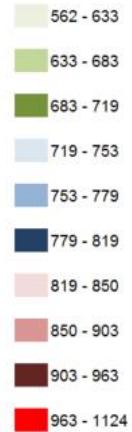
Average
2001 - 2007



Average
2008 - 2012



Rates per 100,000



Source: Eurostat

Female under 65 cancer rates across Europe

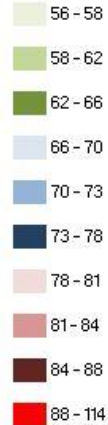
Average
2001 - 2007



Average
2008 - 2012



Rates per 100,000



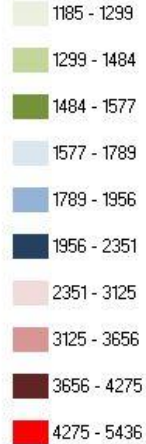
Source: Eurostat

Female over 65 circulatory rates across Europe

Average
2001 - 2007



Rates per 100,000



Average
2008 - 2012



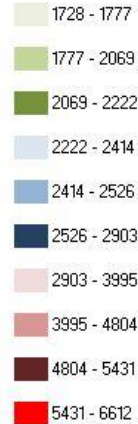
Source: Eurostat

Male over 65 circulatory rates across Europe

Average
2001 - 2007



Rates per 100,000



Average
2008 - 2012



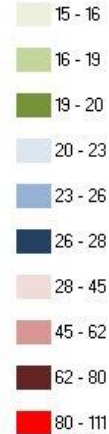
Source: Eurostat

Female under 65 circulatory rates across Europe

Average
2001 - 2007

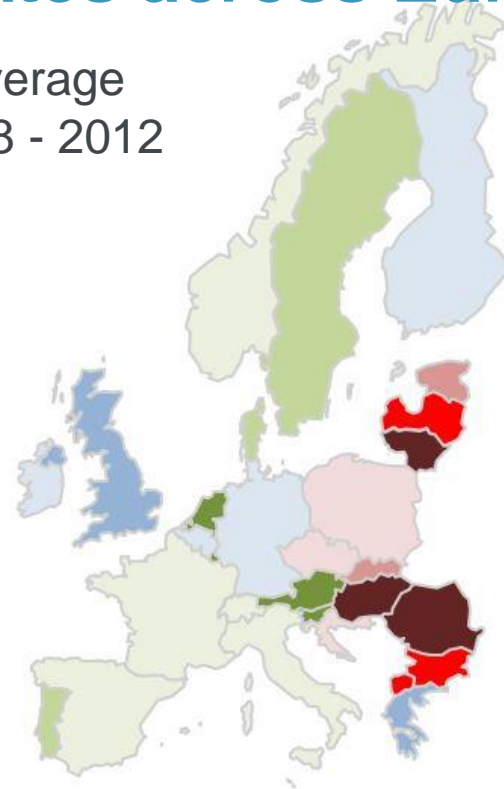


Rates per 100,000



Source: Eurostat

Average
2008 - 2012

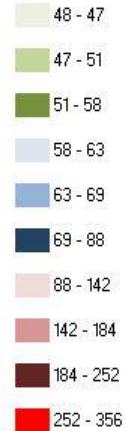


Male under 65 circulatory rates across Europe

Average
2001 - 2007

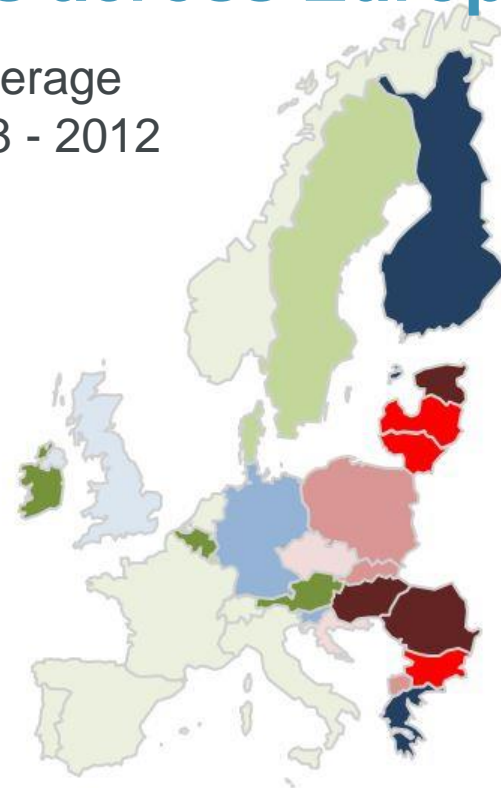


Rates per 100,000



Source: Eurostat

Average
2008 - 2012





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Conclusion

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- There is a link between economic fluctuations and mortality
- Mortality improvement rates have slowed down most significantly in group A countries
 - Slow down most significant for ages 45 – 74
 - Less significant at ages 75+
- Data suggests that Male suicide rates have increased post the financial crises in Ireland and the UK particularly at ages 45 – 64.



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References

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