PRELIMINARY ESTIMATES AND FORECASTS OF THE POPULATION PREVALENCE OF SELF REPORTED

- HYPERTENSION;
- ISCHAEMIC HEART DISEASE; AND
- STROKE

IN THE REPUBLIC OF IRELAND FROM 2005 TO 2015

Prepared by

Ireland and Northern Ireland's Population Health Observatory, Institute of Public Health in Ireland

For

The Department of Health and Children

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1. INTRODUCTION

Ireland and Northern Ireland's Population Health Observatory (INIsPHO) recently published estimates of the population prevalence of diabetes in 2005 and forecasts to 2010 and 2015 for the island of Ireland, at the national and sub-national levels. These estimates are based the PBS Model developed by York and Humber Public Health Observatory (YHPHO), Brent NHS Trust and the School of Health and Related Research (ScHARR).

The Department of Health and Children (DoHC) has requested additional estimates and forecasts for hypertension.

This paper outlines the results from preliminary work that could from the initial steps towards a more systematic approach to monitoring the prevalence of other chronic diseases on the island.

2. KEY FACTORS INFLUENCING POPULATION PREVALENCE

A number of factors will influence population prevalence including:

- Changes in population structure
  - Gender and Age
  - Ethnicity
- Changes in major risk factors
  - Obesity
  - Smoking
  - etc
- Changes in care and outcome

This report only deals with changes in population structure and obesity.

3. METHODS

Population prevalence estimates, obtained from the Health Survey of England (2003-2004) were applied to population projections supplied by the Central Statistics Office. These crude estimates were then adjusted for projected changes in BMI distribution in the Republic.

3.1 Reference prevalence rates

Hypertension

The Health Survey of England (2003-2004) provides age-sex specific prevalence estimates for three different aspsects of self-reported hypertension:

1. Hypertension (SBP ≥ 140 mmHG and DBP ≥ 90 mmHG AND/OR medicine prescribed for high blood pressure)
2. Treated hypertension (taking medicine prescribed for high blood pressure)

3. Controlled hypertension (SBP < 140 mmHG and DBP < 90 mmHG and taking medicine prescribed for high blood pressure)

Ischaemic Heart Disease (IHD) and stroke

The Health Survey of England (2003-2004) also provides age-sex specific prevalence estimates for self-reported Ischaemic Heart Disease (IHD), stroke and (Ischaemic heart disease and stroke)

Table 1: Reference population prevalence rates from the Health Survey of England (2003-2004)

	Age (in years)						
	16-24	**25-34**	**35-44**	**45-54**	**55-64**	**65-74**	**75+**
Males							
Hypertension	6.4%	11.2%	19.5%	34.5%	50.9%	63.9%	64.5%
Treated hypertension	0.0%	0.3%	2.9%	10.4%	23.2%	32.6%	31.6%
Controlled hypertension	0.0%	0.1%	1.5%	5.6%	11.2%	15.8%	10.6%
Ischaemic heart disease	0.0%	0.0%	1.0%	3.4%	11.1%	21.6%	26.5%
Stroke	0.1%	0.4%	0.3%	1.2%	2.2%	7.5%	13.3%
Ischaemic heart disease or stroke	0.1%	0.4%	1.3%	4.2%	12.7%	25.8%	34.1%
Females							
Hypertension	2.1%	5.2%	11.7%	23.8%	46.7%	64.5%	74.6%
Treated hypertension	0.2%	0.8%	2.3%	8.3%	22.2%	35.8%	40.7%
Controlled hypertension	0.2%	0.3%	1.5%	5.5%	11.6%	16.3%	12.2%
Ischaemic heart disease	0.3%	0.0%	0.5%	1.9%	5.8%	9.7%	18.1%
Stroke	0.2%	0.3%	0.6%	0.9%	2.5%	5.3%	8.8%
Ischaemic heart disease or stroke	0.5%	0.3%	0.9%	2.7%	7.7%	13.8%	24.7%

In the first step, these age-sex specific prevalece estimates were then applied to national population projections.

3.2 Population projections

Population projections disaggregated by age and gender were obtained from the CSO for 2010 and 2015. These were based on the most likely scenario MIF2 which follows current demographic trends. The same population projections were used in the diabetes forecasts.

Ethnicity is not included in these population projections and there is currently no data available on ethnicity in the Republic of Ireland. For this reason, reference prevalence rates for the "general population", and not any other ethnic group, were taken from the Health Survey for England.

Of course, these reference prevalence rates could be applied to any sub-national regions for which apprpriate population projections were available.

3.3 Obesity

The second step of the process incorporates a "time" adjustment for changes in the BMI distruibution over the period 2005-2015. This report only includes this adjustment for hypertension and stroke.

The adjustment is based on extrapolation of the linear increase in the obesity and a slow exponential decrease in normal/underweight BMI (the level of 'overweight' is obtained by subtraction) that has been observed in recent Health Surveys for England. Local obesity data in the Republic of Ireland was insufficient to do these proections.

The relative risks of hypertension corresponding to these BMI categories are taken from the 2001 Behavioural Risk Factor Surveillance System (BRFSS) in the US. The relative risks of stroke corresponding to these BMI categories are taken from the Physician's Health Study (males) and the Women's Health Study (females) in the US.

Together with the projected changes in BMI distribution above, these relative risks were used to define an obesity "adjustment factor" for 2010 and 2015. These were then applied to the aestimates of population prevalence estimates obtained in the first step. Separate adjustment factors were calculated for males and females in each year. This is the same approached used to adjust for changes in obesity in the forecasts of the population prevalence of diabetes in 2010 and 2015.

The projected changes in BMI distribution included in the model are:

Table 2: Projected BMI distributions in 2010 and 2015, by gender

	2005	2010	2015
Males			
Obese (BMI 30+)	23.1%	28.8%	33.3%
Overweight (BMI 25-29)	43.4%	44.2%	43.1%
Normal (BMI < 25)	33.5%	27.0%	23.6%
Females			
Obese (BMI 30+)	24.8%	28.5%	31.9%
Overweight (BMI 25-29)	32.9%	34.5%	34.6%
Normal (BMI < 25)	42.4%	37.0%	33.5%

2.4 Other risk factors

Changes in other risk factors are not considered in this preliminary piece of work. They could be a key part of further development of the prevalence model and forecasting method.

2.4 Changes in care and outcome

The management of high blood pressure is continually improving. This will be reflected in changes in the patterns of the three aspects of hypertension covered by this report. An associated issue are changes in management through lifestyle behaviours. Again,these issues were not considered in this preliminary work.

4. RESULTS

4.1 Hypertension

The model estimates that in 2005 there were 439,000 males and 394,000 females aged 15+ years in the Republic of Ireland with (self-reported) hypertension. Based on population change and assumed changes in BMI distribution, this is expected to rise to 660,000 males and 575,000 females in 2015. This corresponds to a population prevalence of 27.1% for males and 23.4% for females in 2005, rising to 35.6% for males and 30.3% for females in 2015.

The estimates of the population prevalence of treated and controlled hypertension are considerabley smaller.

The model estimates that there were 150,000 males and 176,000 females aged 15+ years in the Republic who reported taking medication prescribed for high blood pressure ("treated hypertension") in 2005. Based on population change and assumed changes in BMI distribution, this is expected to rise to 235,000 males and 260,000 females in 2015.

The reference prevalence rates (from the Health Survey of England) for (all) hypertension were higher for males than they were for females. However, for treated hypertension and controlled hypertension, the reference rates were higher for females than they were for males. These differences carried through to the prevalence estimates on the island. LOOK AT VALIDATION? SLAN? PBS & GMS?

Table 3: Expected number of prevalent self-reported cases (persons aged 15+ years), by year and gender

	2005	2010	2015
Males			
Hypertension	439,000	550,000	660,000
Treated hypertension	150,000	191,000	235,000
Controlled hypertension	70,000	89,000	110,000
Females			
Hypertension	394,000	481,000	575,000
Treated hypertension	176,000	215,000	260,000
Controlled hypertension	80,000	99,000	119,000

Table 4: Estimated population prevalence of self-reported cases (persons aged 15+ years), by sex and year

	2005	2010	2015
Males			
Hypertension	27.1%	31.9%	35.6%
Treated hypertension	9.2%	11.1%	12.7%
Controlled hypertension	4.3%	5.2%	5.9%
Females			
Hypertension	23.8%	27.1%	30.3%
Treated hypertension	10.6%	12.2%	13.7%
Controlled hypertension	4.9%	5.6%	6.3%

Figure 1: Expected number of prevalent cases of self-reported hypertension and treated hypertension (persons aged 15+ years), by year and gender

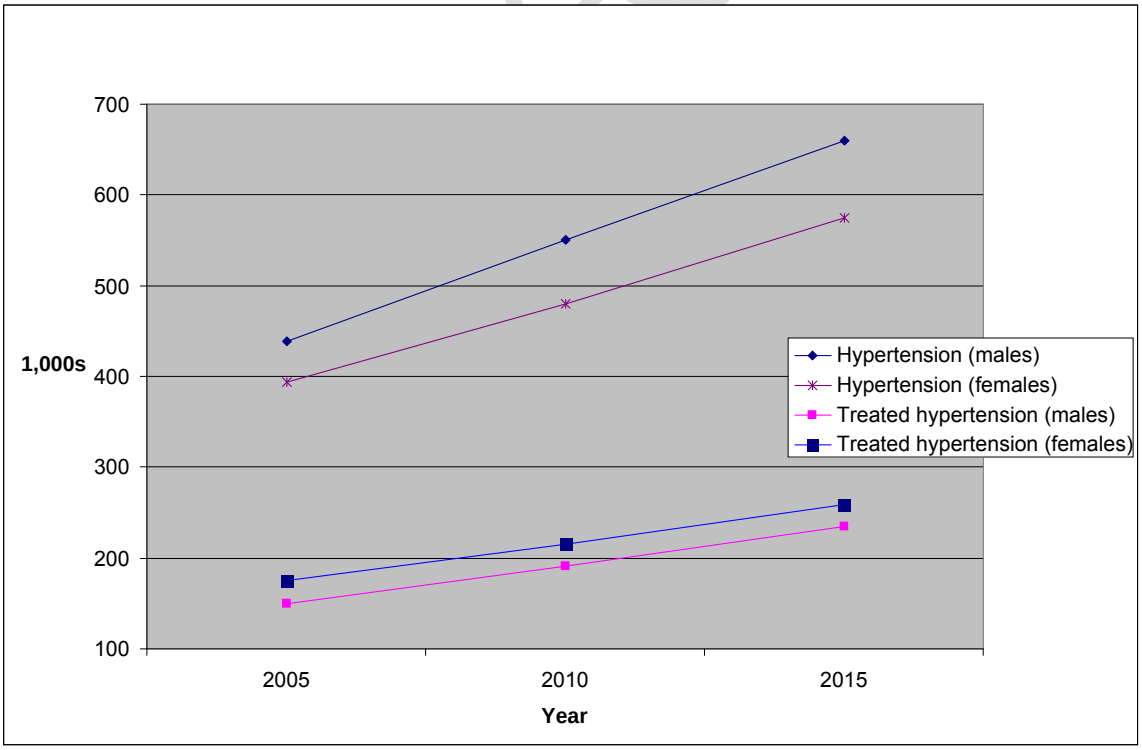


Figure 2: Estimated population prevalence of self-reported hypertension amogst males (aged 15+ Years), 2015-2015.

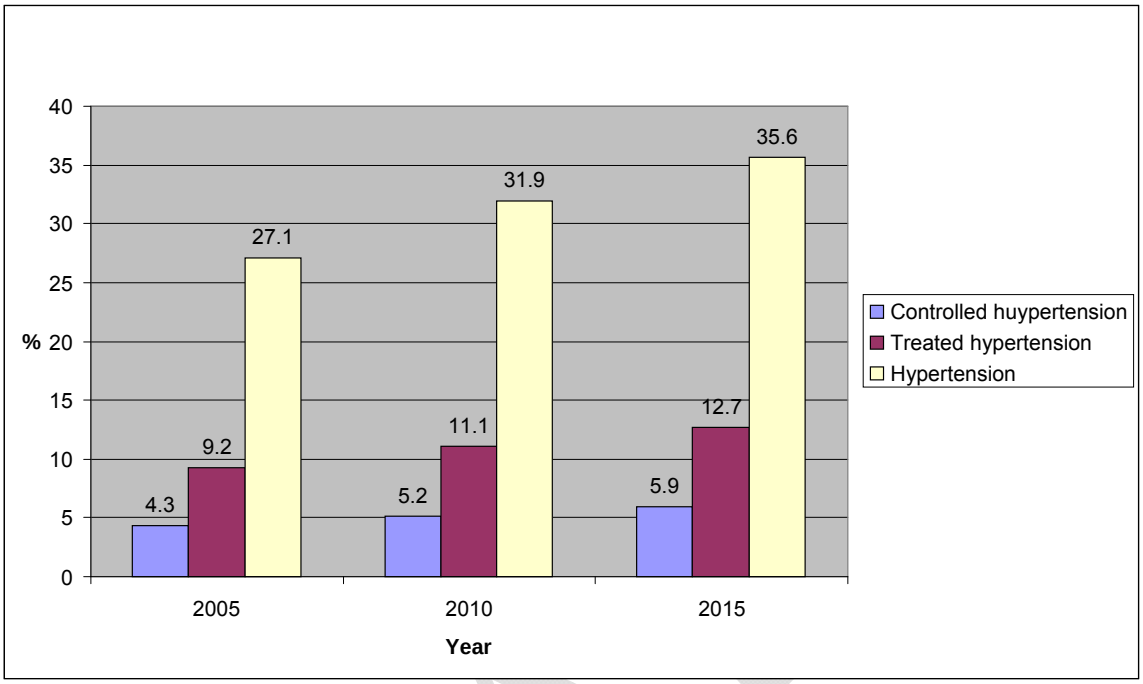
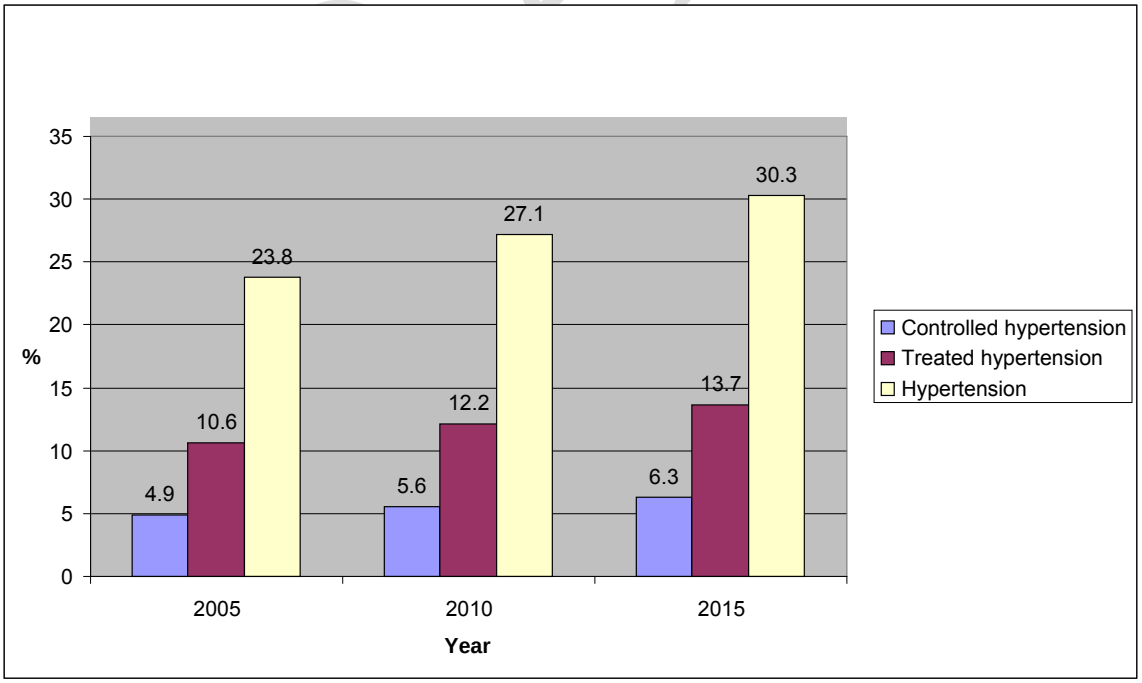


Figure 3: Estimated population prevalence of self-reported hypertension amongst females (aged 15+ Years), 2015-2015.



4.2 IHD and stroke

The model estimates that in 2005 there were 83,000 males and 55,000 females aged 15+ years in the Republic of Ireland with (self-reported) IHD. Based on poulation change and assumed changes in BMI distribution, this is expected to rise to 110,000 males and 69,000 females in 2015. This corresponds to a population prevalence of 5.1% for males and 3.3% for females in 2005, rising to 5.9% for males and 3.6% for females in 2015.

The model estimates that in 2005 there were 31,000 males and 29.000 females aged 15+ years in the Republic who reported having had a stroke. Based on population change and assumed changes in BMI distribution, this is expected to rise to 43,000 males and 37,000 females in 2015. LOOK AT VALIDATION POSSIBLE SLAN? PBS & GMS? ICR?

Table 5: Expected number of prevalent self-reported cases of IHD and stroke (persons aged 15+ years), by year and gender

	2005	2010	2015
Males			
IHD	83,000	95,000	110,000
Stroke	31,000	36,000	43,000
IHD or stroke	103,000	117,000	135,000
Females			
IHD	55,000	61,000	69,000
Stroke	29,000	33,000	37,000
IHD or stroke	80,000	86,000	97,000

Table 6: Estimated population prevalence of self-reported IHD and stroke (persons aged 15+ years), by sex and year

	2005	2010	2015
Males			
IHD	5.1%	5.5%	5.9%
Stroke	1.9%	2.1%	2.3%
IHD or stroke	6.3%	6.8%	7.3%
Females			
IHD	3.3%	3.5%	3.6%
Stroke	1.8%	1.8%	1.9%
IHD or stroke	4.9%	4.9%	5.1%

Figure 4: Expected number of prevalent cases of self-reported IHD and strokes (persons aged 15+ years), by year and gender

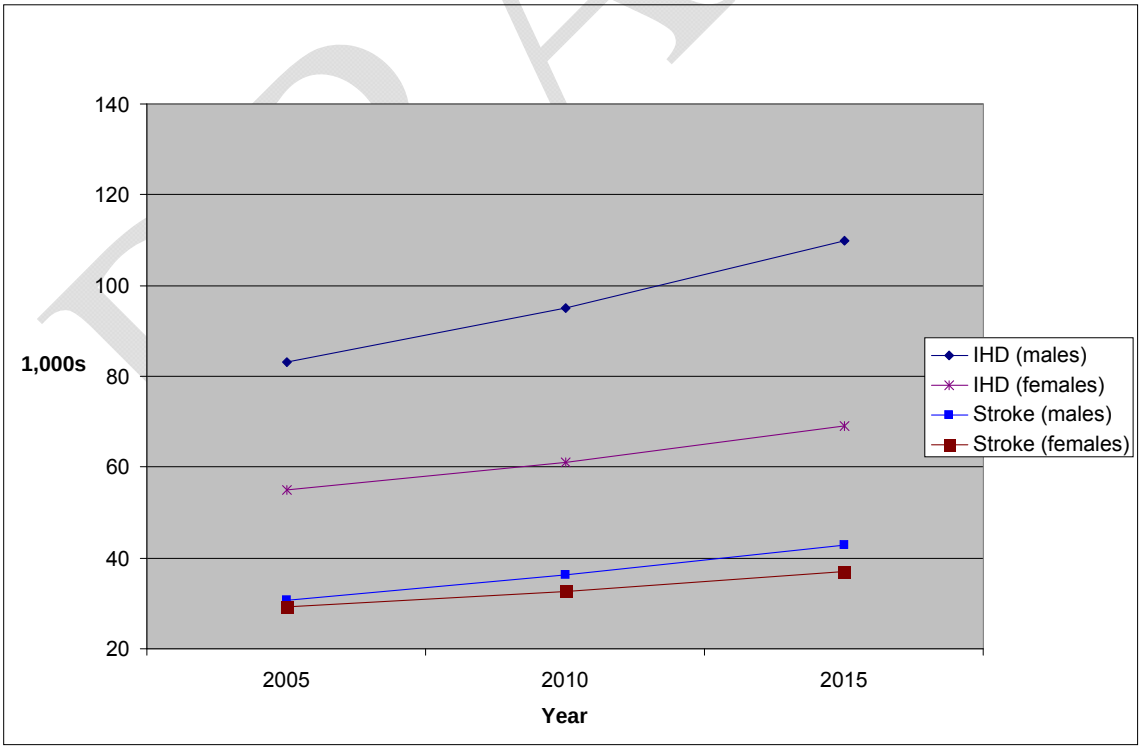


Figure 5: Estimated population prevalence of self-reported IHD and stroke amongst males (aged 15+ Years), 2015-2015.

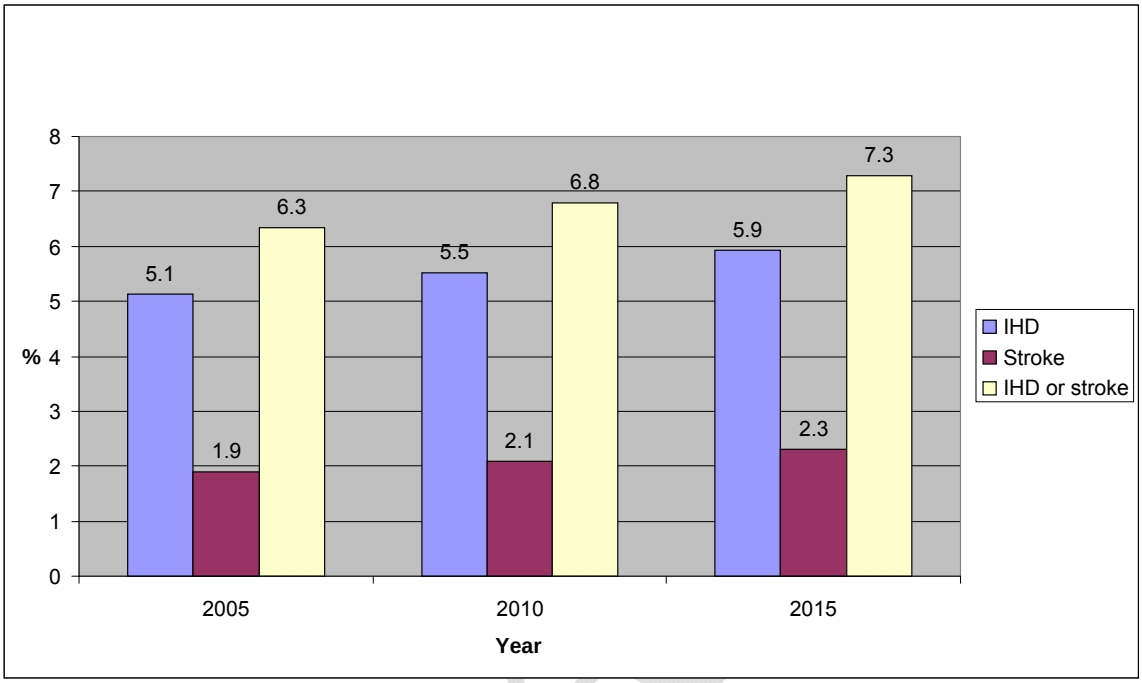


Figure 6: Estimated population prevalence of self-reported IHD and stroke amongst females (aged 15+ Years), 2015-2015.