CARDI GRANTS PROGRAMME

Research Brief

Multimorbidity in the older population

Why multiple chronic conditions matter

Ageing population - ROI

- At the 2006 census, there were 468,000 people aged 65+ (11% of the population).
- By 2041, there will be 1.4 million aged 65 and over (22% of the population).
- Life expectancy is 76.8 years for men and 81.6 years for women.
- 95% of men and women aged 70 and over rate their health as very good (19%), good (50%) or fair (26%).
- 9.1% of people aged 65 and over are still in employment (Q2 2009).

Ageing population - NI

- In 2008, there were 248,500 people aged 65+ (14% of the population).
- In 2041 the 65+ age group is projected to make up 24% of the population.
- Life expectancy is 76.3 years for men and 81.3 years for women.
- 66% of people aged 70 and over rate their health as good (25%) or fairly good (42%).
- 9% of men aged 65 and women aged 60+ are still in employment (Q2 2009).

Policy on carers – ROI

- The National Health Strategy, *Quality and Fairness: A Health System for You,* launched in 2001, is the central document on health policy in ROI. It describes a vision of health services in the coming years and describes the actions needed to achieve this.
- Responsibility for providing health and personal social services in Ireland rests with the Health Service Executive (HSE). The HSE provides a wide range of services for older people, including in-patient, acute services, step down and convalescent care, day services, rehabilitation, community services, home care and home helps.

Policy on carers - NI

- The *Investing for Health Strategy* (IfH) is the main public policy framework for health in Northern Ireland and was published in 2001.The aim of IfH is to reduce health inequalities and to improve the health and wellbeing of all citizens in Northern Ireland.
- *A Healthier Future: A 20 Year Vision for Health and Well-being in Northern Ireland* is a regional strategy for health published in 2004. This strategy acknowledges that the causes of poor health and health inequalities are neither acceptable nor sustainable and that health and wellbeing is the responsibility of everyone.

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Introduction

Chronic diseases are common in older people, and large increases in their prevalence are expected in the future. One worldwide estimate states that by 2030, 89% of all diseases will be chronic conditions (as opposed to communicable or other diseases) in high-income countries. Chronic conditions will account for 54% of all diseases in low and middle income countries (National Institute on Ageing, 2007). These chronic conditions impair the health, activities and quality of life of those they affect. In Northern Ireland (NI) and the Republic of Ireland (ROI), there are considerable financial costs to health, social care and the economy associated with chronic conditions (Balanda et al., 2010).

Having more than one chronic disease, so-called "multimorbidity", can have a severe impact on quality of life and contributes significantly to disability. Therefore, it is important for us to understand how many people live with multiple chronic diseases on the island of Ireland, and what the consequences are for their health and quality of life.

CARDI funded a project on *Multimorbidity and Disability in the Older Population of Ireland* as part of its data mining programme in 2011. It was led by Dr. George Savva of the Irish Longitudinal Study of Ageing (TILDA) (Savva et al., Forthcoming). The aim of the project was to determine the numbers of people living with multimorbidities in the Republic of Ireland (ROI) and Northern Ireland (NI), and how socio-economic status and living arrangements affect the relationship between disease and disability by region.

This research brief presents a summary of the findings of the data mining project, in addition to an examination of the impact of multimorbidity on health care and public policy.

Key findings

- Of the chronic diseases included in this study, musculoskeletal pain[1] was the most widely reported condition across the island of Ireland with a prevalence of 40%, followed by diabetes (7%) and angina (6%) (Savva et al., Forthcoming).
- 11% of the population over 50 in ROI suffered from two or more of the chronic diseases included in the study, compared to 18% of people over 50 in NI (Savva et al., Forthcoming).
- People in higher socio-economic groups showed evidence of being more protected from the effects of chronic disease than those in the lower groups (Savva et al., Forthcoming).
- Those living alone are more likely to report multimorbidity, and are slightly more likely to report a single chronic disease (Savva et al., Forthcoming).
- The prevalence of most chronic diseases was found to increase with age. In common with previous international studies, multimorbidity was found to be around twice as common in the over 75s as those aged 50-64 (Savva et al., Forthcoming).
- People reporting two or more chronic diseases are nearly 20 times as likely to report disability as people with no chronic conditions (Savva et al., Forthcoming).
- Independent of health, disease and all socio-economic factors, people over 50 in NI are more than twice as likely to report being disabled as respondents from ROI (Savva et al., Forthcoming).

1 Musculoskeletal pain affects the bones, muscles, ligaments, tendons, and nerves. Lower back pain is the most common type of musculoskeletal pain while other common types include tendonitis, myalgia (muscle pain), and stress fractures.

Understanding multimorbidity

The World Health Organization has identified preventing and tackling chronic diseases as a top health priority (World Health Organization, 2005). The challenge facing policy makers and health professionals is how to maintain health and quality of life in an ageing population with an increasing prevalence of chronic conditions. However, research into those with more than one chronic condition is in its infancy and multimorbidity has been under-considered in health systems and treatment (Fortin et al., 2007).

The Institute of Public Health in Ireland conducted a study in 2010 which showed that very large numbers of adults across the island live with hypertension, angina and heart disease, stroke and diabetes (Balanda et al., 2010). It also showed that the prevalence of each of these conditions increases dramatically with age.

As the population ages in Ireland, North and South, an increasing number and proportion of people are living with chronic disease. The Institute of Public Health study estimated that by 2020, the incidence of chronic conditions is projected to increase by around 40% in ROI and by around 30% in NI (Balanda et al., 2010).

With the large increase in chronic conditions predicted, it is important to understand multimorbidity, particularly in how it affects the older population. An international literature review recently found that multimorbidity affects more than half of the older population, and that prevalence increases in the "older old" age groups. It also found that data are insufficient for evidence-based care of older patients with multimorbidity (Marengoni et al., 2011).

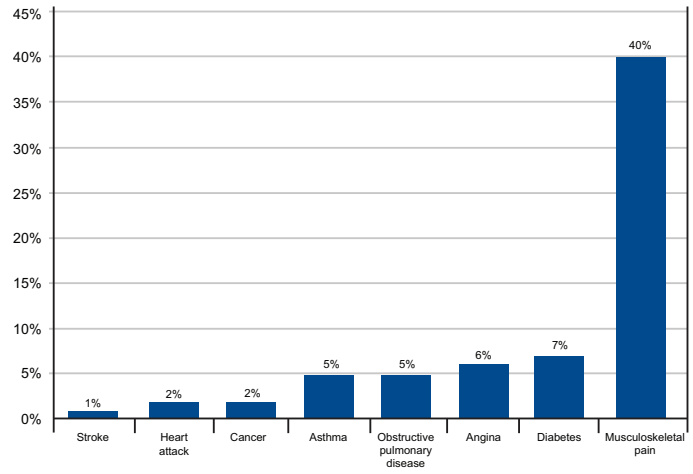
Prevalence of multimorbidity in Ireland

For the *Multimorbidity and Disability in the Older Population of Ireland* research conducted by Savva and funded by CARDI, eight chronic conditions were included in the study:

1. Heart attack
2. Angina
3. Stroke
4. Diabetes
5. Asthma
6. Chronic obstructive pulmonary disease (COPD)
7. Musculoskeletal pain (including rheumatism, arthritis and back pain)
8. Cancer

Musculoskeletal pain was the most widely reported condition across the island with a prevalence of 40%, followed by diabetes (7%) and angina (6%). Asthma and COPD have the same levels of prevalence, 5%, while cancer and stroke were reported less frequently (1-2%).

Figure 1: Prevalence of select chronic diseases across the island of Ireland



Source: Adapted from Savva et al., 2011

The study revealed some clear differences in the prevalence of chronic diseases between ROI and NI. Angina was reported far more frequently in NI, 10% compared to 4% in ROI. So too was musculoskeletal pain, 55% compared to 35% in ROI (although this is not directly comparable due to different questions used in the surveys). On the other hand, asthma was reported more frequently in ROI, 6% compared to 3% in NI.

11% of the population over 50 in ROI suffered from two or more of the chronic conditions included in the study, compared to 18% of people over 50 in NI. However, the numbers are based on a restricted number of chronic conditions measured so likely underestimate the prevalence of multimorbidity[2].

As musculoskeletal pain is the most prevalent chronic condition in the study, it is the most common co-occurring condition when considering multimorbidities. The most common condition pair across the island of Ireland is angina combined with musculoskeletal pain (3.8%). The next most common are musculoskeletal pain combined with diabetes (3.1%) asthma (3%) and COPD (3%).

There is a positive association between many pairs of conditions. Angina was most common among both those with a heart attack (37.4%) or a stroke in the past year (20.5%). COPD is common among asthma sufferers (27.4%) and vice-versa (32.3%). Musculoskeletal pain was reported frequently by all individuals suffering from a chronic condition, with prevalence ranging from 40.5% in participants reporting a heart attack to 67.5% in those suffering from angina.

Co-occurrence of conditions in the study can be linked to three factors. One is primarily cardiovascular, one is primarily respiratory and the third is an increase in chronic pain and angina. The results show that there is a tendency for chronic diseases to co-occur, even adjusting for other

2 For full details on methodology and research limitations, see the full published report.

factors such as age and socio-economic status. This suggests that certain individuals are more generally susceptible to multimorbidity, possibly through higher exposure to common risk factors to chronic disease as they age.

Who is most at risk of multimorbidity?

It is important to identify the groups of older people in the population who are most at risk of multimorbidity, as they will be in particular need of health and social care support. The study identified individuals with multimorbidity, and compared their characteristics with those of individuals with a single chronic disease and those with none.

Overall, there was little difference found between the sexes in either NI or ROI. However, a pattern of progressively worse outcomes for older people and those in lower socio-economic groups was observed across the island of Ireland. This confirms the earlier work on chronic conditions by the Institute of Public Health in Ireland, which found that chronic conditions occur more frequently among poor and vulnerable people in the population of Ireland, North and South. This is at least partly due to the fact that the risk factors for chronic conditions (including poverty, unemployment, the environment, smoking, alcohol consumption, diet and physical activity) are distributed unequally across society (Balanda et al., 2010).

Living situation also appears to have an effect, with multimorbidity and single disease morbidity both being more prevalent for people living alone compared to those living as a couple. Those living alone are around 1.4 times more likely to report multimorbidity, and are slightly more likely to report a single chronic disease.

There is a significant difference in the likelihood of multimorbidity between the lower socio-economic groups and the higher. This difference is more pronounced in NI than in ROI. In NI, those in the lowest group are 2.2 times more likely to report multimorbidity than those in the highest group, and 1.7 times more likely to report a single chronic disease. In ROI, the lowest group are 1.6 times more likely to report multimorbidity, and are no more likely to report a single chronic condition.

The results also reveal differences in levels of multimorbidity across areas in both NI and ROI. Levels of multimorbidity varied by less than 2% across the four HSE regions in ROI, from 10.3% in the South to 12.2% in Dublin / Mid-Leinster. In NI, however, the proportion of the population over 50 reporting two or more chronic diseases ranged from 16.3% in the Southern region to 20.4% in the Western region.

Cardiovascular conditions were more common in men while respiratory conditions and musculoskeletal pain were more common in women. The prevalence of most chronic diseases was found to increase with age. In common with previous international studies, multimorbidity was found to be around twice as common in the over 75s as those aged 50-64.

The impact on self-rated health, disability and quality of life

This section reports on the results of the study which explore the impact of chronic disease and multimorbidity on three important factors in later life: self-rated health, disability and quality of life. A worsening of all health measures increases with the numbers of chronic diseases. However, it is unclear whether the effect is multiplicative, *i.e.* whether or not having two diseases is worse than the sum of having each disease independently. Across the island of Ireland, 28% of people over the age of 50 reported "fair or poor" self-rated health. 26% report a limitation in daily activities and 16% report "fair or poor" quality of life. As the Table below shows, NI respondents reported more negative outcomes for each of these three measures than respondents in ROI.

Table 1: Adverse health outcomes reported in NI and ROI

	Northern Ireland	Republic of Ireland
Fair or poor self-rated health	41%	24%
Limitation in daily activities	44%	20%
Fair or poor quality of life	8%	5%

Source: Savva et al., 2011

Self-rated health

Self-rated health is a known indicator of health outcomes and mortality, even after adjusting for individual diseases. In the ROI population with no chronic disease, just 2% report their health as poor. 5% of people with just one chronic disease report their health as poor, but 21% of people with two or more chronic diseases report poor health. This is independent of other factors such as age, marital status, sex and socio-economic status. The pattern is very similar in NI, where 3% of people with no chronic disease report poor health, compared to 13% with one chronic disease and 40% with two or more chronic diseases. This suggests that on the island of Ireland, multimorbidity is very strongly related to poor self-assessed health. In fact, those with a single chronic disease are 3.9 times as likely to report their health as fair or poor compared to people with no chronic condition. And those with two or more chronic diseases are 17 times more likely to report their health as fair or poor.

Table 2: % of people reporting poor health by number of chronic diseases, North and South

	Northern Ireland	Republic of Ireland
No chronic disease	3%	2%
One chronic disease	13%	5%
Two or more chronic diseases	40%	21%

Source: Savva et al., 2011

Within groups defined by the numbers of chronic diseases, the study found no consistent relationship between age and self-rated health. Older people are no more likely to complain of poor health than any of the other age groups. This indicates that age does not have a great effect on the relationship between chronic diseases and self-rated health, *i.e.* older age groups with the same chronic conditions as younger age groups do not report worse levels of self-rated general health. In fact, for people with multimorbidity, there is some evidence that older age groups report better self-rated general health than younger age groups, which is consistent with the findings of other studies.

Chronic disease does not explain the difference in perceived health between social classes, as those in lower socio-economic groups report themselves to be in poorer health as people with the same number of chronic conditions but in higher socio-economic groups. This suggests that the perceived health of people in lower social class groups is more strongly affected by the presence of chronic conditions when compared to those in higher social class groups.

Disability

Chronic disease has a significant effect on disability, and this effect is independent of other demographic or economic factors including age. Results of the study show that:

- In ROI, 15% of the over 75 age group with no chronic disease reported a disability.
- 55% of 50-64 year olds with multimorbidity were disabled.
- In NI, 26% of the over 75 age group with no chronic disease reported a disability,
- 85% of the 50-64 age group with multimorbidity were disabled.

This suggests that a large proportion of disability in the population over 50 can be explained by multimorbidity or the occurrence of a single chronic disease. In those with no chronic disease, disability increases with age, but among those with multimorbidity, disability does not depend on age. People reporting two or more chronic diseases are nearly 20 times as likely to report disability as people with none. This is true even after adjusting for age, sex, living arrangement and socio-economic status. Interestingly, the results show that even after health and chronic disease are taken into account, people aged over 75 are more likely to be disabled than those between 50 and 64. Those aged between 65 and 75 are not, however.

The relationship between increasing age and disability is unclear and can only be established through more analysis of smaller age categories. The results also show that there is a significant difference between NI and ROI when it comes to reporting disability. Independent of health, disease and all socio-economic factors, people over 50 in NI are more than twice as likely to report being disabled as respondents from ROI.

Quality of life

The study indicates that a large proportion of the effect of chronic disease on quality of life is mediated by the effect of disease on disability. In NI, only 4% of people with multimorbidity who were not disabled reported poor quality of life. However, 22% of people with multimorbidity who were disabled reported a poor quality of life, making them over five times more likely to report a poor quality of life. Reporting poor health appears to be directly linked to reporting poor quality of life, irrespective of the number of chronic conditions reported. This suggests that perceived health and disability are more important determinants of quality of life than chronic disease.

One of the findings with regard to health inequalities is that there appears to be a relationship between reporting poor quality of life and socio-economic grouping. However, this appears to be true only for those people with multimorbidity. This suggests that multimorbidity has more impact on the quality of life of those in lower socio-economic groups.

Some groups in the study were more likely to report a poor quality of life than others. Older people from NI are 1.5 times more likely to report poor quality of life than older people from ROI. Respondents who are divorced, widowed or separated were 1.4 times as likely to report poor quality of life as those who are married or living with a partner. However, there is a slight North / South difference in that people who are married or cohabiting are just as likely to report one chronic condition as those who live alone in NI. People who live alone are more likely to report multimorbidity in both NI and ROI. People with a single chronic condition are 2.7 times as likely to report poor quality of life compared to those with none. Those with multimorbidity are 6.3 times as likely to report poor quality of life.

Policy implications

The CARDI-funded research shows that, on the island of Ireland, multimorbidity, even considering just eight chronic diseases, is widespread. It can be linked to negative effects on self-rated health, disability and quality of life. It is therefore important that evidence based approaches to tackle multimorbidity form part of health care strategies in Ireland, North and South.

Two policy documents highlight the importance of primary prevention and the need to reduce health inequalities when it comes to chronic diseases: *Policy Framework for the Management of Chronic Diseases* in ROI (Department of Health and Children, 2008) and *Service Framework for Cardiovascular Health and Wellbeing* in NI (DHSS&PS, 2008). However, neither document specifically addresses the issue of multimorbidity, or multimorbidity in the older population.

The WHO has identified three principles of action on the social determinants of health, which should form the basis of policy action on multimorbidity. These are:

- Improving daily living conditions.
- Tackling the inequitable distribution of power, money and resources.
- Measuring and understanding the problem and assessing the impact of action (World Health Organization, 2008).

Research from the U.S. (Boyd & Fortin, 2010) indicates that patients with multimorbidity have complex healthcare needs that are not being met by current approaches in healthcare systems. The care is often fragmented, incomplete, inefficient and ineffective. The risk of potentially avoidable hospital admissions or preventable complications in hospital treatment increases dramatically with the number of chronic conditions among older adults.

Additional research from Australia and New Zealand shows that neither country explicitly acknowledges multimorbidity as a major factor in their policies addressing chronic illness, as is the case in both NI and ROI. This is despite the fact that multimorbidity places substantial demands on the health systems of these countries, and these demands are predicted to increase dramatically in the near future (Aspin, et al., 2010).

The fundamental approach in treating people with more than one chronic condition needs to be centred on the patient (and family) rather than on separate conditions at all levels of the health system. Understanding how to deliver this type of care effectively and efficiently is an enormous challenge for healthcare professionals, researchers and policy makers today (Boyd & Fortin, 2010). It is also crucial to include unpaid caregivers in public health policy initiatives and health system design, given the importance of family and unpaid carers in improving the health of people with multimorbidity. Carers can also be people with chronic conditions themselves.

Multimorbidity in the older population requires particular attention. Older adults with more than one chronic condition often have to manage complicated medication and treatments (Haverhals, et al., 2011). They are also more susceptible to post-operative complications and are more likely to have reduced mobility, making the management of chronic conditions more difficult. As a result, the policy and healthcare approaches adopted by service providers need to take the particular needs of the older population into account.

Conclusion

This study has provided important evidence on the impact and consequences of multimorbidity across the island of Ireland. It shows that multimorbidity is around twice as common in the over 75s as those aged 50-64, is more common in single or widowed individuals and also in those from lower socio-economic classes. There also appears to be some difference in the effect of multimorbidity on quality of life across socio-economic groups. These differences across groups show that chronic conditions are not just a health issue, but an issue of poverty and deprivation. These inequalities must be addressed as part of any policy approach.

Tackling chronic conditions and multimorbidity requires a significant effort from both a public health and a clinical perspective. This study highlights the need to tackle the social determinants of health in reducing the effects of inequalities on the accumulation of multimorbidity. We also need to ensure good clinical management of conditions to avoid the onset of disability when conditions start to accumulate.

There is a general consensus among researchers on chronic conditions that in order to understand the causal relationships between these factors, large-scale longitudinal studies of ageing must be developed. Expanding the body of knowledge on multimorbidity and its consequences will be invaluable in the development of public health policy and clinical interventions for promoting successful ageing.

Methodology[3]

The *Multimorbidity and Disability in the Older Population of Ireland* study used data gathered by two population-representative studies of health and wellbeing to examine the causes and consequences of multimorbidity in older people across the island of Ireland. For NI, the data was drawn from the Northern Ireland Health and Social Wellbeing Study (DHSS&PS, 2006). In ROI, the data was taken from the Survey of Lifestyle, Attitudes and Nutrition in Ireland, SLÁN (Department of Health and Children, 2008).

The sample in the study is made up of 1,904 individuals from NI aged 50 and over and 4,255 individuals from ROI aged 50 and over. The datasets North and South were harmonised and included variables such as socio-economic factors, incidence of chronic disease and consequences of disease in terms of self-rated health, disability and quality of life.

The NI and ROI studies were sufficiently similar to allow harmonisation of the datasets with respect to chronic diseases, socio-economic factors and self-rate health, disability and quality of life. However, the questions asked in each study are not identical, therefore the research team advice caution when comparing the results for prevalence of conditions across the island of Ireland.

The study also revealed limitations in analysing specific pairs of chronic conditions unless there is a very large sample size. There were also significant difficulties in comparing NI data with ROI data as a result of the lack of harmonisation in questions asked and data gathered in surveys. There is also strong evidence of different perception of what constitutes ill-health and limitation in daily activity between NI and ROI.

Future studies which cover large proportions of the older population and are comparable between NI and ROI will enable many important questions regarding the role of multimorbidity in the ageing process to be answered.

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3 Description of the methodology can be found in the full report.

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