EConDA lay person report

Overview

PRIMARY PREVENTION IS THE KEY TO A HEALTHY FUTURE

'Economics of Chronic Diseases (EConDA)' is a European Union (EU) co-funded project designed to help EU Member States prioritise, develop and implement cost-effective policies to prevent chronic diseases and reduce premature deaths in the most vulnerable populations, thereby reducing health inequalities.

EConDA demonstrated that interventions addressing risk factors such as obesity and smoking before chronic diseases develop are generally more cost-effective in terms of healthcare savings – including social care, welfare costs and loss of work productivity - than treating an individual for a chronic condition.

In times of economic austerity and ageing populations, economic evaluation in health is crucial to study the burden of disease and to assess which policies could best impact disease trends.

Chronic non-communicable diseases, including cardiovascular diseases, cancer, diabetes and chronic respiratory diseases, are the leading cause of mortality worldwide and in Europe, and are responsible for more than 86% of all deaths.[1] Chronic diseases also represent a major economic burden: 70-80% of health care budgets, an estimated € 700 billion per year, are spent on chronic diseases in the EU alone.[2]

The EConDA project[3], which lasted 2.5 years (April 2013-October 2015), and was led by the UK Health Forum together with sixteen partners[4], received EU funding with the dual objective of assisting EU Member States to develop, select and implement more cost-effective policies to improve chronic disease prevention and to reduce health inequalities due to chronic diseases. The EConDA project focused on 8

[1] WHO Europe http://www.euro.who.int/en/health-topics/noncommunicable-diseases
[2] EU Summit on Chronic Diseases Conclusions http://ec.europa.eu/health/major_chronic_diseases/docs/ev_20140403_mi_en.pdf
[3] www.econdaproject.eu
[4] The consortium includes partners from 8 European countries. · Associated Partners: UK Health Forum (Project Leader), European Heart Network (Belgium), European Society of Cardiology (France), Health Equalities Group (UK), International Diabetes Federation Europe (Belgium), Lithuanian University of Health Sciences (Lithuania), National Institute of Health Doutor Ricardo Jorge, IP (Portugal), University of Groningen (Netherlands) · Collaborating Partners: World Health Organization, Organisation of Economic Cooperation and Development, European Society for Medical Oncology (Switzerland), European Cancer Organisation (Belgium), European Respiratory Society (Belgium), European Kidney Health Alliance (Belgium), European Association for the Study of the Liver (Switzerland), University of Helsinki (Finland), Foundation of European Nurses in Diabetes (UK).

countries: Bulgaria, Finland, Greece, Lithuania, the Netherlands, Poland, Portugal, and the United Kingdom.

EConDA used a micro simulation model developed by the UK Health Forum (formally the National Heart Forum)[5]. The model used existing population and disease data from each EConDA country to create virtual datasets that estimated population characteristics, health behaviours and chronic disease outcomes to the year 2050.

The model focused on coronary heart disease, hypertension, diabetes, lung cancer, chronic kidney disease, stroke, and chronic obstructive pulmonary disease, as well as two risk factors - obesity and smoking. Risk factors were predicted separately for men and women with differing levels of education and for different age groups. The microsimulation model further predicted the impact of different interventions to prevent and treat chronic diseases, and their associated savings in health care costs and improvement in quality of life.

Structure of the Project

Consensus on cost-effectiveness (Work package 4)

This work package aimed to reach a consensus amongst experts on the best way to measure the cost-effectiveness of interventions for chronic diseases.

A review of the literature and interviews with experts were carried out to inform a round-table discussion. The key findings were as follows:

- Various measures of cost-effectiveness should be used including: direct healthcare costs, indirect or non-healthcare costs (such as welfare costs), Quality Adjusted Life Years[6], incidence cases (i.e. new cases in a given time period) of chronic disease avoided, life years gained
- A 'societal' perspective should be taken. This means including costs of disease that are not just related to healthcare, but also non-healthcare costs such as loss in productivity due to sickness, and changes in quality of life as a result of an intervention
- Include country-specific measures of cost-effectiveness where possible e.g. health costs of disease in a specified country.

This consensus was used to inform the development of the cost-effectiveness model in work package 6. The major challenge was to source the necessary data to generate the most accurate estimates.

[5] Tackling Obesities enquiry (Foresight, 2007).

[6] NICE glossary 2015: Quality-adjusted life year (QALYS): 'A measure of the state of health of a person or group in which the benefits, in terms of length of life, are adjusted to reflect the quality of life. One QALY is equal to 1 year of life in perfect health. QALYs are calculated by estimating the years of life remaining for a patient following a particular treatment or intervention and weighting each year with a quality of life score (on a zero to 1 scale). It is often measured in terms of the person's ability to perform the activities of daily life, freedom from pain and mental disturbance.'(https://www.nice.org.uk/glossary?letter=q)

The findings from this work package can be found here: http://www.econdaproject.eu/publications.php

Computer models of chronic diseases (work package 5)

This work package developed computer models of several chronic diseases: type 2 diabetes (T2D), chronic obstructive pulmonary disease (COPD), chronic kidney disease (CKD), coronary heart disease (CHD), hypertension, stroke and lung cancer.

Two 'risk factors' for these diseases were included. These were smoking and overweight/obesity.

'Multi-stage' disease models were developed for T2D, COPD and CKD. This means that instead of an individual in the model having a disease or not, they may pass through different stages of a disease. Figure 1 illustrates this.

Figure 1: Possible transitions between different stages of diabetes used in the micro-simulation models

The purpose of including multi-stage diseases is that a range of different interventions can be tested at each disease stage. For instance, a prevention intervention might reduce an individuals risk of getting the disease in the first place (e.g. reducing obesity will reduce the risk of getting diabetes), a screening intervention might highlight that a person has pre-diabetes or stage 1 CKD and can be treated to prevent progression to the next stage. The model can also treat individuals who already have a disease, allowing them to return to a healthy state or an earlier stage of a disease e.g. moving from later stages of COPD back to stage 3 or 2 for instance.

Key findings from work package 5:

Overweight and obesity	Smoking
• Obesity is predicted to increase across the majority of the EConDA countries and across all levels of education by 2050. • Increasing obesity is projected to result in increases in chronic diseases over time, with widespread effects on the economy of the health system and wider society.	• By 2050, smoking prevalence is forecast to decrease across all of the countries that were modelled.
• Overweight and obesity predictions vary by education, but the pattern is not consistent between countries. For example, 35% of Polish men with higher education are predicted to become obese by 2050 compared to 49% with lower education (see Figure 2) In contrast, 51% of Portuguese women with higher education are predicted to become obese by 2050 compared to 39% with lower education (see Figure 3); Portuguese women with lower education are also predicted to have lower levels of overweight[7].	• There is a social gradient such that a greater number of individuals in the less educated group smoke. This is predicted to persist through to 2050. • Data by smoking prevalence and education level were available for Finland, Lithuania, the Netherlands, and the UK only. Prevalence of smoking was projected to decrease across both education groups in these countries.
• Across all countries the specified chronic diseases were predicted to rise by 2050	

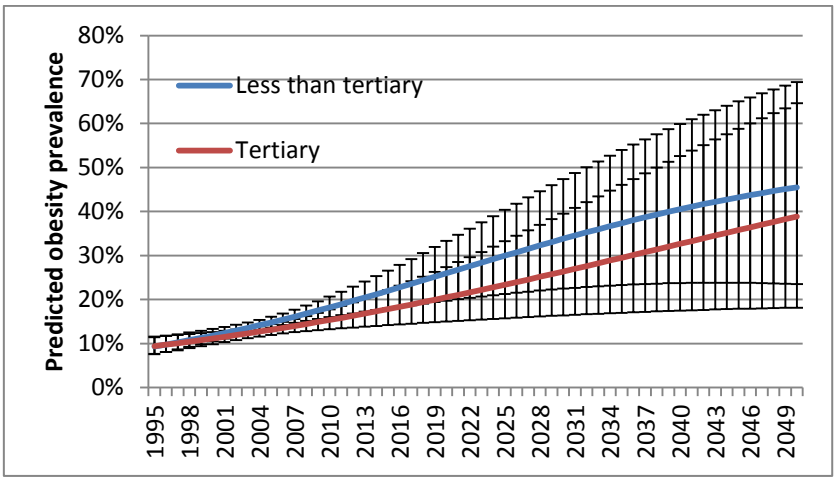

Figure 2 Predicted obesity prevalence among Polish males, by education group

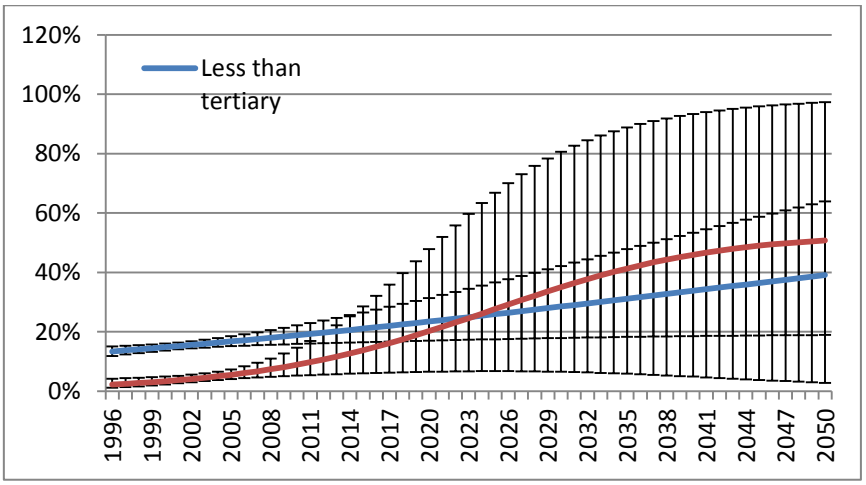

Figure 3 Predicted obesity prevalence among Portuguese females, by education group

[7] While the EConDA projections indicate the anticipated burden of the problem for different groups, there was not enough information about education and BMI for some countries to make precise predictions to 2050 (as indicated by the vertical grey interval lines for each year on Figure 2 and Figure 3)

The findings from this work package can be found here: http://www.econdaproject.eu/publications.php

Cost-effectiveness of prevention, screening and treatment interventions (work package 6)

This work package used the findings from Work package 4 to develop a cost-effective module of the simulation model that links to the disease models developed as part of work package 5. In this way we could test the impact of important risk factors (e.g. smoking and obesity) on the future burden of chronic disease, as well as the impact on costs incurred by the health system and wider society

Key findings from Work Package 6

Overweight and obesity interventions	Smoking interventions
• Significant health and economic gains can be achieved with small reductions in BMI.	• Smoking cessation services (SCS) are cost-effective and have an important impact on reducing the future burden of smoking-related diseases.
• Multi-component lifestyle interventions[8] implemented annually substantially reduce obesity-related diseases. • Maintaining weight loss is more beneficial than if weight is regained after an intervention. Investment in weight loss maintenance interventions is important.	• SCS are projected to have the largest epidemiological impact on COPD and stroke in absolute terms. • SCS are more cost-effective and result in greater gains in quality-adjusted life years when compared to treatment of a single smoking-related disease.
• By its nature, a sugar sweetened beverage (SSB) tax is more cost-effective than weight loss programmes, but both interventions were found to be cost-effective. • Introducing a 20% SSB tax will have an important impact on major chronic disease, such as CHD and type 2 diabetes.	• Important policy measures such as tobacco taxation and bans on smoking in public places are likely to be responsible for downward trends in smoking. Retaining these policies is imperative if the predicted trends are to be maintained.
• The results show the importance of chronic disease prevention to save health system & societal costs.	
• Primary prevention interventions are cost effective when a time horizon more than 10 years is used.	
• Economic analyses of chronic disease should take a societal perspective to account for costs beyond healthcare.	
• The EConDA tool can be downloaded so that users can test the effectiveness and cost-effectiveness of interventions in relation to the future burden of disease: www.econdaproject.eu/tools.php	

Validation of the model (work package 7)

This work package compared the results of the EConDA computer models with other similar models for validation purposes. However, comparison between models was difficult given the very different parameters involved, and the unique nature of the EConDA models which allow progression forwards and backwards through disease stages unlike other models. Comparisons were made with the Dynamo HIA model and differences between other model parameters are outlined in work package 7.

Sustainability of the project: What next?

The EConDA project has enabled the development of a microsimulation model that can test the effectiveness and cost-effectiveness of interventions to prevent, screen and treat chronic diseases within

[8] These weight loss interventions include a diet, physical activity and cognitive component.

the same model. The model has been developed in such a way that it can easily be updated when new data become available, and new diseases can be added to it.

The EConDA project will be sustained with several future projects building on this work to:

- Include additional multi-stage diseases such as dementia and cancers
- Include combined risk factors e.g. to estimate the combined effect of obesity and diabetes on CHD
- Expand the number of countries that are included in the model and related tool
- Increase the number of risk factors included such as alcohol, salt and physical inactivity
- Update the existing models with new data when they become available
- Test a range of combined interventions such as: the impact of increased controls on food marketing to children, buy-one-get-one free offers and a sugar sweetened drinks tax, the impact of preventing smoking through standardised packaging alongside a tobacco duty escalator.
- Statistically validate each variable in the model to test its impact on the results

More information about the EConDA project can be found at: www.econdaproject.eu