



Economics of Chronic Diseases

Chafea Project Grant Nr: 2012 12 13

Acronym:

EConDA

FINAL REPORT

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Declaration by the project coordinator

I, as project coordinator of this project grant and in line with the obligations stated in the Grant Agreement declare that:

- The report represents an accurate description of the work carried out under this project grant for this reporting period;
- To my best knowledge, the financial statements that are being submitted as part of this report are in line with the actual work carried out and are consistent with the report on the resources used for the project and, if applicable, with the certificate of the financial statement.
- All beneficiaries, in particular non-profit public bodies, have declared to have verified their legal status. Any changes have been reported under section WP1 Coordination and project management, in accordance with the requirements of the Grant Agreement.

Name of the project coordinator:

.....

Signature:

.....

Date:

.....

Specification of the project grant

Project title:	
Acronym:	EConDA
Date(s) of the Project:	15 April 2013 to 14 October 2015
Starting date of the grant agreement:	15/04/2013
Duration of the grant agreement (in months):	30 months
EC co-funding:	CHAFEA
Priority area:	3.2 Actions under the second objective 'Promote health'
Sub-action:	3.2.4.2 Preventing chronic diseases – Examine the cost-effectiveness of integrated approaches to chronic disease prevention with a particular focus on diabetes, cardiovascular diseases or respiratory diseases.
Action:	3.2.4 Preventing chronic diseases – Examine the cost-effectiveness of integrated approaches to chronic disease prevention with a particular focus on diabetes, cardiovascular diseases or respiratory diseases.
Main partner information and contact person:	UK Health Forum, London, UK Contact: Laura Webber, laura.webber@ukhealthforum.org.uk
Partners involved in the Project (Institution, Acronym, Contact Person):	European Heart Network (EHN), (Susanne Logstrup) European Society of Cardiology, (Ilaria Ileggeri) Health Equalities Group, (Robin Ireland) International Diabetes Federation Europe (Mayur Mandalia) National Institute of Health Doutor Ricardo Jorge (Ana Rito) University of Groningen (Pepijn Vemer)
List of collaborating partners:	World Health Organization Organization of Economic Cooperation and Development European Society for Medical Oncology European Cancer Organisation European Respiratory Society European Kidney Health Alliance European Association for the Study of the Liver University of Helsinki Warsaw University of Life Sciences Foundation of European Nurses in Diabetes
Keywords (using MESH terms):	<ol style="list-style-type: none"> 1. Non-communicable diseases 2. Statistical Modelling 3. Chronic disease 4. Cost-effectiveness 5. Public health

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Final Publishable Executive Summary

This is a comprehensive summary of your project. It should be formatted to be printed as a stand-alone paper document - extending to a maximum of three pages- to reach a wide audience, including the general public. Kindly ensure that it is of suitable quality to enable direct publication by CHAFAEA.

Please structure your executive summary as follows:

A summary description of the project scope and objectives (general and specific).

A description of the work done, including programme, evaluation and dissemination activities.

The final results in terms of outputs and outcomes, and their potential impact and use by the target group (including benefits).

The strategic relevance and contribution to the EU Health Programme.

Conclusions and recommendations.

Please include available diagrams or photos illustrating the work of the project.

Project scope and objectives

Chronic non-communicable diseases are the leading cause of morbidity, mortality and disability worldwide and in Europe, are responsible for more than 86% of all deaths¹. Chronic diseases also contribute to health inequalities and 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 alone². 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.

EConDA stands for 'Economics of chronic diseases'. The key aim of EConDA was to aid EU Member States to develop, select and implement more cost-effective policies to improve chronic disease prevention and impact upon populations with the highest rates of premature deaths from chronic diseases and reduce health inequalities.

The specific objectives of EConDA were to:

1. Achieve consensus among relevant experts on the methodology for measuring cost-effectiveness of interventions to prevent, screen and treat chronic diseases.
2. Develop a computer simulation model of the future burden of chronic diseases
3. Develop a demonstration model for integrated approaches to address cost-effectiveness of various interventions for chronic disease prevention
4. Implement the model in specific countries
5. Validate the model
6. Publish and disseminate an evaluation of the study

The countries studied in the EConDA project were: Bulgaria, Greece, Finland, Lithuania, Netherlands, Poland, Portugal and the UK

Activities and key findings of the project and their potential impact and use by the target group

Consensus on the best ways to measure cost-effectiveness (objective 1)

Consensus was achieved among key international organizations and experts on methodology for measuring the cost-effectiveness of interventions to prevent, screen and treat chronic diseases. Three reports were produced and are available for consultation from the website: A report on the

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

literature review on cost-effectiveness of interventions for chronic diseases, a qualitative analyses of expert testimony on cost-effectiveness analysis and a report on the consensus meeting on best practice to measure cost-effectiveness in public health.

The **key findings** of the consensus meeting were:

- Various measures of cost-effectiveness should be used.
- A 'societal' perspective should be taken to account for costs beyond healthcare.
- Country-specific measures of cost-effectiveness should be included where possible.
- It is sometimes a challenge to source the necessary data to generate the most accurate estimates on cost-effectiveness of interventions.

Development of an epidemiological disease model (objective 2)

Multi-stage computer models of several chronic diseases were developed to enable the testing of a range of interventions from policy and community level interventions to screening and treatment. The models incorporate two risk factors (smoking and BMI), and seven major chronic diseases (coronary heart disease, type 2 diabetes, chronic kidney disease and chronic obstructive pulmonary disease, stroke, lung cancer and hypertension). Risk factor prevalence was projected to 2050 based on current and historical trends.

Figure 1 illustrates multi-stage disease models using diabetes as an example. Multi-stages enable interventions to be tested at different stages of disease progression from prevention to treatment.



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

The **key findings** of the risk factor projections were:

Overweight and obesity model results	Smoking model results
<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • By 2050, smoking prevalence is forecast to decrease or remain stable across all of the countries that were modelled with the exception of Poland and Portugal where smoking prevalence is projected to increase. Within countries there were differences in the trends by age group and sex.
<ul style="list-style-type: none"> • Overweight and obesity predictions vary by education, but the pattern is not consistent between countries. 	<ul style="list-style-type: none"> • 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.
<ul style="list-style-type: none"> • Across all countries the specified chronic diseases were predicted to rise by 2050 	

Development of a cost-effectiveness simulation model and downloadable tool and their implementation in 8 EU countries (objectives 3 and 4)

The disease model described above was further developed to evaluate the economic burden of diseases in the future and the cost-effectiveness of potential interventions. A downloadable tool using the disease model was developed for use by policy makers and tested at the EConDA workshops. The effect of selected interventions on the health and economic burden of chronic diseases was modelled in 8 countries.

The **key findings** from the disease models were:

Overweight and obesity interventions	Smoking interventions
<ul style="list-style-type: none"> • Significant health and economic gains can be achieved with small reductions in BMI. 	<ul style="list-style-type: none"> • Smoking cessation services (SCS) are cost-effective and have an important impact on reducing the future burden of smoking-

	related diseases.
<ul style="list-style-type: none"> Multi-component behavioural change interventions³ 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. 	<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> 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. 	<ul style="list-style-type: none"> 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.
<ul style="list-style-type: none"> The results show the importance of chronic disease prevention to save health system & societal costs. 	
General findings	
<ul style="list-style-type: none"> Primary prevention interventions are cost effective when a time horizon more than 10 years is used. 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 in each EConDA country: www.econdaproject.eu/tools.php 	

Other project activities

- Disease models are very data intensive and a large amount of time was dedicated to data collection. Poor data or the lack of it is a major limitation of the models in some countries.
- Disease models were validated against existing models (**objective 5**).
- Regular project meetings as well as a number of dissemination activities took place including publication of a leaflet, website, peer-reviewed article, conference presentations, and country workshops.
- The project has been evaluated on a yearly basis. As well as this, an evaluation of the country workshops, conference and downloadable tool was carried out (**objective 6**).

Impact and benefits by target group

The outputs of the project were aimed at policy-makers and stakeholders involved in preventing chronic diseases across Europe. EConDA has produced a wealth of information which can inform health policy decision making in the countries studied. For example, policy makers will be able to assess which risk factors and diseases should be given priority in their specific countries based on the model projections. Further, the downloadable tool enables stakeholders to test different interventions on the future burden of chronic diseases. The literature review and consensus report on cost-effectiveness is a valuable reference for public health professionals and policy makers.

The final reports are being disseminated through the website and networks via the European chronic disease alliance to Health policy planners, advocacy groups and NGOs. These parties, as well as commission officials were invited to attend the final conference. Country delegates were additionally invited to attend the workshops.

The strategic relevance and contribution to the EU Health Programme.

Given the epidemic of chronic diseases across Europe the EConDA project is of immense strategic importance to the EU Health programme. It has contributed to the key objectives of the 2008-2013 EU health programme by:

Relevance and contribution to the EU Health Programme

- Quantifying the absolute and relative inequalities in obesity and smoking by 2050 illustrating the need for targeted preventive interventions in certain groups.
- Predicting the future economic burden of chronic diseases in 8 EU countries to 2050.
- Promoting health by making the economic case for prevention of chronic disease. The project measured the cost-effectiveness over time of prevention, screening and treatment interventions for chronic diseases illustrating that policy and prevention interventions are generally more cost-effective than treating a single chronic disease.
- Providing estimates of the future burden of smoking and overweight by age, sex and education group.
- Developed sophisticated modelling software to test the cost-effectiveness of integrated approaches to preventing, screening and treating chronic disease.

³ These weight loss interventions include a diet, physical activity and cognitive component.

Conclusions and recommendations

The EConDA project illustrates the extent to which disease burden and related costs can be avoided with specified interventions and that even small changes in risk factors can have important impacts. The results provide evidence for the importance of disease prevention showing the impact of low cost interventions on the future burden of ill-health. Instead of treating a single disease, interventions that reduce a common risk factor can in turn have an important impact on a range of chronic diseases concurrently (1). Targeting less educated groups, especially with smoking cessation interventions is key to reducing the social inequalities in health. Given that 97% of health spending is on treatment, and only 3% on prevention with prevention bearing the brunt of austerity (2), our results show that investment in health to reduce disease onset and progression is cost-effective in the long-term.

Recommendations for the future include:

Taking a societal perspective in economic analysis is key to understanding the full economic impact of the chronic disease burden.

The microsimulation model is sophisticated in structure and should be used to develop additional multi-stage diseases such as dementia and cancers.

There is no silver bullet. An integrated set of interventions is necessary in order to get maximum benefit to health.

The EConDA models should be further developed to include additional and combined risk factors such as alcohol, and physical inactivity.

Encouraging countries to monitor risk factors by social group and chronic diseases over time is key. In particular, collection of data on incidence and cost by disease stage is imperative.

Initial scope of the Project

Background and project scope

- You may copy from the Grant Agreement, Annex I. Please make sure that the text is updated and reflects the correct timing.

Globally, the magnitude of the chronic disease burden has been recognised. In the WHO European Region, chronic diseases (such as cardiovascular disease, chronic respiratory disease and type 2 diabetes), account for 86% of all deaths and 77% of disability adjusted life years (DALYS) and rates vary between and within countries due to stark inequalities in health. Chronic diseases have a large impact on health care costs throughout the EU. They 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 alone⁴. 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.

The Economics of Chronic Disease (EConDA) project aimed to aid EU member states to develop, select and implement more cost-effective policies to improve chronic disease prevention and impact upon populations with the highest rates of premature deaths from chronic diseases and reduce health inequalities.

This project first evaluated different methodologies to measure cost effectiveness in order to reach a consensus amongst experts about the optimal methods to use. This was followed by the development of microsimulation models which are able to evaluate the impact of interventions to prevent, screen and treat chronic diseases on the future health and economic burden of chronic disease. Seven disease models were developed including three multistage disease models for type 2 diabetes, COPD and CKD. Models were run for eight selected countries: Bulgaria, Greece, Finland, Lithuania, Netherlands, Poland, Portugal and the UK. A wealth of information on the projected burden of each disease and their costs per country was obtained. Further, valuable insights into the relative advantages of some public health interventions over others was possible. For example, comparing interventions delivered at primary care versus interventions delivered at a population level.

As well as the above activities the project also included validation of the models, a variety of dissemination activities and a full project evaluation report.

General objective of the project

- You may copy from the Grant Agreement, Annex I. Please make sure that the text is updated and reflects the correct timing.

The key aim of the EconDA project was to aid EU Member States to develop, select and implement more cost-effective policies to improve chronic disease prevention and impact upon populations with the highest rates of premature deaths from chronic diseases and reduce health inequalities.

Specific objective(s) of the project

⁴ EU Summit on Chronic Diseases Conclusions http://ec.europa.eu/health/major_chronic_diseases/docs/ev_20140403_mi_en.pdf

1. Achieve consensus among relevant experts on the methodology for measuring cost-effectiveness of interventions to prevent, screen and treat chronic diseases.
2. Develop a computer simulation model of the future burden of chronic diseases
3. Develop a demonstration model for integrated approaches to address cost-effectiveness of various interventions for chronic disease prevention
4. Implement the model in specific countries
5. Validate the model
6. Publish and disseminate an evaluation of the study

Targeted groups

- Please refer to direct and indirect target groups
You may copy from the Grant Agreement, Annex I. Please make sure that the text is updated and reflects the correct timing.

The target group were policy-makers and stakeholders involved in preventing chronic diseases across Europe. These included health policy planners, advocacy groups relevant to health promotion and chronic disease prevention (including ECDA members) and European Commission officials who were invited to conferences/meetings and received reports from all WPs. EConDA involved all of the major European chronic disease NGOs. Other target groups included the representatives of the countries for this pilot project, the population of the selected countries, health professional organisations, in particular those representing medical doctors with a specialisation in one or several of the chronic diseases addressed in this project and academic and research networks and national agencies.

The World Health Organization (Europe) supported this bid and helped provide data and disseminate findings. The project further informed the OECD economics of prevention group. This group actively participated in the final EconDA workshop in Brussels and provided advice during the project.

Expected impact and outcomes of the project

- You may copy from the Grant Agreement, Annex I. Please make sure that the text is updated and reflects the correct timing.

WP4 reviewed and reported on, the range of methods available to test cost-effectiveness. A qualitative study which involved interviews with key experts in the field was carried out and consensus was reached over the best ways of measuring cost-effectiveness. The results of the cost-effectiveness literature review and qualitative study will serve as reference for future studies considering health economic evaluation. The results of the consensus meeting highlighted the limitations across countries with making comparative cost-effectiveness analysis since different thresholds exist or do not exist at all. Quality of life measures were used for comparison as part of the cost-effectiveness analysis.

WP5 and WP6 developed **multi-stage** computer models (**deliverable 2**) capable of estimating the health and economic burden of several chronic diseases. The models have the ability to test a set of integrated interventions based on their effectiveness and cost-effectiveness. The models incorporate two risk factors (smoking and BMI), and seven major chronic diseases (coronary heart disease, type 2 diabetes, chronic kidney disease and chronic obstructive pulmonary disease, stroke, lung cancer and hypertension). They were tested in all 8 countries studied. The models showed the projected trends of obesity and smoking to 2050 and their impact on the future health

and economic burden of chronic diseases for all countries studied. Further, prevention, screening and treatment interventions were compared to taking no action yielding interesting results regarding their relative effectiveness and cost-effectiveness. The project further measured and projected inequalities in smoking and obesity prevalence which are good indicators for inequalities in morbidity and mortality of chronic diseases. These findings identify the most vulnerable groups and highlight the need for policies that target disadvantaged groups in addition to population wide health promotion policies.

The results of the model developed by EConDA provide extensive added value to Public Health across Europe by providing a robust evidence base that will enable governments to make informed decisions as to the most effective and cost-effective policies that reduce the burden of ever increasing chronic diseases and relieve the cost burden on country health systems. Key findings will enable policy makers to more accurately predict future outcomes of policies and better inform decision making. Further, the development of a downloadable tool as part of this project means that policy makers can customise and test 'what if' scenarios in their own countries as well as policy interventions that cannot be tested easily through natural experiments. In conclusion the project will enable EU member states to better develop, implement and select the most cost-effective policies on chronic disease prevention. At a system level the EConDA models are sophisticated enough to provide evidence for: incentives for investment in disease prevention, improvements in health system effectiveness in terms of more accurate resource planning, and increased political prioritisation of health inequity on chronic disease prevention, as well as improved capacity for data collection and analysis.

Deliverables of the project

Please fill the table for each deliverable in the grant agreement

Please delete respective subsections, if your grant agreement foresees less than 10 deliverables

Deliverable 01:

Title of deliverable	Review of cost-effectiveness methods and evidence for chronic disease prevention
Deliverable number in grant agreement	01
Nature (eg. report, book, website etc.)	Report
Delivery date to CHAFEA	30 th September 2013
Specific remarks on this deliverable	This review was drafted ahead of the consensus meeting where it was discussed. It was updated in 2014/15 when conceptualising specific interventions.
Can the deliverable be published at CHAFEA's project database?	Yes

Deliverable 02:

Title of deliverable	Development of a disease model
Deliverable number in grant agreement	02
Nature (eg. report, book, website etc.)	Report
Delivery date to CHAFEA	13 November 2015
Specific remarks on this deliverable	Chronic kidney disease, lung cancer and hypertension models were also delivered as part of this deliverable.
Can the deliverable be published at CHAFEA's project database?	The report detailing the model methodology and outputs can be published.

Deliverable 03:

Title of deliverable	Consensus on criteria that will allow standardisation and comparisons of cost-effectiveness
Deliverable number in grant agreement	03
Nature (eg. report, book, website)	Meeting with experts; Report

etc.)	
Delivery date to CHAFEA	11 February 2014
Specific remarks on this deliverable	The consensus meeting was held on 10-11 December 2013.
Can the deliverable be published at CHAFEA's project database?	Yes.

Deliverable 04:

Title of deliverable	Development of a cost-effectiveness simulation model
Deliverable number in grant agreement	04
Nature (eg. report, book, website etc.)	Report based on the cost-effectiveness module; downloadable tool
Delivery date to CHAFEA	13 November 2015
Specific remarks on this deliverable	
Can the deliverable be published at CHAFEA's project database?	Yes

Deliverable 05:

Title of deliverable	Validation of the model
Deliverable number in grant agreement	05
Nature (eg. report, book, website etc.)	Report
Delivery date to CHAFEA	13 th December 2016
Specific remarks on this deliverable	
Can the deliverable be published at CHAFEA's project database?	Yes

Deliverable 06:

Title of deliverable	Project leaflet
Deliverable number in grant agreement	06
Nature (eg. report, book, website)	Pamphlet

etc.)	
Delivery date to CHAFEA	24 th July 2013
Specific remarks on this deliverable	
Can the deliverable be published at CHAFEA's project database?	Yes

Deliverable 07:

Title of deliverable	Final Evaluation report
Deliverable number in grant agreement	07
Nature (eg. report, book, website etc.)	Report
Delivery date to CHAFEA	6 th November 2015
Specific remarks on this deliverable	Some delay on this deliverable since time was need to write up the report after the conference in month 30.
Can the deliverable be published at CHAFEA's project database?	Yes

Deliverable 08:

Title of deliverable	Interim and final technical and financial reports.
Deliverable number in grant agreement	08
Nature (eg. report, book, website etc.)	Report
Delivery date to CHAFEA	12 th December 2015 (final) 23.09.2014 (annual report), 6.12.2015 (interim finance)
Specific remarks on this deliverable	
Can the deliverable be published at CHAFEA's project database?	Yes

Deliverable 09:

Title of deliverable	Dissemination (website, papers, conference)
Deliverable number in grant agreement	09

Nature (eg. report, book, website etc.)	Website, conference, workshops, excel sheet, papers
Delivery date to CHAFEA	31 st October 2013
Specific remarks on this deliverable	
Can the deliverable be published at CHAFEA's project database?	Yes

Deliverable 10:

Title of deliverable	Final project report and layperson's final project report.
Deliverable number in grant agreement	
Nature (eg. report, book, website etc.)	Report
Delivery date to CHAFEA	13 th November 2015 (layman report), 12 th December 2015 (final project report)
Specific remarks on this deliverable	
Can the deliverable be published at CHAFEA's project database?	Yes

Project implementation

Main activities carried out including methods and means.

- Please describe the work carried out, as it has taken place
- Please describe changes to the original planning
- Why did changes occur?

Objective 1: We conducted a literature review of the methodology used to assess the cost-effectiveness of chronic disease interventions using online databases and personal communications with European collaborators. We then carried out qualitative interviews with European and international health economists and analysed the data using thematic framework analysis. These two pieces of work informed a consensus meeting carried out in December 2013 where key international organisations were represented. A consensus report with key recommendations on the measurement of cost-effectiveness of chronic disease interventions was the final output of this objective and work package 4.

Objective 2: We developed a chronic disease model to project the future health and economic burden of seven chronic diseases: CHD, stroke, CKD, COPD, type 2 diabetes, hypertension and lung cancer. The software for this programme was written in C++ by expert programmers in the UKHF team. The model was based on a dual-module modelling process originally developed by the UK Foresight working group (Foresight Tackling Obesities (3)) which has been applied for the analysis of obesity trends and chronic diseases in more than 80 countries. Module one uses a non-linear, multivariate, categorical regression model fitted to cross-sectional chronic disease data. Module 2 uses a micro-simulation program to produce longitudinal projections of chronic disease burden and related costs to 2050. This creates virtual country cohorts of a large number of individuals based on module one disease distributions from 2015 to 2050. Simulated individuals are at risk of getting a particular disease each year if he or she did not have the disease at the beginning of the year; they can continue living with the disease or die from it (if it is fatal).

Objective 3: We developed a demonstration model to test the cost-effectiveness of various interventions for chronic disease prevention. Future costs of chronic diseases in each country were estimated to 2050 based upon current risk factor trends and disease incidence in each country using micro-simulation modelling. To estimate the cost burden associated with the trends in chronic diseases, as well as the effect of interventions on said costs, both direct health care cost and indirect costs of chronic diseases were projected from 2015 to 2050. Intervention scenarios were compared with baseline scenarios (i.e. trends continue unaltered) obtaining in this way information on costs avoided and QALYs gained as a result of interventions. Data collection and processing of country-specific chronic disease data for entry into the model was carried out using online resources and expert knowledge from partners and collaborators with access to quality data. There were many limitations with data collection. Frequently data on incidence were not available so we converted prevalence to incidence using standard tools. Incidence data by stage often did not exist, so complex algorithms were developed to calculate incidence by stage using the data that were available. Direct and indirect cost data by disease were also very difficult to come by therefore proxy data were used.

Objective 4: The model was adapted and run in 8 EU countries using country specific data as far as possible. The 8 countries were: Bulgaria, Finland, Greece, Lithuania, the

Netherlands, Poland, Portugal, and the United Kingdom. In addition, a downloadable tool was created so that each country has a tool by which to test the cost-effectiveness of a range of different interventions. The tool is downloadable, and was demonstrated in each of the 5 country workshops. This enabled it to be evaluated by potential users and to be improved based on their feedback.

Objective 5: A validation of the model was carried out by comparing results with existing disease and risk factor models. There was some difficulty in directly comparing the results of models since parameters are frequently different. However, in this instance qualitative comparison was made or similar parameters compared.

Objective 6: The results have been disseminated at conferences, published on the project website, and presented to policy makers within the countries and at EU level. Five country workshops were carried out in September 2015 with good attendance from relevant country stakeholders. In the workshops, the project was presented, the modelling tool demonstrated and preliminary findings shown. Finally, also in September 2015 the final EConDA conference took place in Brussels.

The EconDA website was set up at the beginning of the project detailing its aims, participating countries and collaborators. Reports and documents have been uploaded as they have become available. A protocol paper was written and published in a peer reviewed journal, as well as a short report for the WHO and in Lithuanian for a Lithuanian medical magazine. A number of papers are currently in preparation for submission to peer-reviewed journals and will be disseminated at conferences.

Changes to the original plan? Why did they occur?

There were some changes to the original plan:

- We included The Netherlands as an additional country since our partners from The Netherlands felt that this would provide a good source of data and would provide strong expert input given the amount of public health modelling carried out in the Netherlands.
- Instead of a systematic review, a full literature review was supplemented with qualitative interviews to enrich the review. The review included 153 studies and it was not deemed detrimental to final task of drawing a consensus that a full systematic review was not carried out, but a more in-depth qualitative study would enrich the outcomes.
- In addition to developing epidemiological disease models for T2DM, COPD and CHD, a multi-stage disease model was developed for chronic kidney disease also. Given its importance to the heart, it was deemed important to include. Further, Ron Gansevoort at the University of Groningen, an expert nephrologist provided in kind advice on the model development.
- As well as CKD, single stage diseases were also added. These were lung cancer, hypertension, and stroke. Again, these diseases were deemed important to include: Lung cancer is so important to smoking so inclusion provided more accurate estimates of life expectancy. Hypertension and stroke were important to both risk factor models. This meant that the model development took longer than planned since additional data collection, coding and testing was required.
- It was not possible to explore the impact of interventions upon different social groups due to the scarcity of data. However, the model is built in such a way that makes this possible as soon as data become available. Projections for each risk factor were run by education group to determine the burden of obesity and smoking by social group. Knowing the direction of these trends, the outcomes of the microsimulation can be compared qualitatively based on the direction of these risk factor trends.
- As well as a single conference, 5 workshops were held in 5 of the EConDA countries (Bulgaria, Lithuania, The Netherlands, Poland, Portugal). This enabled the results and in

particular, the tool, to be disseminated widely. It provided an opportunity to get user feedback and to identify any technical problems with the tool.

Coordination with other projects or activities at European, National and International level

Which activities have been carried out?
Which problems occurred and how did you solve them?

National

Coordination took place via country partners who made contact with national level projects for data and collaboration in writing papers. For example, close contact was made with the E-COR study in Portugal, where data were supplied for entry into the model (http://www.insa.pt/sites/INSA/Portugues/ComInf/Noticias/Paginas/Estudo_E-Cor.aspx).

The five country workshops (Bulgaria, Lithuania, the Netherlands, Poland, Portugal) provided an opportunity not only to disseminate the project results and tool, but also build contacts in the field of nutrition and chronic diseases for future collaborations. Delegates can use the tool in their own projects, for project commissioning and tender applications. Some useful ideas for future work were developed during the workshops. For example, including cholesterol was deemed an important point of future work and writing a paper on costs of disease in Bulgaria is ongoing.

European

An exhibition was run at the EU project village, European Congress on Obesity (Sofia, 2014). This provided an opportunity to make contact with other EU projects such as Spotlight and Dorian. The EConDA project has been presented at the recent Spotlight meeting and further work could include running the EConDA models in children.

EConDA was represented at the Chronic Diseases and Healthy Ageing (CD-HA) Workshop in The Hague, February 2015. This aimed to share the knowledge acquired through the chronic diseases and healthy ageing actions funded under the second Health Programme 2008-2013.

A European collaboration with Dr. Joan Soriano from the University of Madrid and the 3CIA⁵ project has been established to develop the COPD model using the results from the 3CIAplus project – a European combined dataset on COPD patients.

The EConDA results were disseminated at the recent Spotlight steering meeting. Spotlight is an EU-funded project cross-European research project focusing on the sustainable prevention of obesity through integrated strategies. The EConDA model can test a range of integrated strategies for obesity prevention and can be utilised for this project utilising data from the Spotlight intervention Atlas (www.worldobesity.org/what-we-do/policy-prevention/projects/spotlight/intervention-atlas/). However, no formal collaboration is in place as yet.

A meeting was held with the COPD coalition to discuss data availability and needs for the models. The COPD coalition are developing a COPD Atlas that will be useful for populating and improving the model. The EConDA models and tool will complement their work on

⁵ Soriano JB, Lamprecht B, Ramírez AS, Martínez-Cambor P, Kaiser B, P Alfageme I, Almagro P, Casanova C, Esteban C, Soler-Cataluña JJ, de Torres JP, Miravittles M, Celli BR, Marin JM, Puhán MA, Sobradillo-Ecenarro P, Lange P, Sternberg AL, García-Aymerich J, Turner AM, Han MK, Langhammer A, Leivseth L, Bakke P, Johannessen A, Roche N, Sin DD. A pooled analysis of 15,632 COPD patients comparing the GOLD 2007 and 2011 staging systems for COPD focused on mortality. *Lancet Respir Med* 2015 (in press).

modelling service use in COPD patients. An informal collaboration is in place to ensure both teams are kept informed on the current progress of their work.

A member of the EConDA team attended the EU-funded "Which priorities for a European policy on multi-morbidity?" in Brussels to bring information on the modelling from the EConDA project that could be used to quantify multi-morbidity. This followed from a meeting with DG Sante about the use of our models in further work with the commission, with a particular focus on modelling dementia.

The EConDA project will be sustained by feeding directly into Work Package 4 of the Joint Action on Nutrition and Physical Activity. This will further develop the microsimulation model to include children and quantify the lifetime costs of childhood obesity.

International

Less work has been carried out internationally. However, many of the partners work globally on a policy and modelling level, working with international networks including the OECD, World Bank and World Health Organization. There is continuing interest in the modelling work, for instance the UK Health Forum are working with the World Bank, NICE international and Cancer Research UK to form ways of implementing a version of the smoking tool in developing economies to enable policy makers and commissioners to build an evidence base for fiscal measures in tobacco control.

Sponsorship

Who contributed in which way to your project?

There were no additional sponsors to this project, 40% of funds were contributed in kind.

Project Coordination (WP 1)

Which activities have been carried out? This section could include the following:

Partnership management of tasks and achievements

Management structure description, summary of the steering committee, advisory - board

Description of the internal communication channels

Monitoring and supervision

Impact of possible deviations from the planned milestones and deliverables, if any

List of project meetings, dates, venues, annotated agenda, action oriented minutes

Amendments incurred or requested during the reporting period

Changes in the partnership, if any

Any changes to the legal status of any of the beneficiaries

Impact of possible deviations from the planned milestones and deliverables, if any

Subcontracting rules applied and description of the process for implementing the public procurement (E5 subcontracting cost), if applicable

Conclusions

Which problems occurred and how did you solve them?

Management structure

The EConDA project has been administered by the UK Health Forum (UKHF). The following organisations led on the different work packages:

WP2: European Society of Cardiology

WP3: Health Equalities Group

WP4: European Heart Network

WP5: UK Health Forum

WP6: University of Groningen

The steering group was made up of Laura Webber (UKHF), Martin Brown (UKHF), Abbygail Jaccard/Lise Retat (UKHF), Susanne Logstrup (EHN), Marleen Kestens (EHN), Sophie O’Kelly/Illaria Leggari (ESC), Vilma Kriaucioniene, (LUHS), Robin Ireland (HMP), Ana Rito (INSA), Maarten Postma (RUG), Pepijn Vemer (RUG), Sophie Peresson/Gaël Bassetto/Mayur Mandalia (IDF-Europe).

Activities undertaken

A kick-off meeting, four steering group meetings and two teleconferences were held over the course of the project (see table 1 for details). Meetings involved participation by each partner. Agenda and minutes of each meeting can be found in annex x.

Table 1. Project meetings

Meeting	Date	Place
Kick off meeting	25 th April, 2013	Luxembourg
1 st Steering group meeting	9 th October, 2013	Brussels
2 nd Steering group meeting	4 th March, 2014	Brussels
Planning teleconference	17 th July, 2014	n/a
3 rd Steering group meeting	21 st October, 2014	Brussels
4 th Steering group meeting	10 th March, 2015	Brussels
Planning teleconference	8 th July, 2015	n/a

All reports and deliverables have been reviewed by the project team (e.g. website, leaflet, reviews) and key decisions were discussed and made. For example, we discussed and agreed the questions needed to steer the consensus meeting on cost-effectiveness and the interventions we were to test in each of the models.

Internal communication

The project coordinator communicated directly with Work Package leads and other members of the team on an ongoing basis and through their participation in relevant work package meetings and workshops.

Each associated partner received and signed a cooperation agreement between them and the project lead, UKHF outlining the general and specific tasks that they were to deliver (an example can be found in annexe x).

There were three teleconferences with European Heart Network (WP 4) during the planning stages of the consensus meeting and report writing.

Monitoring and supervision

As we have indicated, the primary mechanisms for this was through the steering meetings, teleconferences, minutes and regular meetings with work package lead and coordinator when necessary.

Advisory board

While there was no formal advisory board, the associate partners provided support and guidance throughout the project. They were an important point of contact for guidance and expert advice relating to health economics, intervention conceptualisation and disease model development. Where relevant associate partners provided external contacts to expert epidemiologists who provided additional advice on the disease model and intervention concepts.

Impact of deviation from planned milestones and deliverables

Largely the deviations from planned milestones and deliverables were both minor and beneficial rather than harmful since deviations were largely due to delivering additional work beyond deliverables. The changes were as follows:

- We included The Netherlands as an additional country since our partners from The Netherlands felt that this would provide a good source of data and would provide strong expert input given the amount of public health modelling carried out in the Netherlands.
- Instead of a systematic review, a full literature review was supplemented with qualitative interviews to enrich the review. The review included 153 studies and it was not deemed detrimental to final task of drawing a consensus that a full systematic review was not carried out, but a more in-depth qualitative study would enrich the outcomes.
- In addition to developing epidemiological disease models for T2DM, COPD and CHD, a multi-stage disease model was developed for chronic kidney disease also. Given its importance to the heart, it was deemed important to include. Further, Ron Gansevoort at the University of Groningen, an expert nephrologist provided in kind advice on the model development.
- As well as CKD, single stage diseases were also added. These were lung cancer, hypertension, and stroke. Again, these diseases were deemed important to include: Lung cancer is so important to smoking so inclusion provided more accurate estimates of life expectancy. Hypertension and stroke were important to both risk factor models. This meant that the model development took longer than planned since additional data collection, coding and testing was required.
- It was not possible to explore the impact of interventions upon different social groups due to the scarcity of data. However, the model is built in such a way that makes this possible as soon as data become available. Projections for each risk factor were run by education group to determine the burden of obesity and smoking by social group. Knowing the direction of these trends, the outcomes of the microsimulation can be compared qualitatively based on the direction of these risk factor trends.
- As well as a single conference, 5 workshops were held in 5 of the EConDA countries (Bulgaria, Lithuania, The Netherlands, Poland, Portugal). This enabled the results and in particular, the tool, to be disseminated widely. It provided an opportunity to get user feedback and to identify any technical problems with the tool.

Ammendments to contract

The only ammendments to contract involved a name change of the lead partner from the National Heart Forum to their new name the UK Health Forum along with a change in their address and bank details and the name change of Heart of Mersey Partnership to Health Equalities Group.

Subcontracting rules applied and description of the process for implementing the public procurement (E5 subcontracting cost), if applicable

We held to the general rule that the sub-contracting rules governing the organisation had precedence. Only the web designer was included as a subcontractor and they were costed at €5000 so no tendering process was necessary.

Conclusions and Recommendations

As per the final evaluation report, the EConDA project was deemed effective in delivering the project, and in a number of places, the EConDA project over delivered. For example, a number of additional disease models were created, a downloadable tool, and qualitative interviews carried out. Further, five country workshops were carried out to more widely disseminate the tool.

Data limitations in many countries meant that the outputs of the models are largely demonstrative of the utility of the microsimulation method rather than providing accurate estimates. However, the models can easily be updated when new data become available.

We recommend that joined up surveillance initiatives for chronic disease and risk factor data need to be developed across Europe. Eurostat provided very useful data, however this needs to be expanded to include trend data for risk factors. In addition, epidemiological data on disease stage and related health and non-health costs are required. This is imperative if an accurate picture of the nation's health is to be estimated.

Despite this, the project highlights the importance of using long-term modelling for resource and policy planning in chronic disease prevention. This will become increasingly more cogent given the imminent threat of a chronic disease epidemic. This project is just the 'primostrato' of what could be achieved in this area. It provides a demonstration of the microsimulation method and much further work can build on the achievements of this project. For example, broadening into other disease areas, additional countries, or providing estimates at a local level within countries.

Reduce the bureaucracy associated with EC funded projects

Several partners commented on the frustration of working within the bureaucratic system associated with an EC funded project and felt that complying with administrative requirements was very time consuming and was a distraction from the core work. The administrative demands can be perceived to outweigh the benefits of participation. This was considered a disincentive for some people to get involved. This risks losing the contribution of valuable experience and expertise.

Future programmes need to consider how this problem can be overcome. Adequate resources need to be allocated for the administration and co-ordination of a project to reduce the burden on individual partners.

Which problems occurred and how did you resolve them?

Data collection was the biggest problem to overcome. Where the literature and country contacts had been exhausted, proxy data were used or tools used to calculate missing

data. For example, where incidence data were available but prevalence data were, then prevalence was converted to incidence using DISMOD-II equations (4). No incidence data by stage were available for type 2 diabetes so algorithms were developed to calculate this from prevalence by stage and total incidence data. These limitations resulted in delay in the running of the models since the new data manipulation tools required additional coding and testing.

There was some delay in the development and conceptualisation of the interventions for the models, however the UK Health Forum team provided substantial additional resource to the WP6 lead and INSA to complete the reviews and intervention development. In addition, the UKHF provided alternative methods and enhanced technical support for this work package.

Financial management

Did you incur fewer costs of more than 10% to the estimated budget of the grant agreement?

If yes, please describe the major reasons for that.

Did you have difficulties in the financial management of the project?

We had a straight forward process for financial management. Our intention was that we would send out the first instalment when cooperation agreements had been signed off. We would then ask all partners to report at the end of year one when we anticipated we would be able to claim the second pre-payment, report at the end of year two when we anticipated that we would be able to claim the third prepayment and then claim the balance on submission and approval of the final report.

This process worked well. However, there were some delays with the annual financial report being submitted by some partners, therefore delaying the pre-financing payment.

Secondly, the budget was not allocated correctly for the UK Health Forum mathematical modeller programmer, Dr Martin Brown. Dr Brown has been seminal in the development of the UK Health Forum's capacity to model, and indeed in taking forward robust 'state-of-the-art' modelling globally. He was one of the core team who developed the seminal modelling work carried out on obesity modelling for the UK government's Foresight programme. His unique expertise has been central to the delivery of EConDA, which built on his previous work (e.g. Wang et al, 2013; McPherson et al, 2007).

He has worked solely for the UK Health Forum on modelling for the past ten years, and has a commitment to public health and modelling for public benefit. Dr Brown has not however had an employment contract nor has he been paid directly through the payroll, instead favouring a more flexible arrangement for both parties whereby he works when necessary to deliver a decided set of outputs as well as providing academic steer to the team. Dr Brown has invoiced the UKHF, at a rate considerably less than he could command commercially, given his unique experience. He therefore has operated 'as if' employed and categorically on a not-for-profit basis. Without his expert knowledge the computer models produced would not have been possible, especially to such a sophisticated and high standard. We recognise that an initial decision was made by CHAFEA not to permit Dr Martin Brown to be included in the budget, however we feel that we had not provided sufficient information and context on both his role in the project and modelling development generally, and his role in UKHF. There was of course no

question about entering a tendering process for this work, as i) no one else had the requisite skills to lead the mathematical modelling ii) it built on work which Dr Brown had led for UKHF for 10 years iii) while not on the payroll Dr Brown is to all intents and purposes a UKHF employee iv) Dr Brown was contributing his labour far below the market rate . We therefore request CHAFEA to review the decision, both on the basis of the statements made in this report, and with due consideration to the impact that non-funding would have to the financial viability of UKHF as a moderately small not-for-profit. We stand ready to provide more supporting information if that is helpful, and trust that given the cost effectiveness and financial probity of the arrangements with Dr Brown, as well as the financial implications for UKHF, you will look favourably on incorporating Dr Brown's costs into the budget. As a result of this we are underbudget, although not more than 10%.

Thirdly, We originally allocated budget to a single final conference, however in discussion with partners we recognised we would have more impact if we redistributed the budget to enable 5 country workshops to take place within the same budget envelop. This was done with the approval of Anne-Marie Yazbeck, Chafea. While ambitious, this provided an additional opportunity to disseminate the project, and also to train users on the downloadable tool and to receive suggestions for improvements. We allocated a budget for business class travel on trains, however almost always economy travel was taken, resulting in additional budget for conference attendance to more widely disseminate the project findings.

Project Results and Visibility

Dissemination activities during and after the project

Please describe shortly the dissemination activities carried out during and after the end of the project.

How can Chafea or the EC further communicate on this project?

This section could include the following:

Description of the key messages.

Visual project identity, including project logo, etc

Activities undertaken to ensure that the results and deliverables have reached the target groups: stakeholder matrix - analysis / target group identification, dissemination content, dissemination means, timing (...)

Problems encountered

How were problems resolved /limitations

There were a number of dissemination activities during the project including conference presentations, workshops, a conference, a peer-reviewed article, exhibitions, and a leaflet. A number of articles are in preparation for submission to peer-reviewed journals.

How will the project be sustained over time?

Laura Webber will continue to manage the UKHF modelling team and can be contact by email: Laura.Webber@ukhealthforum.org.uk and phone: + 44 (0) 20 7382 6936

We will share information on any papers arising from the work, with appropriate acknowledgements to the funders, Chafea and Anne-Marie Yazbeck. We will continue to publicise the work in discussion with OECD, WHO and World bank, and with Ministries of Health and international organisations interested in modelling.

We hope to work with the EC to further develop the work on modelling of chronic diseases in discussion with Member States and the EC.

The UKHF will continue working in synergy with the European Chronic Disease Alliance in their joint work on the prevention of chronic diseases.

How can Chafea or the EC further communicate on this project?

We would gladly support any opportunities in which CHAFEA of EC can further publicise the project including:

- a. Information in the Sante Newsletter
- b. Information on the Sante website under chronic diseases
- c. Publication of articles in relevant EC/Chafea publications
- d. Forthcoming conferences including for example Gastein if the theme is appropriate.

Any costs of participating in conferences would need to be met by Chafea/EC as we do not have a budget for travel.

The following provides a list of key messages from outputs of the project:

Key messages

- The EConDA project illustrates the extent to which disease burden and related costs can be avoided with specified interventions and that even small changes in risk factors can have important impacts.
- The results provide evidence for the importance of disease prevention showing the impact of low cost interventions on the future burden of ill-health.
- Instead of treating a single disease, interventions that reduce a common risk factor such as smoking or obesity can in turn have an important impact on a range of chronic diseases concurrently (1).
- Targeting less educated groups, especially with smoking cessation interventions is key to reducing the social inequalities in health.
- Given that 97% of health spending is on treatment, and only 3% on prevention with prevention bearing the brunt of austerity (2), our results show that investment in health to reduce disease onset and progression is cost-effective in the long-term.

Project logo



Activities undertaken to ensure results have reached the target groups

#	Title	Distribution channel	Target audience
1	Review of cost-effectiveness methods and evidence for the chronic disease prevention	Scientific paper in prep, conference presentation, nominative letters to policy makers, website.	Policy makers, stakeholders, public health researchers.
2	Development of a disease model	Website, scientific paper and conference presentation.	Policy makers, health researchers/academics
3	Consensus on criteria that will allow standardisation and comparisons of cost-effective studies	Scientific paper in prep and conference presentation.	Scientific community
4	Develop a cost-effectiveness simulation model	Website, scientific paper and conference presentation.	Scientific community
5	Validation of the model	Scientific paper and conference presentation.	Scientific community
6	Project leaflet	Social media, organisations'	General public, press,

		newsletters and websites, relevant conference packs, exhibition stands at conferences.	stakeholders, International organisations.
7	Final Evaluation report	Written report on EConDA website and to partner organisations.	Scientific community, stakeholders, international collaborators.
8	Interim and final technical and financial reports	Written report on EConDA website and to partner organisations.	Scientific community, stakeholders, international collaborators.
9	Dissemination	Website, papers, conference, social network sites, nominative letters to policy makers.	Scientific community, public, media, policy decision makers.
10	Final project report and layman's final	Report, website, scientific paper and conference presentation.	Scientific community, public, media, policy decision makers.

Conference and other presentations

- Ana Rito, Mafalda Bourbon, Laura Webber, Tim Marsh, *Chronic diseases in Portugal – a review within the EU project EConDA*, poster presentation III World Congress of Public Health Nutrition, 2014, Gran Canarias, Spain
- Abbygail Jaccard, *The obesity epidemic and risk of hyperglycaemia: using a microsimulation approach to model multi-stage type 2 diabetes*, oral presentation at the fifth world congress of the international microsimulation association (IMA), Luxembourg 2-4 September 2015
- Abbygail Jaccard, *EConDA project results*, invited speaker to The future of research on obesogenic environments (Spotlight project), Brussels 19th November 2015
- Klim McPherson, Martin Brown, Laura Webber, et al. *Evaluating the costs of NCDs; The Nutritional Component. Foresight and beyond*. Invited speaker at the World Public Health Nutrition Association conference, Oxford, UK, September 2014
- EConDA Exhibition, at the European Congress on Obesity, Sofia, Bulgaria. May 2014
- Laura Webber, Martin Brown, *UKHF lecture on modelling including EConDA models*, University of York 18 September, 2014
- Laura Webber, *Hot debates in nutrition and globesity*, leaflet distribution and presentation. EuroPrevent 2014, Amsterdam, 8-10 May 2014
- Laura Webber. *Presentation on EConDA*. Chronic Diseases and Healthy Ageing Workshop. The Hague, February 2015.
- Vilma Kriaucioniene, *Projection of changes in the prevalence of obesity from 2012 to 2050 in Lithuania*. Obesity facts: 22nd European Congress on Obesity (ECO2015). Prague, Czech Republic, May 2015.
- Laura Webber, *EConDA and key findings* EU Joint Action on Nutrition and Physical Activity Launch, September 2015
- Vilma Kriaucioniene, *Past and future trends in the prevalence of overweight and obesity in Lithuania*. Obesitologia: 5th CECON. Budapest, Hungary, May 2015.
- Laura Webber, *Lessons learnt from the EConDA project: Gaps and priorities in the prevention of NCDs*. EU Parliament MEP Group for Kidney Health Presentation to the EU October 2015
- Carolina Perez Ferrer, *Obesity and chronic disease modelling in Europe*, Children and young people's nutrition network – a presentation to nutritionists working in UK Local Authorities, London, UK. December 2015.

Pending submission for 2016 conferences:

- Perez Ferrer C, Knuchel-Takano A, Bhimijiyani A, Jaccard A, Retat L, Brown M, Kriaucioniene V, Webber L, *Inequalities in smoking and obesity in Europe predicted to 2050: Findings from the EConDA project.*
- Webber L, Knuchel-Takano A, Postma M, Vemer P. Reaching a consensus on the best method for assessing the cost-effectiveness of chronic disease interventions: Results from, the EConDA project.
- Retat L, Bhimijiyani A, Baker A, Briggs A, Jaccard A, Knuchel-Takano A, Webber L. *Investigating the impact of sugar-sweetened beverages on the future chronic disease burden in seven European countries: Results from the EConDA project.*
- Perez Ferrer C, Knuchel-Takano A, Jaccard A, Retat L, Brown M, Webber L. Effectiveness and cost-effectiveness of policy and community level interventions for reducing obesity and related chronic diseases.

Peer reviewed articles

- Divajeva D, Marsh T, Logstrup S, Kestens M, Vemer P, Kriaucioniene V, et al. Economics of chronic diseases protocol: cost-effectiveness modelling and the future burden of non-communicable disease in Europe. BMC public health. 2014;14(1):456-.
- Vemer, P “Decision analytic modelling: The need for disease specific model standardization” Chapter in D Tordrup, L Stephan, A Attwill, S Karunaratna, R Bertollini “Research Agenda for Health Economic Evaluation” Health Economic Evidence Review, World Health Organization

Reports and other information available to the public through the website

- EConDA project leaflet
- Literature Review: Cost-effectiveness of interventions to prevent, screen and treat chronic diseases
- Report: Qualitative analysis – expert testimony on the best methods for measuring cost-effectiveness of chronic diseases
- Final report from expert consensus meeting on cost-effectiveness
- Downloadable modelling tool and user guide

Country workshops and final conference

Five country workshops were carried out in September 2015. Workshops were organised by the ESC and were well attended by country stakeholders. The dates and location of workshops were as follows:

Bulgaria, 3rd September 2015
Lithuania, 18 September 2015
Netherlands, 10 September 2015
Poland, 16 September 2015
Portugal, 14 September 2015

Sample agenda of the workshops

10:00-10:30 **Registration & Welcome Coffee**

10:30-10:45	Introduction to the project and participation of Bulgaria Dr. Laura Webber, Director, Public Health Modelling, UK Health Forum Prof. Guenka Petrova, Deputy Rector, MU Sofia
10:45-11:35	Key findings: <ul style="list-style-type: none"> • Review of cost effectiveness methods • Consensus on standardisation of cost effective studies • Presentation of the disease model Dr. Laura Webber, Director, Public Health Modelling, UK Health Forum
11:35-12:00	Presentations of the cost effectiveness tools & demonstration Prof. Maarten Postma, University of Groningen, The Netherlands
12:00-12:30	Questions & Answers
12:30-13:30	<i>Lunch & Coffee Break</i>
13:30-14:20	Interventions testing by participants with real data Dr. Laura Webber, Director, Public Health Modelling, UK Health Forum Assist. Prof. Maria Kamusheva, PhD, MU Sofia
14:20-14:45	Feedback from participants
14:45-15:00	Wrap up & Conclusions Prof. Guenka Petrova, Deputy Rector, MU Sofia

The final project conference was carried out in Brussels on the 22nd September. The presentations given at this conference are available to the public and can be downloaded from the website <http://econdaproject.eu/presentations.php>. The conference was covered by social media with hashtag #EConDAconf.

The selection of attendees to workshops and the final conference was left to country partners given their expert knowledge on their national context. This ensured that the target population, policy makers and other stakeholders involved in chronic disease prevention, attended and/or received relevant information on the project.

A number of exhibitions took place (e.g. European Congress on Obesity 2014, and 2015; Diabetes UK Professional conference; IDF Europe General Assembly) where posters and leaflets about the EConDA project were displayed. Merchandise were also created to disseminate the EConDA logo and website in the form of pens and post-it notes.

Project website

Please give the address of the project website
Are deliverables and further project documentation(s) available?

How long will the project website be available after the project

The project website is: www.econdaproject.eu

Deliverables and further project documentation are available to download from the website.

The website will be available for the next two years, although the domain can be updated after this time provided funds are available.

Publication, Abstracts, Articles

Please list the publications arising from this project.
Where are they accessible?

Divajeva et al Economics of chronic diseases protocol: cost-effectiveness modelling and the future burden of non-communicable disease in Europe Available for download here : <http://www.biomedcentral.com/1471-2458/14/456> and also on the econda website www.econdaproject.eu

Also on the project website are the following documents sorted by work package:

Work package 1

- 1.1. Cooperation agreement
- 1.2. Kick off meeting agenda and minutes
- 1.3. Annual review
- 1.4. Final financial report

Work package 2

- 2.1. Dissemination plan (updated – on dropbox)
- 2.2. Project leaflet (deliverable 6)
- 2.3. Protocol papers (deliverable 9)
- 2.4. Lithuania paper
- 2.5. Rahee report EConDA excerpt
- 2.6. Exhibition posters
- 2.7. EConDA press release
- 2.8. Workshop agendas (deliverable 9)
- 2.9. Workshop attendance list
- 2.10. Conference agenda (deliverable 9)
- 2.11. Conference attendance list (deliverable 9)
- 2.12. Conference slides (deliverable 9)
- 2.13. Lay person report (deliverable 10)
- 2.14. Final project report (deliverable 10)

Work package 3

- 3.1. Baseline evaluation report
- 3.2. Annual evaluation report
- 3.3. Final evaluation report

Work package 4

- 4.1. Literature review (deliverable 1)
- 4.2. Qualitative study (deliverable 3)
- 4.3. Consensus meeting report (deliverable 3)

Work package 5

- 5.1 Detailed Methodology_TechnicalDocument (deliverable 2)
- 5.2 DiabetesModel_TechnicalDocument (deliverable 2)
- 5.3 COPDModel_TechnicalDocument (deliverable 2)
- 5.4 CKDModel_TechnicalDocument (deliverable 2)
- 5.5 Project report WP 5/6 report (deliverable 2) (note supporting annexes are outlined in WP6 annexes)

Work package 6

- 6.1 Project report (deliverable 4)

Supporting appendices to project report WP5_6

Appendix A – input data references (WP5)

1. Bulgaria disease references
2. Finland disease references
3. Greece disease references
4. Lithuania disease references
5. Netherlands disease references
6. Poland disease references
7. Portugal disease references
8. UK disease references

Appendix B – Technical methods

1. DiabetesModel_TechnicalDocument
2. COPDModel_TechnicalDocument
3. CKDModel_TechnicalDocument
4. Detailed Methodology_TechnicalDocument
5. Economic parameters
6. Methodology of WP6_CE model
7. Differences between microsimulation and tool

Appendix C – Scenario Development

1. Multi-component lifestyle interventions results matrix

2. MCLI methods and assumptions
3. SSB tax intervention methods and assumptions
4. Smoking cessation services methods and assumptions

Appendix D – EConDA Tool

1. EConDA Tool Development
2. EConDA Tool user guide
3. EConDA downloadable Tool
4. EConDA Tool Evaluation Survey
5. EConDA Tool Feedback

Appendix E – Results

1. MCLI not annual_no regain100M
2. Netherlands BMI-group and smoking projections by education
3. Finland BMI-group and smoking projections by education
4. Lithuania BMI-group and smoking projections by education
5. Poland BMI-group projections by education
6. Portugal BMI-group and smoking projections by education
7. UK BMI-group and smoking projections by education
8. PersonEditor Smoking examples
9. Population Distribution 60+

Work package 7

7.1 Work Package 7 report_validation

Evaluation of the project

Please describe the evaluation activities carried out
 If this is a recurrent project, please compare your findings to earlier projects
 Description of process and outcome evaluation.
 Evaluation methodology: Evaluation questions, design, method, measurement instruments, task, responsibilities and timing.
 Monitoring Tools developed for data collection.
 Problems encountered and suggestions for improvement

A process evaluation was undertaken annually and at the project's conclusion to understand what happened in the delivery of the project; whether each work package

achieved its objectives; and whether there were any unexpected outcomes or learning during the project.

The process evaluation comprised email-based surveys with work package leaders; telephone and face to face interviews as appropriate. Questionnaires were circulated at the country dissemination workshops and at the final project conference in Brussels. In addition all key project documents and journal articles were monitored as well as the use of the EConDA website.

There were no major problems encountered although an extension had to be requested to produce the Final Evaluation Report in November 2015 to allow time to prepare following the workshops and conference in September 2015.

Participant or partner feedback

Did you make a participant and/or partner feedback survey?
 What were the major issues stated?
 How useful were the deliverables perceived and why?

Yes. As described above. There were no major issues relating to the survey process. In regard to the work packages, it was noted through the survey questionnaires that staffing changes in the latter half of the project made keeping up with the milestones challenging.

Data limitations and collecting data for the models in *WP5 – Development of a disease model* were a regular concern both expressed through the survey questionnaires, at the Steering Committee meetings and at some of the country workshops.

The only deliverable in WP3 is the Final Evaluation Report which built on the Milestones reached through the Evaluation plan, the Baseline Evaluation Report and the Annual Evaluation Reports. All of these were produced in cooperation with the project partners and submitted in the agreed time period.

Process evaluation

Please use the indicators set out in the Grant Agreement
 Provide concrete numbers for the indicators
 Please discuss the numbers in relation to the target and your specific objectives

There were six specific objectives listed in the Grant Agreement:

- Achieve consensus among key international organisations on methodology for measuring cost-effectiveness of interventions to prevent, screen and treat chronic diseases;
- Develop an epidemiological disease model;
- Develop a demonstration model for integrated approaches to address cost-effectiveness of various interventions for chronic disease prevention;
- Implementation of the model in specific countries;
- Validation of the model;
- Publish and disseminate an evaluation of the study.

HMP carried out a number of actions to ensure these objectives were implemented using the methodology described previously.

The process indicators were described individually in each Evaluation Report as they were achieved. Thus a detailed description of *WP4 – Form a consensus on methodology for measuring cost-effectiveness of interventions for chronic diseases* was included in the 1st Annual Evaluation Report, published in April 2014.

Output evaluation

Please use the indicators set out in the Grant Agreement
 Provide concrete numbers for the indicators
 Please discuss the numbers in relation to the target and your specific objectives

The methodology has been described previously. Output Indicators have been described in the various Evaluation Reports.

The consensus meeting with 17 experts attending took place in December 2013 and a report was circulated in January 2014.

Thus with regard to Specific objective 4, *Implementation of the model in specific countries*. This is reported in the Final Evaluation Report published in November 2015. Country workshops using country-specific data were held in Bulgaria, Lithuania, The Netherlands, Poland and Portugal.

Outcome evaluation

Please use the indicators set out in the Grant Agreement

Provide concrete numbers for the indicators

Please discuss the numbers in relation to the target and your specific objectives

This is fully reported in the Final Evaluation Report.

The Outcome Indicators were met according to each individual Work Package and appropriately documented in each Evaluation Report.

A report on the review of new literature was produced in November 2013 (1st Annual Evaluation Report)

The consensus on the methodology was agreed in December 2013 (1st Annual Evaluation Report).

Understanding of the best available data and completion of the working disease model and cost effectiveness model was described throughout and in the 2nd Annual Evaluation Report and Final Evaluation Report in particular.

The working model was implemented in Bulgaria, Lithuania, The Netherlands, Poland, Portugal and the UK.

Five publications were listed in the Final Evaluation Report and ten presentations at conferences.

There were 97 attendees at the country workshops and Brussels conference. Feedback was very positive as described in the Final Evaluation Report.

Discussion in relation to project objectives

Did you achieve your objectives?

Please state clear reasons, why you think you achieved and/or did not achieve the project's specific and general objectives!

Please support your arguments with objective numbers and verifiable sources!

The key aim of EConDA was to aid EU Member States to develop, select and implement more cost-effective policies to improve chronic disease prevention and impact upon populations with the highest rates of premature deaths from chronic diseases and reduce health inequalities.

All specific objectives were achieved including over delivering in some of them as described below.

Objective 1. Achieve consensus among relevant experts on the methodology for measuring cost-effectiveness of interventions to prevent, screen and treat chronic diseases.

A literature review, qualitative study and consensus meeting were carried out in order to fulfil this objective. The literature review and qualitative study were prepared in advanced of the expert meeting and served as a springboard for discussion with experts. The consensus meeting took place on the 10th and 11th December 2013 in Brussels. Experts in economic evaluation from the OECD, WHO, and European Commission were invited to present the approach of their respective organisations in relation to measuring cost-effectiveness as well as participate in the meeting's aim. Health economists who had expertise in a particular disease area or country were also invited to participate. This breadth of expertise helped ensure that a range of issues were captured. 15 participants attended, including 5 members of the EConDA team.

The results of the consensus meeting are summarized in the document : *Establishing a consensus on the best methods for measuring the cost-effectiveness of interventions to prevent, screen and treat chronic diseases* and is available to download from the project website. The report clearly summarizes the consensus of experts in this topic as well as highlighting the limitations of the different methodologies as were raised by the experts.

Objective number 3 was developed on the basis of the conclusions reached by the consensus meeting.

Objective 2: Develop a computer simulation model of the future burden of chronic diseases

The original contract stated developing a model for four chronic diseases (CHD, COPD, CKD and type 2 diabetes). EConDA successfully delivered a working model for seven chronic diseases, the four in contract plus stroke, hypertension and lung cancer. In addition, sophisticated multi-stage models were developed for type 2 diabetes, COPD and CKD. Multi-stage models enable interventions to be tested at different stages of disease progression from prevention to treatment.

The report detailing the methodology and model concepts was submitted in time and are available on the project website (<http://www.econdaproject.eu/publications.php>).

Objective 3: Develop a demonstration model for integrated approaches to address cost-effectiveness of various interventions for chronic disease prevention

Four interventions were modelled and their effectiveness and cost-effectiveness compared: multicomponent lifestyle interventions, an excise tax on sugar sweetened beverages, smoking cessation services and a hypothetical treatment for COPD. These were demonstration interventions which were tested in the countries studied and for which results on effectiveness and cost-effectiveness are presented in the reports. However, the model is flexible and able to handle many different 'what if' scenarios by altering risk factor trends (i.e. smoking or obesity prevalence). In addition to the sophisticated microsimulation model used in EConDA, the project developed a useful downloadable tool which is intended for use by policy makers and public health professionals in the countries studied. This tool could be extended to more countries if requested. The tool allows policy makers to test 'what if' scenarios or specific interventions in their countries (using pre-loaded country specific data) and evaluate their future effect on health outcomes (prevalence, incidence) as well as their effect on costs (direct and indirect costs avoided, QALYs gained and ICERS). This is a very useful and powerful tool that we hope will be widely used to better inform public health policy decision making. The tool was tested at the country workshops and improved based on stakeholder feedback. The tool can be downloaded here: <http://www.econdaproject.eu/tools.php>

Objective 4: Implement the model in specific countries

The model was implemented in 8 European countries: Bulgaria, Greece, Finland, Lithuania, Netherlands, Poland, Portugal and the UK. A very thorough set of results is presented for each country in the report for WP5 and WP6. The project report can be found on the project website in work package 6: <http://www.econdaproject.eu/publications.php>.

Objective 5: Validate the model

The models were validated against 19 other models for example DYNAMO-HIA. The report of the validation exercise corresponds to deliverable 5 (WP7). The project report can be downloaded on the EConDA website: <http://www.econdaproject.eu/publications.php>

Objective 6: Publish and disseminate an evaluation of the study

The results have been disseminated across workshops in five of the EConDA countries as well as in Brussels at a final conference. A protocol paper has been written as well as a short report for the WHO and in Lithuanian for a Lithuanian medical magazine. A number of papers are currently in preparation for submission to peer-reviewed journals and will be disseminated at conferences. Information about EConDA and its results have been disseminated at a number of conferences and written up for publication in peer-reviewed journals and in presentations to policy makers within the countries and at an EU level.

The project paper can be downloaded here: <http://www.econdaproject.eu/instruments.php> and the conference and workshop presentations here: <http://www.econdaproject.eu/presentations.php>

Major results and key findings

Please shortly summarise the major results of this project
Please shortly summarise the key findings and messages

Findings from the cost-effectiveness literature review, study and consensus meeting

- Various measures of cost-effectiveness should be used.
- A 'societal' perspective should be taken.
- Country-specific measures of cost-effectiveness should be included where possible.
- It is sometimes a challenge to source the necessary data to generate the most accurate estimates on cost-effectiveness of interventions.

Findings from the obesity prevalence and smoking projections

Overweight and obesity	Smoking
<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • By 2050, smoking prevalence is forecast to decrease or remain stable in the total population across all of the countries that were modelled with the exception of Poland and Portugal where smoking prevalence is projected to increase. Within countries there were differences in the trends by age group and sex.
<ul style="list-style-type: none"> • Overweight and obesity predictions vary by education, but the pattern is not consistent between countries. 	<ul style="list-style-type: none"> • 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.
<ul style="list-style-type: none"> • Across all countries the specified chronic diseases were predicted to rise by 2050 	

Findings from the chronic disease models

Overweight and obesity interventions	Smoking interventions
<ul style="list-style-type: none"> • Significant health and economic gains can be achieved with small reductions in BMI. 	<ul style="list-style-type: none"> • Smoking cessation services (SCS) are cost-effective and have an important impact on reducing the future burden of smoking-related diseases.
<ul style="list-style-type: none"> • Multi-component lifestyle interventions⁶ 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. 	<ul style="list-style-type: none"> • 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.
<ul style="list-style-type: none"> • 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. 	<ul style="list-style-type: none"> • 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.
<ul style="list-style-type: none"> • The results show the importance of chronic disease prevention to save health system & societal costs. 	
General findings	
<ul style="list-style-type: none"> • 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. 	
<ul style="list-style-type: none"> • 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 	

⁶ These weight loss interventions include a diet, physical activity and cognitive component.

Key messages

- The EConDA project illustrates the extent to which disease burden and related costs can be avoided with specified interventions and that even small changes in risk factors can have important impacts.
- The results provide evidence for the importance of disease prevention showing the impact of low cost interventions on the future burden of ill-health.
- Instead of treating a single disease, interventions that reduce a common risk factor such as smoking or obesity can in turn have an important impact on a range of chronic diseases concurrently (1).
- Targeting less educated groups, especially with smoking cessation interventions is key to reducing the social inequalities in health.
- Given that 97% of health spending is on treatment, and only 3% on prevention with prevention bearing the brunt of austerity (2), our results show that investment in health to reduce disease onset and progression is cost-effective in the long-term.

Target groups and added value

How does the target group(s) benefit from this project?
Please describe the added value of the project for the EU citizen.
Which added value has the EU co-funding given to the project?

The outputs of the project were aimed at policy-makers and stakeholders involved in preventing chronic diseases across Europe. The literature review and consensus report on cost-effectiveness is a valuable reference for public health professionals and policy makers. With modelling in WP5 and WP6 EConDA produced a wealth of information which can inform health policy decision making in the countries studied. Amongst the valuable evidence produced was the:

- Quantification of absolute and relative inequalities in obesity and smoking by 2050 which illustrates the need for targeted preventive interventions in certain groups.
- Predictions of the future economic burden of chronic diseases in 8 EU countries to 2050.
- Promotion of health by making the economic case for prevention of chronic disease. The project measured the cost-effectiveness over time of prevention, screening and treatment interventions for chronic diseases illustrating that policy and prevention interventions are generally more cost-effective than treating a single chronic disease.
- Provision of estimates of the future burden of smoking and overweight by age, sex and education group.
- Development of sophisticated modelling software to test the cost-effectiveness of integrated approaches to preventing, screening and treating chronic disease.

The models and related tools provide a way for chronic disease resource planning and budget allocation into the future, which is of benefit not just to governments but to commissioners at a local, national and European level. In austere times it is imperative to know where resources are needed most.

Health professionals, academics and anyone who seeks to promote a reduction in risk factors and their related chronic diseases will benefit from the outputs of the simulation model and use of the tool. The tool provides a way of testing the cost-effectiveness of a range of different interventions. Academics will particularly value the validation of the demonstration models against existing models drawing comparisons between other methods

If used as intended, the results of the EconDA project could therefore have a positive impact on the health outcomes of entire European populations and could save millions to health care systems. This represents added value for the EU citizen as the direct health care cost and indirect costs savings that could be achieved by selecting more cost-effective interventions using EconDA data and tools can dwarf the costs of the actual project.

Further use of the project results

How could the project results best be further used?
 How can policy makers use the project results?
 How can health professionals and/or public health professionals use your project results?
 How can patients/citizens best use your project results?
 Which further dissemination activities would be necessary for that?

The results of the project must continue to be disseminated as much as possible. We have plans to present some of the findings in 2016 conferences and write at least three papers for publication in peer reviewed journals. The EC can further help disseminating the findings through their website and communications with relevant stakeholders.

EConDA findings highlight the need for investment in prevention interventions and policies instead of relying on less cost-effective treatment interventions as is currently the case. Our findings make a strong case for the prevention of obesity in particular which continues to rise in most European countries and which is associated with a number of costly chronic diseases. This information is of particular value to health professionals in primary care who should devote more time (with the right resourcing) to health promotion and prevention of diseases. Public health professionals and public health funding institutions can also use EConDA data to make the case for prevention research.

One of the process findings of the project was the lack of quality disease and cost data in many countries. This can be useful to make the case for increased resources going into data collection and better disease monitoring in all countries.

Major problems and lessons learned

Which major problems did the project face?
 Were these problems addressed in your Risk analysis and contingency planning?
 Were these problems unforeseen?
 How did you handle them?
 Which lessons did you learn from organising this project?

The project did not encounter any major problems. The greatest challenge was sourcing good quality data for all countries to be able to develop the models. The partners from the European Chronic Disease Alliance provided useful contacts in which to gather unpublished data once the literature had been exhausted. The data scarcity issue was overcome by developing complex algorithms to calculate disease data by stage.

However, this resulted in some delay in the implementation and testing of the disease models and related cost model. While data availability was noted as an external risk, the complex development of the model meant that more coding was necessary than originally envisaged. Further, where proxy data were used, interpretation of the outputs should be treated with caution. However, revealing the scarcity of data will serve to highlight the need for better surveillance data in that member state. Future work should more clearly establish a framework for data collection.

As a result of data scarcity and also time management of some partners, milestones slipped and an extension was requested for the final work package 5-7 reports due to an underestimation of the amount of work required, the additional diseases added (putting disease model development and testing back) and over delivery in some work packages. Work package 5 and 6 were combined in practice because of the interdependencies between them. The brunt of the work fell on the UKHF due to some partners not delivering, which put more pressure on deadlines and resources. In future work, these interdependencies will be more clearly identified so that allocated work can be successfully completed by the responsible partners. Interim progress reports for each partner would have been helpful, in order to better review tangible outputs and progress.

There were some staff changes during the project resulting in knowledge loss. However, effective handover periods meant that this the impact of this was kept to a minimum, though this did result in extra days needed to complete the project.

- Internal risk analysis: loss or under-performance of a partner. This will impact upon the outputs from the project. However the partners have a commitment to the project, track record of delivery and long-standing working relationships with each other and so this risk is considered very low.

Future recommendations

What would you do differently, if you would plan this project with your knowledge of today?

Which recommendations can you give to other project coordinators?

This was an ambitious project and we underestimated the extent of the work load within work packages, especially with the addition of disease models to ensure a more full picture of the future could be developed. However, this meant that some milestones and deadlines were not met on time. More time would have been allocated to work packages 5-7 since additional diseases were added.

The UKHF programmer should have been budgeted as a contractor as opposed to a member of staff since this has so far resulted in a substantial loss to the UKHF in terms of resource.

Future recommendations include:

- the development of the demonstration models into fully worked up models for additional countries. This would form part of EConDA II which would bring risk factors together to test the impact of combined risk factors on disease; include additional multi-stage diseases such as dementia and cancers; test additional interventions along the pathway of disease.

Reduce the bureaucracy associated with EC funded projects

There was some frustration amongst partners of working within the bureaucratic system associated with an EC funded project and a feeling that complying with administrative requirements was very time consuming and was a distraction from the core work. The administrative demands can be perceived to outweigh the benefits of participation. This is often a disincentive for some people to get involved. This risks losing the contribution of valuable experience and expertise.

Future programmes need to consider how this problem can be overcome. Adequate resources need to be allocated for the administration and co-ordination of a project to reduce the burden on individual partners. In addition, the project report overlaps significantly with the technical report even though they are separate deliverables, requiring substantially more work.

One specific alteration could be to provide more detail of what is required in the financial reporting of expenses. For example, provide columns so that partners know the precise detail required in other costs instead of simply 'description of item'.

Further remarks

Please state further remarks that you find noteworthy

The EConDA model illustrates utility of the microsimulation method for resource planning and policy testing. The models show the extent to which disease burden and related costs can be avoided with specified interventions. The results provide evidence for the importance of disease prevention showing the impact of low cost interventions on the future burden of ill-health. Instead of treating a single disease, interventions that reduce a common risk factor can in turn have an important impact on a range of chronic diseases concurrently. Given that 97% of health spending is on treatment, and only 3% on prevention (1) with prevention bearing the brunt of austerity (2), our results show that investment in health to reduce disease onset and progression is cost-effective in the long-term. This project is just the 'primostrato' of what could be achieved in this area. Much further work is necessary to build on the outputs of the EConDA project and can be developed in EConDA 2.

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