Editorial (EQUIPT Supplement)

**EQUIPTMOD as a basis for rational investment decisions in tobacco control**

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**Key Message**:

*EQUIPTMOD is an economic modelling tool that can be used by national and regional governments in Europe to assess the return on investment (ROI) of different tobacco control scenarios using the best available evidence, and so provides a rational basis for decision making in this crucial area of population health.*

**Introduction**

So far as tobacco consumption is concerned, evidence couldn’t be clearer in two areas: (a) that smoking is the cause of a wide range of conditions including neoplasms, cardiovascular and respiratory diseases; and (b) that smoking kills ([1](#_ENREF_1), [2](#_ENREF_2)). Recent estimates are available to show how this burden actually translates to colossal economic (opportunity) costs globally: US$422 billion in 2012 just in healthcare costs (i.e. 5.7% of global health expenditure) and US$1436 billion (i.e. 1.8% of the world's annual gross domestic product) when productivity losses were added ([3](#_ENREF_3)). Europe is particularly affected as the tobacco epidemic in the continent is most advanced - still some 28% of the European Union (EU) population smokes ([4](#_ENREF_4)). The health and economic burden of tobacco use therefore calls for the “urgent need for countries to implement stronger tobacco control measures to address these costs” ([3](#_ENREF_3)). This suggestion immediately begs an important policy question: how can the countries do that? In particular, policy makers all across Europe are in need of bespoke information on the economic and wider returns of investing in evidence-based tobacco control so that they can make stronger business cases for better tobacco control.

A broad spectrum of policy measures exist in the EU member states: from regulation of tobacco products to advertising restrictions; from creation of smoke-free environments, tax structures and activities against illicit trade to anti-smoking campaigns and stop smoking services ([4](#_ENREF_4)). The implementation of these measures is often countered by massive lobbying of tobacco industry ([5](#_ENREF_5)). The Framework Convention on Tobacco Control (FCTC), arguably the most important international step to combat the scourge of tobacco, has established a landmark reference but only parts of this comprehensive framework have indeed been accomplished ([6](#_ENREF_6)). For example, just about a third of European countries that managed to increase tobacco taxes also have established laws on smoke-free public places, and even less offer cessation programmes ([2](#_ENREF_2)). As a result, more investment in tobacco control is needed. Equally, countries need to look for alternative strategies to improve the value for money of current provision of services as well as consider where they could disinvest from less effective services to allow them to reinvest that money to more effective tobacco control measures.

Investment decisions involve much more than how much to spend on tobacco control; it is crucial to have a rational basis for adoption of different strategies or scenarios. EQUIPTMOD is designed specifically for this kind of modelling. For example, the budget holders (e.g. local authority service commissioners in England; social health insurance company in Germany or the national health services in Spain) may want to continue providing most services at their current levels but at the same time may want to scale up certain services and stop providing more costly and/or less effective services. This creates opportunities for ‘prospective investment scenarios’; the utility of which could be assessed against the baseline (i.e. current practice). This assessment is vital as it would allow policy makers to be explicit about the returns that their bespoke tobacco control agendas could generate.

In 2012, the National Institute of Health and Care Excellence (NICE) published the first Tobacco Control Return on Investment (ROI) Tool ([7](#_ENREF_7)) as a series of initiatives to support local authorities (LAs). The policy context was that the newly enacted Health and Social Care Act 2012 put LAs in the forefront of public health, including tobacco control. This tool was well received by relevant stakeholder community and was instrumental in informing the development by NICE of similar ROI tools in other areas of public health. The tool was an economic model that synthesised existing best evidence around smoking cessation services and allowed LAs to estimate the ROI from what they were currently doing (i.e. ROI of the current package of interventions). In addition, the tool encouraged LAs to think about how they could do things differently (i.e. consider alternative package of interventions). The ‘mix and match’ of interventions to create an alternative investment package allowed by the tool was attractive and thus led to several business cases, informed spending reviews, and supported development of local/sub-national tobacco control strategies ([8](#_ENREF_8)).

The NICE Tobacco ROI tool was developed by a research consortium led by Health Economics Research Group (HERG) at Brunel University London. Building on the success of the NICE ROI tool in England, the consortium applied to and received – after a competitive bidding process - funding from the European Commission to transfer the ROI tool to other European member states. This massive undertaking, essentially a comparative effectiveness research (CER) entitled ‘European-study on quantifying utility of investment in protection from tobacco (EQUIPT)’, was guided by a complex protocol and was designed to test the transferability of the NICE Tobacco ROI tool to other EU member states by adapting it to meet the needs of European decision makers, following the transferability criteria described in Pokhrel et al. ([9](#_ENREF_9)). Stakeholders’ needs and intention to use ROI tools in Germany, Hungary, Spain, Netherlands and UK collected via interviews and surveys were analysed ([10](#_ENREF_10)). This analysis was complemented by secondary analysis of the contextual and other factors. Informed by this contextual analysis, country-specific ROI tools have been developed using a mix of economic modelling and Visual Basic programming. The ultimate aim of the EQUIPT study is to make this tool available to European stakeholders to support decision making in tobacco control. The EQUIPT ROI Tool, available freely from <http://equipt.eu>, can be used to compare various policy scenarios, including new or continued investment strategies or stopping services that are less effective.

Based on the tool, the researchers did extensive analyses of cost-effectiveness of alternative strategies for tobacco control across the countries included in this project. This Supplement to *Addiction* now presents those analyses as well as the description of the methods underpinning the EQUIPTMOD and has a collection of 9 papers and an editorial comment. The papers included in this Supplement represent the highest level of scholarly analyses addressing a key question: what is the ROI of alternative tobacco control strategies in a country in question? These analyses based on the EQUIPTMOD are brought together in the pages of one scientific journal via this collection of papers. The collection is divided into two themes. The first theme covers the methodological issues and provides an overview of how the ROI tool was developed. The second theme covers country-specific applications of the tool, leading to rigorous policy analyses in each of the five EQUIPT countries.

**Theme one: methods and challenges around development of EQUIPTMOD**

Developing a ROI tool to support decision making is challenging for a number of reasons. For example, the tool must be underpinned by robust economic model that not only is capable of capturing lifetime outcomes and costs as current smokers choose to make quit attempts, but also reflects the current decision context in which the tool is expected to serve. The decision context (in this case, the public sector) itself poses a number of further challenges: public finance operates in ‘myopic’ fashion, thus costs and benefits in the short to medium terms are key ingredients to decision making and so are costs and benefits falling outside healthcare (e.g. productivity). Coyle and colleagues ([11](#_ENREF_11)) consider these specific challenges and describe the methods of the economic model (EQUIPTMOD) underpinning the EQUIPT ROI tool. Using examples from England, they demonstrate how the tool can provide consistent estimates of the health and wider returns that investing in bespoke tobacco control interventions could generate for countries.

An economic model is as good as the assumptions underlying it. Therefore, EQUIPTMOD required estimates of intervention effects, reach and costs. West and colleagues ([12](#_ENREF_12)) reviewed the recent literature on the effect and reach of various population level interventions intended to increase quit attempts as well as individual level interventions intended to increase the success rates (abstinence for at least 12 months). To derive effect sizes of the interventions included in the EQUIPTMOD, they used systematic reviews of efficacy supplemented by individual effectiveness evaluations and national surveys. Trapero-Bertran and colleagues ([13](#_ENREF_13)) developed a standardized method to source both economic costs of tobacco smoking and costs of implementing cessation interventions. Although both type of costs varied substantially across the countries, they contributed to the return on investment estimates in support of national or regional policy options (theme two papers). Finally, Nemeth and colleagues ([14](#_ENREF_14)) tested the transferability of the ROI tool to other countries. They found that collecting data on a small number of model inputs made EQUIPTMOD transferable, thus showing the ROI tool’s potential to facilitate transfer of tobacco control related economic evidence to new jurisdictions.

Taken together, the collection of theme one papers picks up on the subtle challenges around modelling ROI in the contemporary European decision contexts related to public health. Availability of a co-created (with stakeholders) user-friendly, rigorously tested, transferable, ROI tool is thus expected to support tobacco control decision making in Europe.

**Theme two: country-specific application of EQUIPTMOD and policy analyses**

A useful feature of ROI tools like the EQUIPTMOD is to demonstrate the health and economic value of the current provision of tobacco control services compared to a counterfactual in which no such provision is assumed. A more useful feature however is the tool’s ability to provide estimates of health and wider returns from investing in tobacco control strategies that could serve as alternatives to the current practice. For example, what if we changed the current provision by increasing the reach of a service or introduced new and effective intervention to current provision of services or even stopped the current provision of costly and/or potentially less effective service? Theme two papers provide a number of such context-specific policy analyses.

Compared with the UK, smoking cessation aids are used less frequently in Germany while the smoking prevalence is higher. This underscores the need for more economic evidence to drive investment in tobacco control in Germany. Huber and colleagues ([15](#_ENREF_15)) evaluated cost effectiveness of increased reach of specific smoking cessation interventions using the EQUIPTMOD and found that a cost-effective strategy in Germany could be to increase the reach of group-based behavioural support, financial incentives and varenicline for smoking cessation by just 1% of current annual quit attempts. Likewise, the analysis conducted by Trapero-Bertran and colleagues ([16](#_ENREF_16)) show that if Spanish authorities expanded the reach of existing GP brief interventions for smoking cessation, provided pro-active telephone support, and reimbursed smoking cessation medication to smokers trying to stop, such policies would more than pay for themselves in the long run. In Hungary, Nemeth and colleagues ([17](#_ENREF_17)) show that doubling the reach of existing group-based behavioural support therapies and pro-active telephone support provide good return on investment.

An important policy question in the contemporary public health funding climate, dominated mainly by austerity measures across Europe, is whether it would be cost-effective to provide a new intervention to complement the current provision of smoking cessation services. In their analyses, Cheung and colleagues ([18](#_ENREF_18)) demonstrate that providing internet-based smoking cessation interventions as a complement to the current practice could be a cost-saving policy option in the Netherlands. Likewise, in Hungary introducing a social marketing campaign would more than pay for itself in the long run, as Nemeth and colleagues ([17](#_ENREF_17)) have shown.

Sequential analysis is a method in health economics that allows identification of optimal investment options given a set of investment choices. Often, policy makers want to know which of proposed changes in the services as described above provides the best value for money. Using the EQUIPTMOD, Anraad and colleagues ([19](#_ENREF_19)) compared five investment choices (i.e. potential changes to the current practice) related to tobacco control in England and the Netherlands, the two EQUIPT counties with similar current provision of smoking cessation services. They found that the inclusion of cytisine (a smoking cessation medication) and increasing the reach of brief physician advice, text messaging support and group-based therapy would be a cost-effective policy in both countries.

The analysis by Anraad and colleagues ([19](#_ENREF_19)) highlight how valuable cytisine can be for stop smoking services. Cytisine, a plant-based nicotine receptor partial agonist, aims to reduce withdrawal symptoms and thus increase the chance of success in quit attempts. Cytisine, a similar medication to varenicline, is not yet licensed for use in the Netherlands and UK but has been found to be effective (RR=3.98) in trials ([20](#_ENREF_20)) and potentially cost-effective in modelling studies ([21](#_ENREF_21)). The analysis by Anraad and colleagues ([19](#_ENREF_19)) thus confirms a long held hypothesis that including cytisine, which is significantly cheaper than varenicline, to the current provision of smoking cessation services provides better value for money and thus makes the business case for licensing and using it in the UK and the Netherlands.

The collection of theme two papers collectively conveys a single, powerful message: that current government action on smoking is good for a country’s wealth as well as its health but governments can do much better than this. The question is how. The analyses presented in this Supplement demonstrate cost-effectiveness of several alternative strategies. The need of the hour is to translate this knowledge to policy making. An earlier evaluation study clearly shows that countries that implement ‘evidence-based tobacco control’ are the ‘winners’ ([22](#_ENREF_22)). Thus, there is a reason to be hopeful that EQUIPT ROI tool could facilitate this knowledge translation.

**Conclusion**

The papers in this Supplement provide a wealth of information to support evidence-based decision making in tobacco control across five countries in Europe, and potentially wider. The EQUIPTMOD is a valuable decision-support tool available to European policy makers and wider stakeholders. The way forward is to use it to support investment decisions for evidence-based tobacco control.

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**References**

1. Thun MJ, Carter BD, Feskanich D, Freedman ND, Prentice R, Lopez AD, et al. 50-year trends in smoking-related mortality in the United States. N Engl J Med. 2013 Jan 24;368(4):351-64.

2. World Health Organisation. Data and Statistics. 2016. . 2016; Available from: <http://www.euro.who.int/en/health-topics/disease-prevention/tobacco/data-and-statistics>

3. Goodchild M, Nargis N, d'Espaignet ET. Global economic cost of smoking-attributable diseases. Tob Control. 2018 Jan;27(1):58-64.

4. European Commission. Public Health: Tobacco Policy. 2016; Available from: <http://ec.europa.eu/health/tobacco/policy/>.

5. Peeters S, Costa H, Stuckler D, McKee M, Gilmore AB. The revision of the 2014 European tobacco products directive: an analysis of the tobacco industry's attempts to 'break the health silo'. Tob Control. 2016 Jan;25(1):108-17.

6. WHO. WHO Framework Convention on Tobacco Control. 2003; Available from: <http://whqlibdoc.who.int/publications/2003/9241591013.pdf>.

7. NICE. The NICE Tobacco Return on Investment Tool 2012; Available from: <http://www.nice.org.uk/usingguidance/implementationtools/returnoninvesment/TobaccoROITool.jsp>.

8. The EQUIPT Study Group. Tobacco Control: Policy Proposals. 2016; Available from: <http://equipt.eu/deliverables>.

9. Pokhrel S, Evers S, Leidl R, Trapero-Bertran M, Kalo Z, Vries H, et al. EQUIPT: protocol of a comparative effectiveness research study evaluating cross-context transferability of economic evidence on tobacco control. BMJ Open. 2014 Nov 24;4(11):e006945.

10. Voko Z, Cheung KL, Jozwiak-Hagymasy J, Wolfenstetter S, Jones T, Munoz C, et al. Similarities and differences between stakeholders' opinions on using Health Technology Assessment (HTA) information across five European countries: results from the EQUIPT survey. Health Res Policy Syst. 2016 May 26;14(1):38.

11. Coyle K, Coyle D, Lester-George A, West R, Nemeth B, Hiligsmann M, et al. Development and application of an economic model (EQUIPTMOD) to assess the impact of smoking cessation. Addiction. 2017 Aug 18.

12. West R, Coyle K, Owen L, Coyle D, Pokhrel S. Estimates of effectiveness and reach for 'return on investment' modelling of smoking cessation interventions using data from England. Addiction. 2017 Aug 18.

13. Trapero-Bertran M, Leidl R, Muñoz C, Kulchaitanaroaj P, Coyle K, Präger M, et al. Estimates of costs for modelling return on investment from smoking cessation interventions. Addiction. 2018.

14. Németh B, Kulchaitanaroaj P, Lester-George A, Huic M, Coyle K, Coyle D, et al. Utility of model input uncertainty analysis in transferring tobacco control related economic evidence to countries with scarce resources: results from the EQUIPT study. Addiction. 2018.

15. Huber MB, Prager M, Coyle K, Coyle D, Lester-George A, Trapero-Bertran M, et al. Cost-effectiveness of increasing the reach of smoking cessation interventions in Germany: results from the EQUIPTMOD. Addiction. 2017 Dec 15.

16. Trapero-Bertran M, Muñoz C, Coyle K, Coyle D, Lester-George A, Leidl R, et al. Cost-effectiveness of alternative smoking cessation scenarios in Spain: results from the EQUIPTMOD Addiction. 2018.

17. Németh B, Józwiak-Hagymásy J, Kovács G, Kovács A, Demjén T, Huber MB, et al. Cost-effectiveness of possible future smoking cessation strategies in Hungary: results from the EQUIPTMOD. Addiction. 2018.

18. Cheung KL, Wijnen BFM, Hiligsmann M, Coyle K, Coyle D, Pokhrel S, et al. Is it cost-effective to provide internet-based interventions to complement the current provision of smoking cessation services in the Netherlands? An analysis based on the EQUIPTMOD. Addiction. 2017 Dec 15.

19. Anraad C, Cheung KL, Hiligsmann M, Coyle K, Coyle D, Owen L, et al. Assessment of cost-effective changes to the current and potential provision of smoking cessation services: An analysis based on the EQUIPTMOD. Addiction. 2018.

20. Cahill K, Lindson-Hawley N, Thomas KH, Fanshawe TR, Lancaster T. Nicotine receptor partial agonists for smoking cessation. In: The Cochrane Collaboration, editor. Cochrane Database of Systematic Reviews. Chichester, UK: John Wiley & Sons, Ltd; 2017.

21. Leaviss J, Sullivan W, Ren S, Everson-Hock E, Stevenson M, Stevens JW, et al. What is the clinical effectiveness and cost-effectiveness of cytisine compared with varenicline for smoking cessation? A systematic review and economic evaluation. Health Technol Asses. 2014 May;18(33):1-+.

22. Joossens L, Raw M. The Tobacco Control Scale 2013 in Europe. 2013; Available from: <http://www.europeancancerleagues.org/images/TobaccoControl/TCS_2013_in_Europe_13-03-14_final_1.pdf>.