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The Fiscal Consequences of Adult Immunisation in The Netherlands

Supporting Active Ageing Through Immunisation (SAATI):

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Estimate the fiscal impact of adult vaccination based on likely changes in vaccine preventable morbidity and mortality and resulting productivity related changes in tax receipts and government transfer costs

The specific tasks required

- Develop a fiscal accounting model that reflects the fiscal impact for government from investments in adult vaccination
- Evaluate the benefits to government based on gross tax revenue and discounted net tax revenue attributed to changes in morbidity and mortality attributed to adult immunisation
- Estimate the the return on investment, based on changes in morbidity and mortality that can be reflected in future discounted gross and net tax revenue



Fiscal perspectives of health compared to conventional approaches



- Government perspective largely ignored as traditional societal perspective analysis considers that transfers and lost taxes have no impact on society welfare gains or loss
- From "government perspective" fiscal transfers and lost taxes that arise from illness are real costs that can be derived – in much the same way as unemployment
- From government perspective citizens are not only a <u>cost</u> but also a source of <u>revenue</u> that influences tax receipts
- From government perspective, changes in population health influence government accounts: expenditure (i.e. costs) and revenue (i.e. taxes)

'Government perspective' on health in workingaged adults – UK

Impact on government accounts		Annual cost to government 2007 Billion £	to Percentage 007 government cost	
Workless benefits	Government cost	29	43%	
Healthcare	Government cost	5 – 11	11%	
Foregone taxes	<i>Revenue loss</i>	28 – 36	46%	
Total costs to government		£62 - 76		

Does conventional HTA framework capture the other 90% of costs?

Dame Carol Black's Review of the health of Britain's working age population 17 March 2008, TSO London



FRAMEWORK FOR CAPTURING THE FISCAL IMPACT OF ADULT IMMUNISATION

Government Perspective Modelling

GMAS The 'per capita' fiscal life course



Fiscal consequences vaccine preventable conditions in working -age adults

Infected populations result in quantifiable less tax and higher healthcare and social insurance expenditure which could be averted by a vaccination programme

Impact of communicable disease	Fiscal impact
Higher direct medical (inpatient/outpatient costs) for the healthcare system	+++
Increased abseentism putting financial burden to the social security systems and productive output	+
Pre-mature mortality resulting in productivity loss (earnings loss leading to decreased tax revenue)	++++
Increased disability and long-term morbidity leading to reduced productivity, decreased earnings and higher unemployment probability leading to a smaller tax base	+++

GMAS Likely fiscal consequences of communicable diseases



Kotsopoulos, et al. J. Of Mental Health Policy and Economics (2013)

GMAS Combining three modeling approaches



Background, rationale and methodology

- The analytic framework described here follows a lifetime modelling approach which considered how changes in population health influence both government transfers (e.g. social services, pensions, healthcare) compared with on-going tax transfers to government (e.g. income tax, value added tax, social insurance)
 - The analysis described here depicts the gross tax receipts to the government for the seven communicable diseases in adults for which vaccines are available
 - Linked to vaccine investment costs, the future tax revenue associated with the resulting changes in morbidity and mortality are projected
- Average retirement at the age of 67
- The cost of vaccination was based on a vaccination schedule starting at the age of 50 for the seven vaccine preventable conditions
- The costs for vaccine administration were based on historical evidence on influenza vaccination coverage rates of 77% for all vaccines

Generational accounting framework applied to health funding

GMAS

Government transfers (lifetime)	Tax transfers to government (lifetime)
Health programs: Pneumococcal Pertusis Diptheria Influenza Herpes zoster Tetanus Allowances non-vaccine related health expenditure Pensions	Income taxes Excise taxes Property taxes Sales taxes Corporate taxes
$NPV_{fiscal} = \sum_{t=0}^{Te} \frac{Tax_t - Cost_t}{(1+r)^t}$ Where in year t:	(1)
$Tax_{t} = Direct \ tax_{t} + Indirect \ tax_{t} + Nat$ $Cost_{t} = Education_{t} + Health_{t} + Transfer$	

Model design based on: Kotlikoff L. Generational Accounting: Knowing Who Pays, and When, for What We Spend. New York. New York, USA: Free Press, 1992.

GMAS Model's inputs

• The model is based on a diversified set of variables: Demographic; epidemiological; clinical; health economic; fiscal; microeconomic

Demographic	Life tables; age-pyramid of the current population
Epidemiological	Age-specific incidence of each disease; age-specific mortality; disease- attributable long-term disability (e.g. hearing loss, or premature retirement); disease attributable mortality
Clinical	Vaccine efficacy in reducing the incidence of disease and disease attributable mortality; vaccination coverage estimates
Health economic	Direct medical costs of disease; sick-days; caregivers burden; institutional costs; cost of vaccination; non-definable indirect costs of disease (e.g. travel time)
Fiscal	Direct and indirect tax; government transfers (health and social protection)
Microeconomic	Age-specific earnings; discount rate; cost inflation; wage productivity growth

Adult immunisation prevents infectious cases and attributable deaths



- The adult immunisation programme in cohort of 50 year olds was projected to prevent 34,528 infectious disease cases over the remaining life span,
- Approximately 5,782 premature deaths are prevented from infections

Significant productivity gains and savings can be achieved through adult immunisation



- Adult immunization can reduce absenteeism for the seven vaccine preventable conditions evaluated
- An estimated 29 cases of disability can be eliminated in adults for vaccine preventable conditions
- Preventing disability represents saving in future disability costs and represents increased productivity





- An estimated €6.6 million can be saved annually based on reduced health costs attributed to vaccine preventable conditions in adults
- Although indirect costs are lower than direct health costs, the potential savings for society is greater due to improved labour force participation and productivity

GMAS Scorecard: Aggregated benefits adult immunization

Government budget item	Value	Incremental Fiscal impact
Medical cost-savings	Savings	€6,651,724
Productivity loss (indirect costs)	Savings	€24,793,930
Prevented disability costs	Savings	€502,426
Gross discounted tax	Revenue	€547,490,400
Vaccination cost	Cost	€136,878,802
B/C ratio	Return on investment	€4.02

Investment €1 in adult immunization has the capacity to generate over €4 of future economic revenue for government

Final considerations

- Conventional economic frameworks for evaluating health conditions predominantly focus on direct costs of healthcare which dismisses the wider costs and benefits of changes in population health on the public sector
- Adopting a "government perspective" framework to evaluate investments in health and resulting changes in morbidity and mortality provides a framework to estimate how governments benefit from investments in adult immunisation programs
- Vaccination is a contributing factor to maintain productive output offering a 4-fold return on investment for governments
 - Every €1 invested yields €4 of fiscal benefit
- Limiting the analysis to fiscal parameters may undervalue programs because it does not consider multiplier effects in the economy that can arise from improved health

Final Considerations (2)

- Cross-country applicability
 - Similar ratio of tax burden to social transfer, therefore we expect consistency in terms of the productivity gains and associated gross tax revenue linked with adult immunisation
- Political, economic and fiscal reasoning
 - Health, Ageing and Retirement in Europe (2005): Elderly populations, despite diminishing earnings have a significant residual societal and fiscal value in terms of disposable income and consumption that can be captured using the fiscal model described here
 - Maintaining people in the workforce, healthy and productive is a key priority for public debt sustainability and economic growth

GMAS Policy Perspective...

"With a shrinking labor supply, Europe's future economic growth will therefore depend entirely on <u>getting more out</u> <u>of each remaining worker (many of them unskilled,</u> recently arrived immigrants), even as it has to tax them at higher and higher rates to pay for old-age pensions and health care (Longman)."

Longman P. Foreign Affairs. New York: May/Jun 2004 83(3): pg. 64

"Policy-makers who are interested in improving economic outcomes (e.g. on the labour market or for the entire economy) would have good reasons to consider investment in health as one of their options by which to meet their economic objectives."

Suhrcke M, McKee M, Sauto Arce R, Tsolova S, Mortensen J. The contribution of health to the economy in the European Union. European Communities, 2005; ISBN 92-894-9829-3.

GMAS Where to spend healthcare dollars?



If Treasury were allocating healthcare resources would treatments be prioritized differently?



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