



Investing in the Prevention of Communicable Disease

Outbreaks:

Fiscal Health Modelling for Assessing the Public Investment Case

Conflict of interest:

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Connolly M. holds stocks in Global Market Access Solutions LLC. Boersma C. and Postma M.J. hold stocks in Health-Ecore B.V.

INVEST

INNOVATE

IMPLEMENT



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Fiscal Health Modelling for Assessing the Public Investment Case

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Introduction in Fiscal Health Modelling

Health service

- ☐ Health service costs (direct)
- ☐ Patient costs
- ☐ Caregiver's costs
- ☐ Patient outcomes e.g., QALYs

Societal

- ☐ Health service costs (direct)
- ☐ Patient costs
- ☐ Caregiver's costs
- ☐ Patient outcomes e.g., QALYs
- ☐ Foregone productivity

Government

- ☐ Health service costs (direct)
- ☐ Patient costs
- ☐ Caregiver's costs
- ☐ Patient outcomes e.g., QALYs
- ☐ Foregone taxes
- ☐ Social protection costs
- ☐ Other governmental costs

Health service and societal perspectives are often disconnected from the fiscal reality of government finance

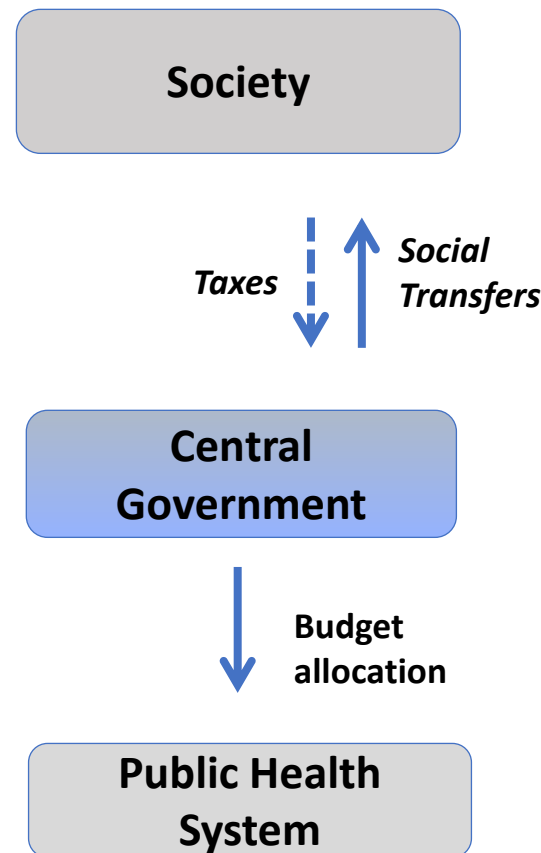




Introduction in Fiscal Health Modelling

Assessing the public economics of health & health expenditure

- Most public health services are funded by the central government
- Population health $\uparrow$ = societal wealth $\uparrow$
- Consequently, a proportion of wealth is transferred back to the government from taxes
- Government perspective:
Changes in population health influence government accounts, expenditure (i.e., healthcare costs) and revenue (i.e., taxes)
- By applying this perspective we can analyse discrete investments in new health interventions

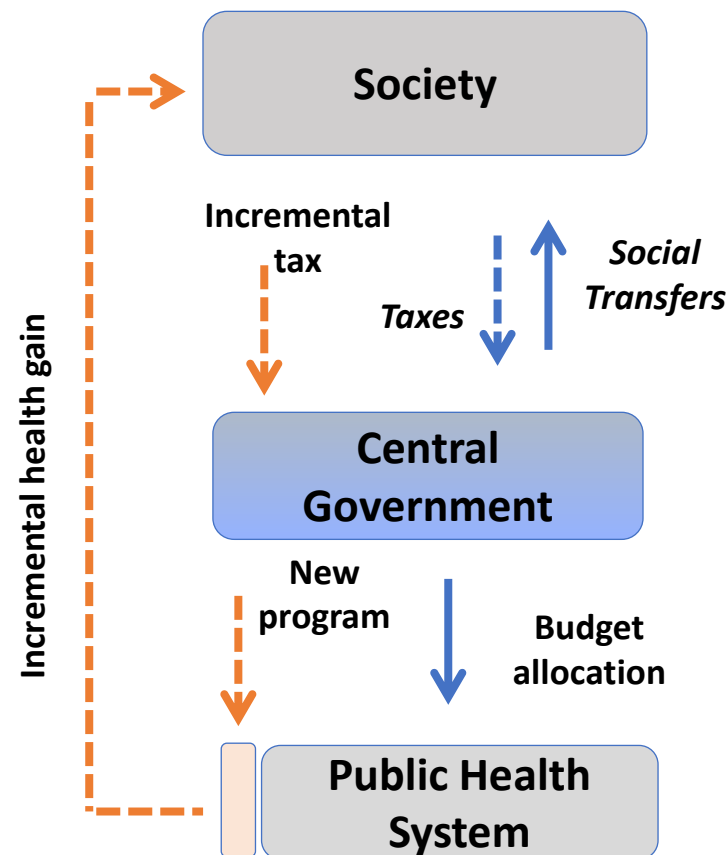




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Application of Fiscal Health Modelling



- The framework for governmental decision-making
 - Communicable disease (CD): a first test case of COVID-19 fiscal impact
 - Based on publicly available population data on morbidity and mortality
 - Use to build the investment case for prevention and pandemic preparedness of CDs
- Budget allocation and investments in prevention and public health sustain additional HTA perspectives
 - Vaccines often assessed at a €20.000/QALY threshold
 - €50.000/QALY and €80.000/QALY also used





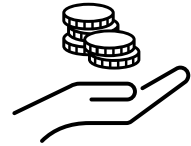
Methods of Fiscal Health Modelling

- Identified and developed two approaches to Fiscal Health Modelling (FHM) for VITAL:
 - Approach 1: Prospective modelling of fiscal categories based on observed population data of long-term morbidity and mortality
 - Approach 2: Retrospective identification of the fiscal impact of CDs
- First test case was COVID-19: data availability
 - Public population data (RIVM); Approach 1 (2020/2021)
 - Data from a cost-effectiveness model; approach 1 transferability
 - Retrospective identification of governmental income and opportunity costs; approach 2

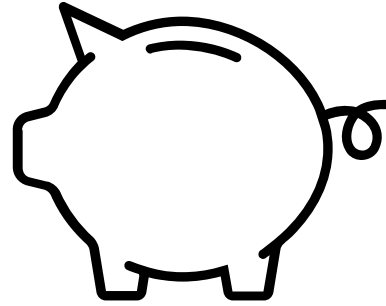




Methods of FHM (approach 1)



- ❖ Income tax revenue
- ❖ Inheritance tax revenue
- ❖ VAT revenue

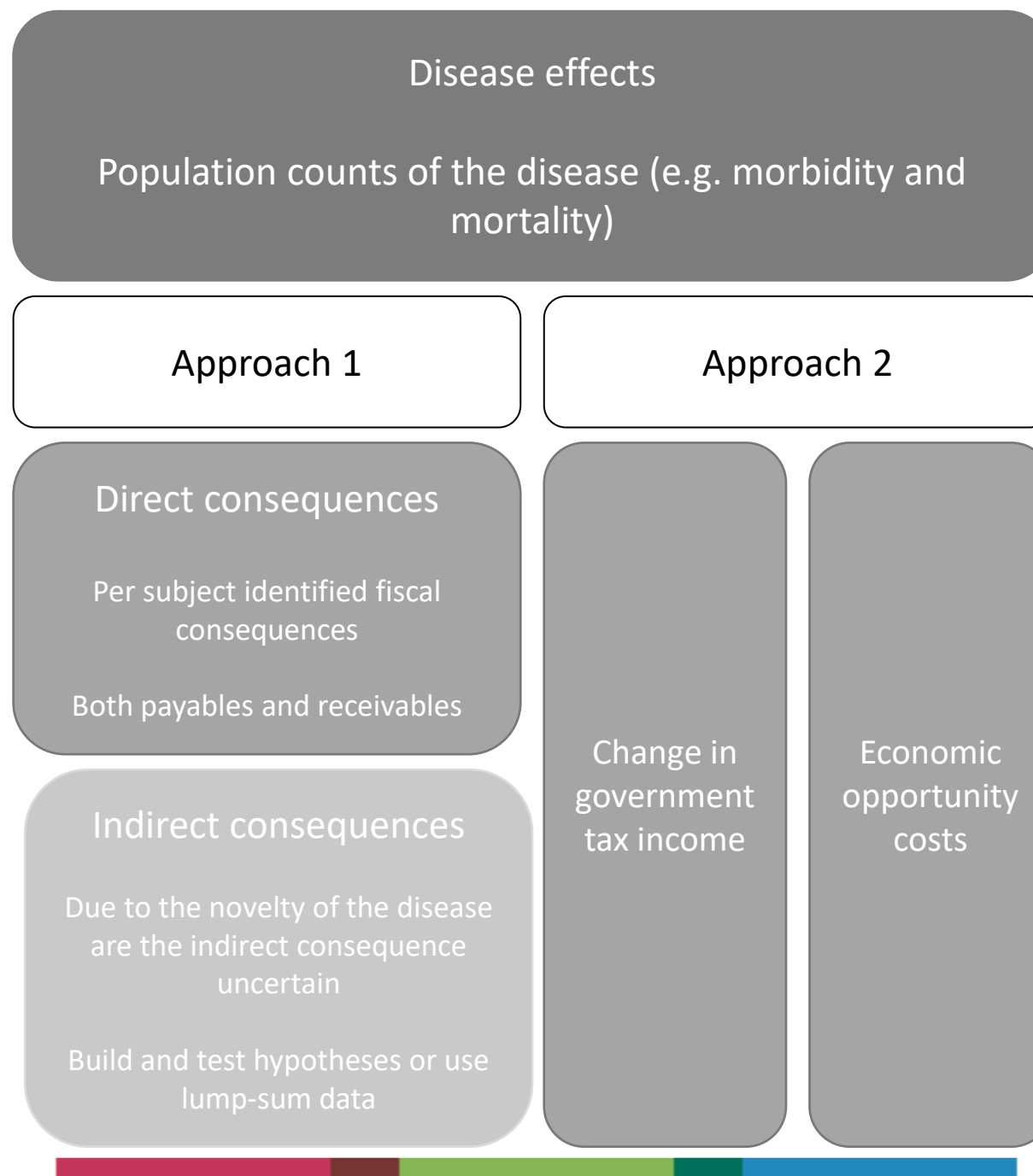


- ❖ Social benefits paid
 - ❖ Disability
 - ❖ Mortality
- ❖ (State) Pension payments



Methods of FHM (approach 2)

- Retrospective identification of the fiscal impact of a CDs
- Comparing the expected (extrapolated), based on previous years, and observed outcomes per category
 - Tax income (2020/2021)
 - Gross domestic product (2020)

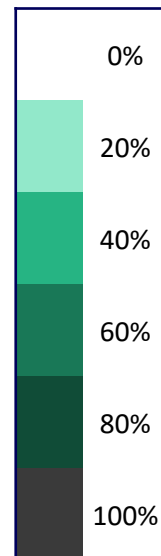




Results: Patient data

Age group (pre-vacc)	Infections	Hospitalisations	ICU admissions	Mortality
0 – 19	119.444 (13,84%)	289 (1,44%)	9 (0,2%)	- (0%)
20 – 39	273.900 (31,74%)	962 (4,79%)	149 (3,33%)	- (0%)
40 – 59	279.164 (32,35%)	4.173 (20,77%)	1.165 (26,06%)	293 (1,93%)
60 – 79	140.289 (16,26%)	8.935 (44,48%)	2.918 (65,27%)	4.634 (30,59%)
80+	50.117 (5,81%)	5.729 (28,52%)	230 (5,15%)	10.221 (67,47%)
Total	862.914 (100%)	20.088 (100%)	4.471 (100%)	15.148 (100%)

Age group (post-vacc)	Infections	Hospitalisations	ICU admissions	Mortality
0 – 19	275.337 (23,24%)	345 (3,34%)	8 (0,34%)	- (0%)
20 – 39	425.232 (35,90%)	853 (8,25%)	164 (6,76%)	- (0%)
40 – 59	319.623 (26,98%)	2.518 (24,34%)	728 (30,10%)	170 (3,19%)
60 – 79	136.460 (11,52%)	4.276 (41,33%)	1.436 (59,35%)	1.929 (36,13%)
80+	27.934 (2,36%)	2.354 (22,75%)	83 (3,44%)	3.240 (60,68%)
Total	1.184.586 (100%)	10.347 (100%)	2.420 (100%)	5.339 (100%)





Results: fiscal impact

- Approach 1 (prospective modelling)
- Receivables
 - Income tax revenue: -€259 million
 - VAT revenue: -€225 million
 - Inheritance tax: €326 million
- Payables
 - Social benefits: /
 - Pension payments averted: €930 million





Results

- Approach 1 (prospective modelling)
- 60 – 79 age group largest extremities of fiscal outcomes (per category)
 - All fiscal categories, except social benefits, are affected as a result of mortality in this age group
- 80+ group is the primary age group driving the total fiscal costs
 - Inheritance tax
 - Little impact on other categories



Results: Indirect consequences of Long-COVID

Age Group	Activity not limited	Activity limited	Activity limited severely
0-19	3,38%	2,16%	0,63%
20-39	4,38%	5,22%	1,98%
40-59	5,10%	6,83%	3,25%
60-80	3,18%	4,82%	2,42%
80+	1,85%	3,20%	1,63%
weight. Avg	4%	4%	2%

- Current impact on long-term morbidity is unknown (>2 years), proposed methods for calculation:
 - Assumed that 25%, 50% and 100% of the severely affected patients have complications longer than two year
 - For x year (multiple scenarios)
 - Cost per year fully unable to work: **18,165** euros of social benefit per patient by the government until the age of retirement



Results

- Approach 2 (retrospective identification)
- Change in government tax income
 - Expected tax income values for 2020 and 2021: € 214,781 million and € 228,291 million
 - Realized values for 2020 and 2021: €205,671 million and € 223,819 million,
 - Incremental: -€9,110 million and -€4,472 million



Results

- Approach 2 (retrospective modelling)
- GDP opportunity costs
 - Expected tax income values for 2020: € 1,130 trillion
 - Realized values for 2020: € 1,034 trillion
 - Incremental: €-96,296 billion



Discussion

- FHM approach 1 versus approach 2
 - 1: More detailed, long-term impact, and prospective budgeting
 - 2: Captures everything, shorter-term impact, long-term insight most valuable
- Data availability: transferability
- Drivers of fiscal impact
 - Approach 1
 - Mortality: Impact primarily in elderly age groups
 - Morbidity: little to no effect
 - Approach 2
 - Mortality and morbidity, social changes represented in outcomes, not specified



Conclusion

- FHM 1
 - Based on part of a single analysis on real-life counts and fiscal impact or part of HTA model
- FHM 2
 - Real-life impact on predetermined categories
 - Broad impact analysis for future reference
 - Includes all health interventions, social and economic effects
- Application of FHM within HTA and health economics research can aid future decision-making regarding investments in disease prevention



Thank you for your attention!

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