



Synoptic overview of models and approaches for quantification of health impacts

Odile Mekel

NRW Institute of Health and Work (LIGA.NRW)

Innovation in Health; WHO CC Regional Health Policy and Public Health

odile.mekel@liga.nrw.de

Quantification of health impacts
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WHO Collaborating Center for
Regional Health Policy
and Public Health



Background

- Workshop: Quantifying the health impacts of policies – Principles, methods, and models
- Organised by Unit Innovation in Health & WHO CC RHPPH (LIGA.NRW)
- 1.5-day invitational workshop: 16 – 17 March 2010, Düsseldorf
- ~ 35 participants (GER, NL, UK, DK, FI, IT, USA)
- Motivation to conduct the workshop: **taking the issue of quantification forward**
 - for application in health-related assessments in NRW
 - for application in HIA
- Model developers were invited to present their tool incl. current status and exemplary applications





Evaluation criteria

- formal description
 - name
 - range of application / target group
 - system requirements, characteristics
 - accessibility
- program implementation
 - analysis design
 - input
 - output
 - integrated data bases
 - underlying model
 - application sample
 - peer review; validation
- user friendliness
 - clarity / transparency
 - user guide / help
 - documentation of input / output storage of (intermediate) results
 - stability of the program
 - parameter input plausibility control
 - program support





Formal description of models and tools

- Prevent (www.epigear.com; www.eurocadet.org)



- DYNAMO-HIA (www.dynamo-hia.eu)
DYNAMIC MOdel for Health Impact Assessment



- BoD/EBD in NRW (www.liga.nrw.de)
Burden of Disease in North Rhine-Westphalia



PH

- HEIMTSA/INTARESE
(www.integrated-assessment.eu)



EH

- Impact Calculation Tool (ICT) (en.opasnet.org)

- Health Forecasting (www.health-forecasting.org)



- [MicMac (www.nidi.knaw.nl/en/micmac)]










PH





Formal characteristics

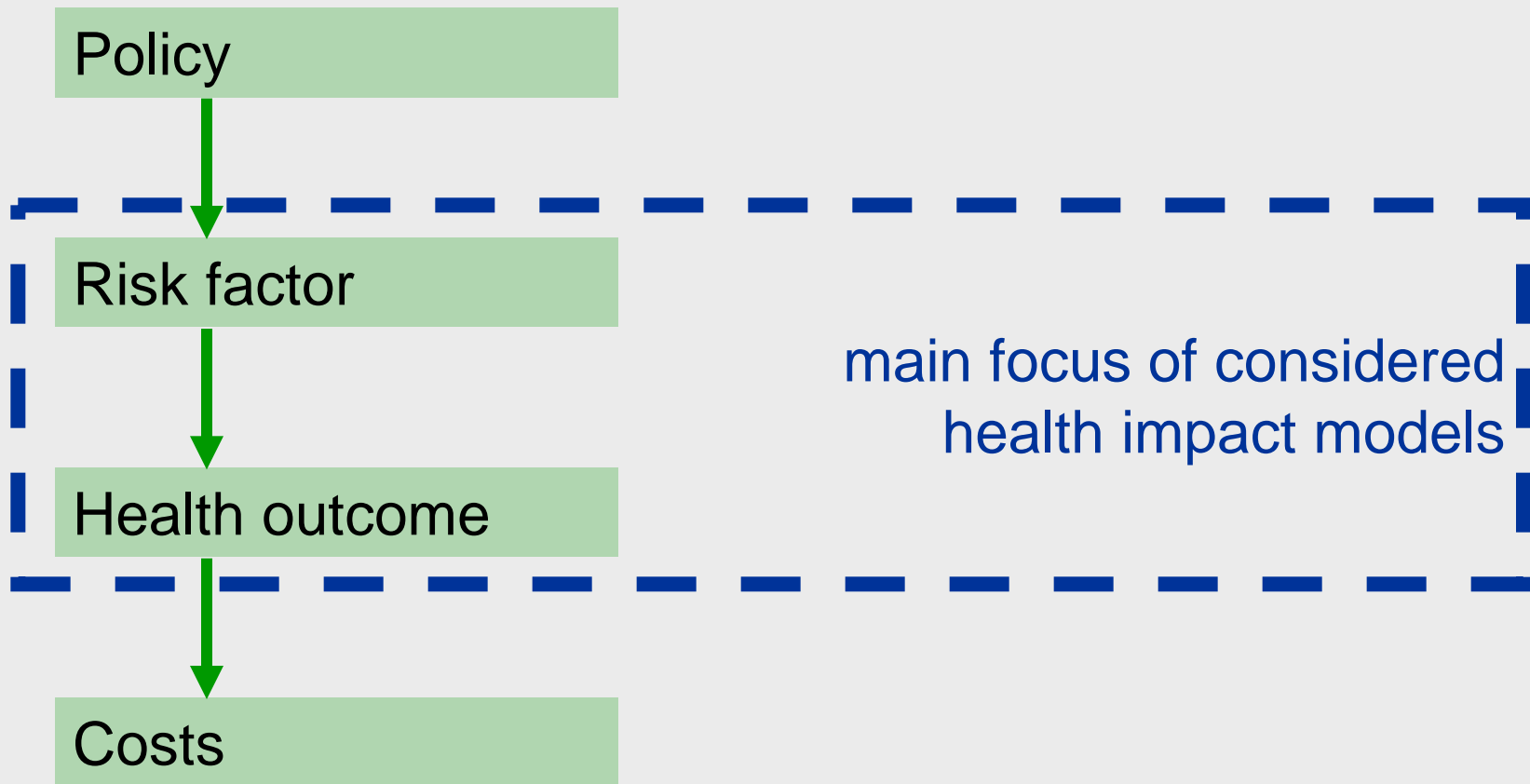
			accessibility	system characteristics
Prevent 	EU		free on request	stand-alone
DYNAMO-HIA 	EU		free	stand-alone
BoD 			free	xls-templates, DISMOD
micmac 	EU		free (?)	stand-alone
Health Forecasting 	USA		on request	hosted @ UCLA
ICT	EU		free	stand alone, or Analytica© add-on; part of the INTARESE set
INTARESE / HEIMTSA  	EU		free	platform with integrated set of stand-alone modules; platform closely links models and datasets

epidemiological models





'Full chain' of quantifying health impacts





Analysis design

- micro simulation (DYNAMO-HIA, micmac)
- macro simulation (BoD, Health Forecasting, Prevent)
- demography forecast: yes/no

- scenario approach (DYNAMO-HIA, Prevent, INTARESE/HEIMTSA)
 - reference / baseline / BAU
 - intervention / alternative
- no scenarios, but multiple runs under different conditions (ICT, BoD, Health Forecasting)





Input

population: overall mortality
life births
life tables
demography forecast

incidence
prevalence
mortality
(DALY)

} for relevant diseases by age, sex

risk factor exposure / prevalence by age, sex

transitions between risk factor states

disability weights

duration

exposure response / risk functions e.g. RR

effects of interventions / policies on prevalence of risk factors





Integrated data sets

Prevent (Eurocadet version)

- incidence / prevalence for 17 cancers for EU27 + 3
- risk factors prevalence
- risk functions for risk factors and cancer
- risk factors:
 - smoking
 - alcohol
 - low intake veg. & fruits
 - lack of phys. activity
 - excess BMI

DYNAMO-HIA

- all necessary input data provided for at least 10 MS, some data for EU27
- population data, newborns
 - 9 diseases (5 cancers, IHD, stroke, COPD, diabetes)
 - risk factors:
 - BMI
 - smoking
 - alcohol
 - risk factor prevalence
 - transition rates
 - risk functions for risk factors and health outcomes

HEIMTSA / INTARESE

- depending on the model
- 'resource center'
- guidance system with pointers to data sources
- compendium of > 50 exposure response functions
- risk factors: air pollutants, damp, noise, EMF, climate



Output

- population structure (diseased / non-diseased)
- projected prevalence risk factor / diseases, mortality, SMPH (e.g. YLL, LE, DALY), attributable cases
by sex and age

- INTARESE / HEIMTSA: depending on the model, but eventually same output as above

- all tools provide output-tables that can be exported. most provide graphs and some (dynamic) population pyramids





Application samples

Prevent: tobacco control policies in 18 MS; impact of smoking ban (DK); decrease of hormone replacement therapy and breast cancer

DYNAMO-HIA: deregulation of alcohol (S)

BoD NRW: impact of smoking ban (SHS); health needs assessment NRW and subregions: projection of demographic change on health status

ICT: PM2.5 (FI)

INTARESE: case studies on transport, housing, water, household chemicals

HEIMTSA: indoor / outdoor pollution, traffic noise, heavy metals

INTARESE/HEIMTSA: common case study on climate change

UCLA Health Forecasting: primary prevention vs. treatment, physical activity CHD; O₃ and PM2.5 local health





Conclusions - 1

- Multitude of sophisticated scientific well-founded models and tools for use in HIA are available for free (developed in scientific arena)
- They can model change in risk factor, change in health outcome; some also costs.
Some are developed specifically for investigating change, others by running the model under different conditions
- The effect of a policy (plan, program, project) on a risk factor / health outcome merely not part of the models





Conclusions - 2

- Several models are 'empty shells' and need substantial **input** data e.g. population data, risk factors, diseases, and relationships
- Some approaches provide platforms for (input) data, models, and guidance
- Users need profound knowledge of underlying epidemiological concepts and for EH on exposure assessment

- no 'one size fits all' model / approach
- there is more than
DYNAMO-HIA and INTARESE/HEIMTSA

