Public health models (Health)
# Table of Contents

**Socio–economic models: Public Health**

1. Introduction ........................................................................................................................................1/3
2. Methodology ......................................................................................................................................1/3
3. Process ...............................................................................................................................................1/3
4. Review ...............................................................................................................................................1/3
   4.1 Evaluation results .....................................................................................................................1/3
   4.2 Experiences ..............................................................................................................................1/3
   4.3 Combinations ...........................................................................................................................2/3
   4.4 Strengths and weaknesses ........................................................................................................2/3
   4.5 Further work .............................................................................................................................2/3
   4.6 References of the tool ...............................................................................................................2/3
1 Introduction

The population health paradigm places the traditional medical model of individual care within the context of multiple determinants of health. There are various health models available for a wide range of purposes. Some explore future health scenarios (PHSF model; TARGETS model), others place human health in an ecosystem context (Butterfly Model of Health; Mandala of Health model). MIASMA is an acronym devised to refer to several modules: the vector–borne disease model, the thermal stress model, and the skin cancer model. This modelling framework is designed to describe the major cause and effect relationships between atmospheric changes and human population health. The models are driven by scenarios of population figures and atmospheric changes, superimposed on baseline data regarding disease incidence, climatic conditions, and ozone–layer thickness. Global atmospheric changes directly influence the exposure to health risks, via changes in ambient temperature and received UV–B radiation, as well as indirectly, in influencing the dynamics and distribution of vector–borne diseases. Changes in the pattern of health risks demarcate the changes in the levels of incidence of the diseases influenced by the determinants. The mortality rates associated with cardiovascular diseases are directly influenced by thermal stress, mainly in urban areas.

2 Methodology

The objective of most of these models is to provide a better understanding of the dynamics underlying the health impacts of environmental changes, e.g. climate change and ozone depletion, and the sensitivities and uncertainties surrounding these impact estimates. In this context, the instructive and educational value of models presented can strongly increase our awareness of the potential health impacts of environmental changes. Another goal of the modelling framework is to help identify gaps in our knowledge of the processes underlying the impacts studied, which may help to set the agenda for further research.

3 Process

First, external scenarios on socio–economic and environmental conditions have to be specified or taken from other models. Then, baseline data on the health situation have to be defined. The models can then be used to derive the health impacts, based on a large number of health determinants, of various combined scenarios of external drivers.

4 Review

4.1 Evaluation results

Models on public health have a special status, as they are neither strongly linked to economic models nor to most biophysical models. However, they have to take relevant socio–economic as well as environmental conditions into account. The number of public health models for SIA is still limited, although the importance of health issues for economic processes and the impact of environmental conditions on public health are high. In the future, public health consideration have to play a stronger role in SIA.

4.2 Experiences

Several models have been used to either analyse the link between biophysical and environmental conditions on human health, or to provide future scenarios on health impacts of environmental changes. The MIASMA
Public health models (Health)

model has been used successfully in various educational settings. Individual scientist have used the tool and experiments with is have been discussed in international ‘assessment’. This tool is less useful to for policy analysis. For the case of biofuel scenarios, health models have only limited applicability, except for the potential impact of increased biofuel use on air quality.

4.3 Combinations

Newer versions of the MIASMA model have successfully been coupled to newer GCM models and SRES scenarios. Output of the tool has been aggregated and used in other models, like FUND, IMAGE and TARGETS. Some health models are integrated into a modular framework of other socio–economic and biophysical models for consistent feedbacks. Health models require either scenario inputs or model inputs on key socio–economic and biophysical conditions. E.g. the MIASMA model relies on global and GCM climate change scenarios, as well as on input regarding population development.

4.4 Strengths and weaknesses

Strengths:

- Comprehensive list of health determinants
- Covering different levels of causality
- Usually closely linked with other modules
- First IA model on health–climate relationship and straightforward user interface with self–explaining help files (MIASMA)
- Useful for Educational purposes (MIASMA)

Weaknesses:

- Distinction between direct and indirect health determinants
- Limited response variables
- Not easily adaptable for different regions
- Limited possibility to change settings

4.5 Further work

Various modules have been updates and revised in the years after MIASMA 1.0.

4.6 References of the tool

MIASMA


Public health models (Health)


