Landeszentrum Gesundheit
Nordrhein-Westfalen

Schätzung potentieller Gesundheitsgewinne in NRW durch die Reduzierung von Übergewicht und Fettleibigkeit

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GESUNDHEITSCAMPUS
NORDRHEIN-WESTFALEN

Hintergrund

Gesundheitliche Auswirkungen von Maßnahmen / Interventionen prospektiv quantitativ schätzen

- Gesundheitsfolgenabschätzung / Health Impact Assessment (HIA)
- Präventionspotenzialanalysen

DYNAMO-HIA als vielversprechendes Software Modell identifiziert

➔ Erprobung und Anpassung auf NRW-Verhältnisse

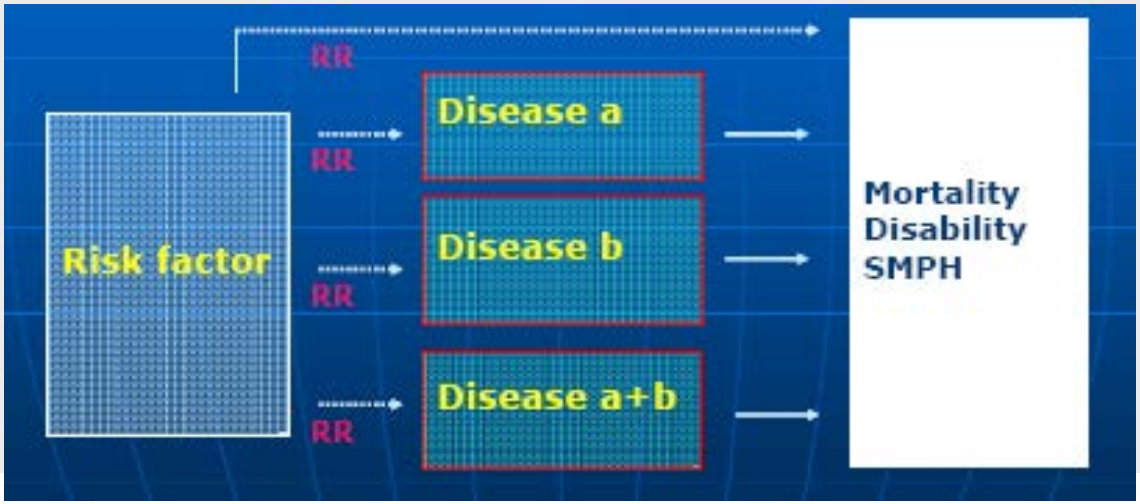
DYNAMO-HIA

- frei verfügbare Software
- entwickelt durch EU Forschungskonsortium unter Leitung von Erasmus MC und RIVM (NL)
- download inkl. umfassende Dokumentation
  www.dynamo-hia.eu

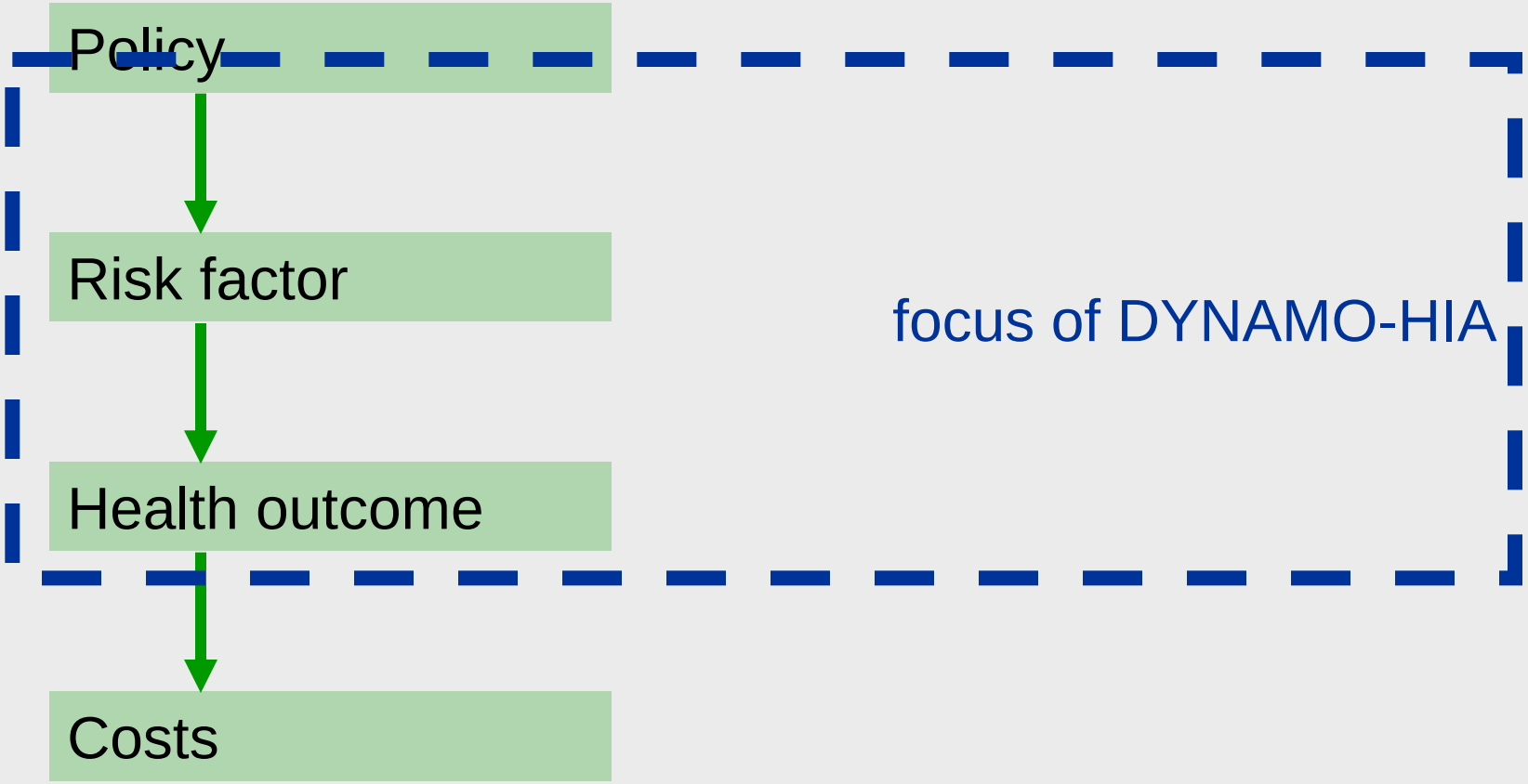
Basics DYNAMO-HIA tool

- to project the **effects of changes** in **risk factor** exposure due to policy measure or intervention on disease-specific and summary measures of population health
- **Projects** how changes in risk factor distribution affect disease-specific and summary measures of population health
- **Organizes** and stores necessary input data
- **Syntheses** according to standard causal epidemiological pathway

(Nusselder / Boshuizen, 2011)



'Full chain' of quantifying health impacts



DYNAMO-HIA – 2

- simulates a **real life** population **through time**
- is based on epidemiological evidence + available data
- provides large set of outcome measures
- is publicly available + no programming skills needed
- data are included for large set of EU countries

Nusselder, 2010

DYNAMO-HIA – 3

Type of data

- Population numbers
- Newborns (optional)
- Incidence, prevalence and mortality for relevant diseases
- All-cause mortality
- All-cause disability (optional)
- Exposure distribution of risk factors
- RRs linking exposure to health outcomes

General

- All data by single-year of age (0-95 years) and sex
- Flexibility in choice risk factor exposure, disease type and transitions between risk factor states

Nusselder, 2010

Basic input data

Population data

- **Counts 0-95 yrs (2009)**
- **Newborns (2009)**
- Overall daly weights, single year in % (optional)
- **Overall mortality, single year in %**

bold: NRW data

Risk factors: Alcohol, **BMI**, smoking

- **Prevalence**

9 Diseases

- Prevalence
- Incidence
- DALY weights (optional)
- Excess mortality
- Relative Risk from risk factor
- Relative Risk from diseases

- Breast cancer
- Colorectal cancer
- Esophageal cancer
- Lung cancer
- Oral cancer
- COPD
- Diabetes
- IHD
- Stroke

Body Mass Index (BMI) – data sources for NRW

age	source	methodology	region	year	sample size
0 - 3					
4	kindergarten examination	measured data	NRW	2010	11 765
5 - 6	school-entrance examination	measured data	NRW	2011	141 125
7 - 13					
14 - 15	school-leaving examination	measured data	NRW	2010	5 177
16 - 17					
18 – 75 and older	multiple	self-reported	NRW	2009	

by sex

Body Mass Index (BMI) – data sources Germany

age	source	methodology	level	year	sample size
3 months - < 17	KiGGS	measured data	Germany	2003 – 2006	17 158
14 - < 17	NVS II	measured data	Germany	2003 – 2010	11 765

by sex and age (per year)

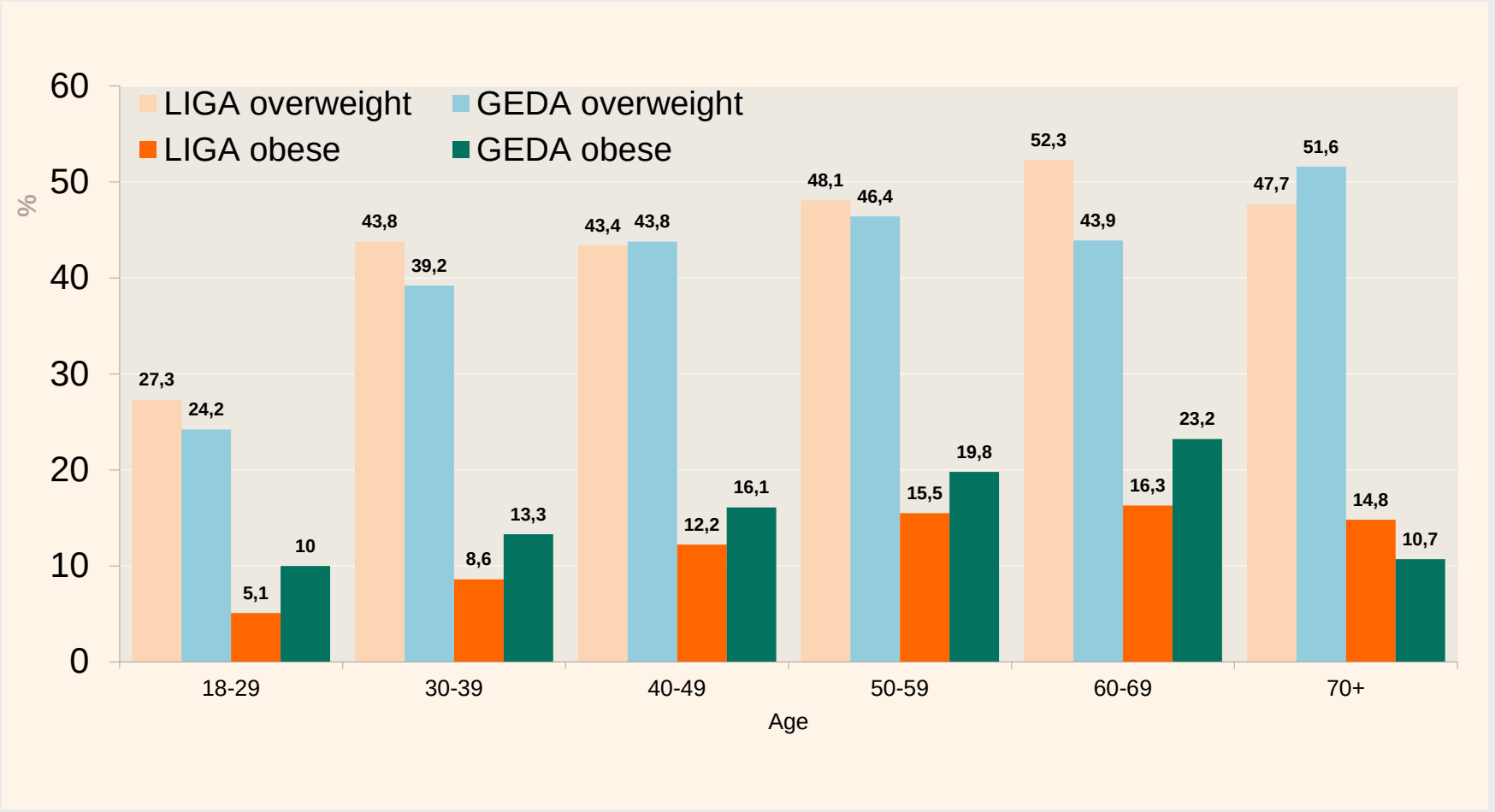
Body Mass Index (BMI) – data sources NRW: adults

source	methodology	sample size
NRW Mikrozensus 2009	face-to-face interview; self-reported data	1% NRW Population n =179 622
NRW Survey 2009	telephone interview; self-reported data	n = 2 006
GEDA NRW / RKI 2009	telephone interview; self-reported data	n = 4 496

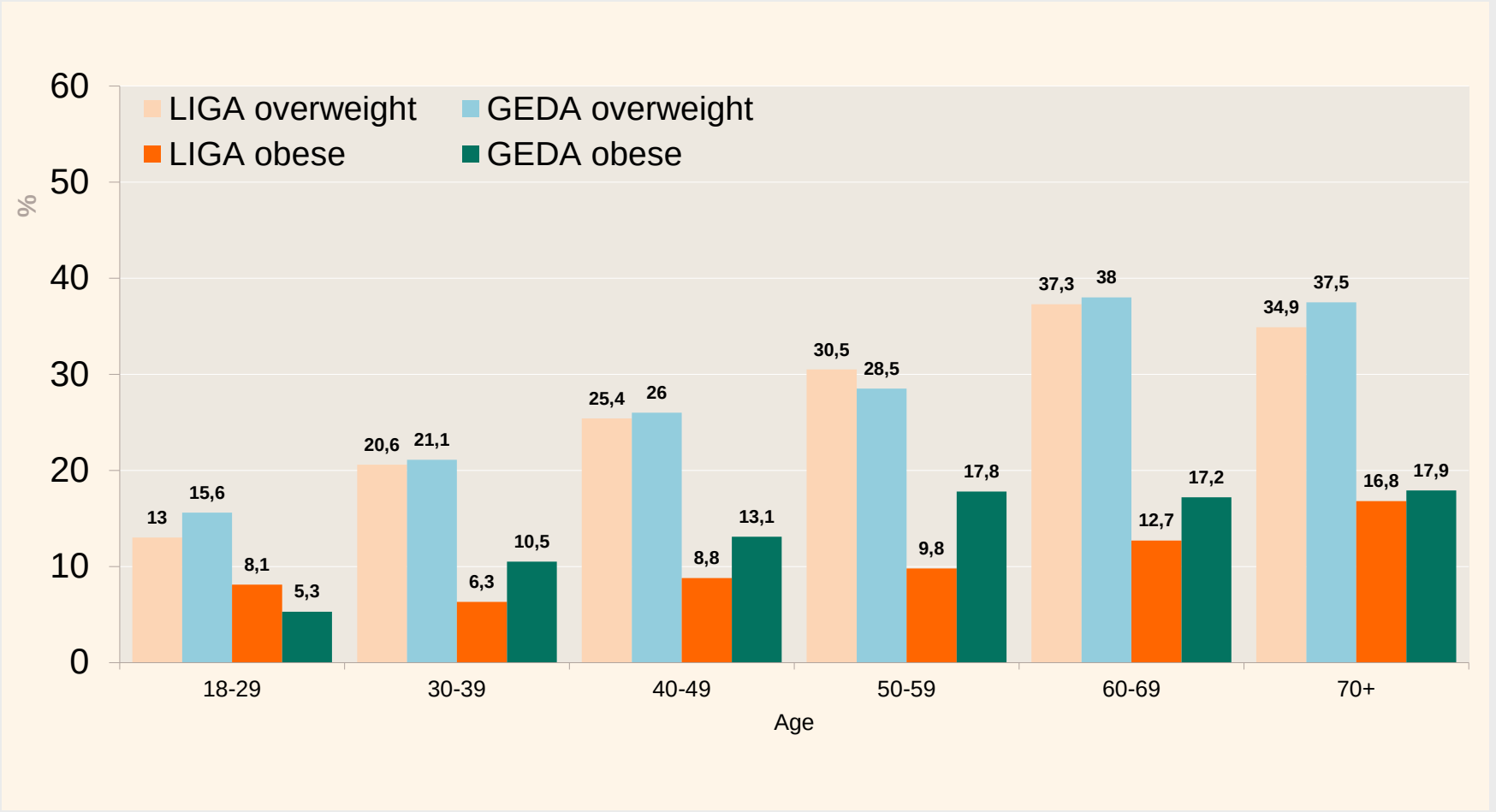
Germany (DYNAMO-HIA integrated data set)

NVS II	measured data	n = 13 207

Comparison BMI – LIGA vs. GEDA (2009): male adults NRW



Comparison BMI – LIGA vs. GEDA (2009): female adults NRW



Selection BMI data for NRW

Criteria

- High quality
- NRW relevance
- Sample size
- All age groups, preferably by year
- Recent
- Corresponds to RR function

Selection

- Children: KiGGS data
- Adults: GEDA NRW sample

Scenarios

- Reference scenario:

  simulates current risk factor prevalence distribution and diseases by age and sex through time

  initial exposure prevalence + future transitions

- Alternative scenario:

  compared to reference scenario: different risk factor prevalence which influences associated diseases – simulation by age and sex through time

  new initial exposure prevalence + future transitions

Scenarios

- Reference scenario: BMI prevalence as in 2009; 5 diseases: IHD, stroke, diabetes, colorectal cancer, breast cancer

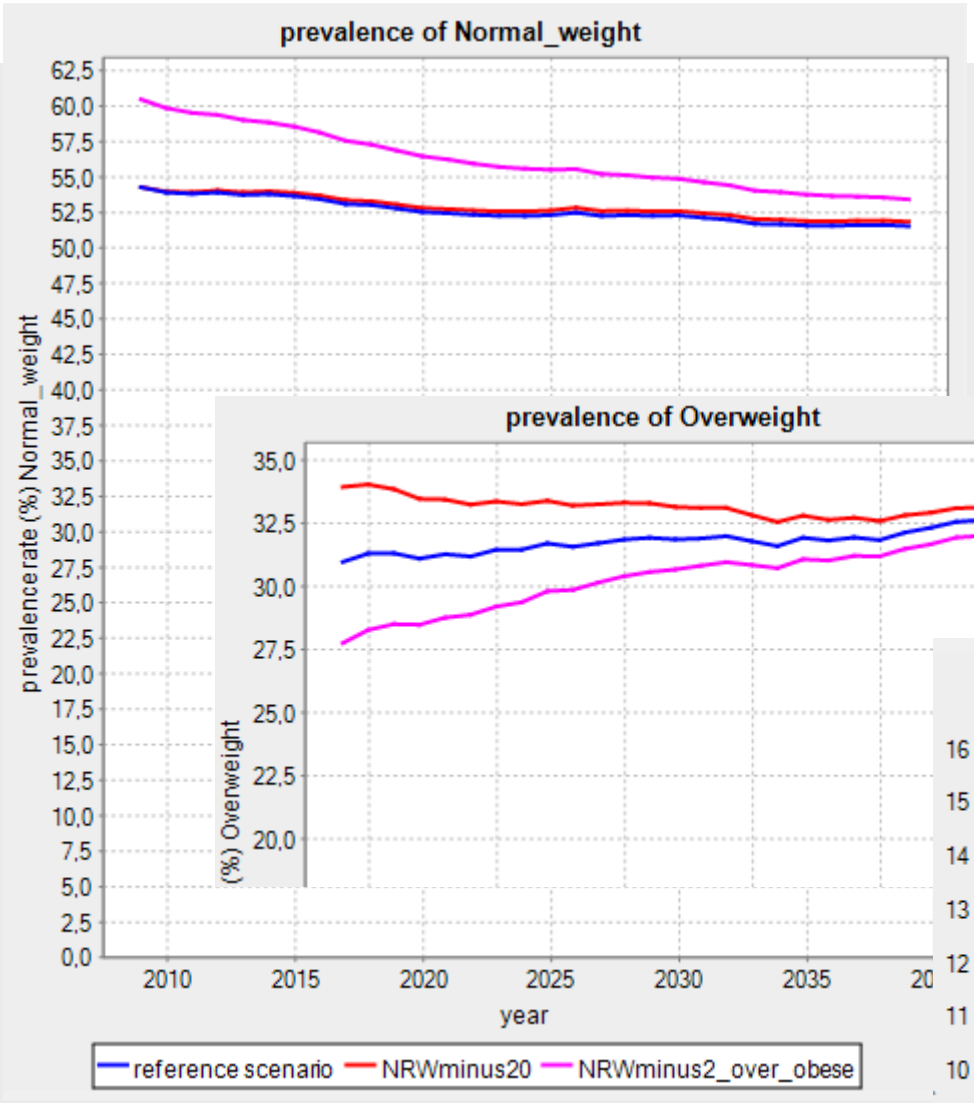
Alternative scenarios

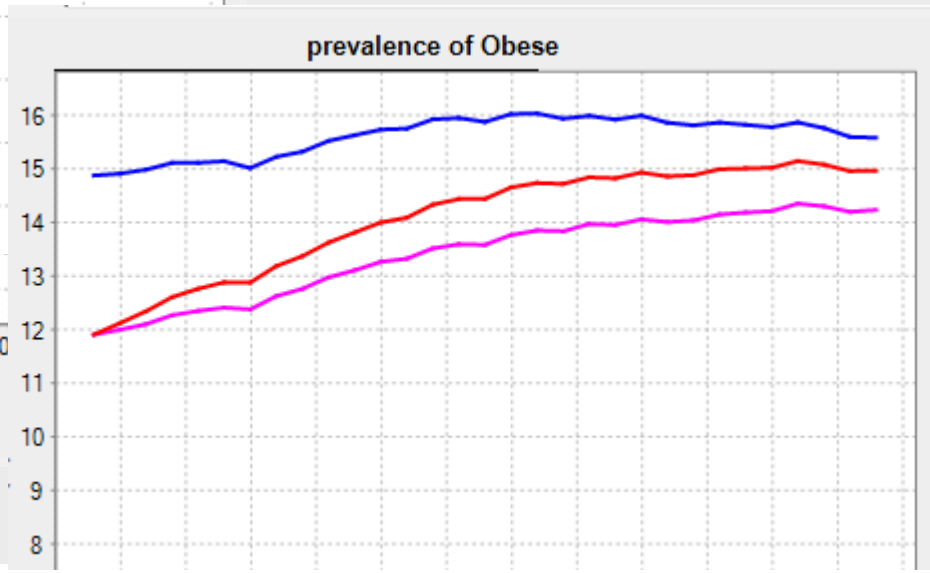
Knowledge about the quantitative effectiveness of interventions regarding reduction of obesity/overweight is scarce

- Scenario 1: reduction of the prevalence rate of obesity with 20% over all age groups

- Scenario 2: reduction of the prevalence of obesity **and** overweight with 20% over all age groups

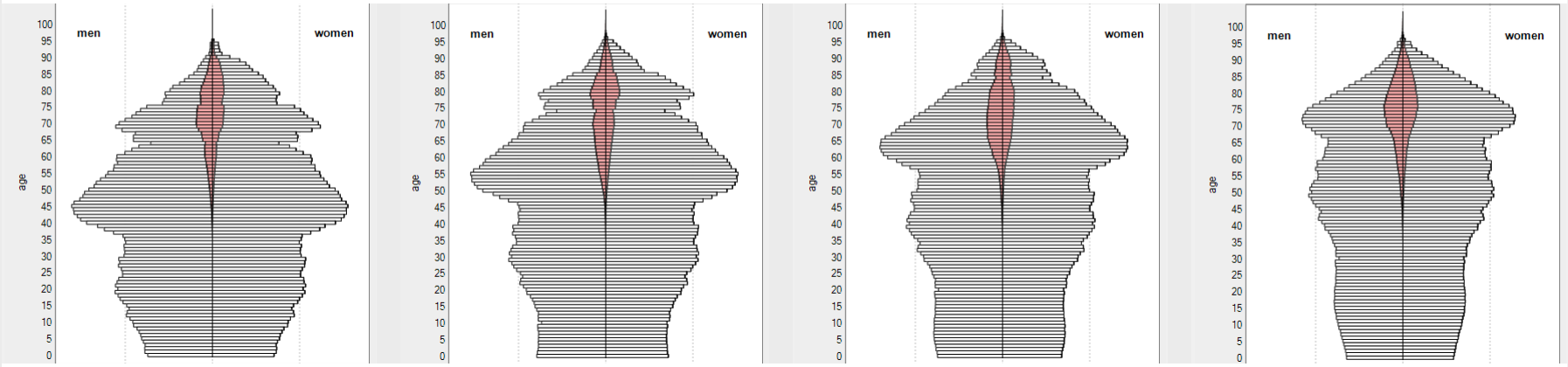
Results


prevalence of Normal_weight
prevalence rate (%) Normal_weight
62,5
60,0
57,5
55,0
52,5
50,0
47,5
45,0
42,5
40,0
37,5
35,0
32,5
30,0
27,5
25,0
22,5
20,0
17,5
15,0
12,5
10,0
7,5
5,0
2,5
0,0
2010
2015
2020
2025
2030
2035
year
prevalence of Overweight
(%) Overweight
35,0
32,5
30,0
27,5
25,0
22,5
20,0
reference scenario
NRWminus20
NRWminus2_over_obese

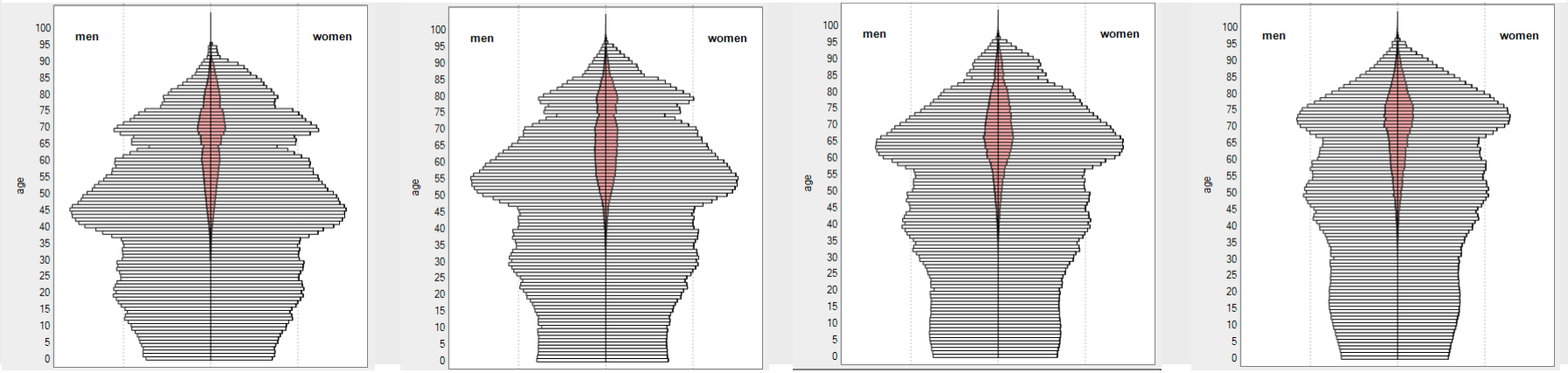

prevalence of Obese
16
15
14
13
12
11
10
9
8

Results – population pyramids

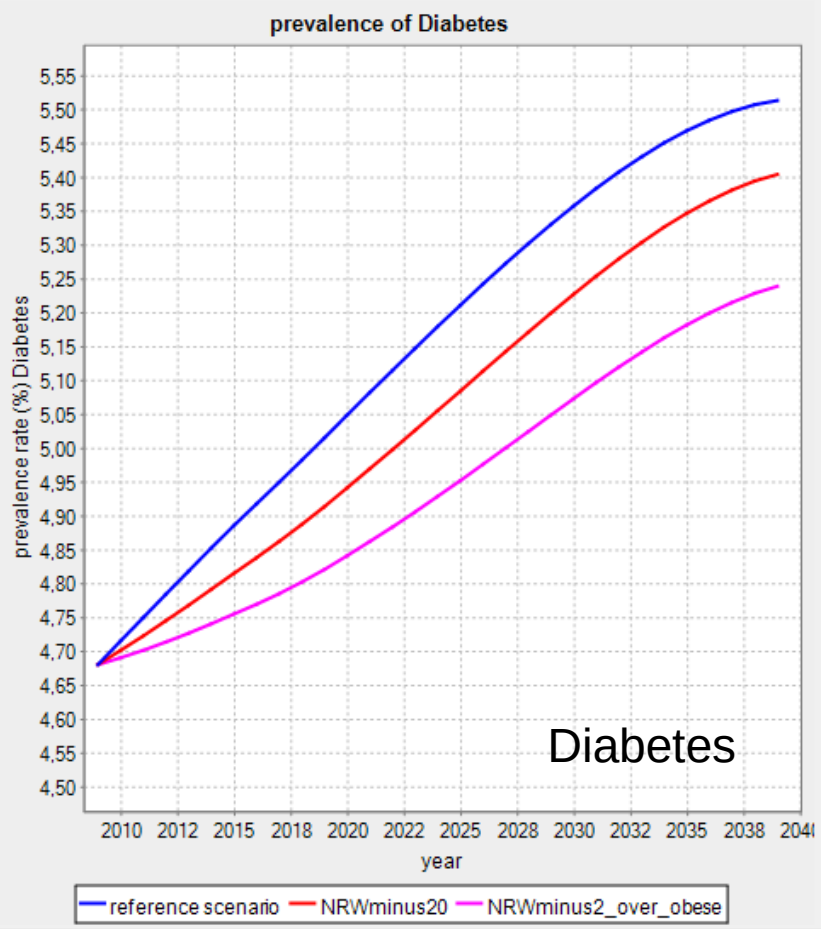
IHD 2009 2019 2029 2039

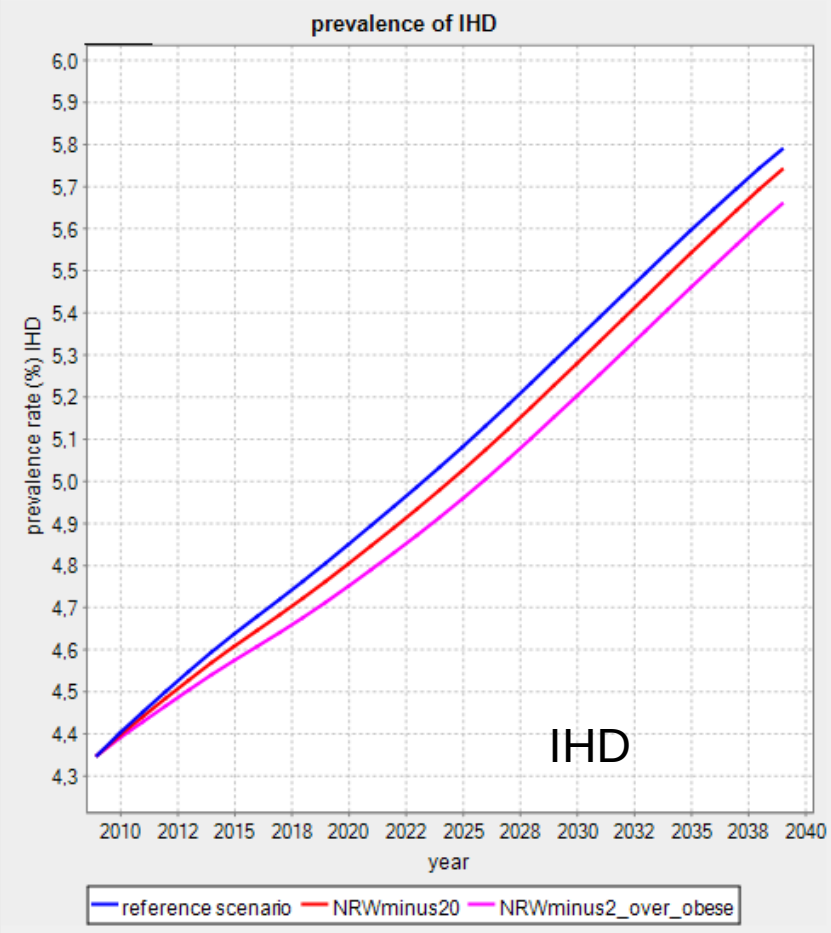


Diabetes



Results – prevalence





Discussion – 1

Strenghts of DYNAMO-HIA

- Free available
- Contains already a rich set of quality assured data (national level)
- Extensive documentation and training material
- Complex epidemiological model(s) implemented
- Life course approach incl. transitions between risk factor states
- Own risk factors and other diseases can be incuded
- Effects of interventions / policies can be modeled by comparing scenarios

Discussion – 2

Challenges

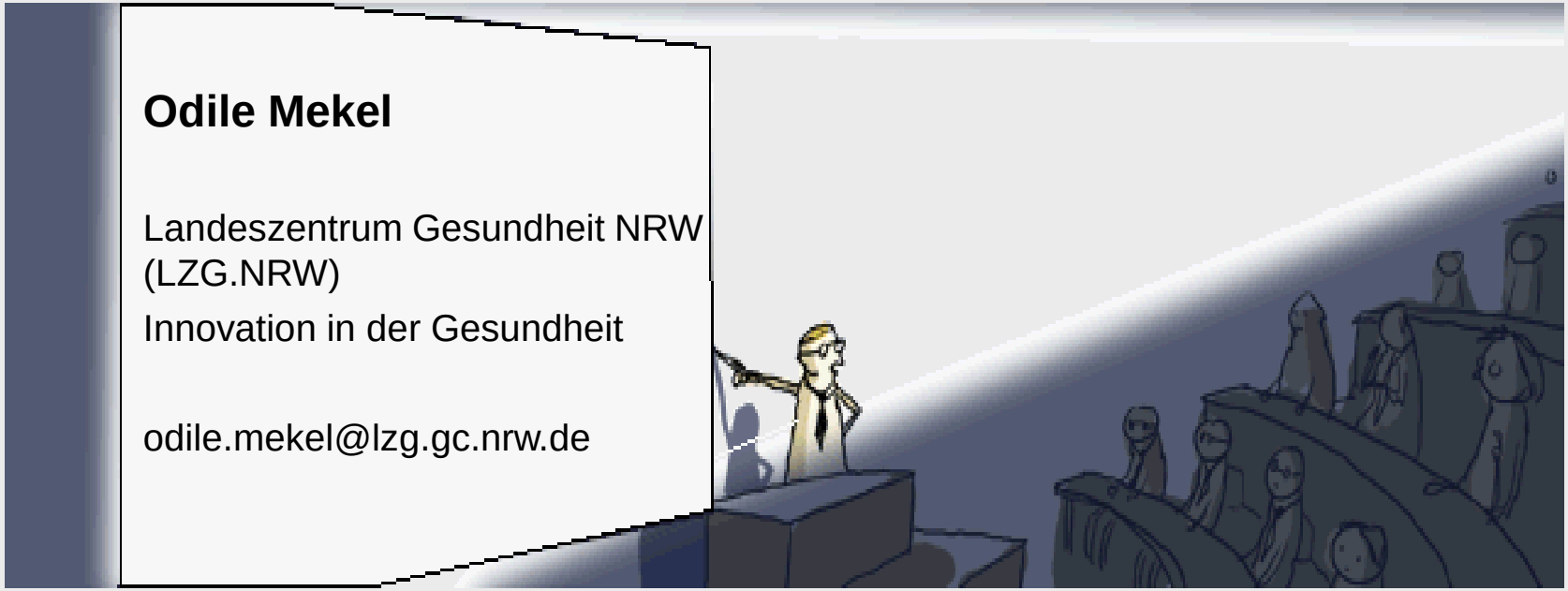
- Availability of high quality input data
- Assumptions are neccesary, also for overcoming missing data

- Effectiveness of interventions / policies for reducing overweight / obesity is scarce
- Scenario modelling applied on meta level; more realistic scenarios will follow
- Comparability of prevalence estimates for NRW / Germany
- Sensibility analysis of input data
- Expansion of further risk factors (e.g., physical activity) and diseases

Conclusion

- DYNAMO-HIA can be adjusted to NRW situation
- Allows comparative analysis of different interventions / policies on population health by scenario analysis („what-if“) for estimating prevention potentials and health impacts
- Dynamic (complex) demographic and epidemiological modelling
- Effectiveness of interventions / policies regarding change of risk factor distributions is important research area

Contact



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