The German Diabetes Surveillance System

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National Diabetes Surveillance in Germany

Background/Aims

Diabetes Surveillance in Germany – International Context

- 1989: WHO Resolution WHA42.36 – Prevention and control of diabetes mellitus (St. Vincent Decleration)

- 2011: UN Resolution 66/2 on the Prevention and Control of Noncommunicable Diseases (NCD), 2012

- 2013: WHO Global Monitoring Framework & Action Plan for NCD Prevention and Control

The Saint Vincent Declaration

Diabetes mellitus in Europe: A problem of all ages in all countries

A model for prevention and self care
Saint Vincent (Italy), 10-12 October 1989

A meeting organized by WHO and IDF in Europe

Diabetes Surveillance in Germany – National Context

- **2002: National disease management guideline (NVL) type 2 diabetes, continuously updated modules since 2006**
  - Management type 2 diabetes; diabetic foot, retinopathy, nephropathy, neuropathy, structured education programs
  - Long & short versions, pocket guidelines, patient guidelines
- **2002-2004: Diabetes management programs for people with diabetes (type 2, type 1)**
- **2003: National Health Goal Type 2 Diabetes – decreasing diabetes risk, ensuring early diagnosis and access to treatment**

NVL are established under the auspices of the German Medical Association (BÄK),
German Association of Statutory Health Insurance Physicians (KBV),
German Association of Scientific Medical Organisations (AWMF);
coordination: German Agency for Quality in Medicine (ÄZQ)

www.gesundheitsziele.de
http://www.bundesversicherungsamt.de/en/english.html
http://www.leitlinien.de/nvl/diabetes/

Diabetes Surveillance in Germany – National Context

- 2009: German Ministry of Education and Research (BMBF) provides funding for German Center for Diabetes Research

- 2012: Implementation of screening for gestational diabetes

- 2015: Preventive Health Care Act
  - Health promotion across all age groups in all settings
  - Continued development of health checks and screening programs
  - National prevention strategy at national and regional level

- 2015: German Ministry of Health (BMG) provides four year funding to establish
  - National Diabetes Surveillance System (Lead: Robert Koch Institute)
  - Information and Communication Strategy to assess and meet subgroup-specific information needs (Lead: Federal Centre for Health Education)

Diabetes Surveillance in Germany – Milestones

MS 1: Development of a conceptual framework (2015-2017)

- Key concepts, review and selection of core indicators
- International workshop July 2016

MS 2: Implementation (2016-2018)

- Data availability, accessibility and usability testing
- Feasibility studies
- National expert workshops 2016/2017

MS 3: Dissemination (2017-2019)

- Publication of conceptual framework
- International workshop 2018 on Diabetes/NCD surveillance activities and dissemination of results
- Providing timely health information for specific target groups

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National Diabetes Surveillance in Germany

Status Quo: Conceptual framework

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Diabetes Surveillance in Germany – Conceptual Framework

Causal chain of chronic diseases

UNDERLYING SOCIOECONOMIC, CULTURAL, POLITICAL AND ENVIRONMENTAL DETERMINANTS	COMMON MODIFIABLE RISK FACTORS	INTERMEDIATE RISK FACTORS	MAIN CHRONIC DISEASES
Globalization	Unhealthy diet	Raised blood pressure	Heart disease
Urbanization	Physical inactivity	Raised blood glucose	Stroke
Westernization	Tobacco use	Abnormal blood lipids	Cancer
Population aging	Environmental factors	Overweight/obesity	Chronic respiratory diseases
	NON-MODIFIABLE RISK FACTORS	Impaired pulmonary function	Diabetes
	Age	Allergic sensitization	Allergic diseases
	Heredity	Reduced cognitive & physical function	Arthritis, back pain
			Dementia

Risk profiles · *Multimorbidity/Frailty/Disability*

Adapted from WHO 2005: Preventing chronic diseases: A vital investment. WHO global report (p. 48)
http://www.who.int/chp/chronic_disease_report/full_report.pdf

September 22nd 2017   2nd BRIDGE HEALTH Meeting of the EUBIROD Network   8

Diabetes Surveillance in Germany – Conceptual Framework

Ecological Model of Health
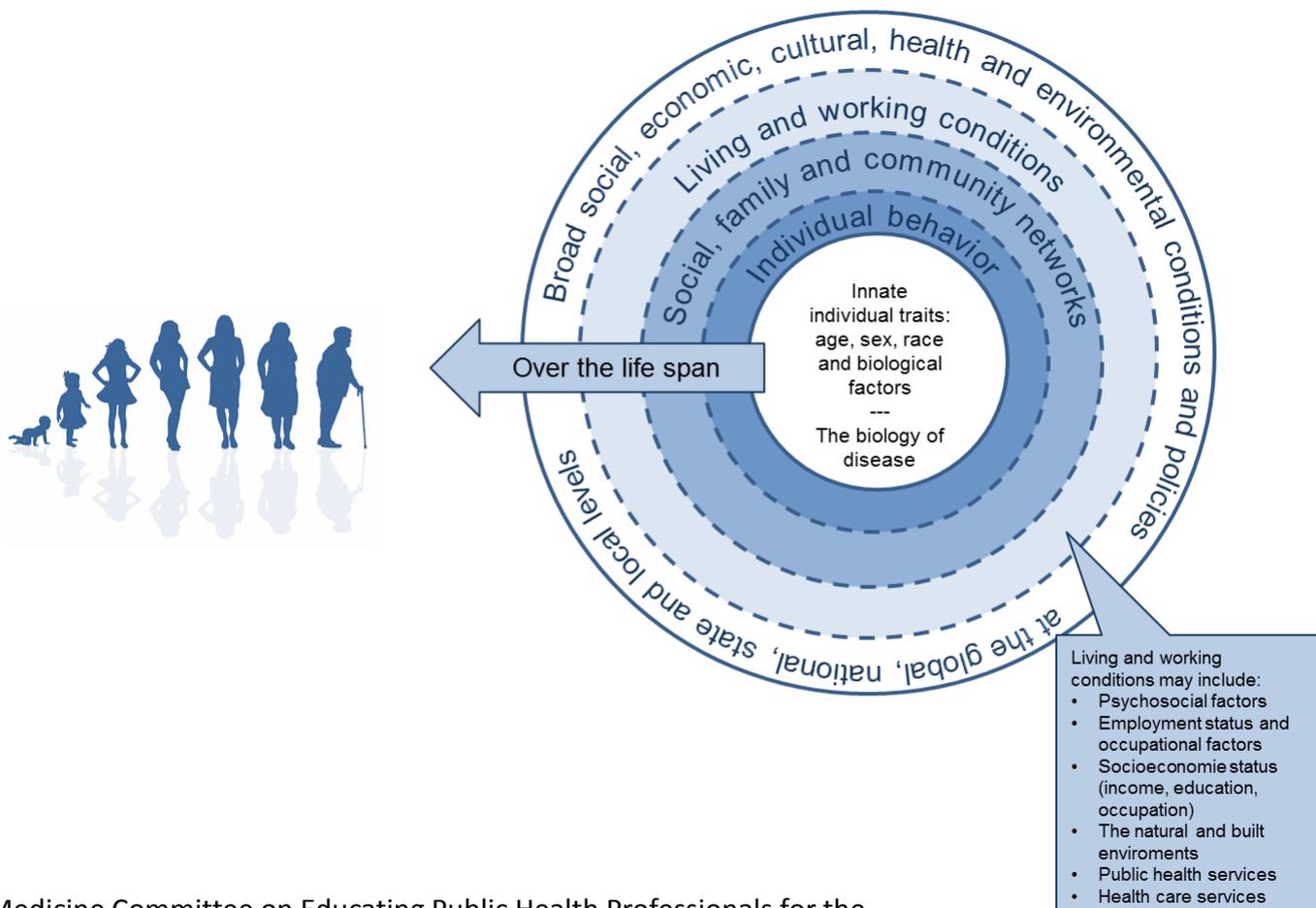
Institute of Medicine Committee on Educating Public Health Professionals for the
21st Century 2003   http://www.nap.edu/read/10542/chapter/3

Diabetes Surveillance in Germany – Conceptual Framework

National Health Goal 'Type 2 Diabetes'

- Reducing occurence of metabolic syndrome and incidence of diabetes mellitus type 2 (primary prevention)

- Detecting diabetes in an early stage of illness, whithout complications (secondary prevention)

- Improving quality of life of people with diabetes and reducing diabetes associated comorbidities (treatment and rehabilitation)

Diabetes Surveillance in Germany – Strategic Areas of Action

Reducing diabetes risk
- Prevalence of environmental and behavioural risk factors and resources; Diabetes incidence

Improving diagnosis and treatment
- Prevalence known/unknown diabetes; Quality of care

Reducing diabetes associated complications
- St. Vincent criteria

Reducing diabetes burden and costs
- direct/indirect costs; healthy life years; DALYs

Diabetes Surveillance in Germany – Indicator Development

Inclusion:

OECD countries

Results:

15 out of 35 OECD countries with indicator based diabetes/health reports

45 Indicators

International expert workshop

Aims: international comparability

USA, Canada, UK Scottland, Denmark, OECD

2 step Delphi process

1. Round (online)
2. Round (face to face)

Definition of relevant indicator set

- 30 core indicators
- 10 additional indicators

Final Expert Consensus Round, Scientific Advisory Board Meeting, Berlin, September 27, 2017

Literature search
03/16

Int. workshop
07/16

Delphi process
09/16 – 03/17

Finalizing
09/17

Reducing Diabetes Risk	Improving Diagnosis and Treatment
Core Indicators 1. Diabetes Incidence 2. Gestationaldiabetes 3. Overweight/Obesity 4. Physical Activity 5. Smoking 6. Social Deprivation	**Core Indicators** 11. Prevalence of known diabetes 12. Prevalence of unknown diabetes 13. Participation in DMP 14. Quality of care in DMP 15. Quality of care 16. Medication 17. HRQL 18. Screening for Gestationaldiabetes 19. Age at diagnosis
Additional Indicators 7. Prediabetes 8. Consumption of sugar sweetened bevarages 9. Context factors (e.g. health policy strategies) 10. Risk (Score) developing diabetes	**Additional Indicators** 20. Participation in medical check up 21. Treatment satisfaction
Reducing Diabetes Complications	Reducing Diabetes Burden and Costs
Core Indicators 22. Amputation rate 23. Depression 24. Cardiovascular diseases 25. Retinopathy 26. Nephropathy 27. Hypoglycemia 28. Neuropathy 29. Diabetic foot syndrom 30. Renal replacement therapy	**Core Indicators** 33. Mortality 34. Hospital discharges by diabetes 35. Direct costs 36. Years of life lost 37. Healthy life years 38. Reduced earning capacity
Additional Indicators 31. Adverse pregnancy outcomes 32. Risk (Score) developing cardiovascular disease	**Additional Indicators** 39. Years lived with disability 40. Disability adjusted life years

National Diabetes Surveillance in Germany

Data (sources)

Diabetes Surveillance in Germany – Data Sources

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National Health Surveys (Robert Koch Insitute)	**Administrative data** (statutory health insurance data; DMPs; DRG statistics)

Specialized clinical care registries (renal replacement therapy)	**German Diabetes Surveillance System**	Epidemiological and clinical diabetes registries (population < 15 yrs)

Regional disease registries (cancer, stroke, myocardial infarction, heart failure)	**Official health statistics** (mortality, long-term care, hospital discharge)

DMP: Disease Management Programs

DRG: Diagnosis-related-groups (hospital statistics based on case flat rates)

Diabetes Surveillance in Germany – National Health Surveys

KiGGS	GEDA	DEGS
Studie zur Gesundheit von Kindern und Jugendlichen in Deutschland	GESUNDHEIT IN DEUTSCHLAND AKTUELL	Studie zur Gesundheit Erwachsener in Deutschland
Children/Youth 0-17 yrs	**Adults 18+ yrs**	**Adults 18-79 yrs**
Surveys, Cohort	Surveys	Surveys, Follow-up
Interview, Examination	Interview	Interview, Examination
N = 17461	N > 20000	N $\cong$ 7120
KiGGS: 2003-2006 KiGGS1: 2009-2012 KiGGS2: 2014-2016	Wave 1-3: 2009-2012 Wave 4: 2014/2015	GNHIES98: 1997-1999 DEGS1: 2008-2011

RKI Health Monitoring System estalished 2008
Funding: Ministry of Health Germany (BMG)

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Diabetes Surveillance in Germany – Diabetes Prevalence

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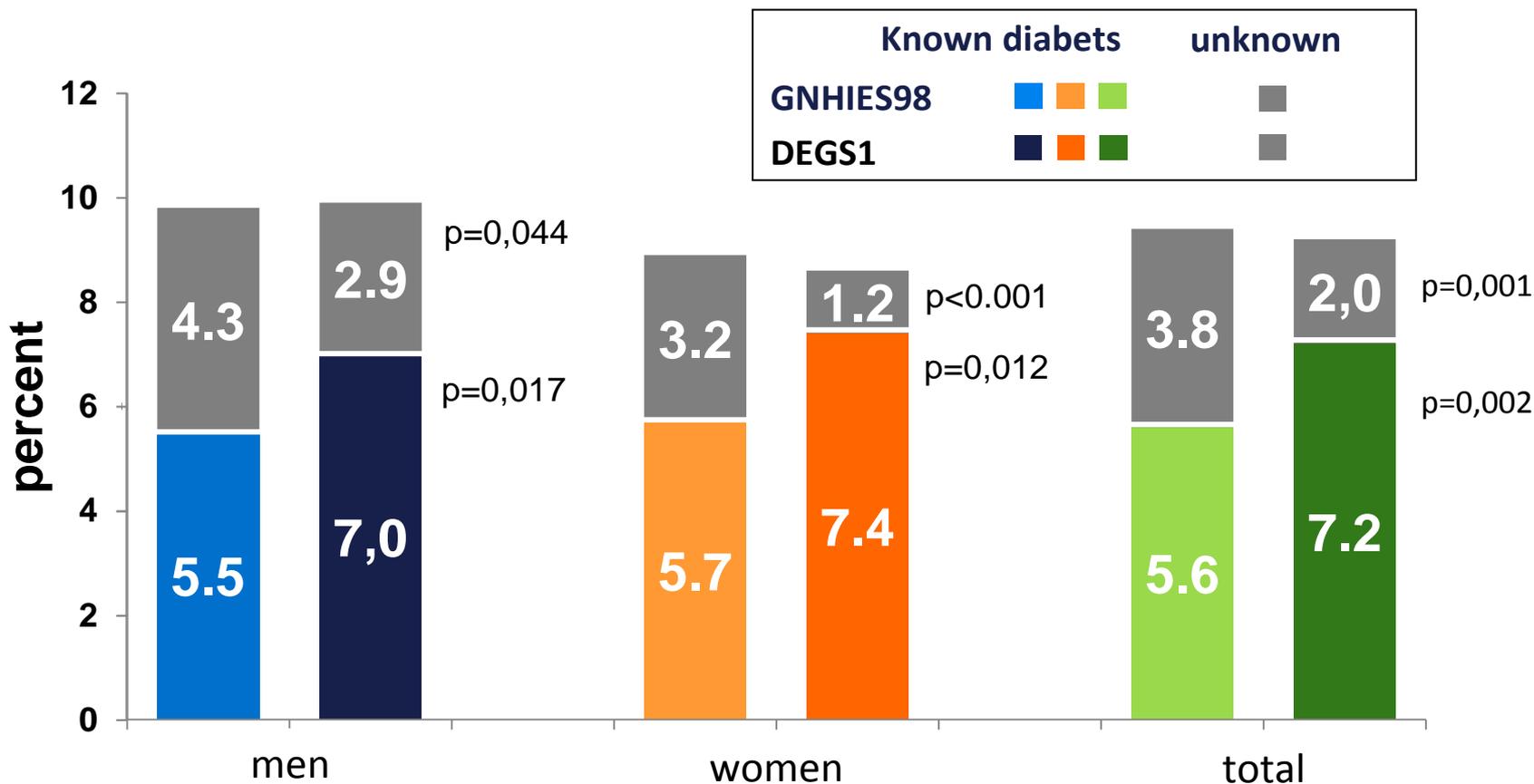
Diabetes prevalence in adults 18-79 yeras, weighted and standardized for population structure 2010
Unknown diabetes: persons without known diabetes but HbA1c >=6,5%

Heidemann et al. Diabet Med 2016

Diabetes Surveillance in Germany – Quality of care

Prevalence of quality indicators in persons with diabetes mellitus 45-79 years
(GNHIES98: n=333; DEGS1: n=526)
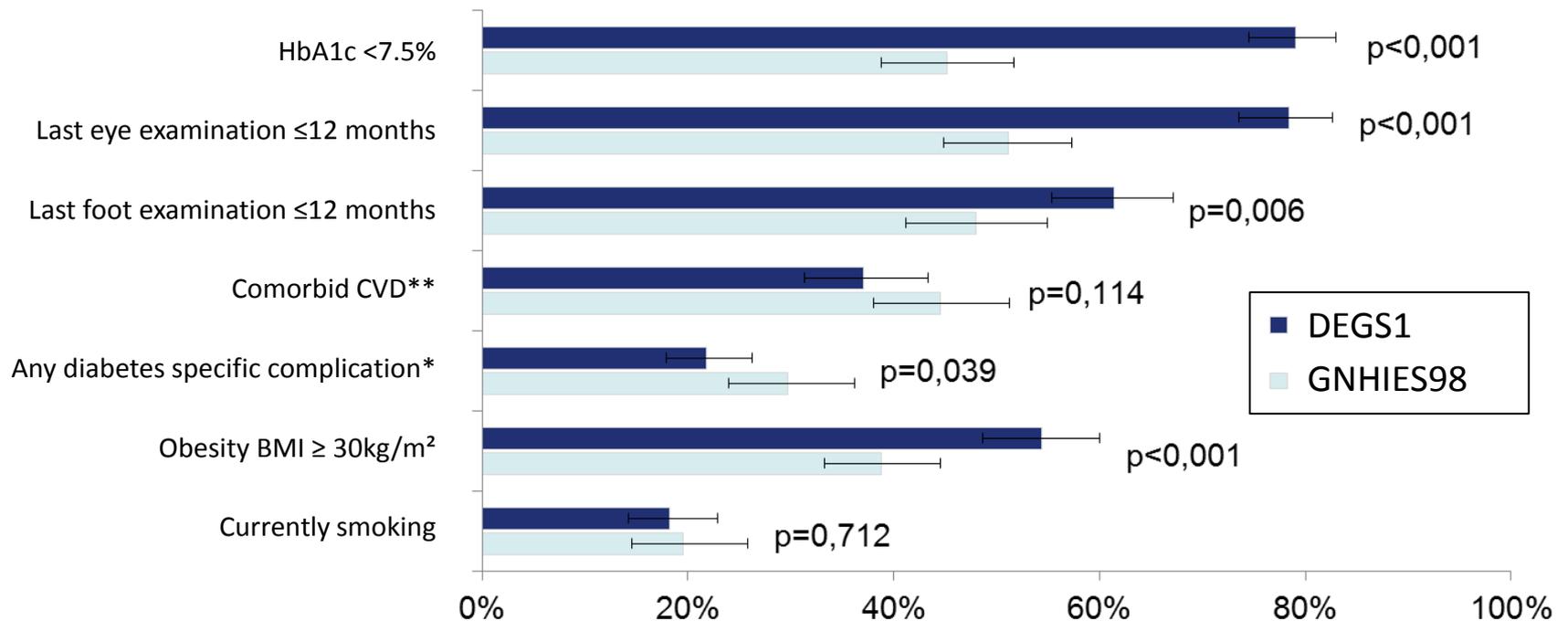
Lifetime diabetes prevalence, weighted and standardized for population structure 2010

*   Diabetic kidney disease, diabetic eye disease, diabetic poly neuropathy, diabetic foot, diabetic amputation
** coronary heart disease, myocardial infarction, chronic heart failure, stroke

Du et al. BMJ Open Diabetes Research and Care 2015

Diabetes Surveillance in Germany – HbA1c, diabetes and mortality

	Normo-glycemia	Prediabetes		Unknown diabetes	Known Diabetes
		High diabetes risk	Very high diabetes risk		
Mortality rate (per 1000 py)	4.1	8.6	11.3	29.4	27.4
All-cause mortality risk: Hazard Ratio (95% CI)					
Model A	1.00	1.04 (0.82-1.32)	0.95 (0.73-1.22)	1.87 (1.41-2.47)	1.66 (1.29-2.16)
Model B	1.00	1.02 (0.80-1.30)	0.87 (0.67-1.13)	1.63 (1.23-2.17)	1.41 (1.08-1.84)

Data: Mortality Follow-up of GNHIES98 participants

Normoglycemia: HbA1c <5.7%; **prediabetes**: HbA1c: 5.7-5.9% (high diabetes risk); HbA1c: 6.0-6.4% (very high diabetes risk); **unknown diabetes**: HbA1c >=6.5%

Model A: adjusted for age and sex
Model B: further adjusted for education, smoking, sport, moderate alcohol consumption, BMI, waist circumference, history of myocardial infarction, stroke, or cancer, and history of hypertension or hyperlipidemia

Paprott et al. Diabetes Care 2014

Diabetes Surveillance in Germany – Secondary data sources

Data source	N (latest year)	Periodicity
Hospital statistics: Diagnosis related groups (DRG statistic) based on case flat rates	> 55 Mio. (2015)	Annually since 2005 (aggregated results)
Disease Management Programs (DMP) • Diabetes mellitus type 1 • Diabetes mellitus type 2	• > 4 Mio. T2DM (2016) • ~ 200.000 T1DM (2016)	Annually since 2006 (aggregated results)
Information system for health care data (data transparency), DaTraV • Combines claims data from statutory health insurance funds and ICD-10 diagnosis, costs and medications	> 70 Mio. (2015)	Data excerpts on request (currently includes data from 2009-2013)
Regional data of one statutory health insurance company (AOK)	~ 4 Mio. (2015)	Individual data from ongoing Pilot Study based on research cooperation Public Health / Primary Care

Diabetes Surveillance in Germany – Ambulatory care-sensitive hospitalization rates (ACSH)

Age and sex standardized rates of diabetes mellitus associated long term complications (DMLT) on area level (2014)

Diabetes mellitus langfristige Komplikationen (DMLT)
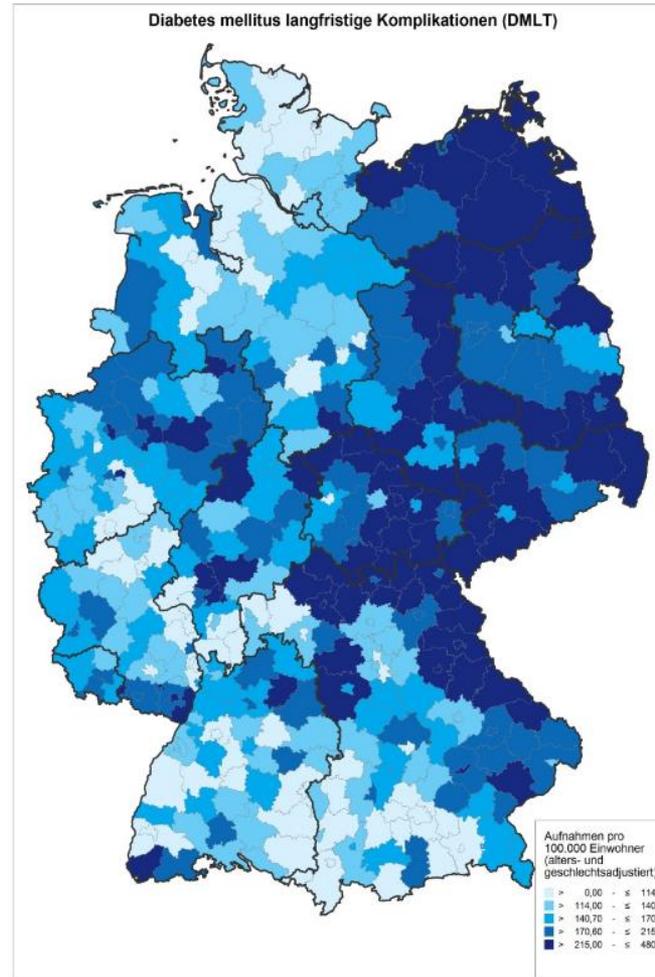
Pollmanns et al.
www.rki.de/diabsurv

Diabetes Surveillance in Germany – Diabetes complications

DMST: short term complications
DMLT: long term complications
DMUnc: metabolic crisis without
        complications
DMAmp: amputation of lower
        extremities

Age and sex standardized rates per 100.000 persons (national level)
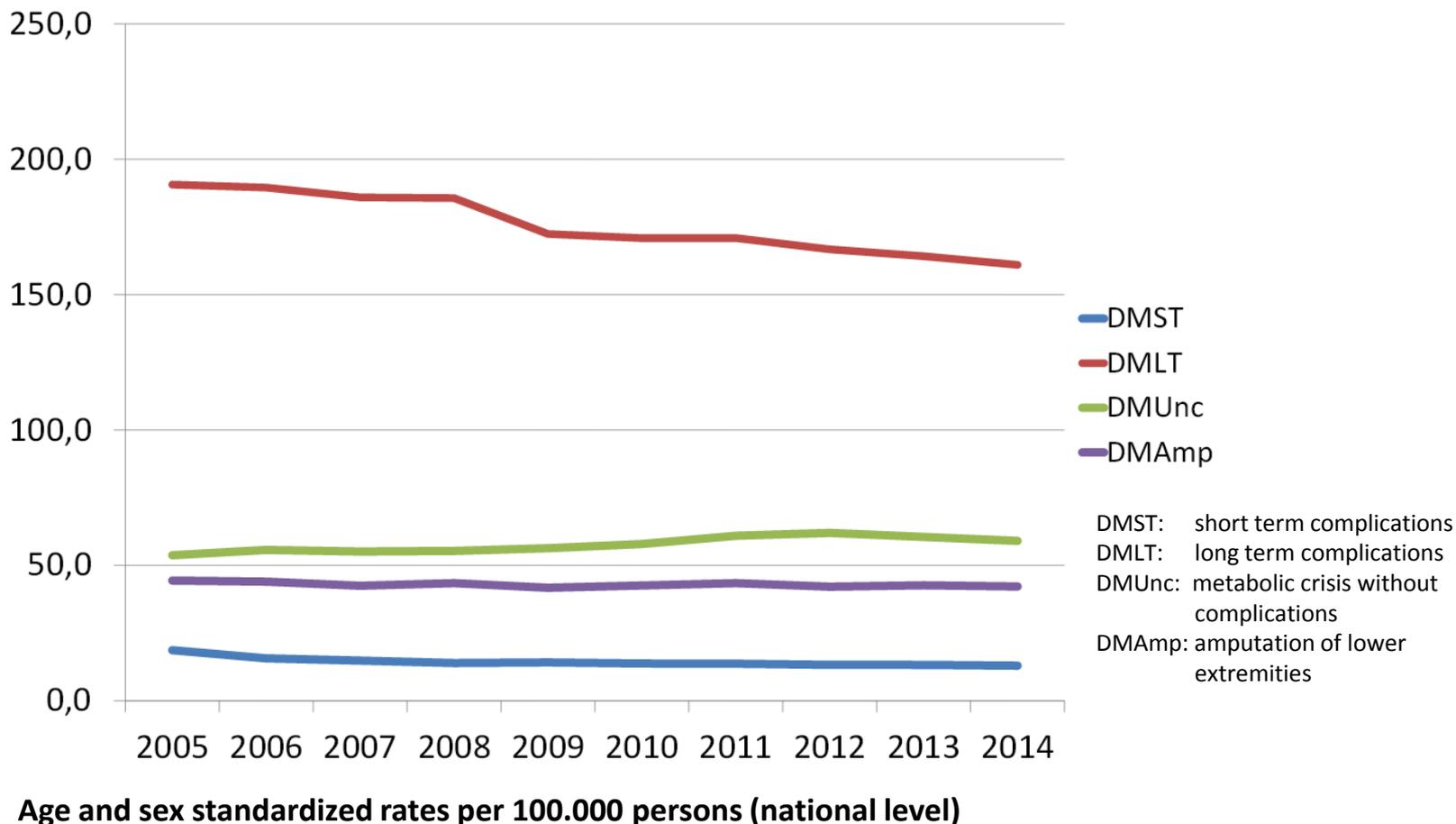
Diabetes Surveillance in Germany – Quality of care (DMP)

Disease Management Program Diabetes m. Typ 2– Goal achievement 2014
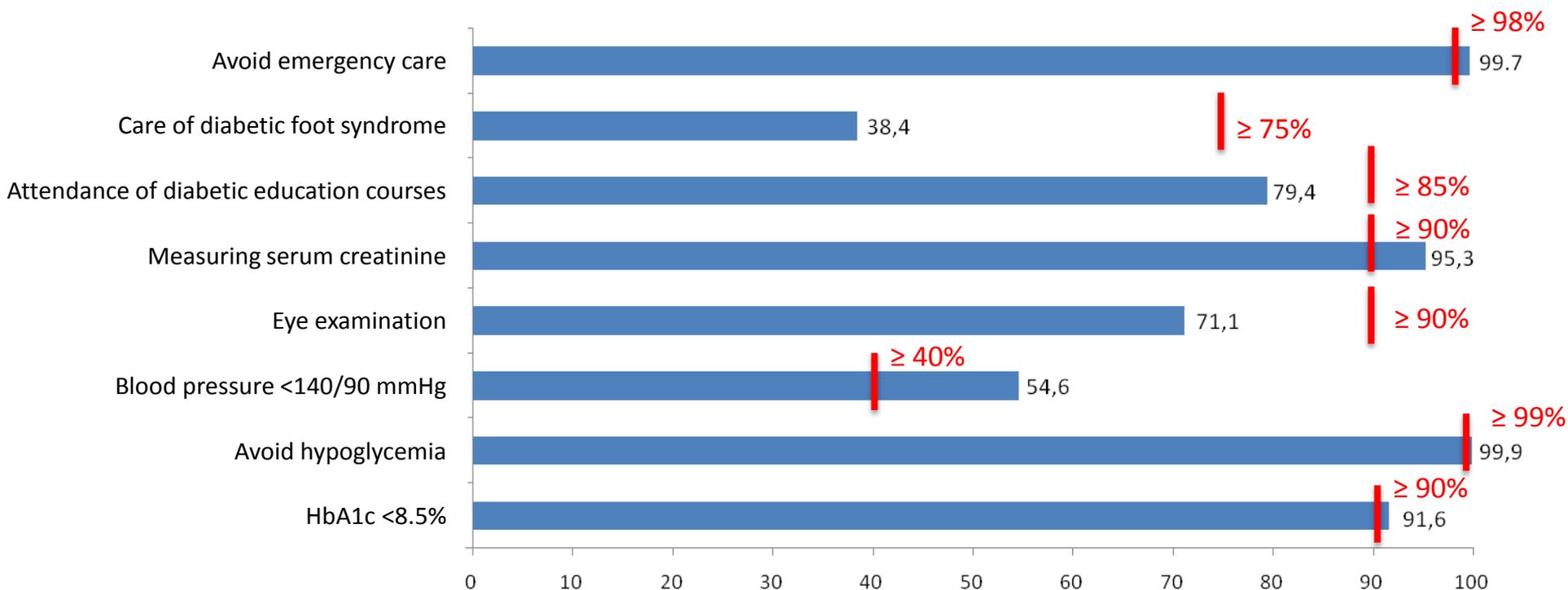
Data source: Kassenärztliche Bundesvereinigung (KBV) http://www.kbv.de/html/8444.php

Diabetes Surveillance in Germany – Health insurance data (DaTraV)

- \> 70 million persons (statutory health insurance)
- ICD-10 diagnoses (hospitals. Practitioners), costs, medication, sick pay
- 2009-2012 (lagged update of data set, 4 years)
- Aggregated data (no individual data)
- No data on private health insurances

year	Typ-1 % (crude)	Typ-1 % (standardized*)	Typ-2 % (crude)	Typ-2 % (standardized*)	Number of persons included
2010	0.64	0.62	7.93	7.30	66.2 Mio.
2011	0.63	0.61	8.32	7.58	66.4 Mio.

*age and sex standardized according to population 31.12.2007

Diabetes Surveillance in Germany – Regional health insurance data (AOK)

Project in cooperation with the University of Heidelberg

Aims:

(1) To identify relevant indicators of ambulant care for the Diabetes Surveillance

(2) Which indicators are measurable using existing health insurance data

47 out of 70 relevant indicators are measurable with health insurance data

- measurable
- not measurable
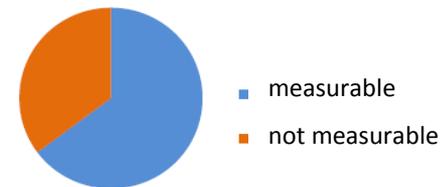
For example not measurable are:
- Health related quality of life
- Laboratory based indicators (HbA1c, Lipids, Creatinine, etc.)
- Individual goals for diabetes therapy