



Berner Fachhochschule
Haute école spécialisée bernoise
Bern University of Applied Sciences

Summerschool 2016

Diet, physical activity and health – how can we postpone the development of chronic disease

August 22, 2016

David Fäh

Non-communicable disease (NCD)

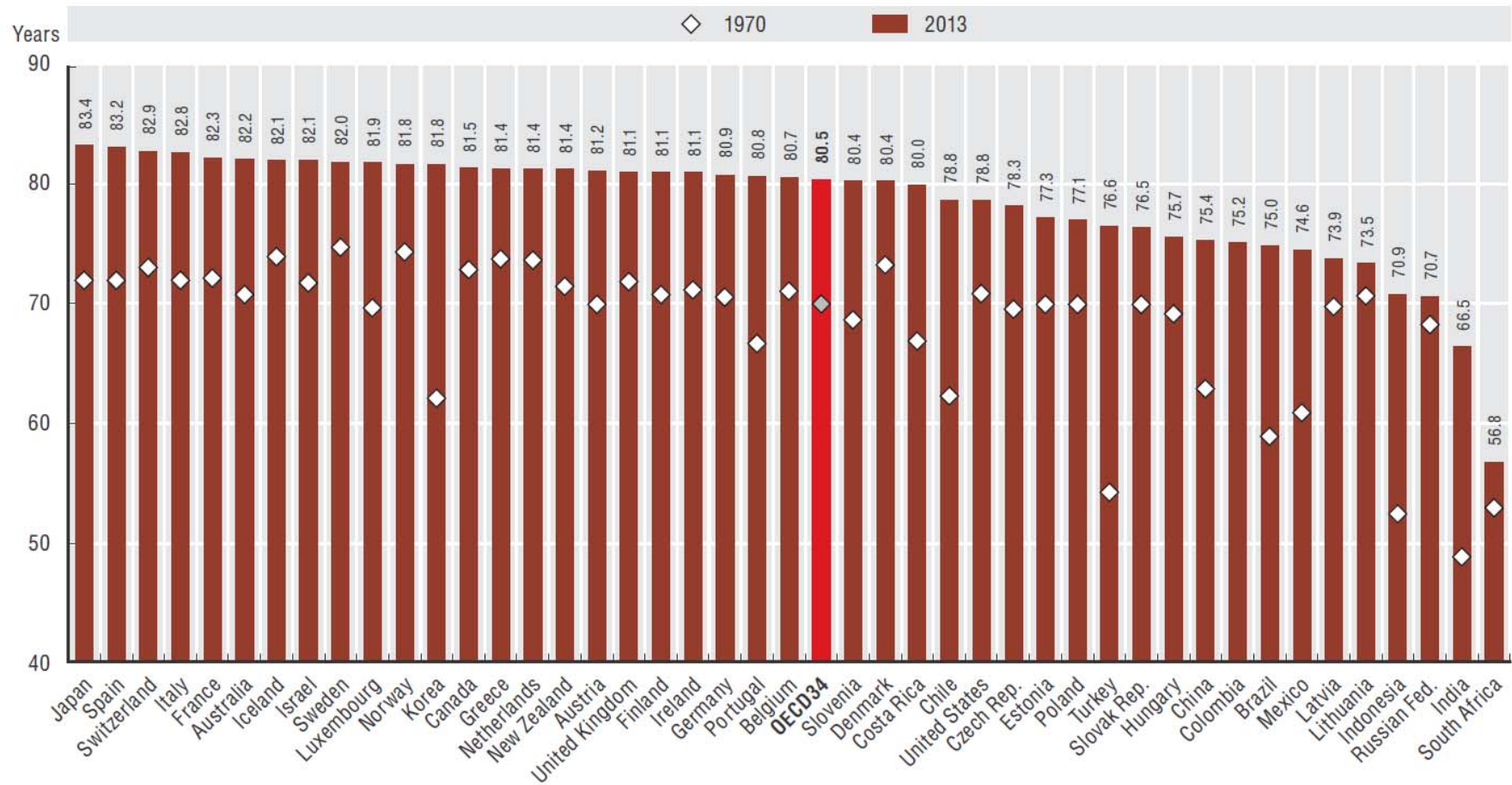
Obesity epidemic

Diet and NCD

Physical activity and NCD

What must we do?

Life expectancy at birth



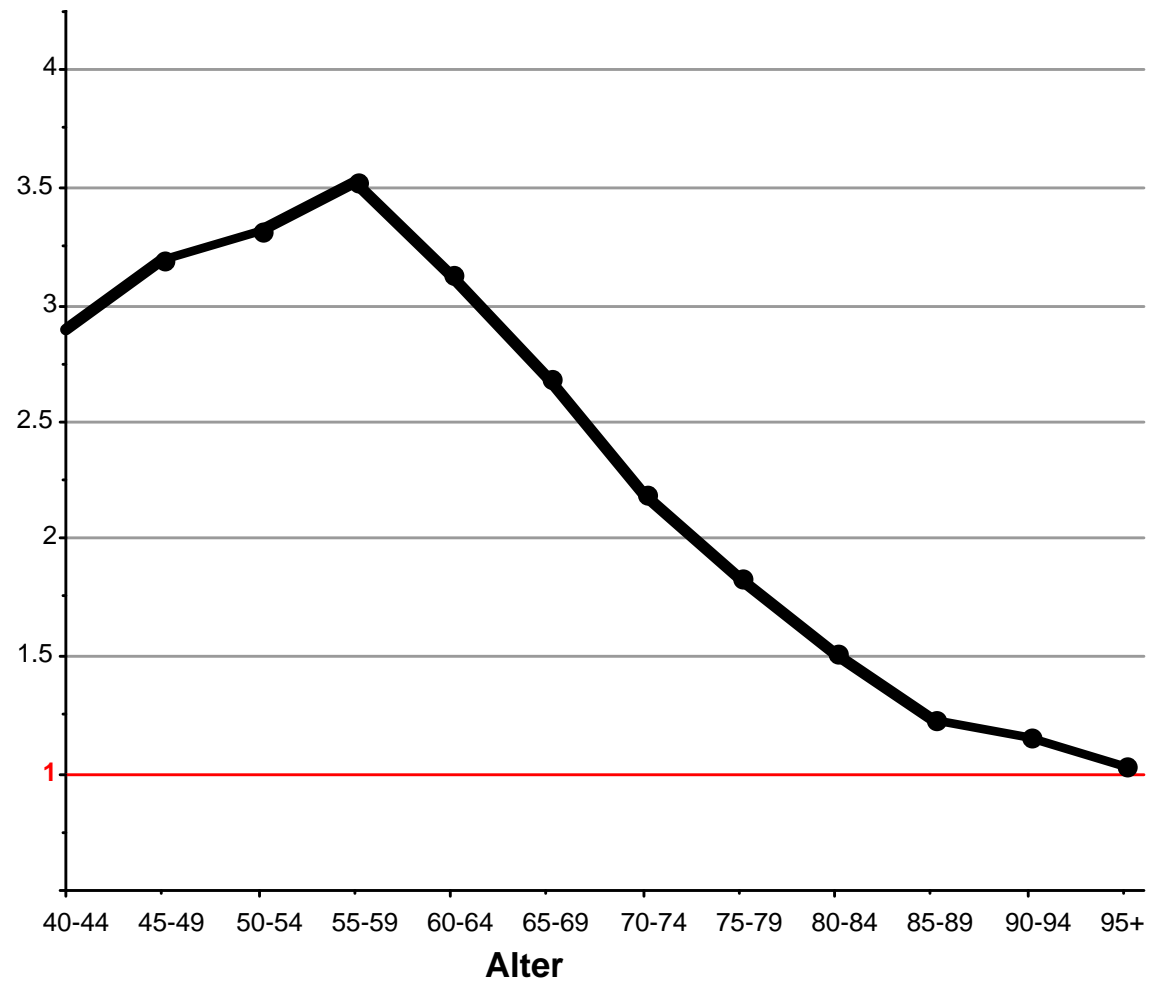
<http://apps.who.int/medicinedocs/documents/s22177en/s22177en.pdf>

Life expectancy, Switzerland, by sex

Average number of remaining life years								
	1981	1991	2001	2010	2011	2012	2013	2014
At birth								
Men	72.4	74.1	77.4	80.2	80.3	80.5	80.5	81.0
Women	79.2	81.2	83.1	84.6	84.7	84.7	84.8	85.2
At age 30								
Men	44.5	46.1	48.7	50.9	51.1	51.2	51.4	51.7
Women	50.4	52.2	53.8	55.2	55.3	55.2	55.3	55.7
At age 50								
Men	26.0	27.7	29.9	31.8	32.0	32.1	32.2	32.5
Women	31.3	33.1	34.5	35.8	35.9	35.7	35.8	36.2
At age 65								
Men	14.3	15.6	17.3	18.9	19.0	19.1	19.1	19.4
Women	18.2	19.8	21.1	22.2	22.2	22.1	22.1	22.4
At age 80								
Men	6.2	6.8	7.6	8.4	8.4	8.4	8.4	8.6
Women	7.6	8.7	9.4	10.2	10.1	10.0	10.0	10.3

Source: ESPOP, STATPOP, BEVNAT

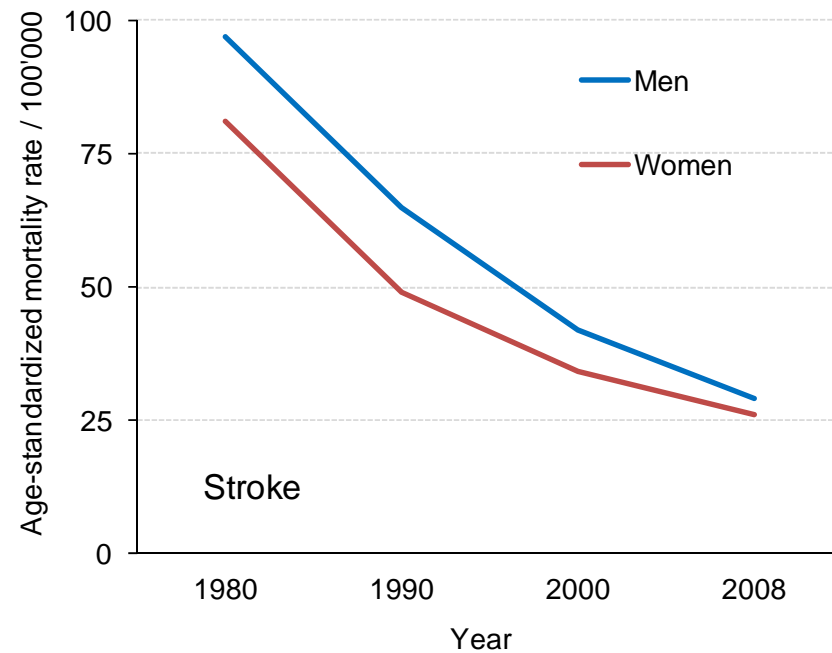
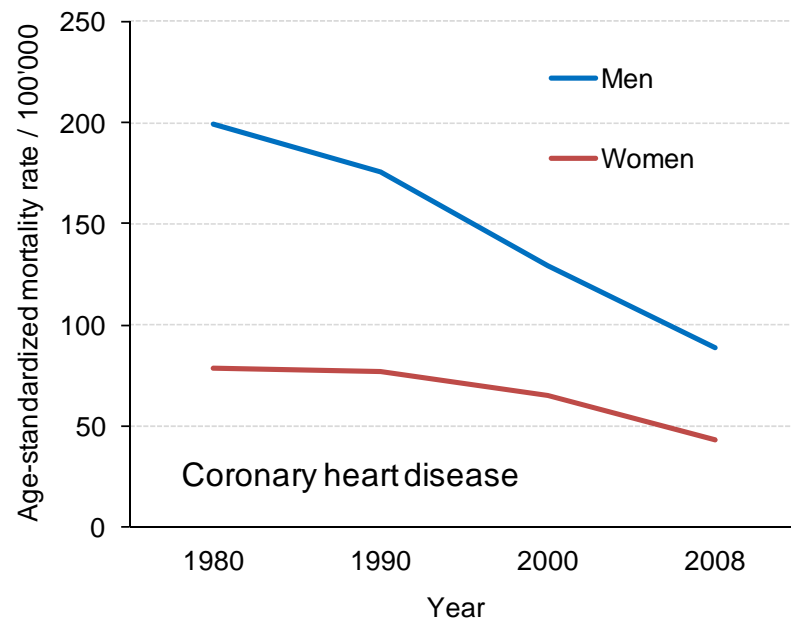
Sex ratio cardiovascular disease mortality, men/women, Switzerland



Datenquelle: Todesursachenstatistik (BFS)

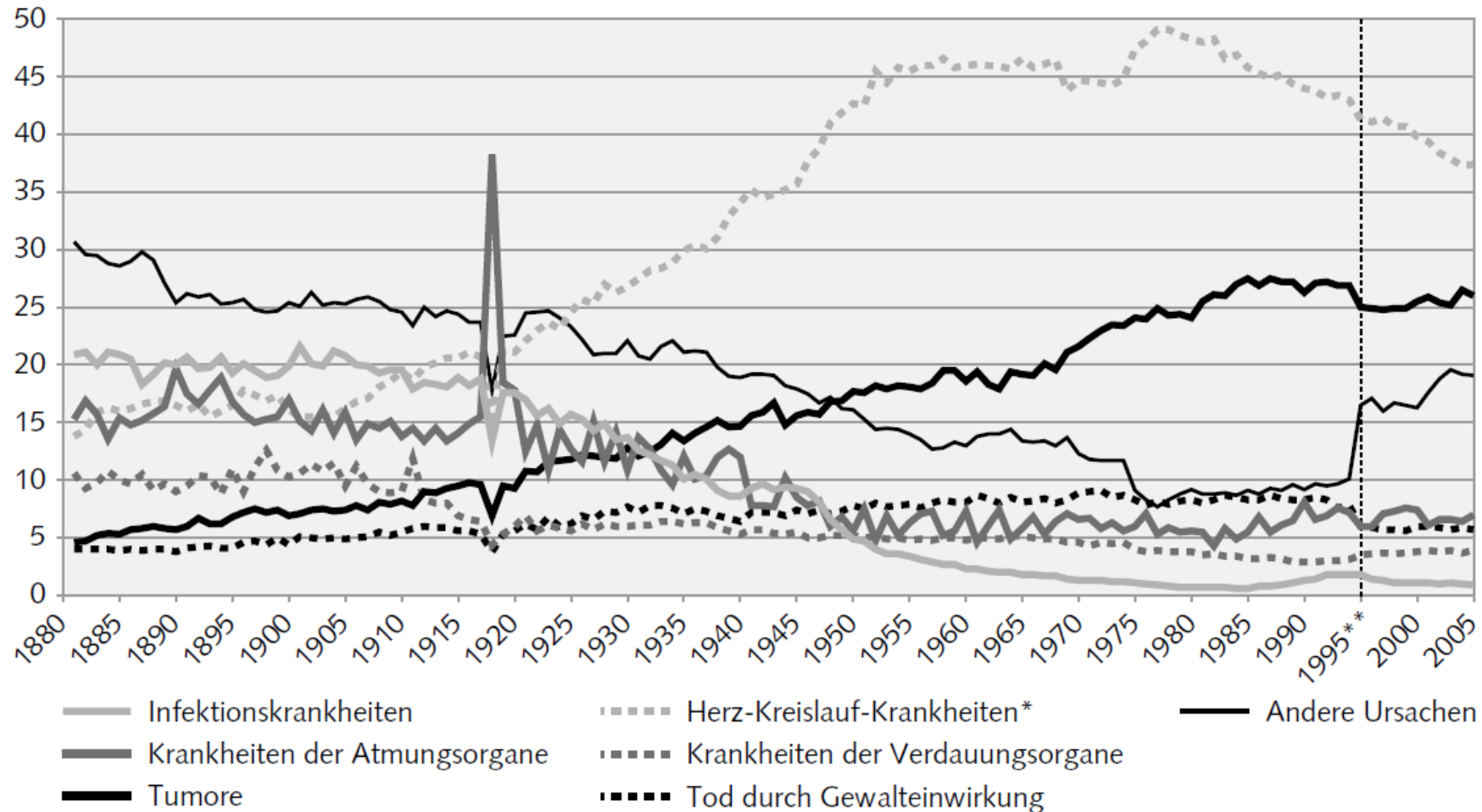
mb 2007

Coronary heart and stroke mortality in men and women, trends, Switzerland



BFS: Todesursachenstatistik, Schweiz

Proportion of causes of death (grouped)



* mit Krankheiten des Nervensystems bis 1900

** Änderung der Klassifikation der Todesursachen (Übergang von CIM-8 zu CIM-10)

Switzerland; Source: Raymond Kohli, Sterblichkeit nach Todesursachen, 1998/2003

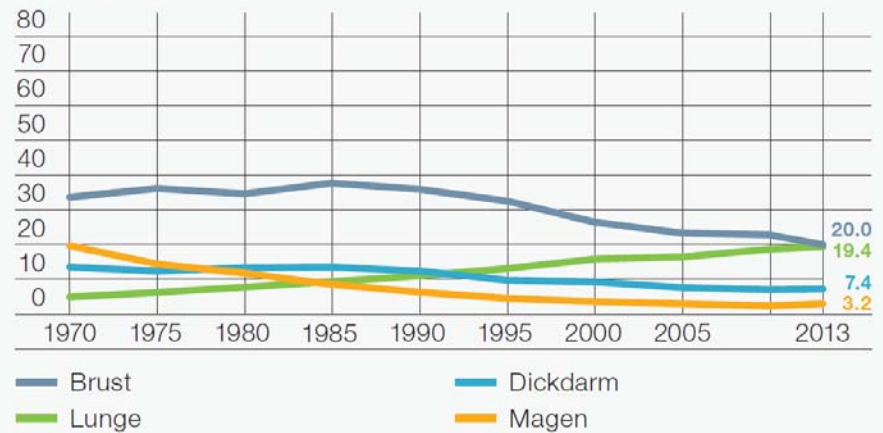
© Bundesamt für Statistik (BFS)

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Cancer mortality in men and women in Switzerland

Krebssterblichkeit nach Organ bei Frauen

Todesfälle pro 100 000 weibliche Einwohnerinnen

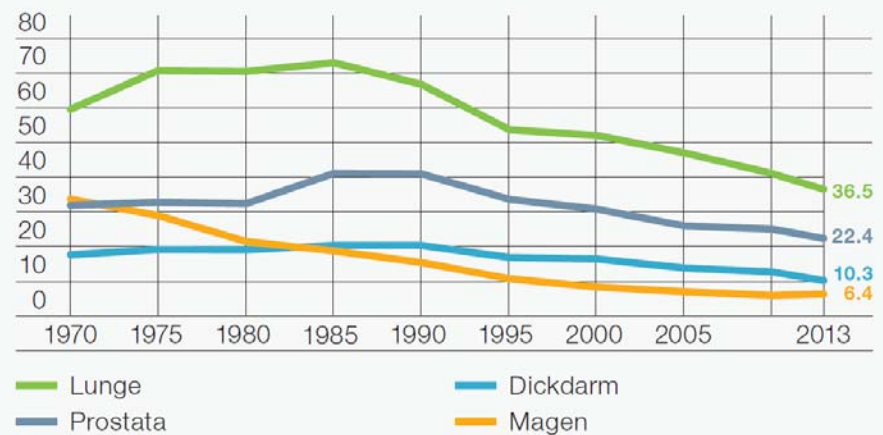


Quelle: Todesursachenstatistik, Bundesamt für Statistik, diverse Jahrgänge.

Berechnung: direkte Methode, europäische Standardbevölkerung.

Krebssterblichkeit nach Organ bei Männern

Todesfälle pro 100 000 männliche Einwohner



Quelle: Todesursachenstatistik, Bundesamt für Statistik, diverse Jahrgänge.

Non-communicable disease (NCDs)

The 4 most important:



Non-communicable disease (NCDs)

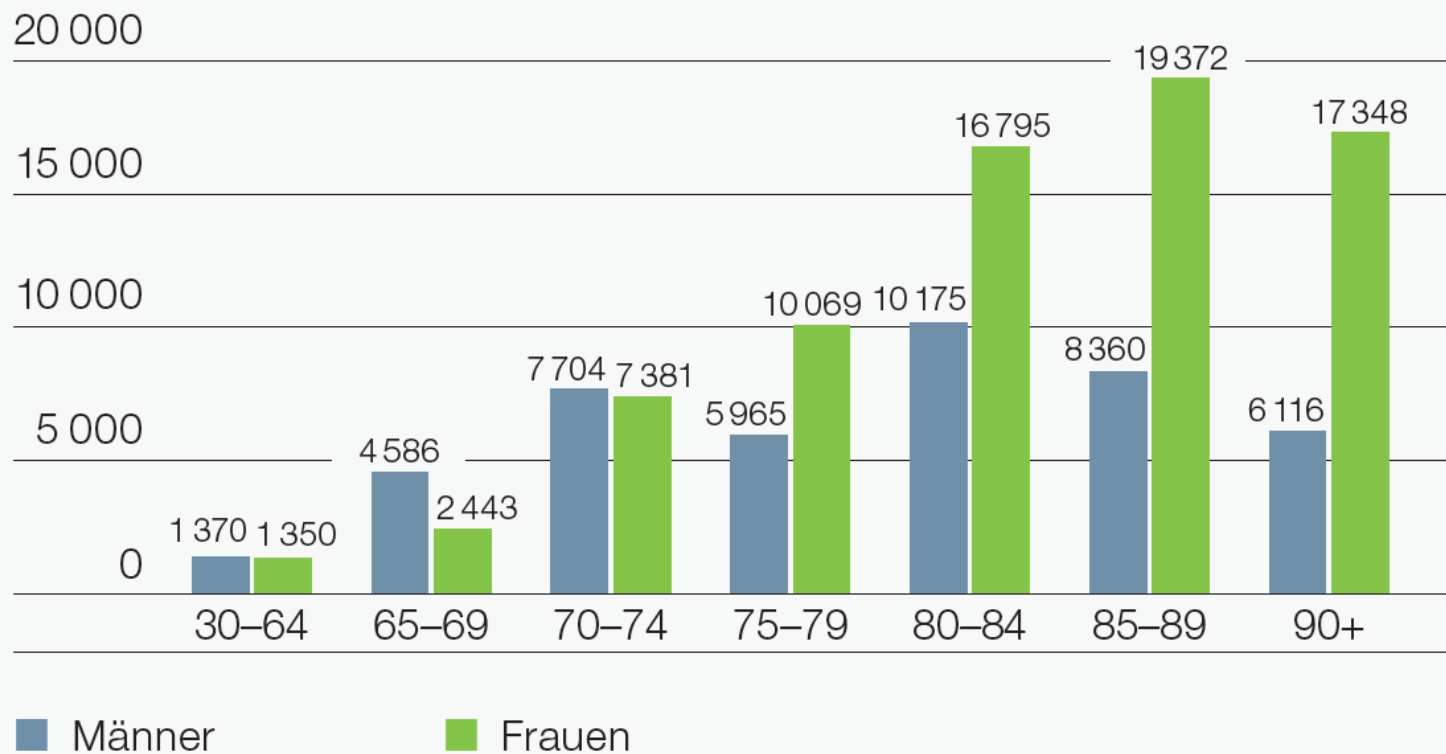
2 new ones:

- ▶ 5. Chronic neurological disease like (Alzheimer) dementia
- ▶ 6. Arthritis and chronic disease of the musculoskeletal system

Prevalence of dementia by age group

Altersspezifische Prävalenz von Demenzerkrankungen

Anzahl Demenzkranke pro Altersgruppe, 2015¹

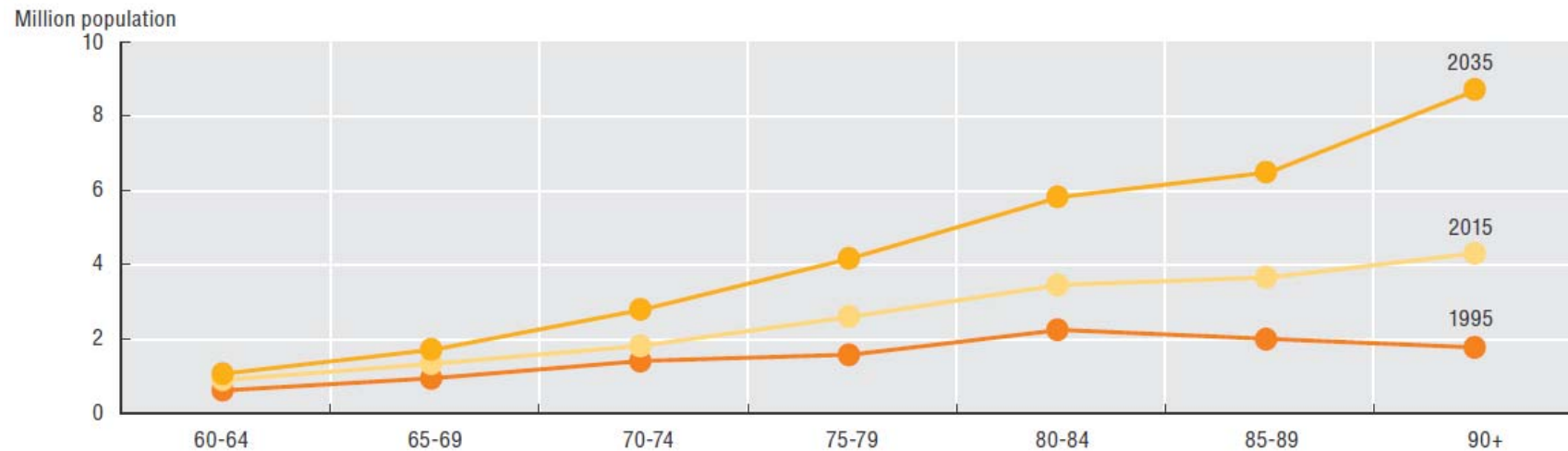


Quelle: Schweizerische Alzheimervereinigung, 2015.

¹ Schätzung.

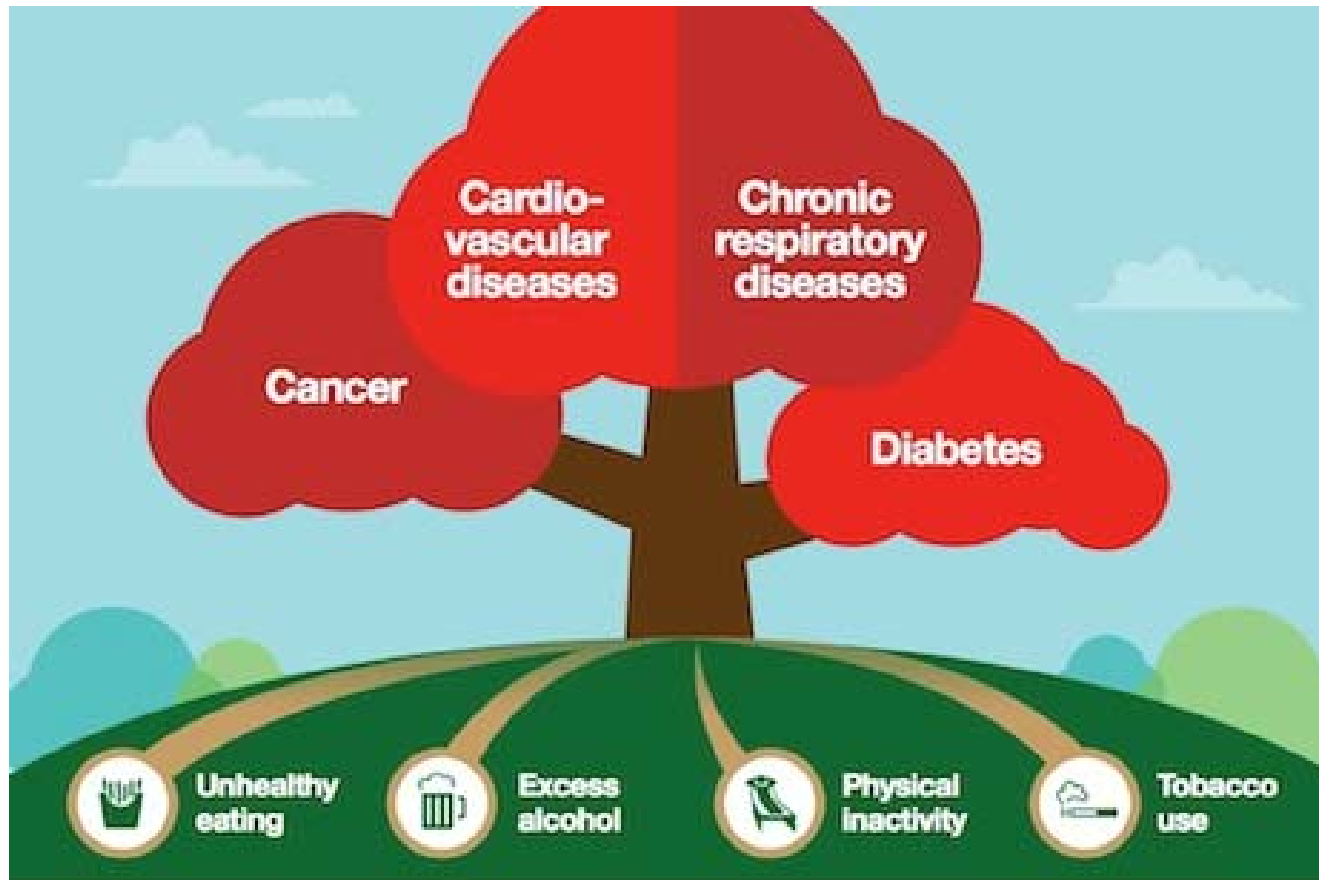
Dementia by age group and over time

11.11. Estimated number of people with dementia in all OECD countries, by age, 1995, 2015 and 2035



<http://apps.who.int/medicinedocs/documents/s22177en/s22177en.pdf>

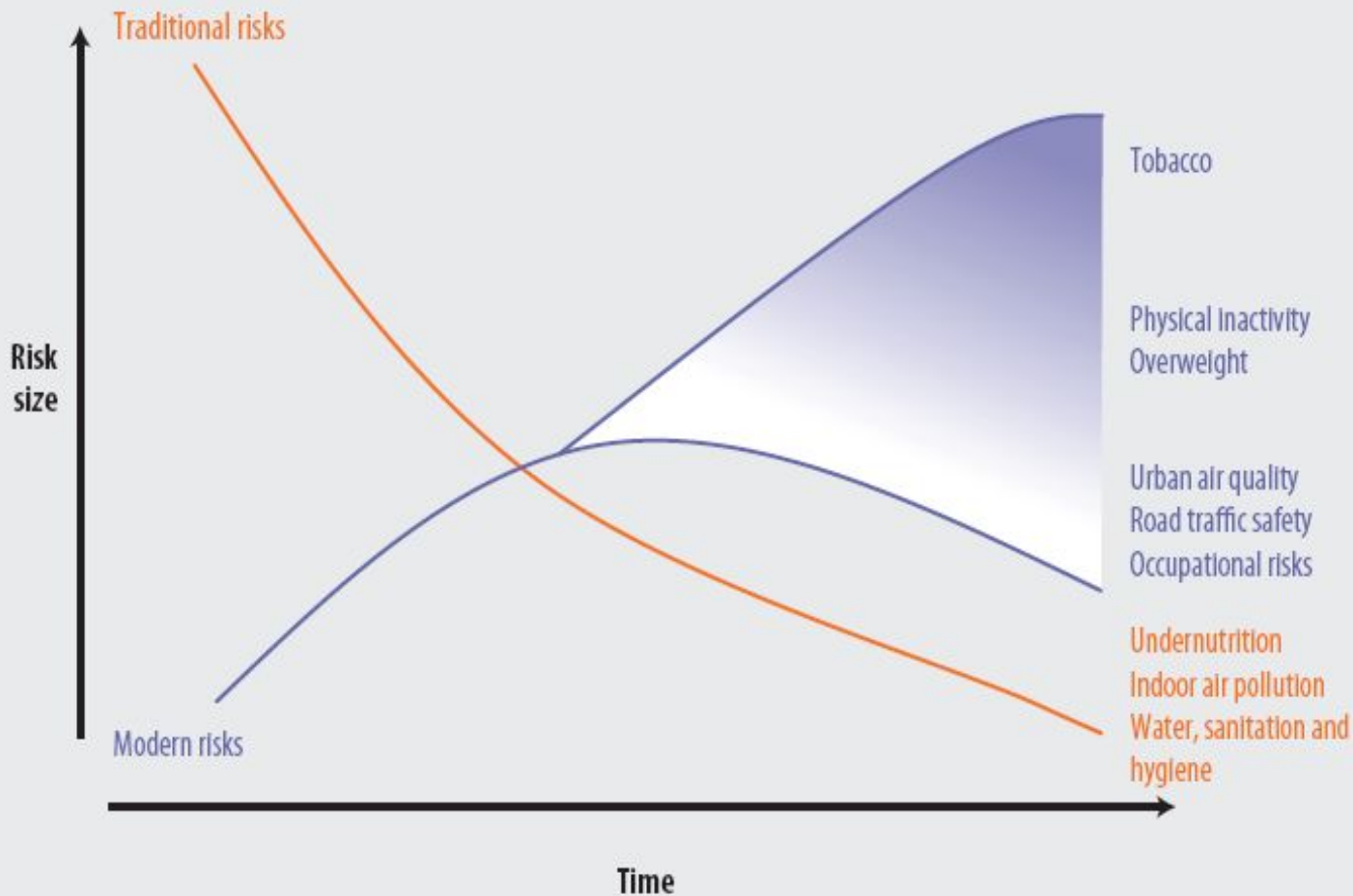
NCDs: common roots (risk factors)



NCD risk factors



Figure 2: The risk transition. Over time, major risks to health shift from traditional risks (e.g. inadequate nutrition or unsafe water and sanitation) to modern risks (e.g. overweight and obesity). Modern risks may take different trajectories in different countries, depending on the risk and the context.



Weltweite Gesundheitsrisiken Weltgesundheitsorganisation WHO 2009

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Non-communicable disease (NCD)

Obesity epidemic

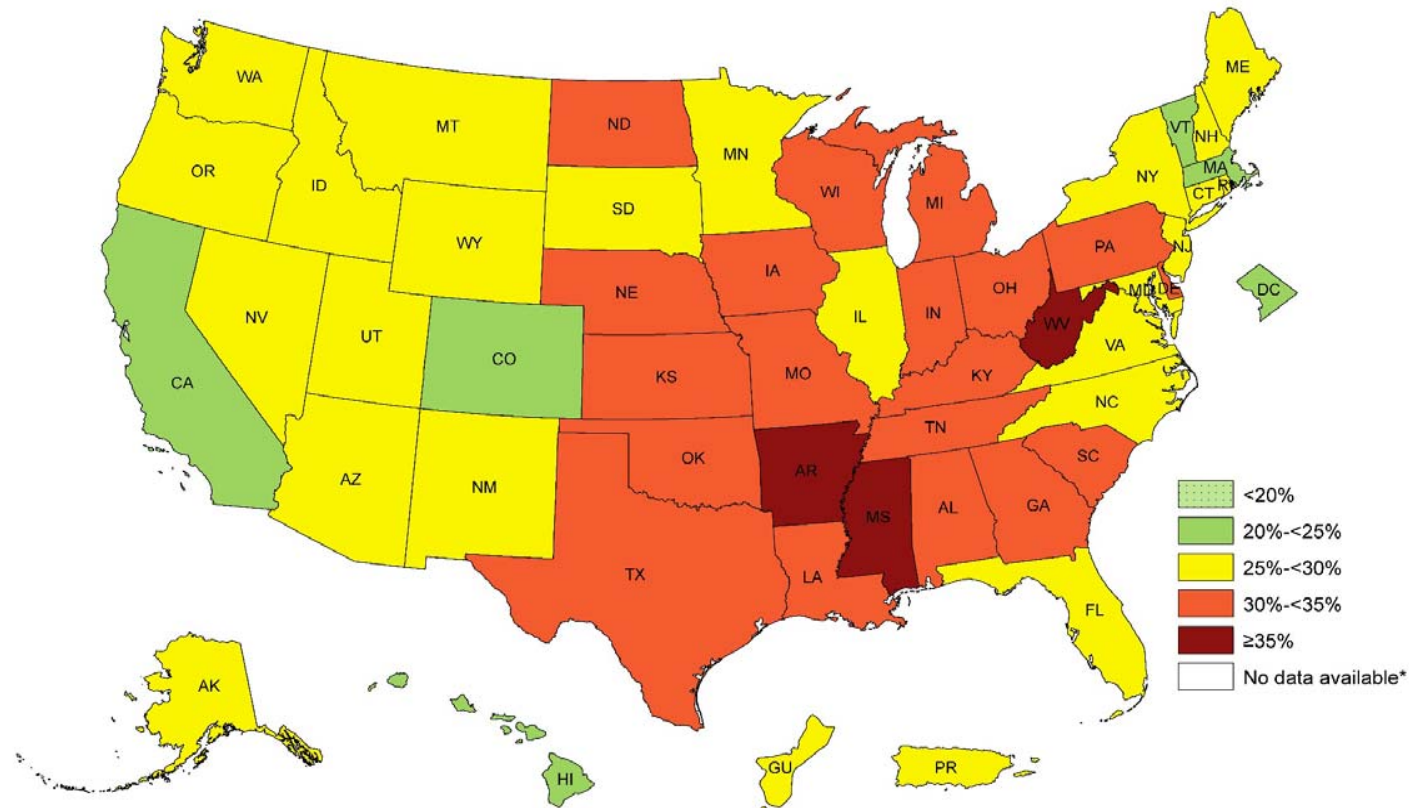
Diet and NCD

Physical activity and NCD

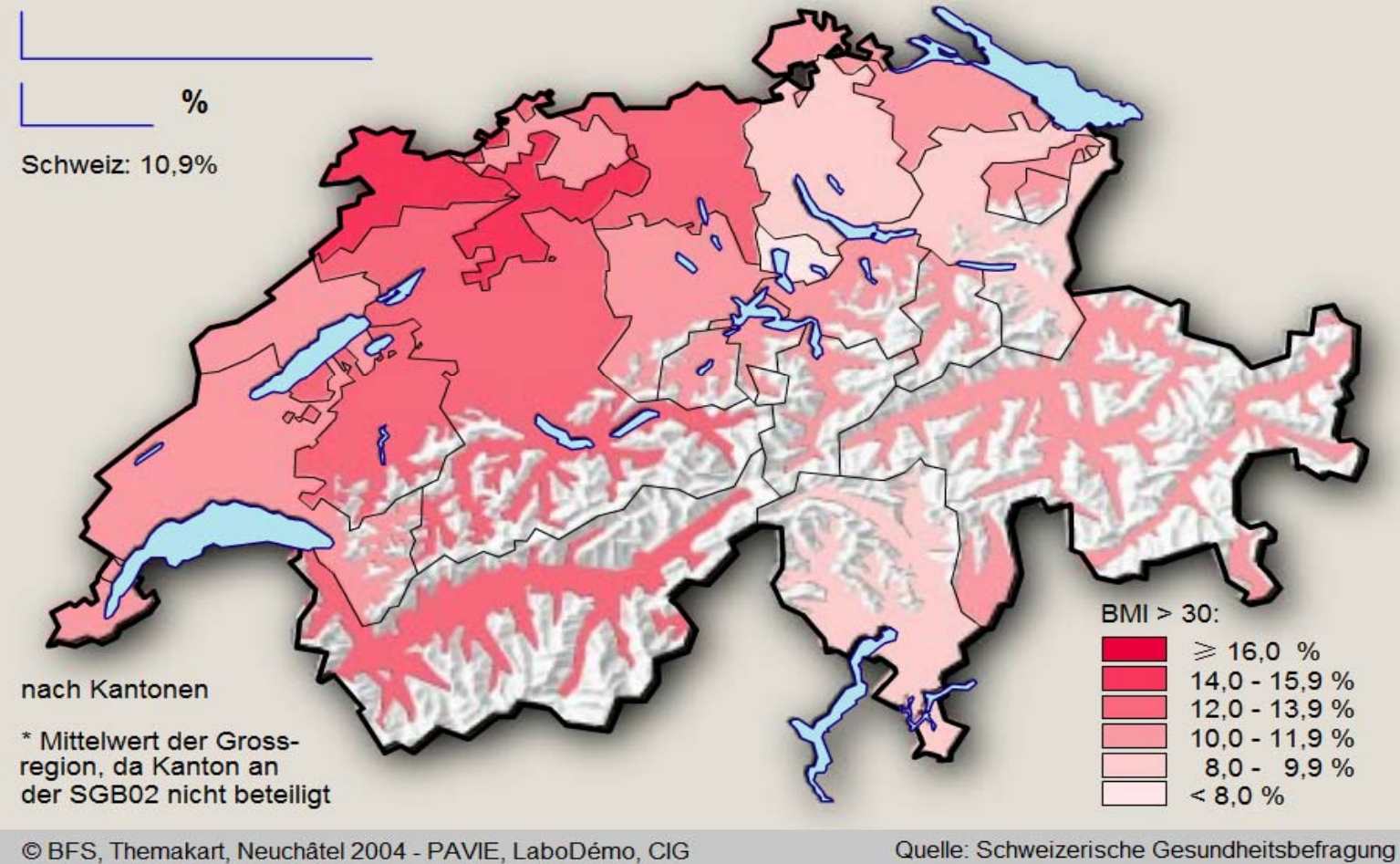
What must we do?

Prevalence* of Self-Reported Obesity Among U.S. Adults by State and Territory, 2014

*Prevalence estimates reflect BRFSS methodological changes started in 2011. These estimates should not be compared to prevalence estimates before 2011.



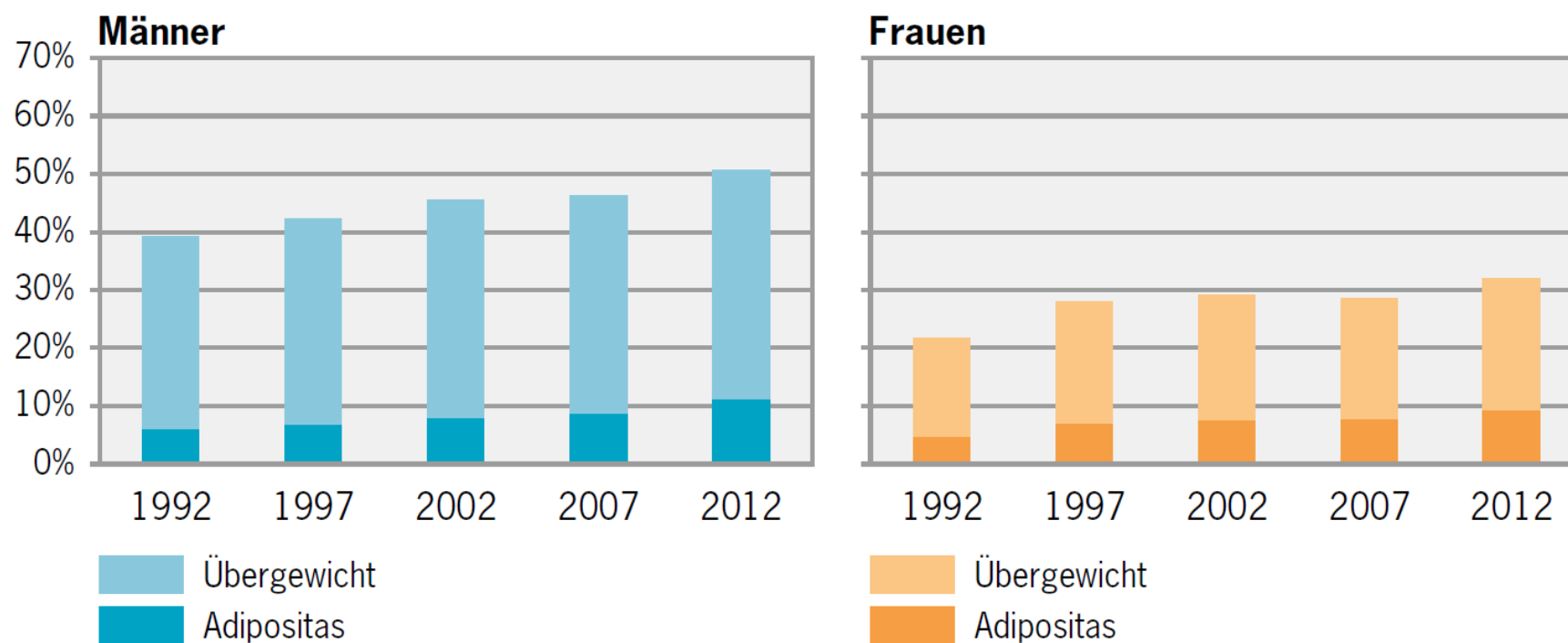
50-Jährige und Ältere mit starkem Übergewicht (BMI >30), 2002



Prevalence of overweight /obesity, Switzerland (self-reports)

Übergewicht und Adipositas, 1992–2012

G 5



Quelle: SGB

© Bundesamt für Statistik (BFS)

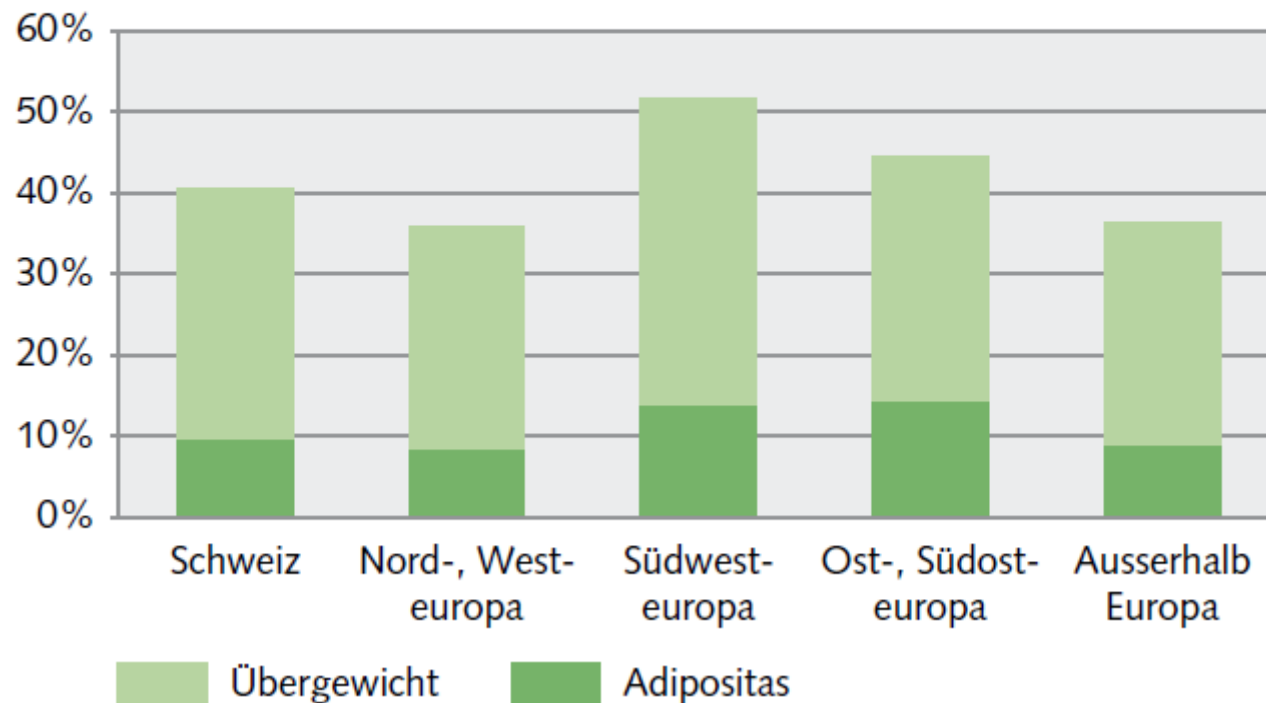
BFS, Schweizerische Gesundheitsbefragung 2012

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Obesity and nationality, Switzerland

Übergewicht und Adipositas nach Nationalität, 2012

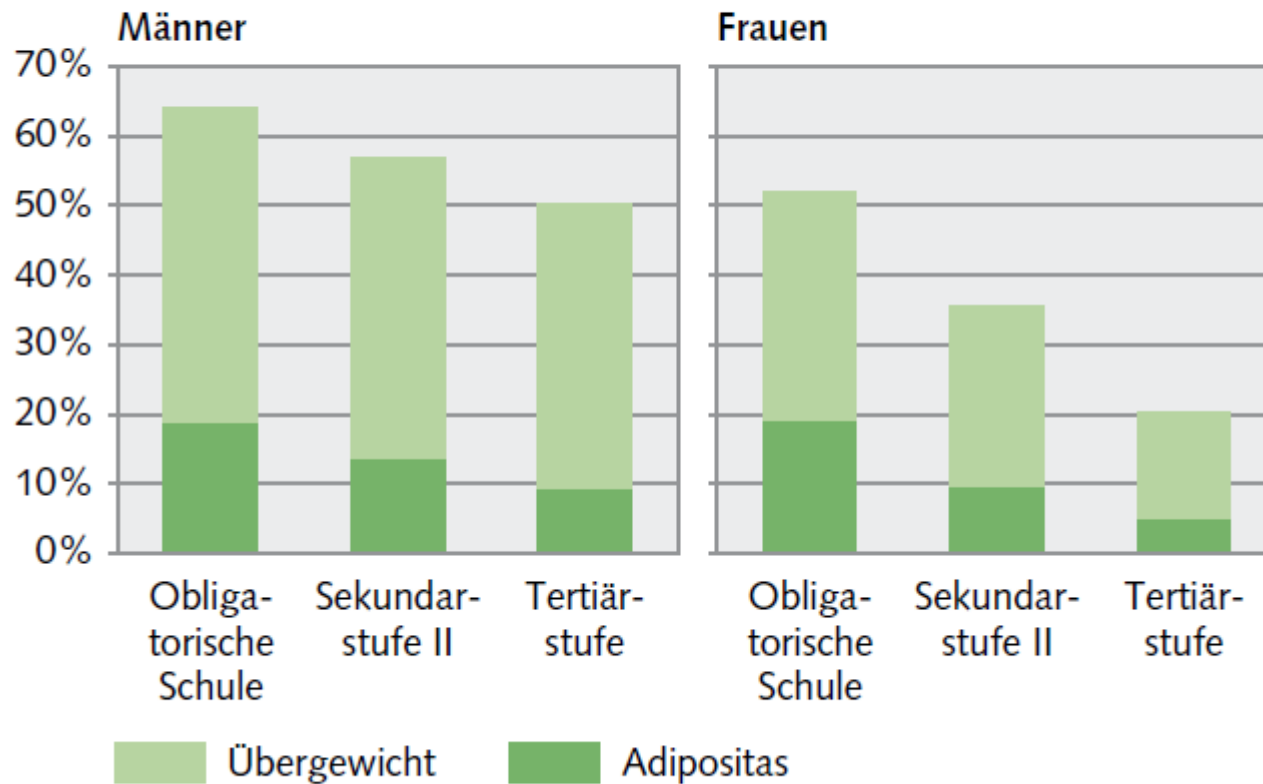
G 3



Obesity and SES, Switzerland

Übergewicht und Adipositas nach Bildungsniveau, 2012

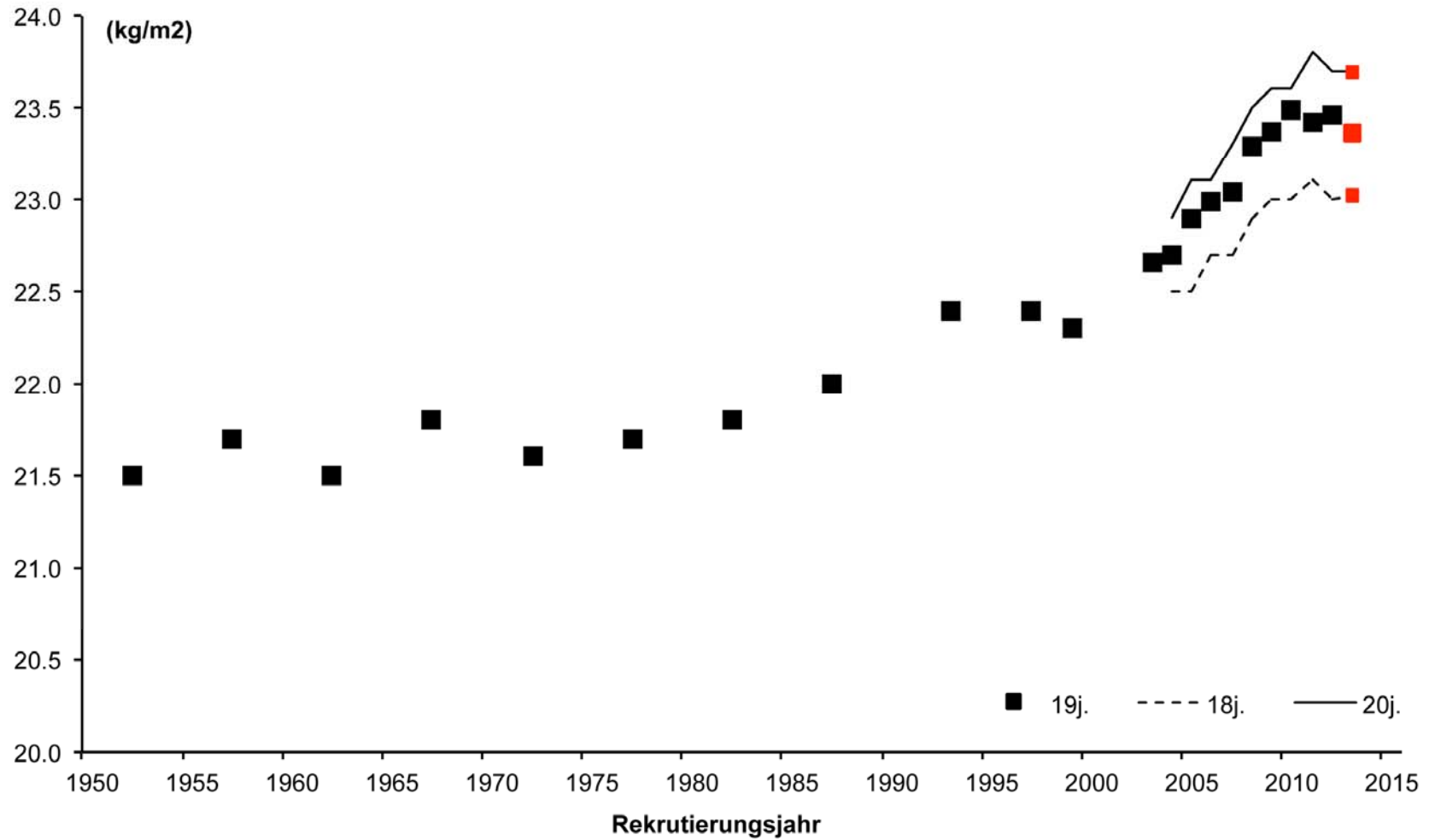
G 4



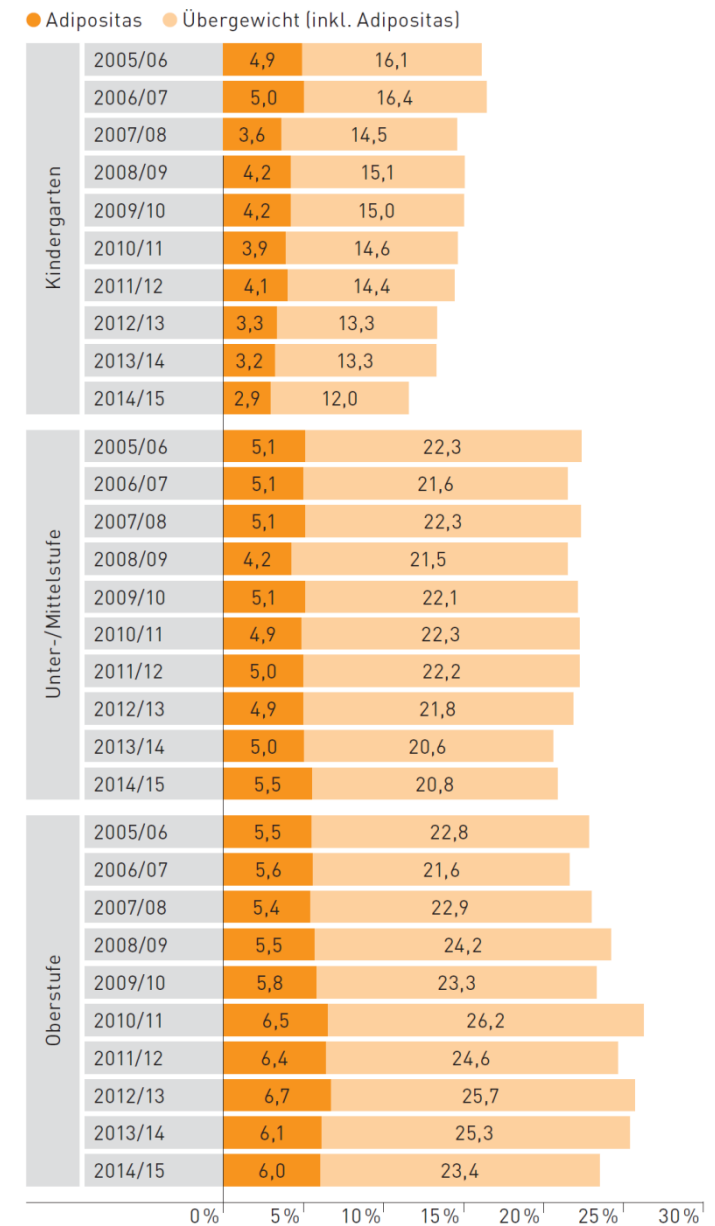
Die Auswertung zur Bildung berücksichtigt nur Personen ab 25 Jahren.

Mean BMI in Swiss conscripts

Mittelwert BMI der Schweizer Stellungspflichtigen seit 1952



Prevalence of overweight / obesity in school children in Switzerland



http://gesundheitsfoerderung.ch/assets/public/documents/1_de/d-ueber-uns/5-downloads/Faktenblatt_013_GFCH_2016-03_-_BMI-Monitoring.pdf

Non-communicable disease (NCD)

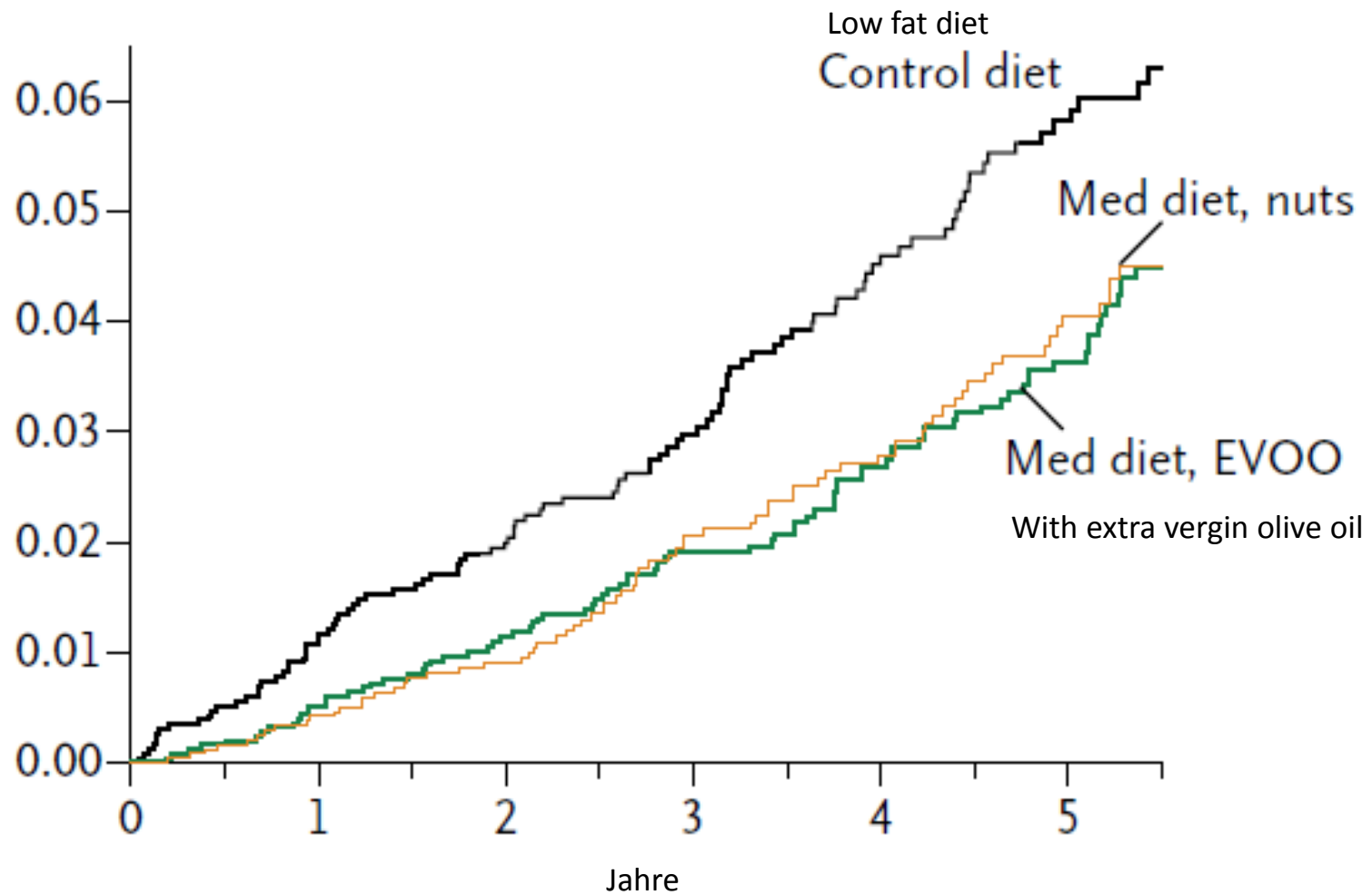
Obesity epidemic

Diet and NCD

Physical activity and NCD

What must we do?

Incidence of CVD in persons without preexisting CVD: PREDIMED-Study

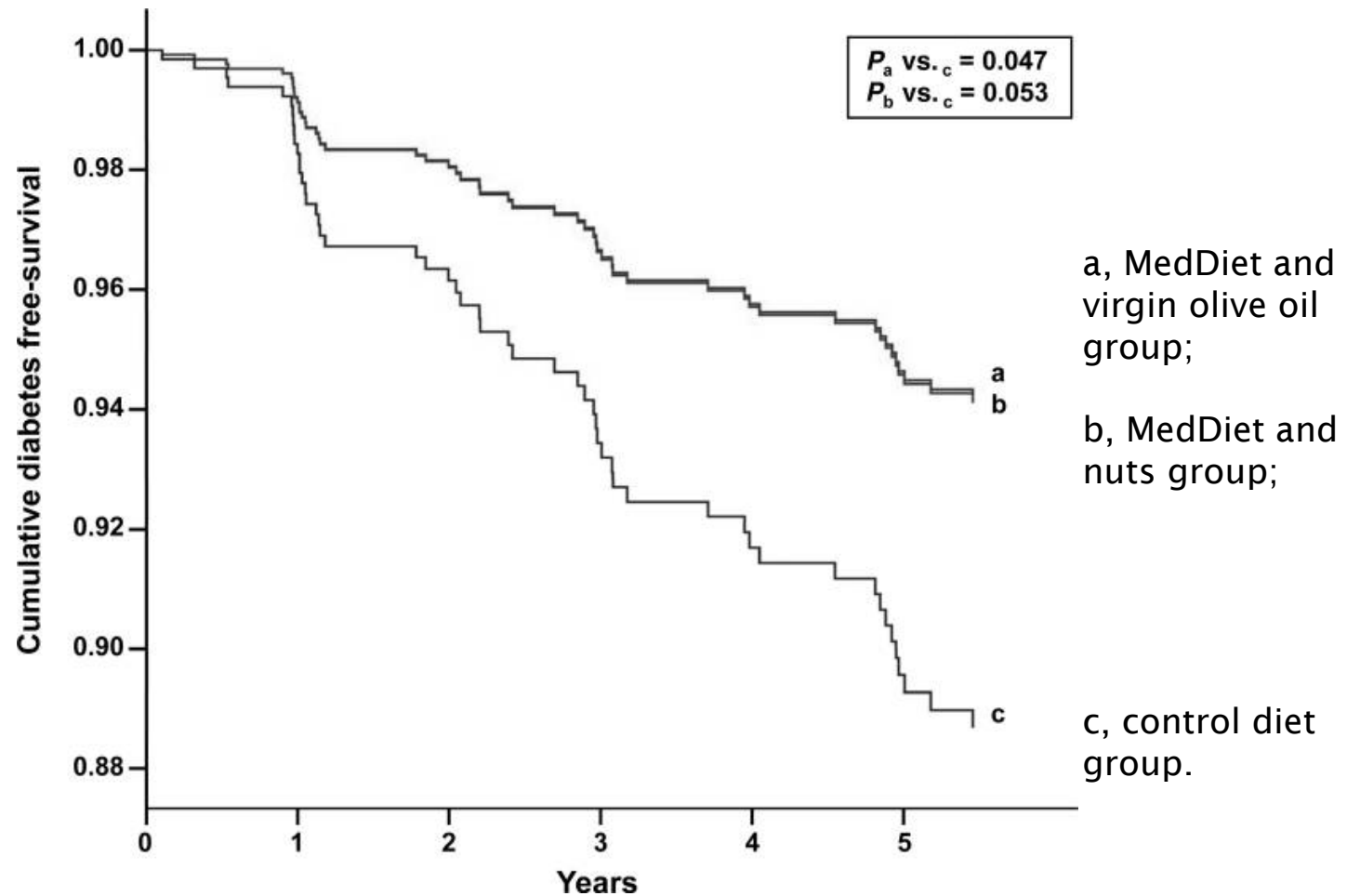


N Engl J Med 2013; 368:1279-1290

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PREDIMED study: Diabetes Mellitus Type 2

Incidence of Type II diabetes



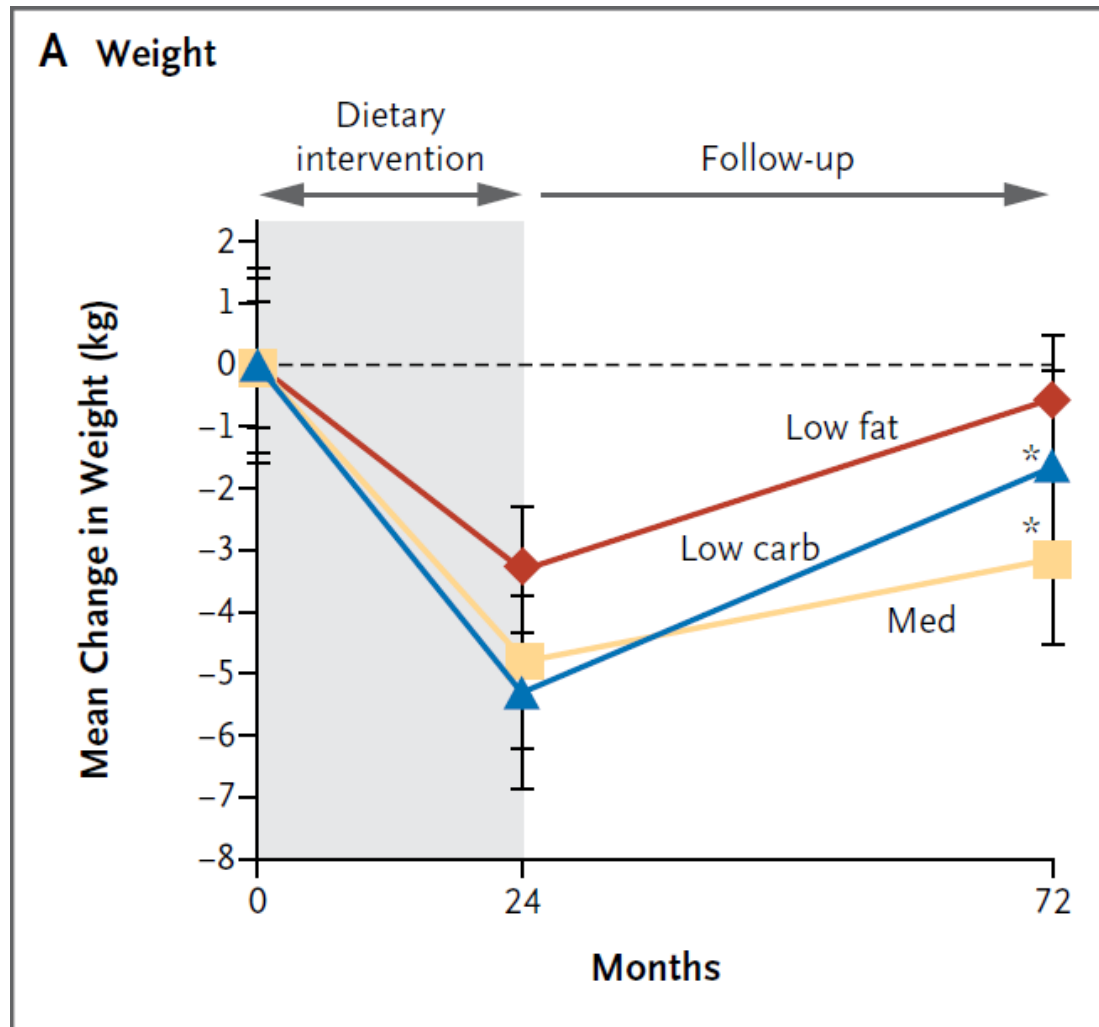
Diabetes Care. 2011 Jan;34(1):14-9

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Health effects of the Mediterranean diet	Magnitude
Risk reduction for coronary heart disease mortality	20-40%
Risk reduction for cancer	20-30%
Risk reduction for all cause mortality	17-25%
Risk reduction for cardiovascular disease	25-45%
Risk reduction for type 2 diabetes mellitus (incidence)	25-30%
Reduction body weight, BMI, waist circumference	In average 5 kilograms sustainable weight reduction
Improvement of components of the metabolic syndrome	about 30-40%

Curr. Cardiovasc. Risk Rep. **8**, 416 (2014)

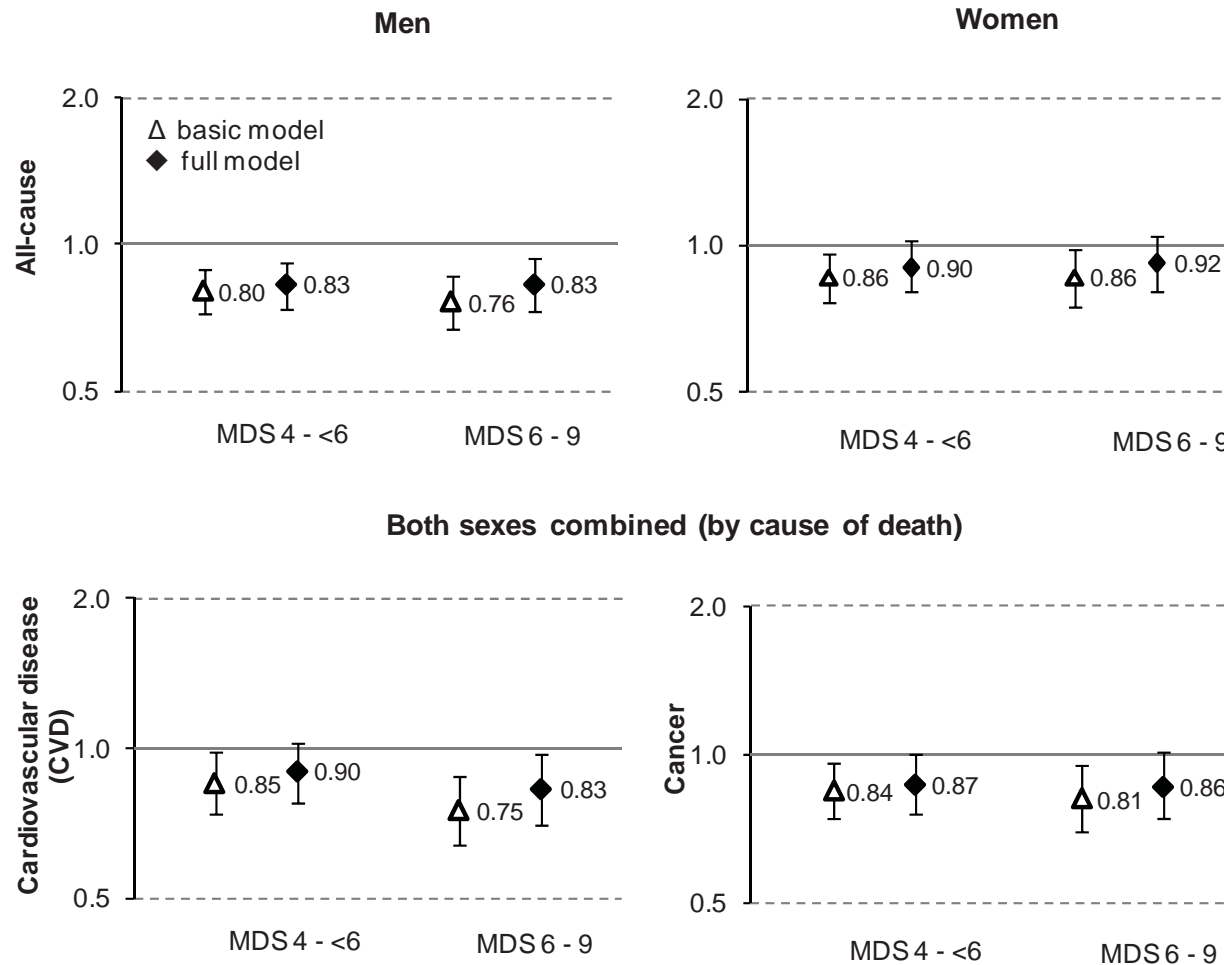
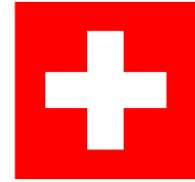
3 different diets and body weight



Med: Mediterranean diet

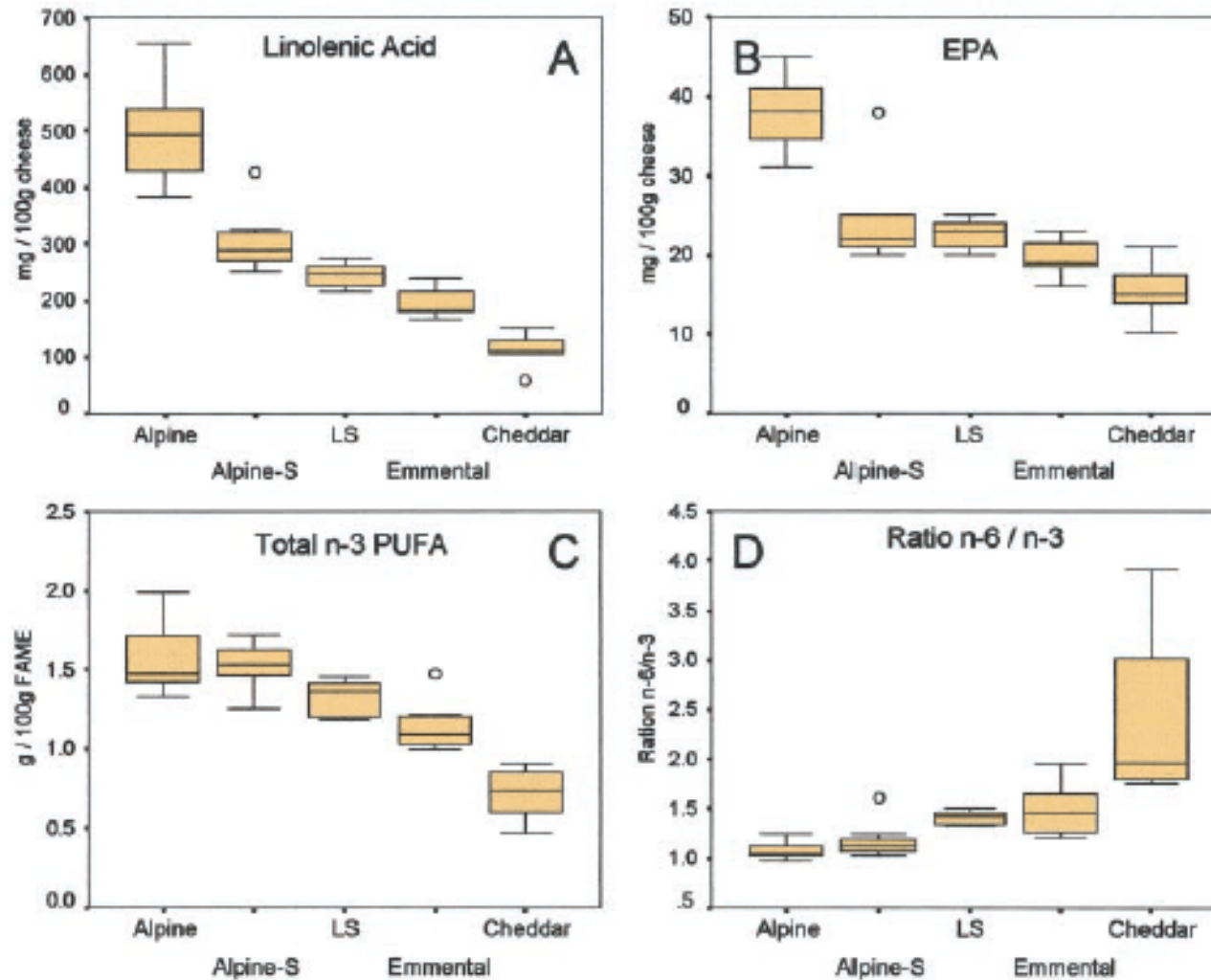
N Engl J Med 2012; 367:1373-1374

Adherence to Mediterranean Diet (MD) in Switzerland and CVD, cancer and all-cause mortality



MDS: Mediterranean Diet Score from 0 (no adherence) to 9 (perfect adherence)

Fatty acids composition of cheeses



Circulation. 2004;109:103-107

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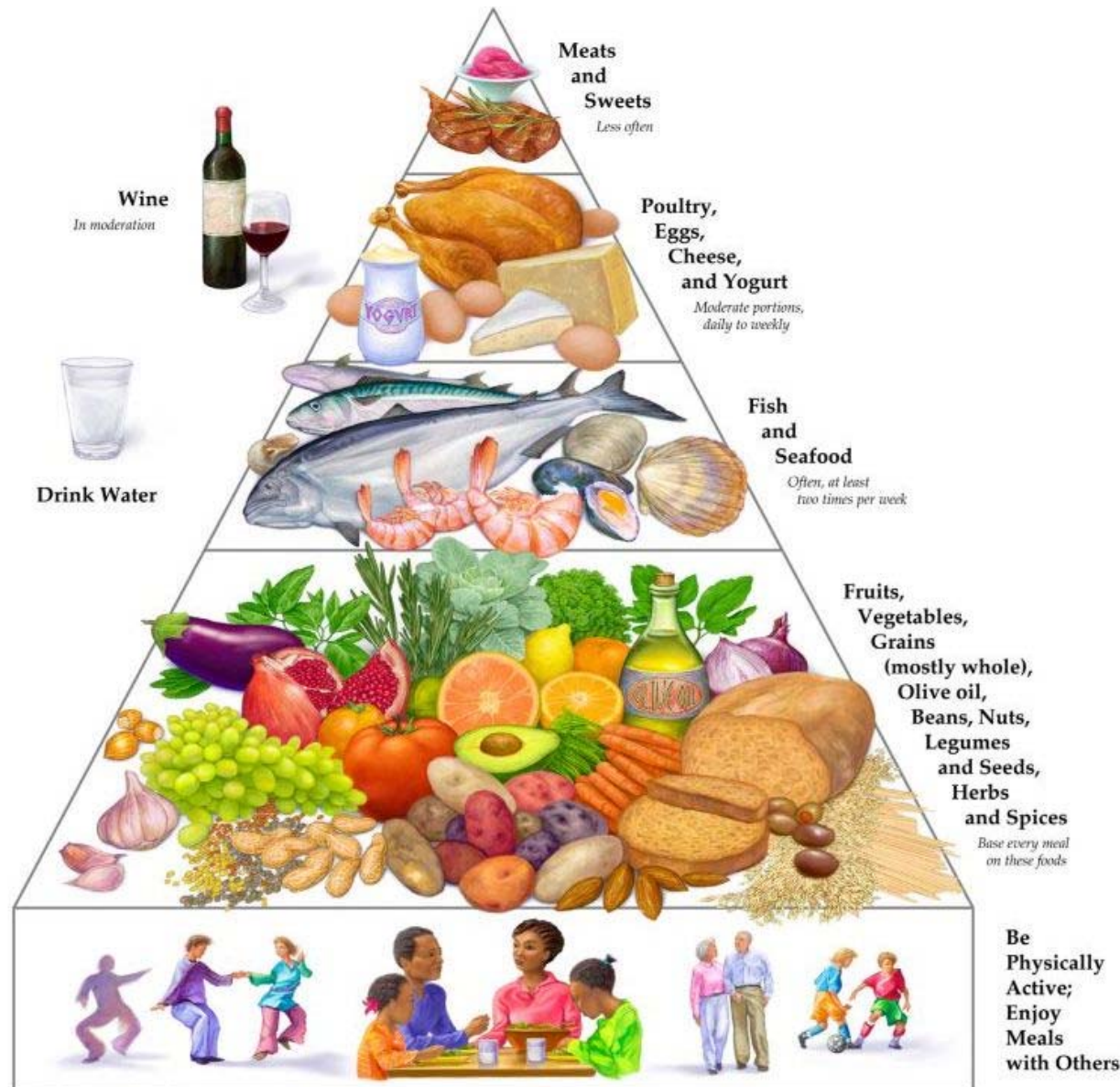


Illustration by George Middleton

© 2009 Oldways Preservation and Exchange Trust

www.oldwayspt.org

Mediterranean Diet

1. An abundance of plant foods: fruits, vegetables, grains, nuts, seeds
2. Starchy food should contain fibres: legumes, quinoa, amaranth
3. Minimally processed and seasonally fresh foods
4. Fresh fruits as the typical daily dessert
5. Extra Vergine olive oil as the principal source of dietary fat
6. Dairy, poultry, and fish in low to moderate amounts
7. Less than five eggs per week
8. Red meat in low frequency and amounts
9. Wine in low to moderate amounts (one to two glasses per day for men and one glass per day for women)



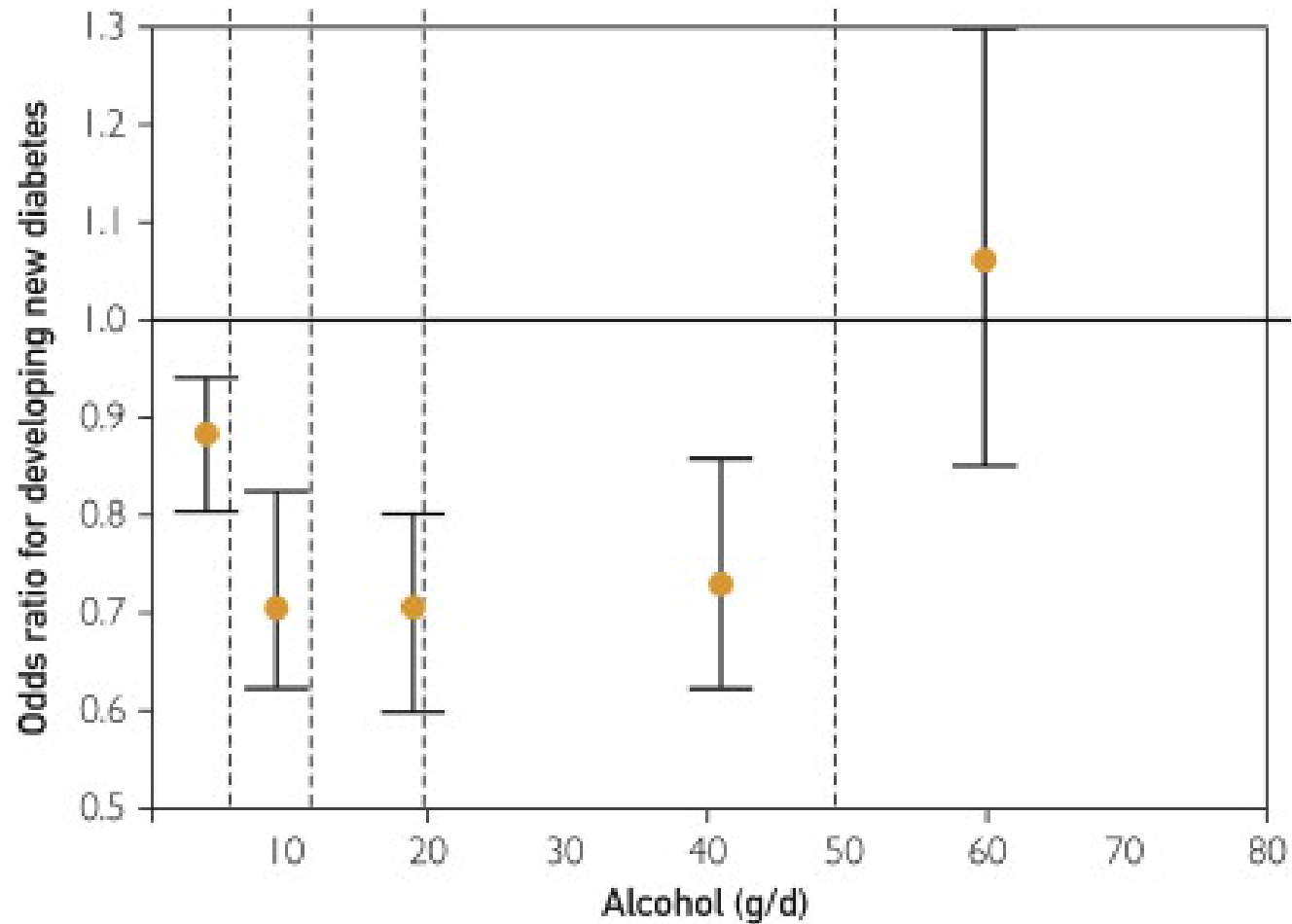
Endocrinol Metab Clin North Am. 2009 Mar;38(1):45-78

Risk of death associated with the Mediterranean Diet (MD): What remains after subtraction of single MD-components?

Variable	Relative risk of death	P-value	Reduction of effect (%)
ME total	0.864	<0.001	0
ME minus vegetables	0.886	0.002	16.2
ME minus legumes	0.877	<0.001	9.7
ME minus fruits and nuts	0.879	0.001	11.2
ME minus fibres	0.872	<0.001	6.1
ME minus monounsaturated / saturated fats (quotient)	0.878	0.003	10.6
ME minus abstinence of dairy products	0.870	<0.001	4.5
ME minus abstinence of meat / - products	0.887	0.001	16.6
ME minus alcohol	0.896	0.002	23.5

BMJ. 2009 Jun 23;338:b2337.

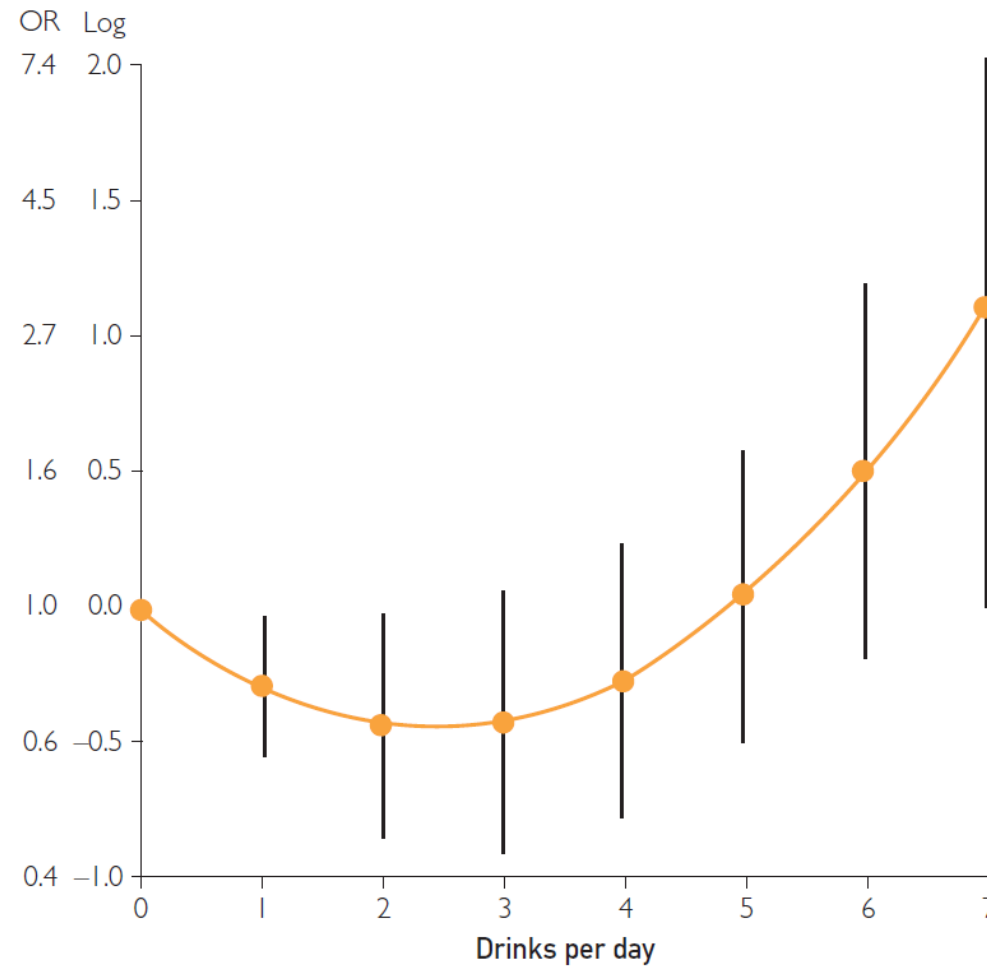
Alcohol consumption and type 2 diabetes risk



Mayo Clin Proc. 2014 Mar;89(3):382-93

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Alcohol consumption and ischemic stroke risk



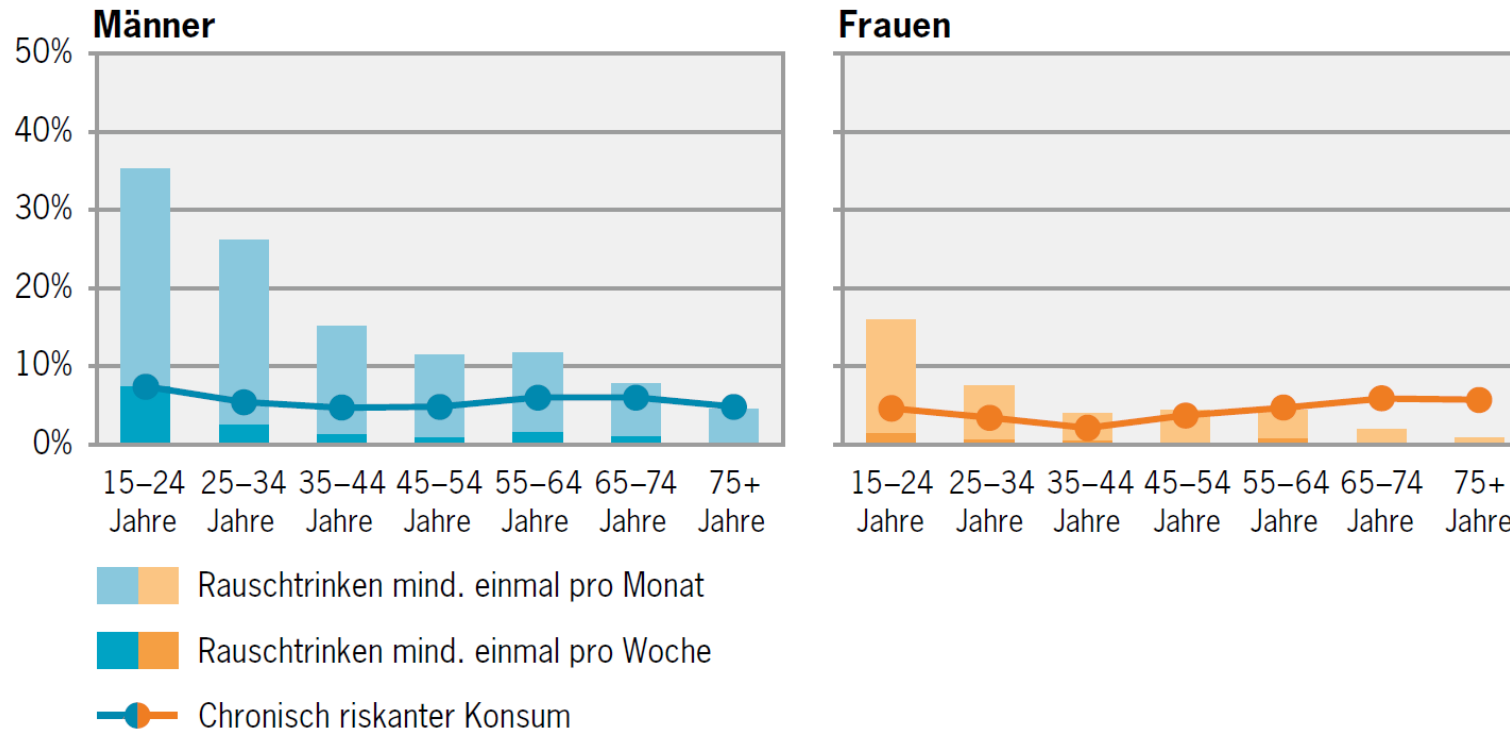
Mayo Clin Proc. 2014 Mar;89(3):382-93

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Chronic risky alcohol consumption

Riskanter Alkoholkonsum, 2012

G 18

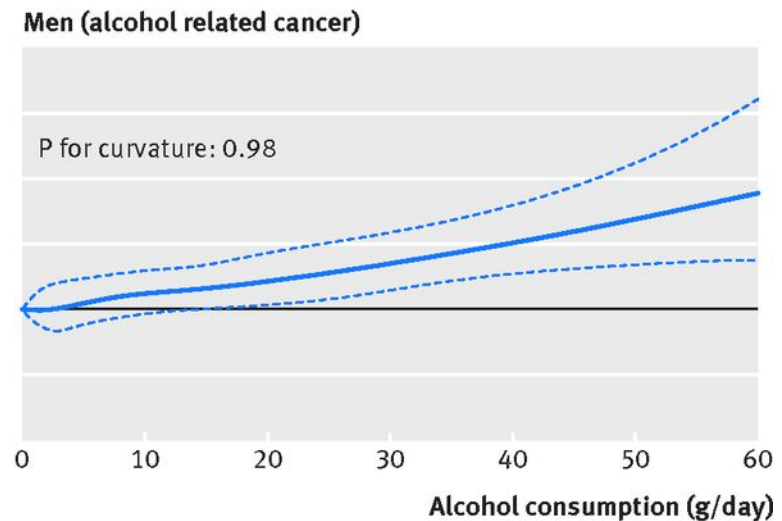
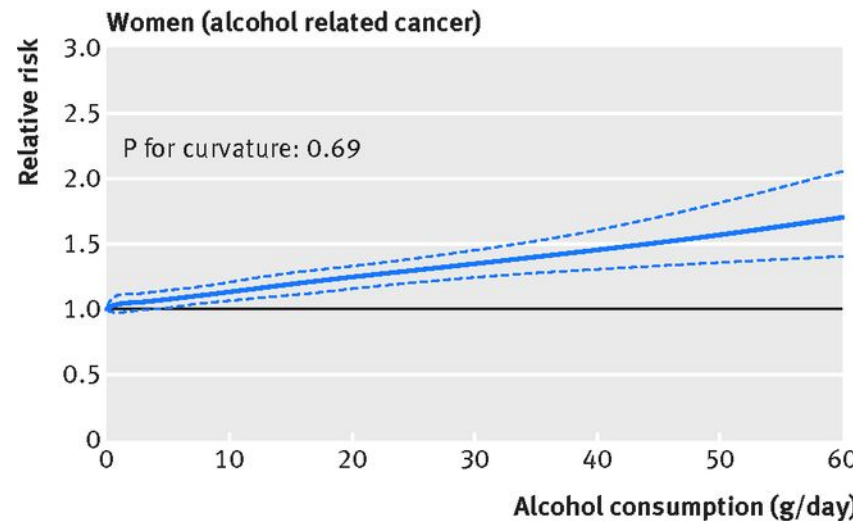
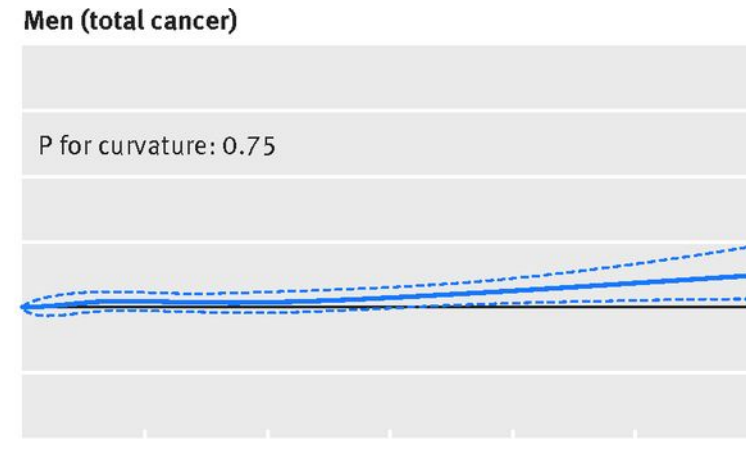
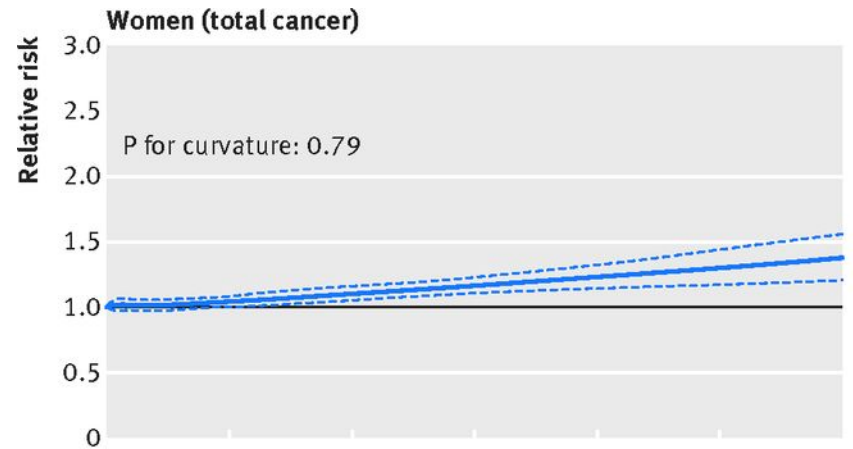


Rauschtrinken: 6 oder mehr Gläser eines alkoholischen Standardgetränks bei einer Gelegenheit (unabhängig vom Geschlecht).
 Chronisch riskanter Konsum: bei Männern im Durchschnitt mehr als 4 Gläser eines alkoholischen Standardgetränks (z.B. eine Stange Bier) pro Tag, bei Frauen mehr als 2 Gläser pro Tag.

Quelle: SGB

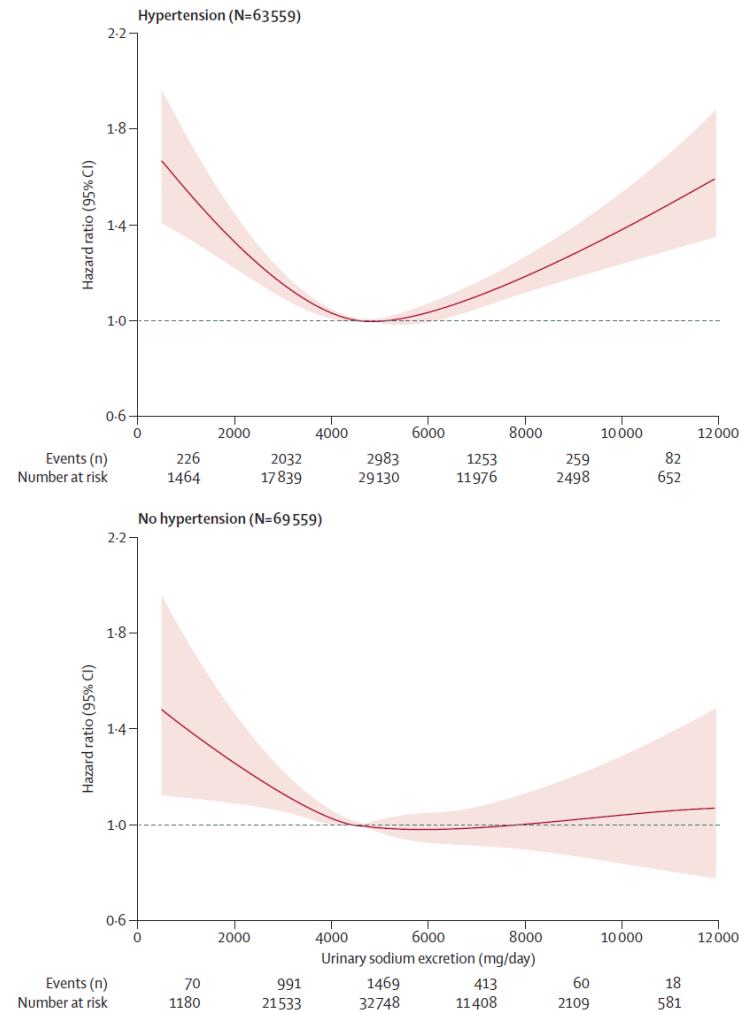
© Bundesamt für Statistik (BFS)

Alcohol consumption and cancer-risk (total and alcohol related cancer)



Yin Cao et al. BMJ 2015;351:bmj.h4238

Sodium excretion (urin) and cardiovascular disease



[http://www.thelancet.com/journal/lancet/article/PIIS0140-6736\(16\)30467-6/abstract](http://www.thelancet.com/journal/lancet/article/PIIS0140-6736(16)30467-6/abstract)

Non-communicable disease (NCD)

Obesity epidemic

Diet and NCD

Physical activity and NCD

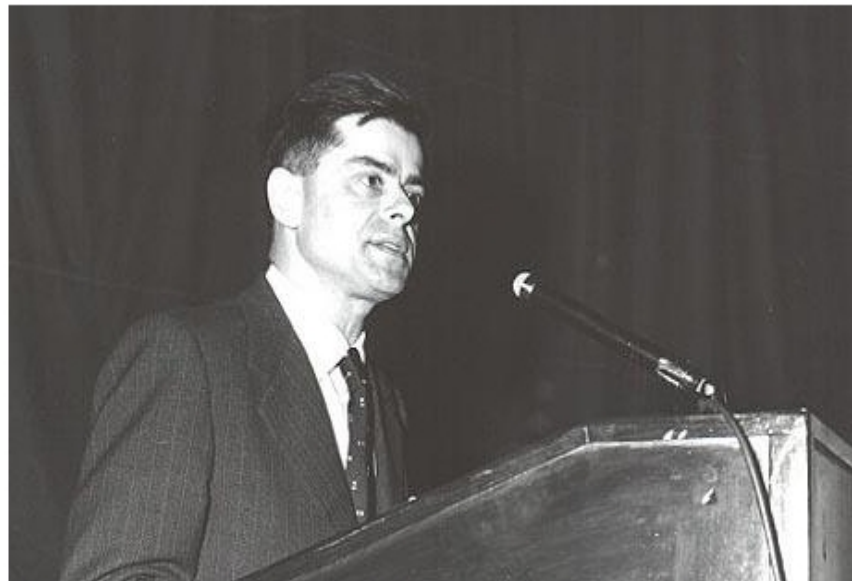
What must we do?

**CORONARY HEART-DISEASE AND
PHYSICAL ACTIVITY OF WORK**

J. N. MORRIS **J. A. HEADY**
 M.A. Glasg., M.R.C.P., D.P.H. M.A. Oxfd
 OF THE SOCIAL MEDICINE RESEARCH UNIT, MEDICAL RESEARCH
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 OF THE MEDICAL DEPARTMENT, LONDON TRANSPORT EXECUTIVE

C. G. ROBERTS **J. W. PARKS**
 B.A., M.D. Camb. M.B.E., M.D. Camb., D.C.H.
 OF THE TREASURY MEDICAL SERVICE



Morris addressing the 1954 World Conference of Cardiology in Washington DC

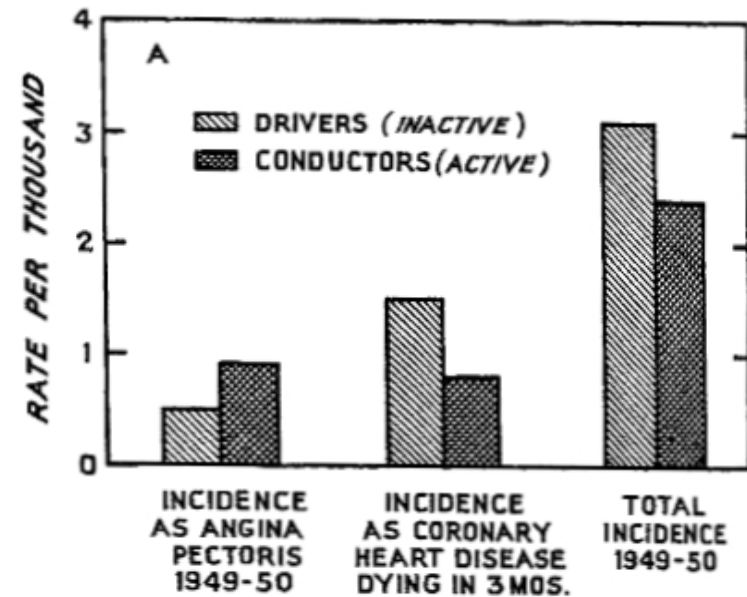


Fig. 2.—First clinical episodes of coronary heart-disease in 1949-52:
 A, drivers and male conductors, aged 35-64, of Central London Buses;



Collection of London Transport Museum

All-cause mortality reduction and physical activity (n=416'175, Taiwan)

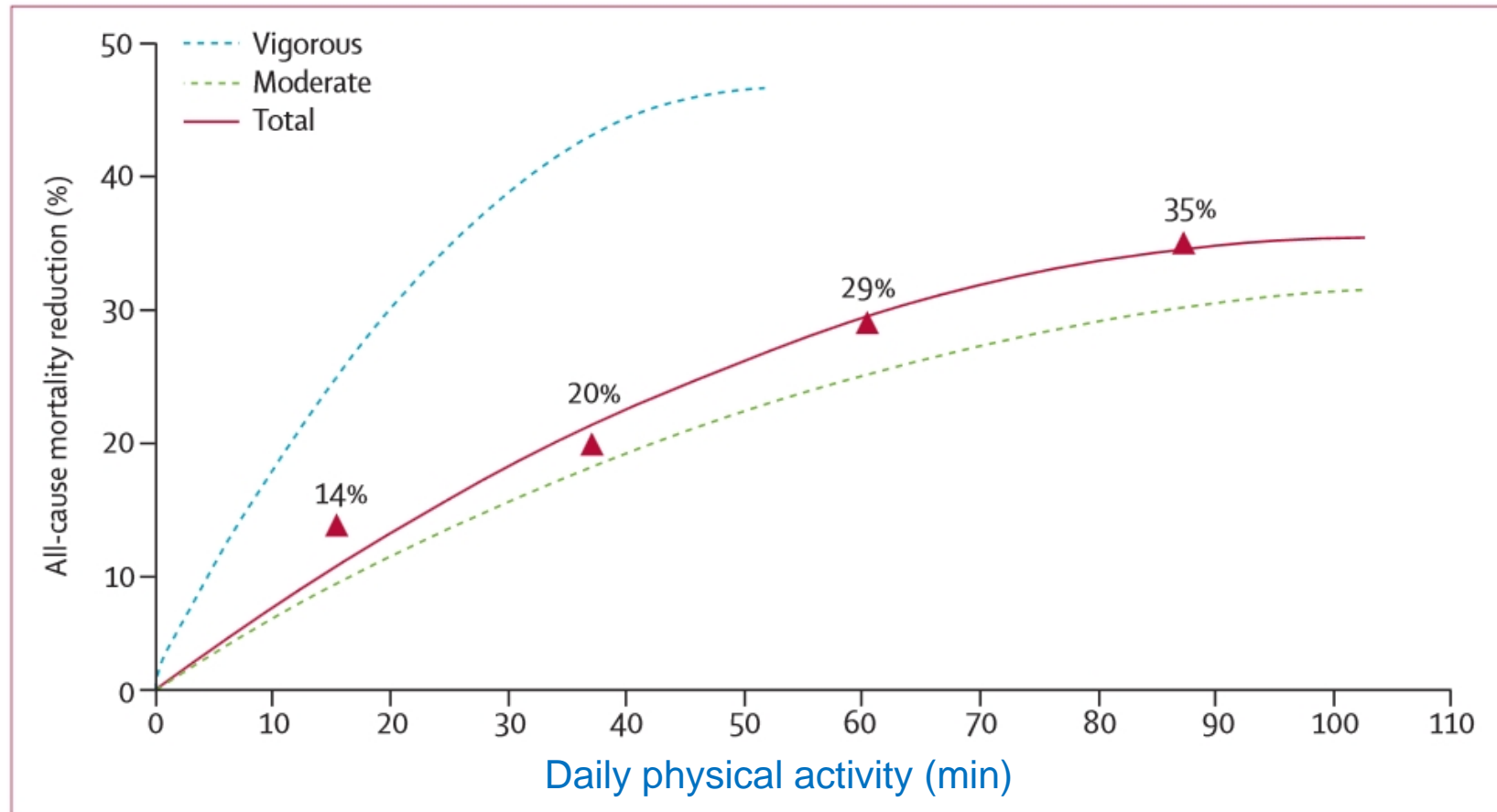


Figure 2: Daily physical activity duration and all-cause mortality reduction

Lancet. 2011 Oct 1;378(9798):1244-53.

Risk reduction through physical activity

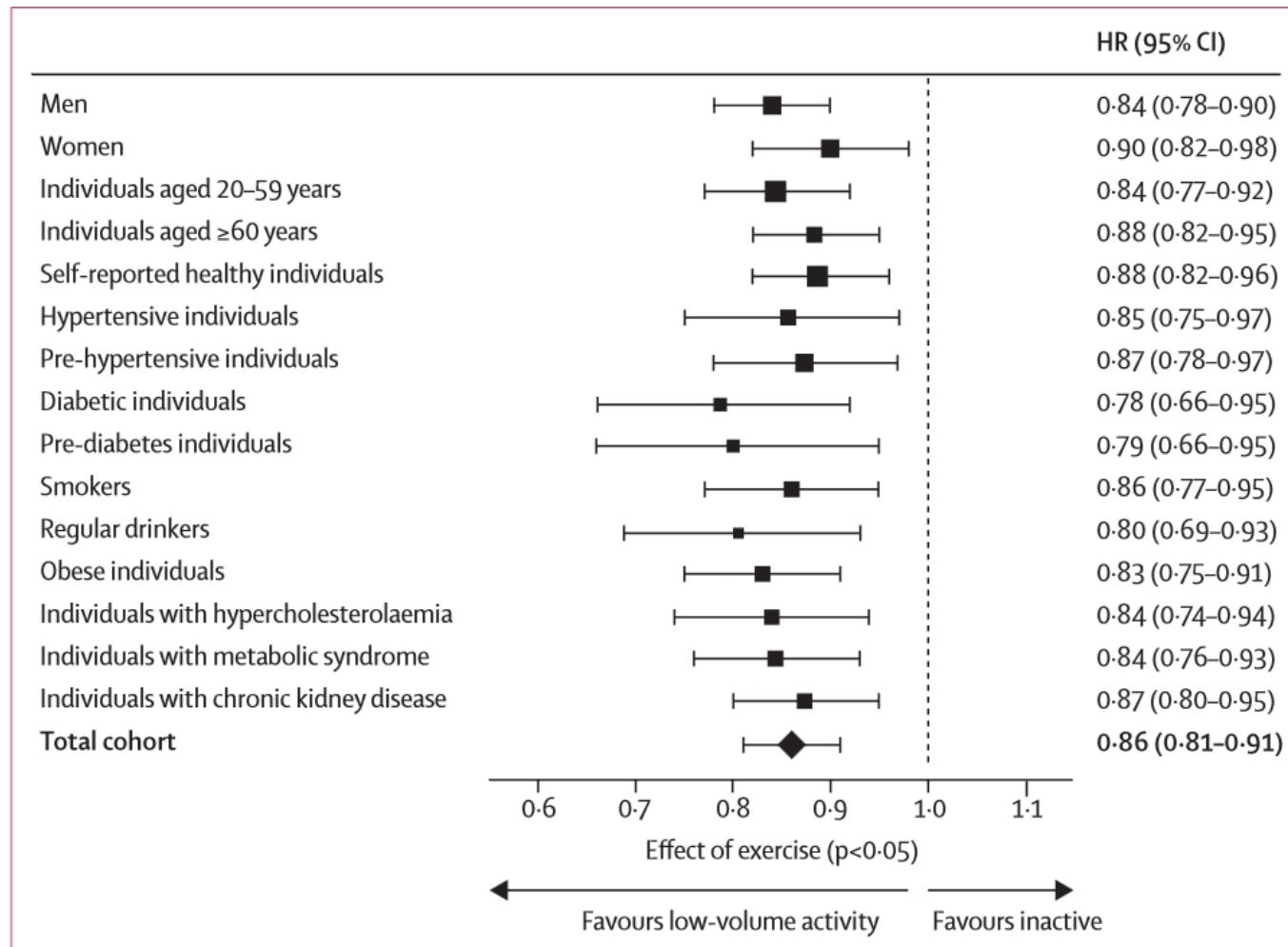


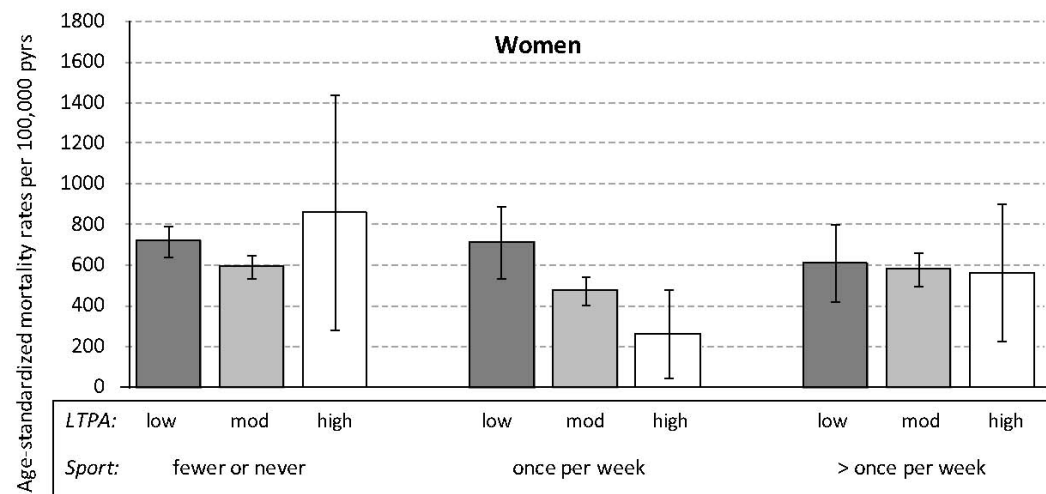
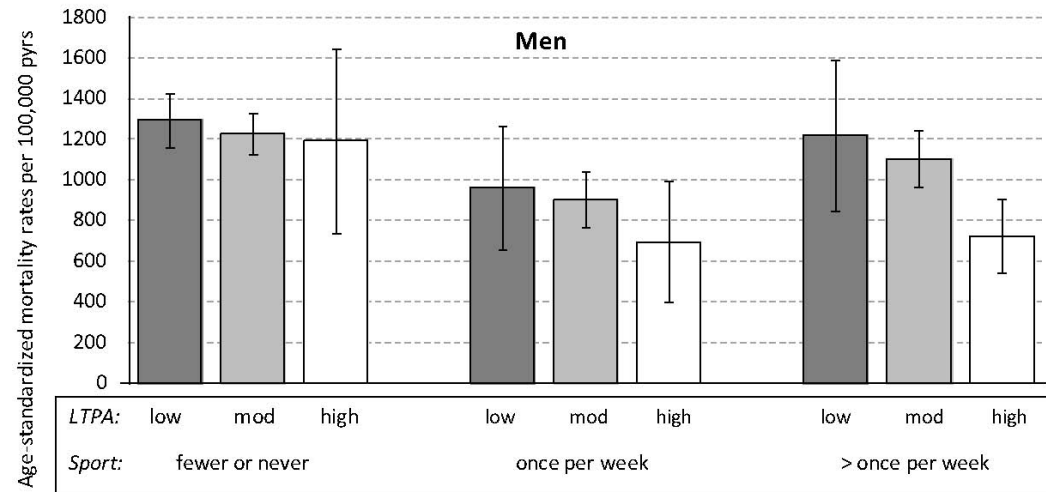
Figure 3: Adjusted all-cause mortality hazard ratio for individuals in the low-volume activity group compared with individuals in the inactive group, by participant characteristic

All hazard ratios (HR) are relative to health outcomes in individuals in the inactive group.

David Hall | Bham University of Applied Sciences | Summer School 2016 | 22.06.2016

Lancet. 2011 Oct
1;378(9798):1244-53.

Type of physical activity also matters



Prev Med. 2014 May;62:89-95;

LTPA: Leisure time physical activity

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Non-communicable disease (NCD)

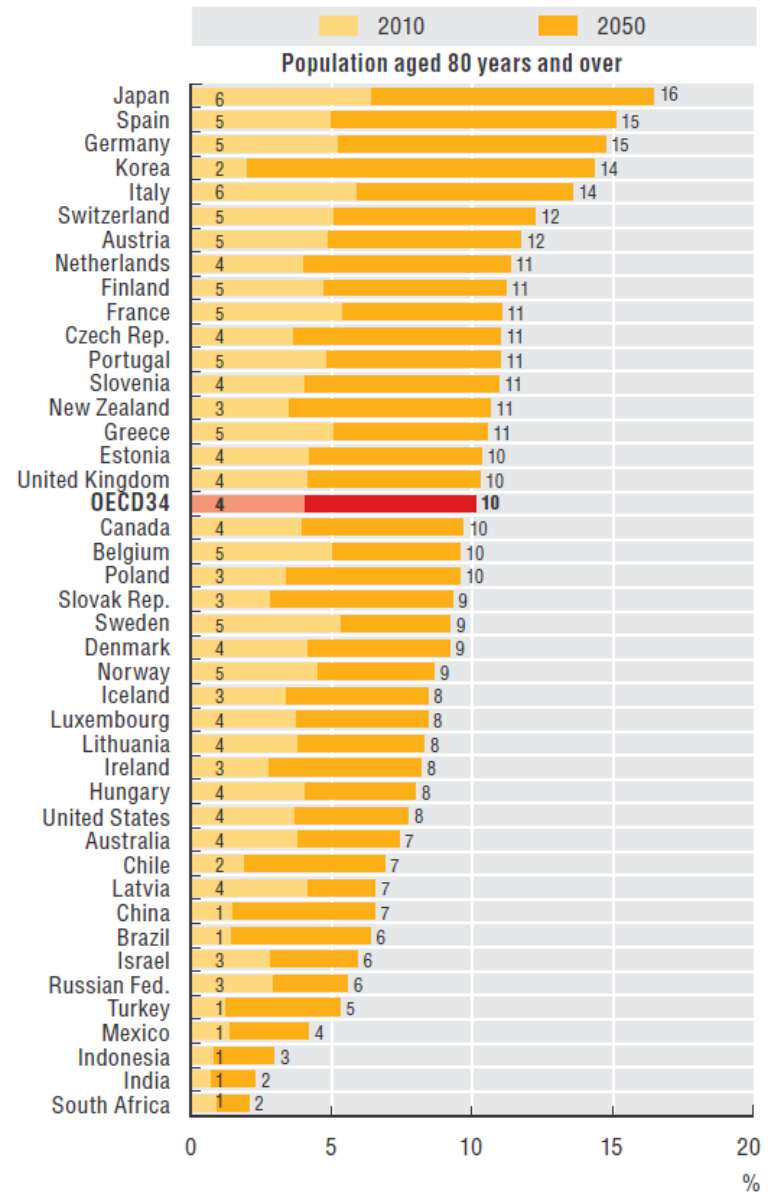
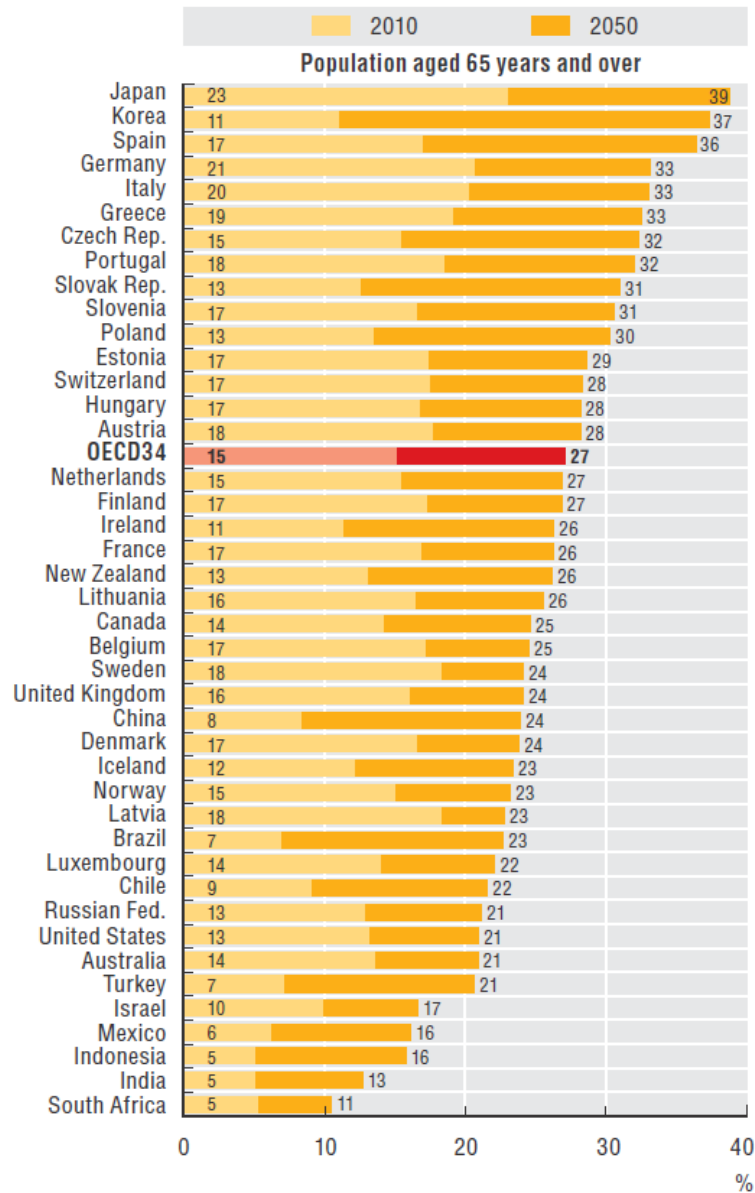
Obesity epidemic

Diet and NCD

Physical activity and NCD

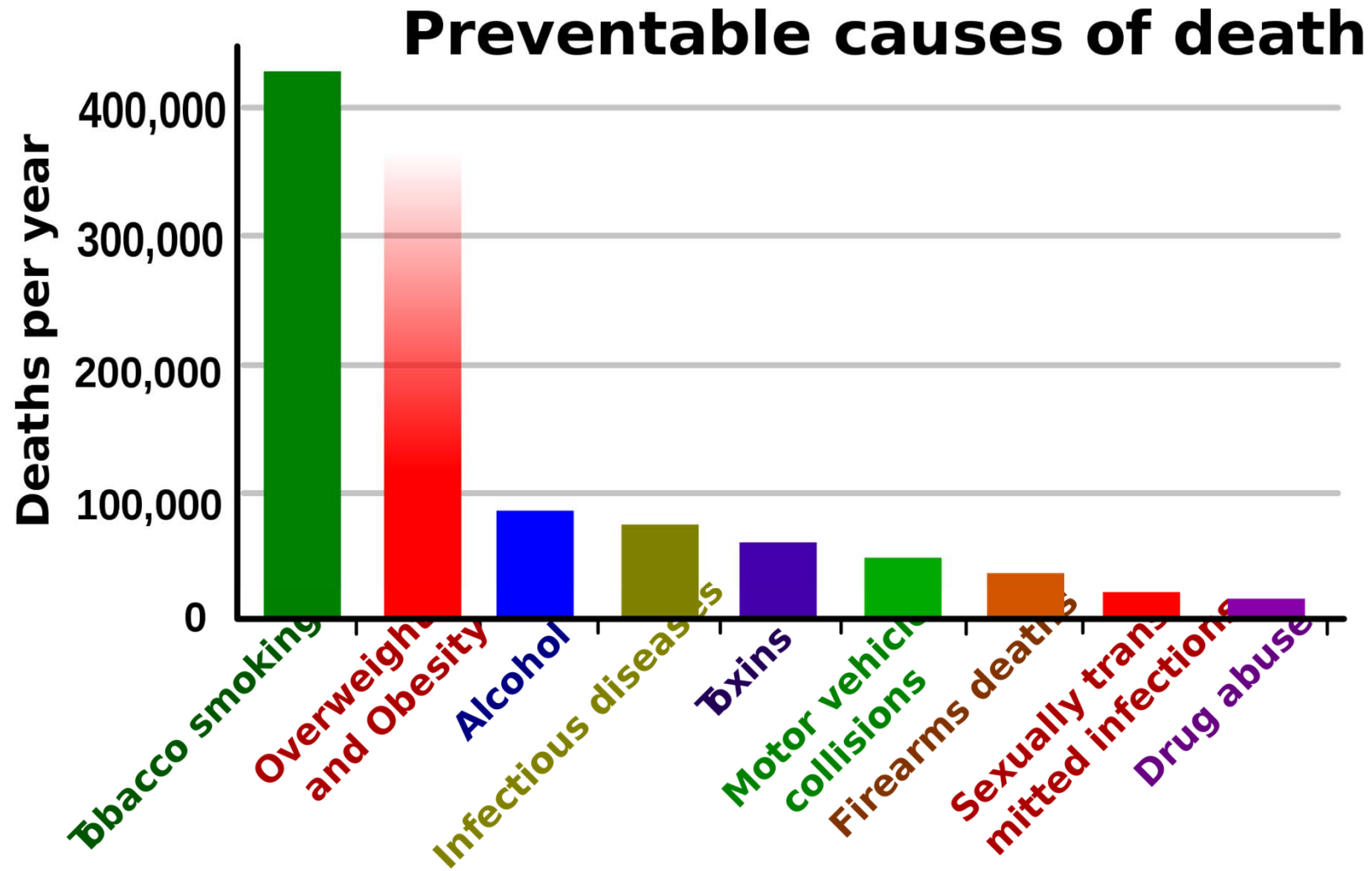
What must we do?

11.1. Share of the population aged over 65 and 80 years, 2010 and 2050

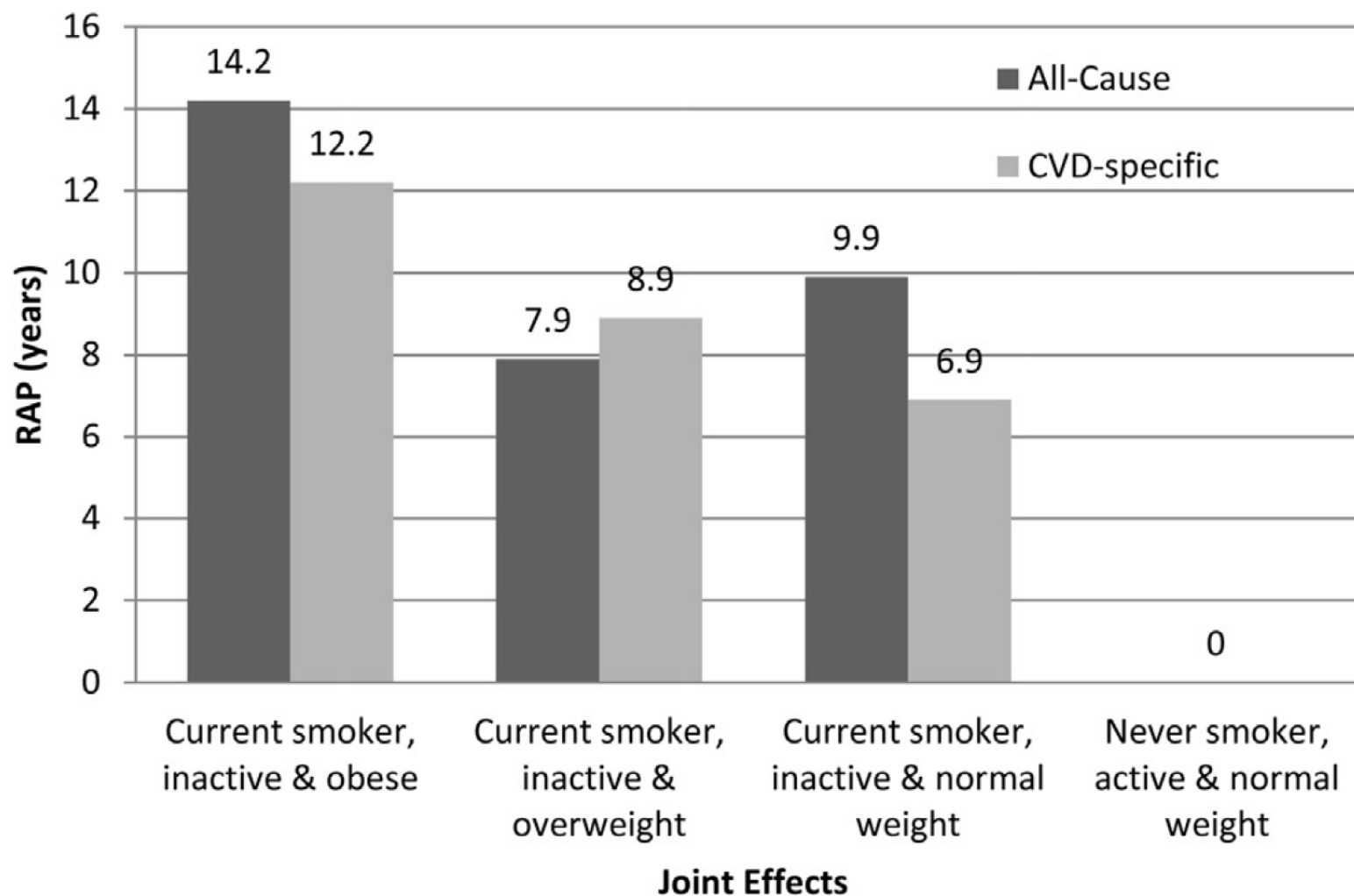


<http://apps.who.int/medicinedocs/documents/s22177en/s22177en.pdf>

Preventable deaths per year, USA

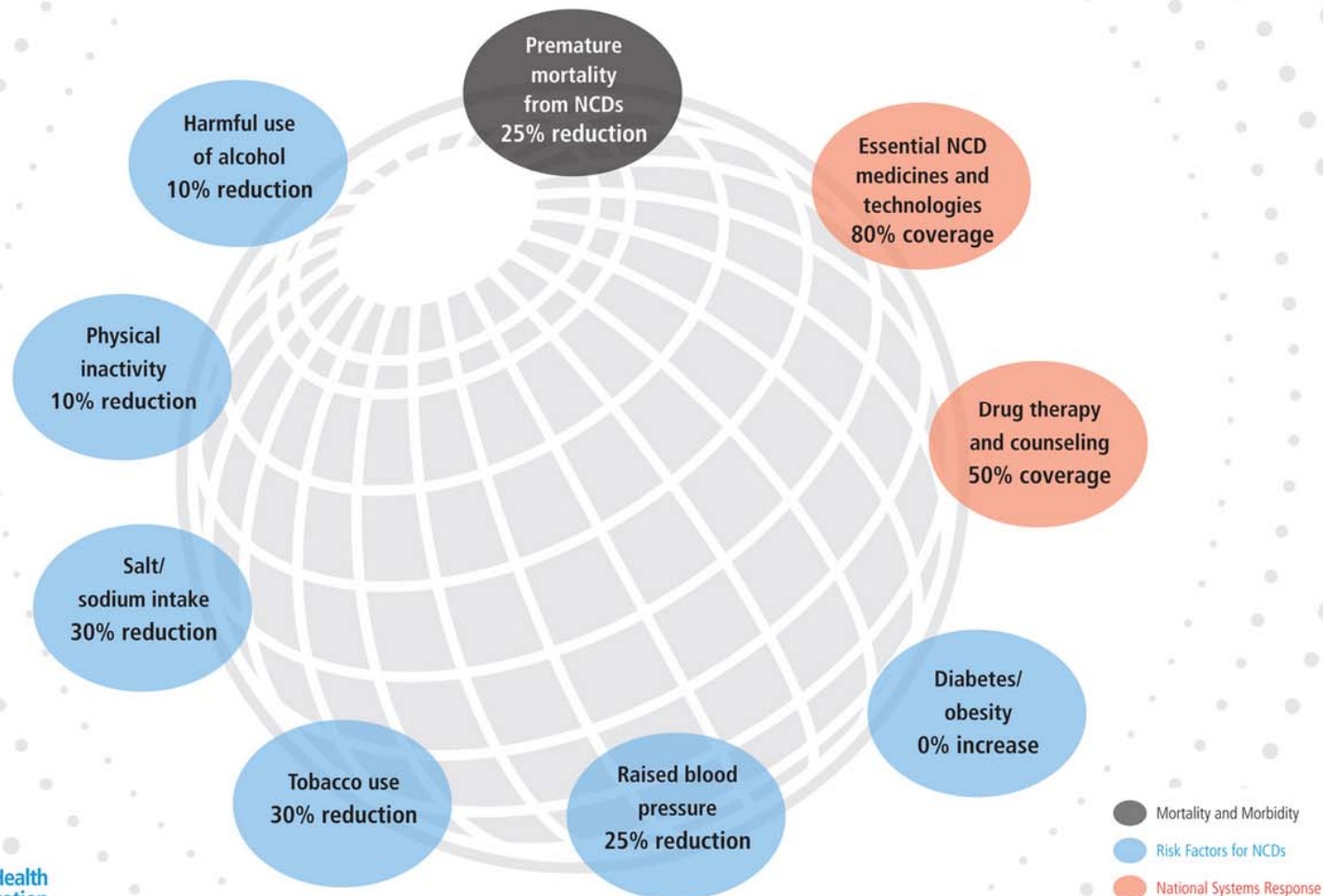


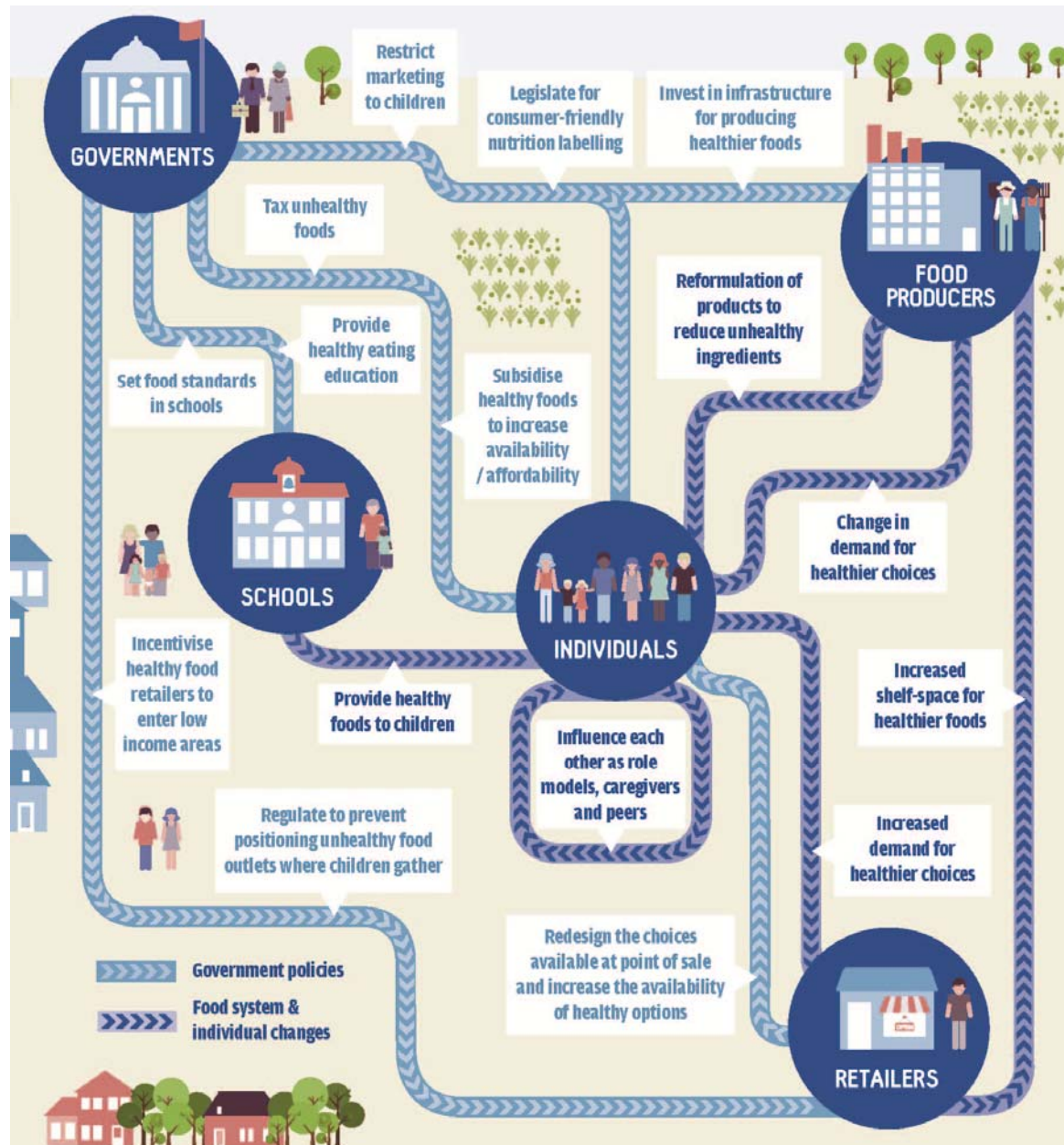
Reduction life expectancy (years)



http://actbr.org.br/uploads/conteudo/1005_smoking_inactivity.pdf

Set of 9 voluntary global NCD targets for 2025





Lancet. 2015 Feb 18. doi: 10.1016/S0140-6736(14)61745-1

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Diet: possible public health interventions

- ▶ Regulate labelling of foods / health claims
- ▶ Introduce taxes / subsidies
- ▶ Regulate commercials / sponsoring
- ▶ Adapt food composition / portion size
- ▶ Regulate retail shops (food presentation / availability)
- ▶ Regulate food in fast food restaurants & canteens (i.e. schools)

- ▶ Improve educational system (food literacy)

<http://www.wcrf.org/int/policy/nourishing-framework/>

Schweizerische Ärztezeitung 2006;87: 34, 1453-1458

<http://www.hsph.harvard.edu/obesity-prevention-source/obesity-causes/food-environment-and-obesity/>

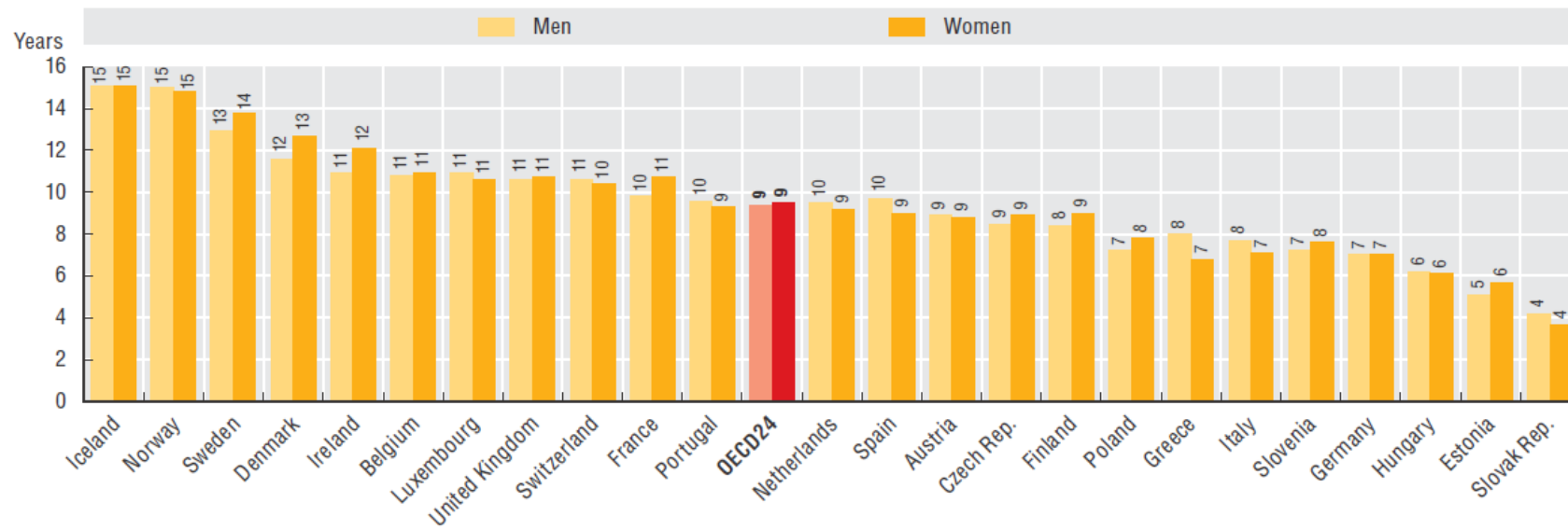
Physical activity: possible public health interventions

- ▶ City planning (green space, cycling / walking ways)
- ▶ Architecture of buildings
- ▶ Promote public transportation
- ▶ Road pricing
- ▶ Taxes on gasoline
- ▶ Improve public security / regulate media
- ▶ Promote physical activity at kindergarten, schools

http://www.cdc.gov/nccdphp/dch/programs/communitiesputtingpreventiontowork/resources/physical_activity.htm
<http://www.hsph.harvard.edu/obesity-prevention-source/obesity-causes/physical-activity-environment/>

J Law Med Ethics. 2013 Winter;41 Suppl 2:46-51 Schweizerische Ärztezeitung 2006;87: 34, 1453-1458

11.5. Healthy life years at age 65, European countries, 2013



<http://apps.who.int/medicinedocs/documents/s22177en/s22177en.pdf>

«Rectangularisation» of life span

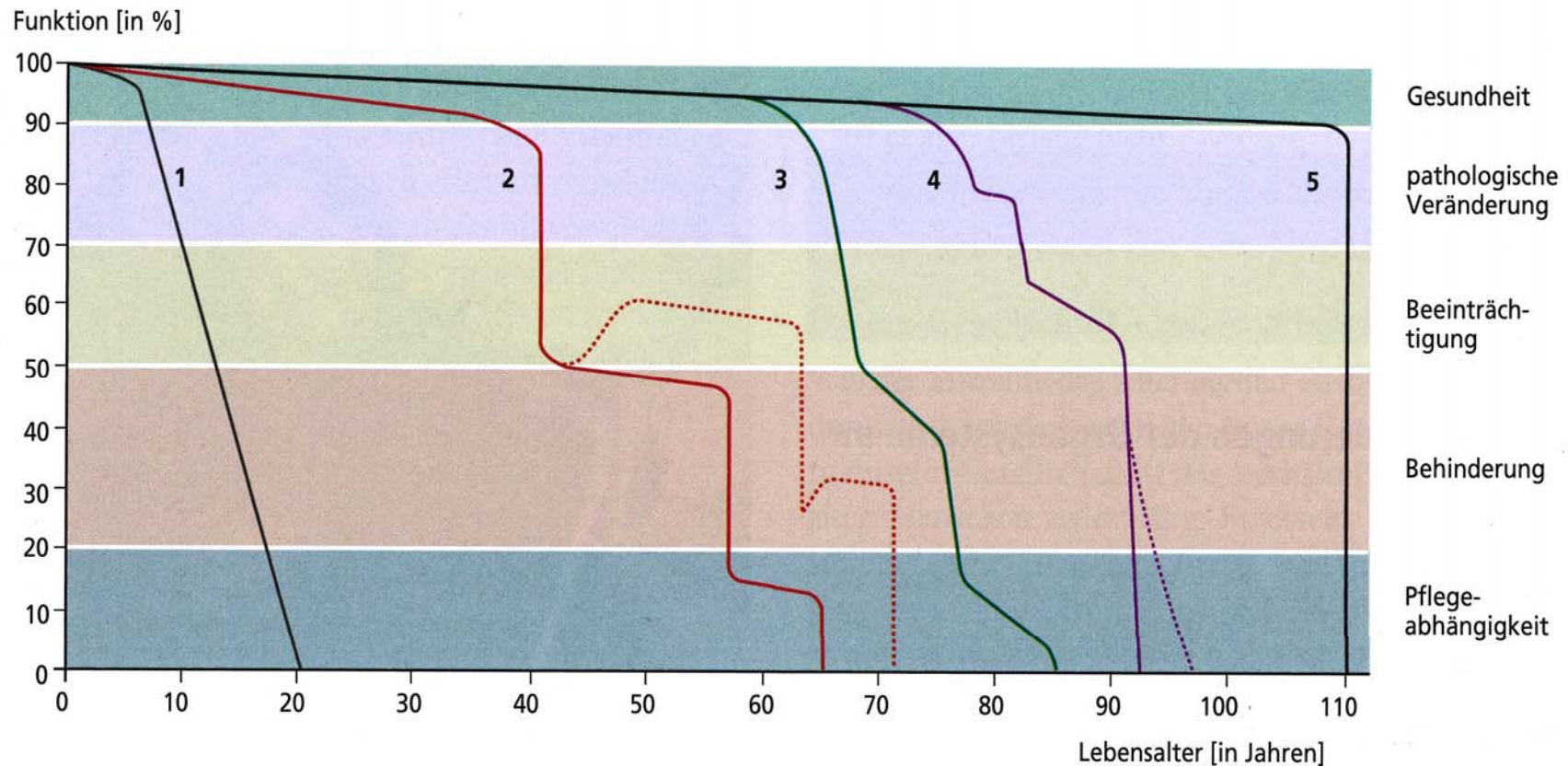


Abb. 22.2: Verschiedene Alterungsverläufe (verändert nach Nikolaus und Zahn). Linie 1: Stark beschleunigter Alterungsprozess ab dem 6. Lebensjahr bei der Progerie (vorzeitige Vergreisung). Linie 2: Risikofaktoren (Bluthochdruck, erhöhte Blutfette, Nikotin) führen ebenfalls zu einer schnelleren Alterung. Nach einem Akutereignis (z. B. Schlaganfall) kann durch therapeutische Intervention eine Besserung der Lebenserwartung und der Lebensqualität erreicht werden (gestrichelte Linie). Linie 3: Rasche Funktionsbeeinträchtigung, wie sie für Demenzerkrankte typisch ist. Es folgt eine mehrjährige Phase der Behinderung und Pflegeabhängigkeit. Linie 4: „Normales“ Altern. Bis ins hohe Alter bestehen nur leichte Beeinträchtigungen. Die Phase von Behinderung und Pflegeabhängigkeit ist auf wenige Monate beschränkt (durch medizinische Therapien oft aber erheblich verlängert). Linie 5: Idealtypischer Verlauf des Alterns („in hohem Alter auf der Parkbank friedlich entschlafen“).

Menche, Biol., Physiol., Anat.; Kapitel 22

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