

# The Future of Managing Chronic Disease in Europe

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# **Managing chronic disease (CD) –**

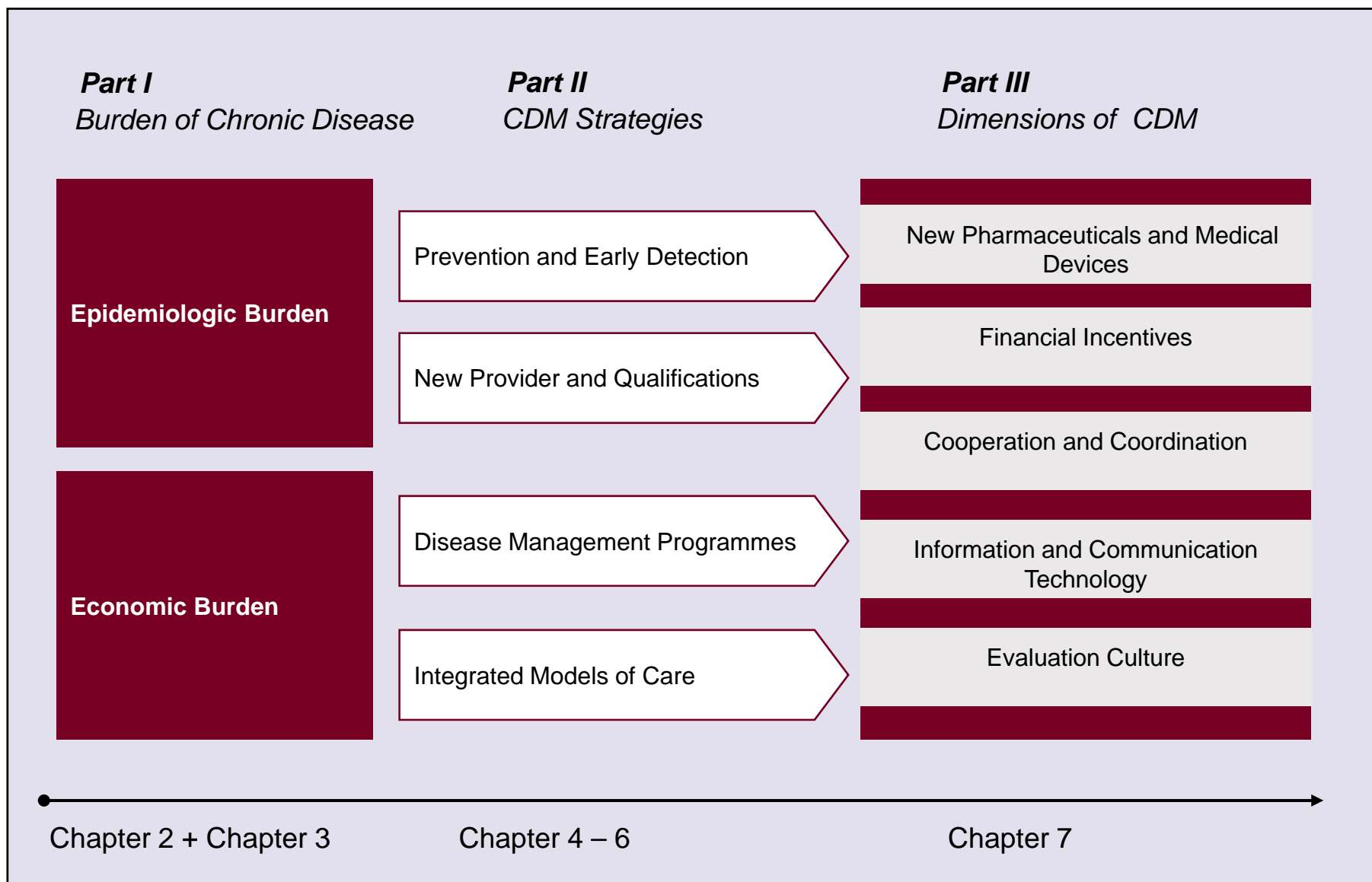
**the “ongoing management of conditions over a period of years or decades”,**

which goes beyond CVD/cerebrovascular disease, diabetes and asthma/COPD to include cancer and HIV/AIDS (as survival rates and times have visibly improved), mental disorders (depression, schizophrenia, dementia/ Alzheimer’s...) as well as certain disabilities (sight impairment, arthroses ...) – **is potentially the greatest health care challenge.**

# Driving research question(s)

- What is the impact of chronic disease in terms of burden of disease and economic costs (health expenditure and loss of productivity),
- what is done to “better” manage CD (in the broad sense, i.e. including prevention, new provider qualifications and settings, DMPs),
- what are the health and economic effects of this, and
  - what has to be done to change it to the better (incl. financial incentives, IT, etc.)?

# Structure of the Report



## **2.1 Epidemiology and burden of chronic disease in Europe – current status**

- The health burden of chronic diseases: deaths & disability-adjusted/healthy life years (DALYs)
- Impact of risk factors (smoking, hypertension, high cholesterol, overweight, nutrition, physical inactivity)
- Selected CD epidemiology in Europe – overall and by economic status of country

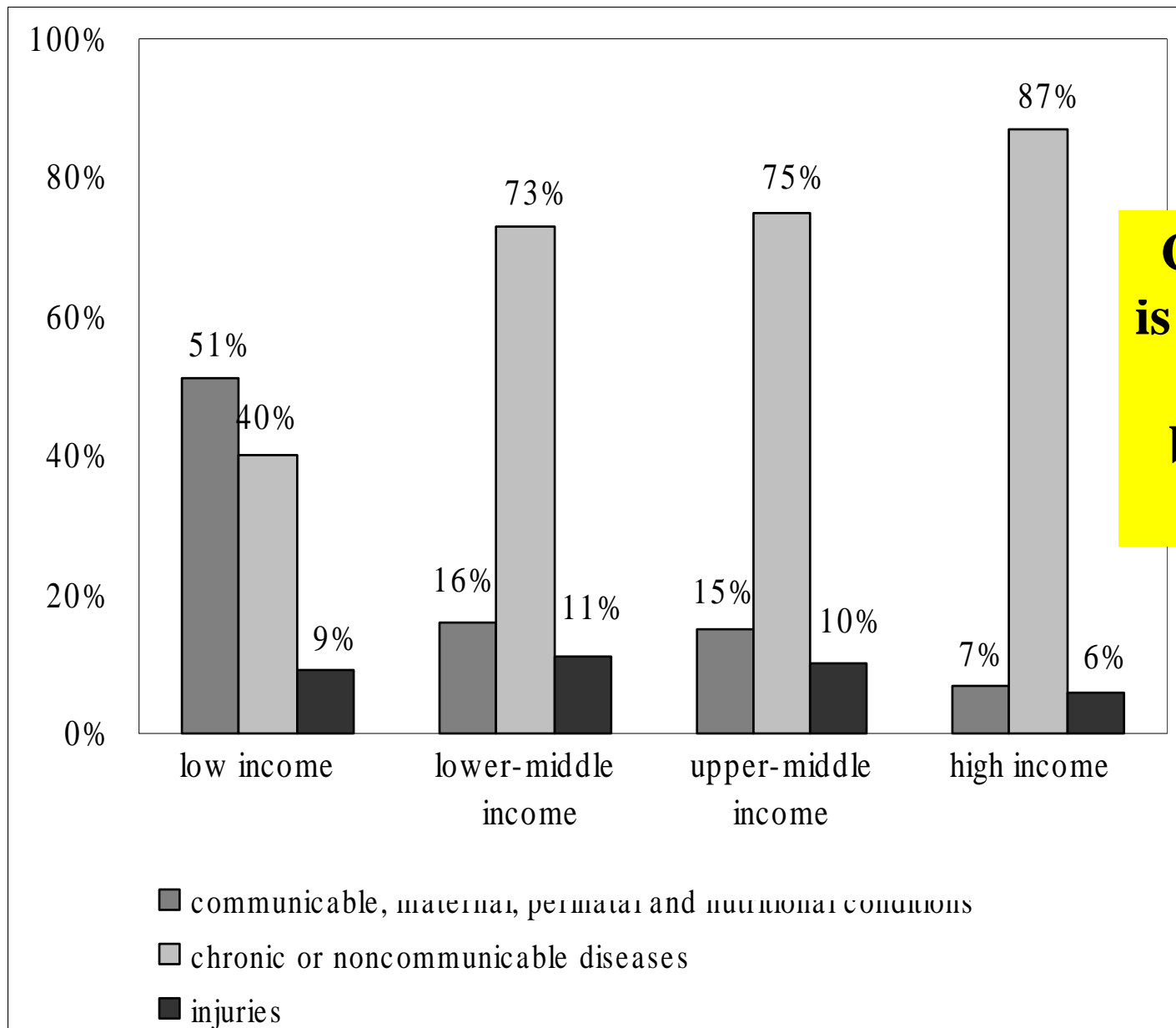
## Disease burden and deaths from non-communicable diseases in the WHO Euro\_ ean re\_ ion b\_ cause 2005

Groups of causes	Disease Burden		Deaths	
	DALYs (x 1000)	Proportion from all causes (%)	Number (x 1000)	Proportion from all causes (%)
<b>Selected noncommunicable diseases</b>				
<b>Cardiovascular diseases</b>	<b>34.421</b>	<b>23</b>	<b>5.067</b>	<b>52</b>
<b>Neuropsychiatric conditions</b>	<b>29.370</b>	<b>20</b>	264	3
<b>Cancer (malignant neoplasms)</b>	17.025	11	<b>1.855</b>	<b>19</b>
Digestive diseases	7.117	5	391	4
Respiratory diseases	6.835	5	420	4
Sense organ diseases	6.339	4	0	0
Musculoskeletal diseases	5.745	4	26	0
Diabetes mellitus	2.319	2	153	2
Oral conditions	1.018	1	0	2
<b>All noncommunicable diseases</b>	<b>115.339</b>	<b>77</b>	<b>8.210</b>	<b>86</b>
<b>All causes</b>	<b>150.322</b>	<b>100</b>	<b>9.564</b>	<b>100</b>

## Deaths and burden of disease attributable to common risk factors, in absolute numbers and percentages of all deaths/ DALYs, sorted by contribution to world-wide deaths (2001)

Chronic disease risk factors	Low- and middle-income		High-income		World	
	Deaths	DALYs	Deaths	DALYs	Deaths	DALYs
<b>High blood pressure</b>	6,223 <b>(12.9%)</b>	78,063 (5.6%)	1,392 <b>(17.6%)</b>	13,887 (9.3%)	7,615 (13.5%)	91,950 (6.0%)
<b>Smoking</b>	3,340 (6.9%)	54,019 (3.9%)	1,462 <b>(18.5%)</b>	18,900 <b>(12.7%)</b>	4,802 (8.5%)	72,919 (4.7%)
<b>High cholesterol</b>	3,038 (6.3%)	42,815 (3.1%)	842 <b>(10.7%)</b>	9,431 (6.3%)	3,880 (6.9%)	52,246 (3.4%)
Low fruit and vegetable intake	2,308 (4.8%)	32,836 (2.4%)	333 (4.2%)	3,982 (2.7%)	2,641 (4.7%)	36,819 (2.4%)
Overweight and obesity	1,747 (3.6%)	31,515 (2.3%)	614 (7.8%)	10,733 (7.2%)	2,361 (4.2%)	42,248 (2.8%)
Physical inactivity	1,559 (3.2%)	22,679 (1.6%)	376 (4.8%)	4,732 (3.2%)	1,935 (3.4%)	27,411 (1.8%)

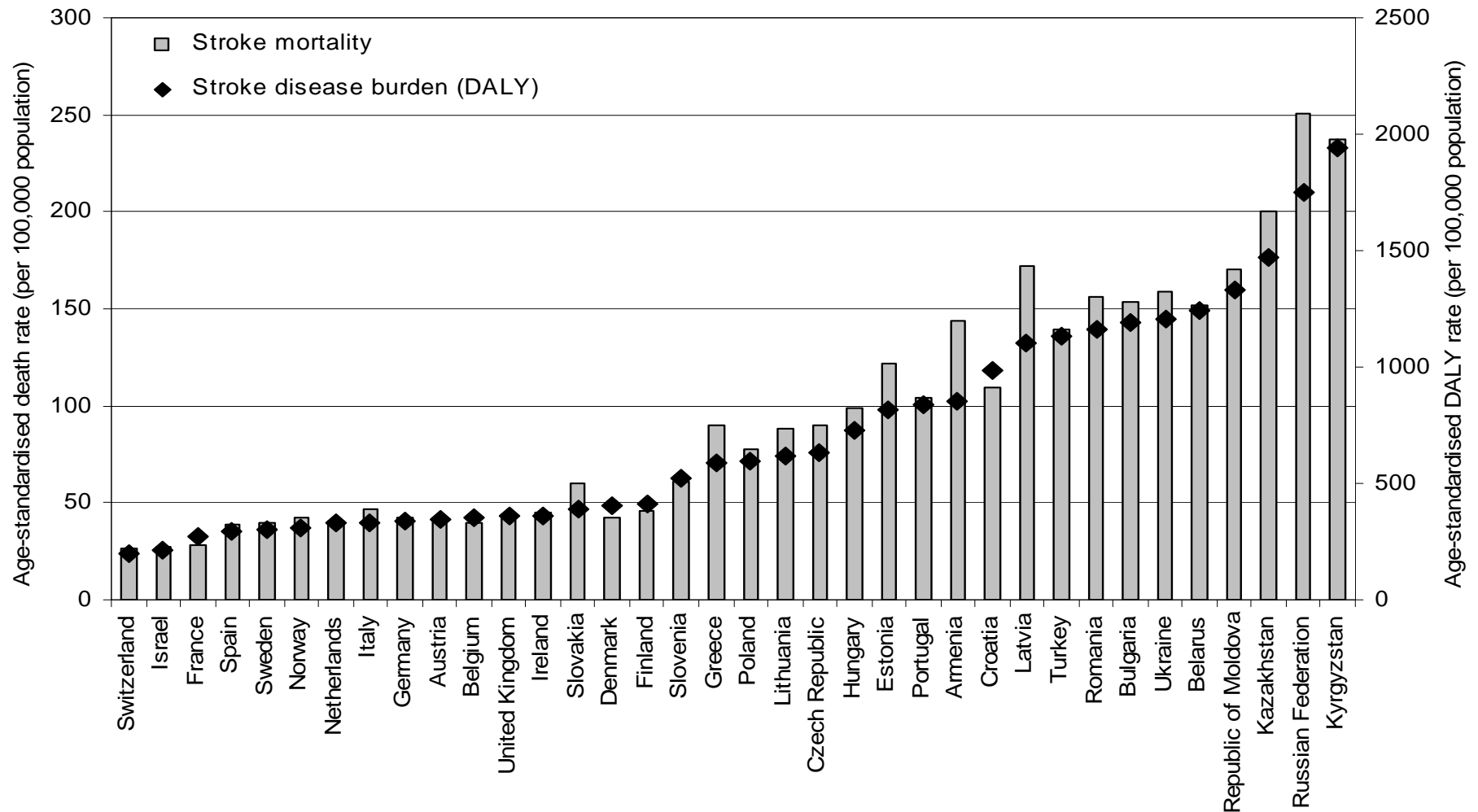
# Worldwide share of deaths by causes and countries within different World Bank income categories (2002)



**Chronic disease is the major cause of death in all but the poorest countries!**



# Burden of death and disease attributable to stroke in selected countries in the WHO European region (2002) – **not primarily a high-income problem!**



## 2.2 Epidemiology and burden of chronic disease in Europe – predictions

- Predictions for specific conditions vary: e.g., WHO (2006) has projected fewer deaths and DALYs from **stroke** for both sexes and all ages by 2030. In contrast, Carandang et al. (2006) have estimated more strokes and a greater burden of disease.
- Deaths directly attributable to **diabetes** are predicted to rise from about 152,000 in 2005 to more than 203,000 in 2030 (WHO 2006) as a result of rising obesity levels, especially among children.
- Deaths from **COPD** are expected to rise by about 25%, from 270,000 in 2005 to more than 338,000 in 2030 – but the burden of COPD is projected to fall from about 3.44 to 2.95 million DALYs (WHO 2006).
- **Almost certain:** The number of persons with **dementia** will increase from 7.7 million in 2001 to 10.8 million in 2020. Without effective prevention and treatment, it is expected to double to 15.9 million in 2040.

## **3. Economic consequences of chronic disease**

- 3.1** Microeconomic: chronic diseases negatively affect wages, earnings, workforce participation and hours worked, lead to early retirement, high job turnover and disability *[many studies in US settings]*
- 3.2** Macroeconomic: CD is costly to health system *AND* CD impairs economic growth (-> double burden)

# Effects on labour participation

Country and study	Year data collected	Chronic condition and impact of chronic condition on employment indicators/labour supply
Canada Kraut et al. 2001	1983–1990	<b>Diabetes</b> People 2.1-fold less likely to work
Europe Jimenez-Martin et al. 1999	1994–1995	<b>Chronic disease</b> Chronic disease increases the retirement probability Husband's health affects the couple's retirement decisions much more strongly than the wife's health does
Finland Sarlio-Lahteenkorva and Lahelma 1999	1994	<b>Obesity</b> Women face a 2.5-fold higher likelihood of unemployment Women face a 1.4-fold higher likelihood of unemployment
Ireland Gannon and Nolan 2004	2000	<b>Chronic disease</b> Men 61% less likely to work; women 52% less likely to work
	2002	<b>Chronic disease</b> Men 66% less likely to work; women 42% less likely to work
Russia Suhrcke et al. 2005	2002	<b>Chronic disease</b> Retirement age decreases by 2.5 years Men have a 13.6% greater chance of retirement Women have a 14.0% greater chance of retirement
Sweden Lindholm et al. 2001	1979–1997	<b>Chronic disease</b> Unemployment 1.9-fold higher 2.5-fold increase in people on welfare 1.8-fold increase in people with financial difficulties 3.5-fold increase in economic inactivity
United States Saxner et al. 2001	1990–1998	<b>Mental health</b> Absenteeism is 47% higher
		<b>Tobacco use</b> Absenteeism is 19% higher
		<b>Obesity</b> Absenteeism is 23% higher
United States Simon et al. 2000	N/A	<b>Depression</b> 15.3% higher employment rate for depression remission vs. control group
United States Dwyer and Mitchell 1999	1992	<b>Cardiovascular disease</b> Expected retirement age decreases by 0.7 years
		<b>High blood pressure</b> Expected retirement age decreases by 1.0 years
		<b>Diabetes</b> Expected retirement age decreases by 0.12 years
		<b>Cancer</b> Expected retirement age decreases by 0.13 years
United States Pelkowski and Berger 2004	1992–1993	<b>Chronic disease</b> Men work 6.1% fewer hours Women work 3.9% fewer hours
United States McGarry 2002	1992–1994	<b>Self-reported adult health</b> Men 3.5% less likely to work at age 62
United States Colle 2003	1992–2000	<b>Chronic disease</b> Men have a 42% greater probability of retirement and lose 1,030 hours of lifetime work Women have a 31% probability of retirement and lose 654 hours of lifetime work
United States Cawley 2004	1997–2004	<b>Obesity</b> For white people, a 10% weight increase corresponds to a 12% decrease in probability of full-time employment, 5.4% fewer hours worked, 5% fewer months, 16% increase in months on welfare, and 10% lower earnings For African Americans a 10% weight gain corresponds to a 10.9% increase in months spent on welfare

# Costs of CVD in Europe (per capita, % of health exp.)

<i>Country</i>	<i>Cost per capita (€)</i>	<i>% of total health care expenditure</i>
Germany	423	15
UK	368	18
Sweden	318	12
Netherlands	273	11
Luxembourg	255	8
Austria	247	11
Finland	235	12
Denmark	215	7
Italy	204	11
Belgium	201	8
France	194	8
Greece	140	11
Ireland	108	4
Spain	97	7
Portugal	93	8
Czech Republic	83	14
Slovenia	80	8
Cyprus	67	7
Estonia	55	17
Hungary	52	9
Slovakia	52	18
Poland	46	16
Lithuania	43	16
Latvia	24	11
Malta	22	2
<b>TOTAL EU</b>	<b>230</b>	<b>12</b>

<i>Condition/ risk factor</i>	<i>Country</i>	<i>% of national health expenditure</i>	<i>Year</i>
Coronary heart disease	UK	11	1999
Schizophrenia	France	2	1992
	UK	1.7	1992/3
	Netherlands	1.6	1989
Depression	UK	0.9	1990/1
Mental illness	USA	7	1990
Obesity	France	2	1992
	Portugal	3.5	1996
Diabetes	Various	2.5-15	various
Tobacco	Germany	5.6	1993

## 4. Strategies against chronic disease: what is being done?

4.1 Prevention and early detection

4.2 New provider qualifications  
e. . nurse \_ ractitioner and  
settings



4.3 Disease management programmes (DMPs)

4.4 Inte \_ rated care Ed Wa \_ ner & Co.

# **Disease management programmes: key elements**

- comprehensive care: multidisciplinary care for entire disease cycle
- integrated care, care continuum, coordination of the different components
- population orientation (defined by a specific condition)
- active client-patient management tools (health education, empowerment, self-care)
- evidence-based guidelines, protocols, care pathways
- information technology, system solutions
- continuous quality improvement

**DMPs are popular – at least in Germany, where they were tied to financial incentives until 2008**

<b>DMP</b>	<b>Number of patients enrolled in DMP 2008</b>
Diabetes mellitus type 2	2,708,154
Diabetes mellitus type 1	93,357
Coronary heart disease	1,221,374
Asthma	313,914
COPD	264,299
Breast cancer	100,499
<b>Total</b>	<b>4,701,597</b>



## 5. Strategies against chronic disease: how effective?

- *Crucial and weak point!*
- Most publications report on relatively small-scale interventions without control or inadequate control (e.g. no randomization, no risk adjustment)
- (As for pharmaceuticals etc. :) the weaker the study design, the larger the published effects
- Logic of Evidence-based Medicine applies: best available evidence counts

# Effects of anti-smoking measures on smoker prevalence

Measure	Effect on smoker prevalence
Price increase by 10 percent	Decline by 4 percentage points in countries with high per capita income
Ban on smoking at work	Decline by 5-10 percentage points
Bans on smoking in pubs, restaurants and other public places	Decline by 2-4 percentage points
Advertising ban	Decline by 6 percentage points if ban is absolute
Health warning on cigarette packs	In the Netherlands, 28 percent of all 13- to 18-year-olds said they smoked less as a result of the health warnings; in Belgium, 8 percent of those asked said they smoked less because of warnings.
Media campaigns	Percentage of smokers declines by 5-10 percentage points, depending on how the campaigns are targeted at specific groups
Withdrawal measures; subsidies for treatment	Decline by 1-2 percentage points after 2 years, depending on the spectrum of people registered

Source: European Network for Smoking Prevention. Effective tobacco control in 28 European countries, October 2004.

[www.ensp.org/files/effectivefinal2.pdf](http://www.ensp.org/files/effectivefinal2.pdf)

# How effective are Disease Management Programmes? 1

Disease	Meta-analysis	Reviews	Individual Studies	Evaluation of Large-scale Interventions
CHF	7	11	118	1
CAD	3	4	78	1
Diabetes	4	5	64	3
Asthma	2	2	37	1
COPD	2	3	25	0
Depression	2	2	24	0

CHF indicates congestive heart failure; CAD, coronary artery disease; COPD, chronic obstructive pulmonary disease.

# How effective are Disease Management Programmes? 2

Author	Setting	Managed Condition(s)	Comparison Strategy	Results
Sidorov (2002)	Program developed and operated by integrated delivery system	Diabetes	Program participants versus nonparticipants, controlled for age, sex, insurance type, duration of plan enrollment, presence of pharmacy benefit	Improved quality of care and disease control, lower cost and utilization, net cost savings
Fireman (2004)	Program developed and operated by integrated delivery system	CAD, CHF, diabetes, asthma	Patients with the condition against nondiseased group matched by age and sex	Improved quality of care and disease control, cost increased less in intervention group than in reference group, no net cost savings
Villagra (2004)	Program developed and operated by disease management vendor for a health plan client	Diabetes	Natural experiment created by phased roll-out, plus pre-post comparison, adjustment for risk, and demographic differences	Improved quality of care, lower cost and utilization in both comparisons, net cost savings

CAD indicates coronary artery disease; CHF, congestive heart failure.

Mattke et al. *Am J Manag Care*. 2007; 13: 670-676

# How effective are Disease Management Programmes? 3

Disease	Clinical Processes	Health-related Changes in Behaviors	Disease Control	Clinical Outcomes	Healthcare Utilization	Financial Outcomes	Patient Experience Satisfaction, Quality of Life, Etc
	Adherence to Evidence-based Guidelines		Changes in Intermediate Measures		Changes in Utilization of Services		
<b>CHF</b>	<b>Improved</b>	Inconclusive evidence	<b>Improved</b>	Inconclusive evidence	<b>Reduced hospital admission rates</b>	Inconclusive evidence	<b>Improved</b>
<b>CAD</b>	<b>Improved</b>	Evidence for no effect	<b>Improved</b>	Evidence for no effect	Inconclusive evidence	Inconclusive evidence	Insufficient evidence
<b>Diabetes</b>	<b>Improved</b>	Evidence for no effect	<b>Improved</b>	Insufficient evidence	Inconclusive evidence	Inconclusive evidence	Insufficient evidence
<b>Asthma</b>	Inconclusive evidence	Inconclusive evidence	Inconclusive evidence	Evidence for no effect	Inconclusive evidence	Evidence for no effect	Insufficient evidence
<b>COPD</b>	Insufficient evidence	Insufficient evidence	Inconclusive evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence	Insufficient evidence
<b>Depression</b>	<b>Improved</b>	N/A	<b>Improved</b>	Inconclusive evidence	Increased utilization	Increased cost	<b>Improved</b>

Codes: N/A: not applicable, as no relevant health-related behaviors for depression exist.

Disease-end point combinations in which disease management seems to achieve the intended result are shaded.

Source: RAND analysis using identified articles.

CHF indicates congestive heart failure; CAD, coronary artery disease; COPD, chronic obstructive pulmonary disease.

**Table 1: Summary of evidence on effectiveness of CCM components**

<i>CCM component</i>	<i>Interventions shown to be effective</i>	<i>Outcome measures affected</i>
Patient self-management support	<ul style="list-style-type: none"><li>• Patient educational sessions</li><li>• Patient motivational counselling</li><li>• Distribution of educational materials</li></ul>	<ul style="list-style-type: none"><li>• Physiological measures of disease</li><li>• Patient<ul style="list-style-type: none"><li>– quality of life</li><li>– health status</li><li>– functional status</li><li>– satisfaction with service</li><li>– risk behaviour</li><li>– knowledge</li><li>– service use</li><li>– adherence to treatment</li></ul></li></ul>
Delivery system design	<ul style="list-style-type: none"><li>• Multidisciplinary teams</li></ul>	<ul style="list-style-type: none"><li>• Physiological measures of disease</li><li>• Professionals adherence to guidelines</li><li>• Patient service use</li></ul>
Decision support	<ul style="list-style-type: none"><li>• Implementation of evidence-based guidelines</li><li>• Educational meetings with professionals</li><li>• Distribution of educational materials among professionals</li></ul>	<ul style="list-style-type: none"><li>• Professionals adherence to guidelines</li><li>• Physiological measures of disease</li></ul>
Clinical information systems	<ul style="list-style-type: none"><li>• Audit and feedback</li></ul>	<ul style="list-style-type: none"><li>• Professionals adherence to guidelines</li></ul>
Delivery system	Little published experimental evidence	
Community resources	Little published experimental evidence	

## **6. Strategies against chronic disease: how costly and how cost-effective?**

- Even less published evidence; if costs are reported in evaluations, the methodology is usually flawed!
- On macro-economic implications, we have to rely on models and projections!
- **Managing CD costs additional money (-> not effective for cost-containment in short run), but may be cost-effective (data missing!).**

## Cost per Quality-Adjusted Life Year (QALY) saved by interventions to reduce or prevent obesity

Intervention	Target population	Estimated cost per QALY, US\$	Source
Planet health (a school-based intervention to improve nutrition and increase physical activity)	Middle-school children	<b>In girls, 4,305</b>	(Wang et al., 2003)
Orlistat	Overweight and obese patients with type 2 diabetes mellitus	<b>8,327</b>	(Maetzel et al., 2003)
Bariatric surgery	Middle-aged men and women who are morbidly obese	<b>Women: 5,400-16,100</b> <b>Men: 10,000-35,600</b>	(Craig & Tseng, 2002)
Diet, exercise, and behaviour modification	Adult women	<b>12,640</b>	(Roux et al., 2006)

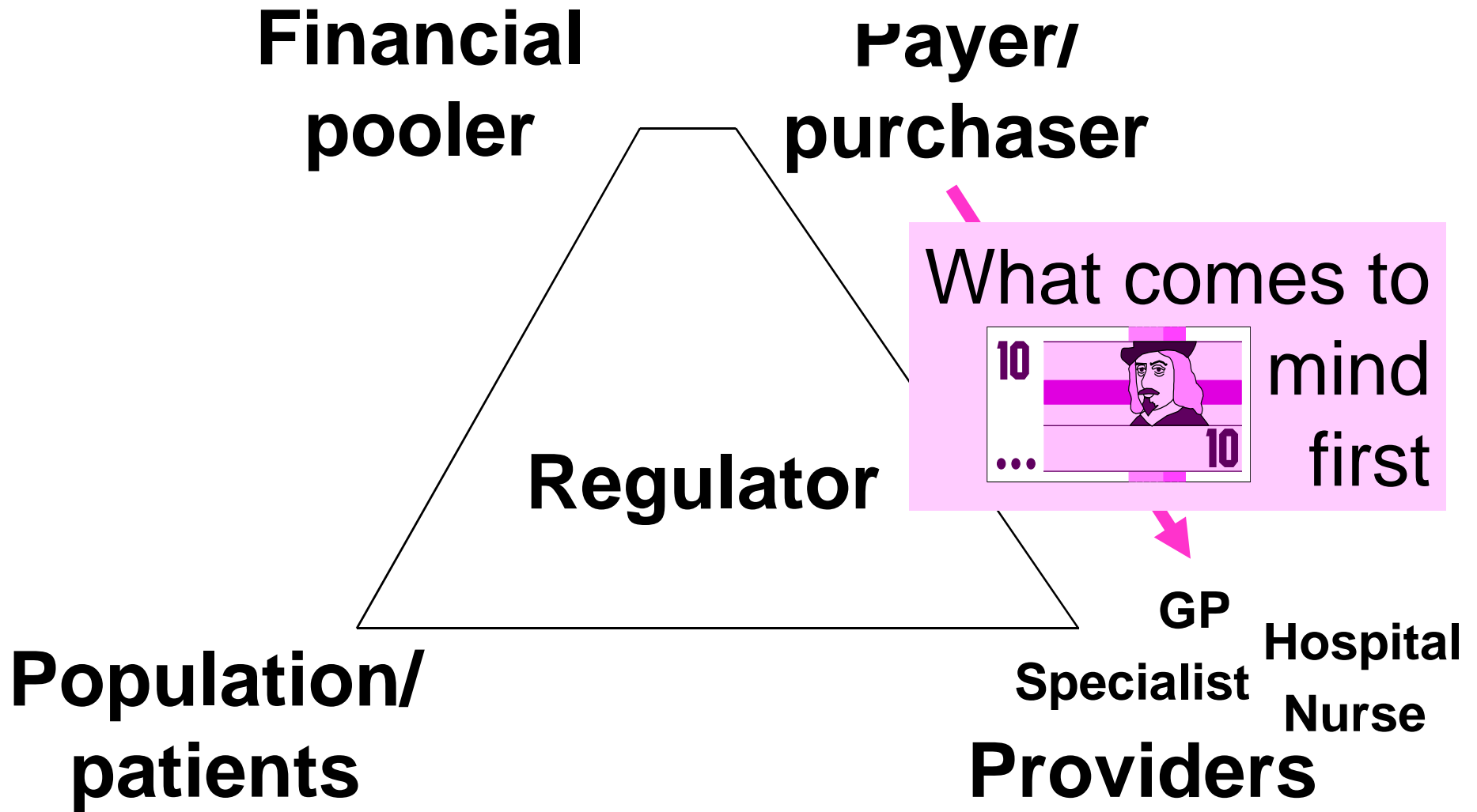


## The evidence on the four strategies ...

- Relatively good evidence on preventive “technologies” to reduce risk factors (tobacco, obesity ...) – best in comprehensive approaches which however are nowhere fully utilised; prevention also cost-effective (but requires resources in the order of curative technologies)
- Developing new professions promising but evidence limited – certain country examples
- DMPs improve processes but evidence on outcomes still to come, no cost savings but possibly cost-effective
- Integrated care: sounds necessary and promising, but hardly any solid evidence

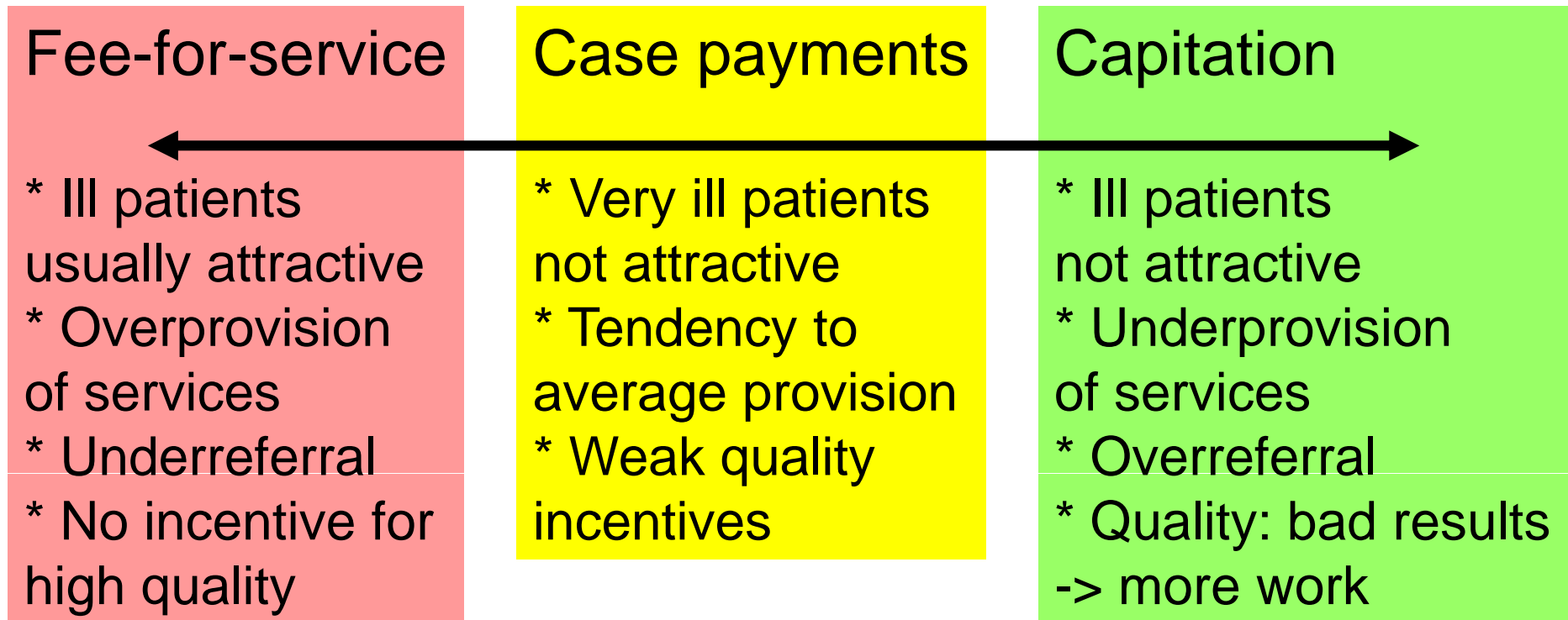
## 7. Shaping the future of managing chronic diseases in Europe

- New pharmaceuticals and medical devices may help to improve CD -> but critical assessment regarding patient benefit, based on accepted methodology, crucial
- Right mix of financial incentives very important (for insured/ patients, payers, providers ...)
- Strengthen coordination (in access, orientation, provision of information, continuity/coordination/communication among professionals)
- Elaborated information and communication technologies crucial, but agreement on international technical standards necessary
- Establish evaluation culture without exceptions



**7.2 Right mix of financial incentives (for insured/ patients, payers, providers ...)**

# Weaknesses of traditional ways of a in roviders for chronic care



\* No incentives for appropriate continuity of care across providers

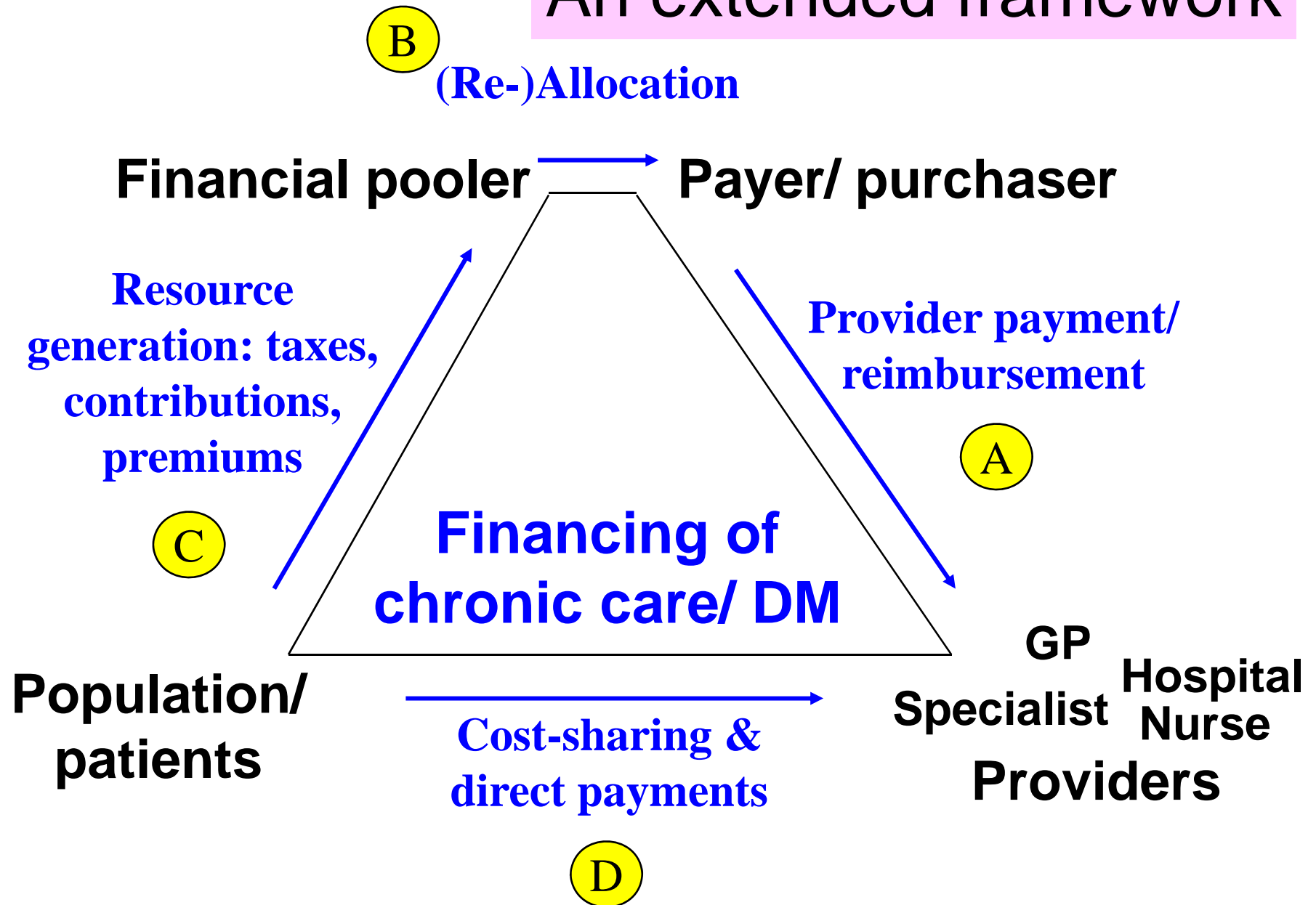
# Examples of new payment measures

- ‘year of care’ payment for the complete service package required by individuals with chronic conditions (DK)
- Per patient bonus for physicians for acting as gatekeepers for chronic patients and for setting care protocols (F)
- bonus for DMP recruitment and documentation (D)
- 1% of overall health budget available for integrated care (D)
- bonuses for reaching structural, process and outcome targets (UK)
- ‘pay-for-performance’ bonuses (US)

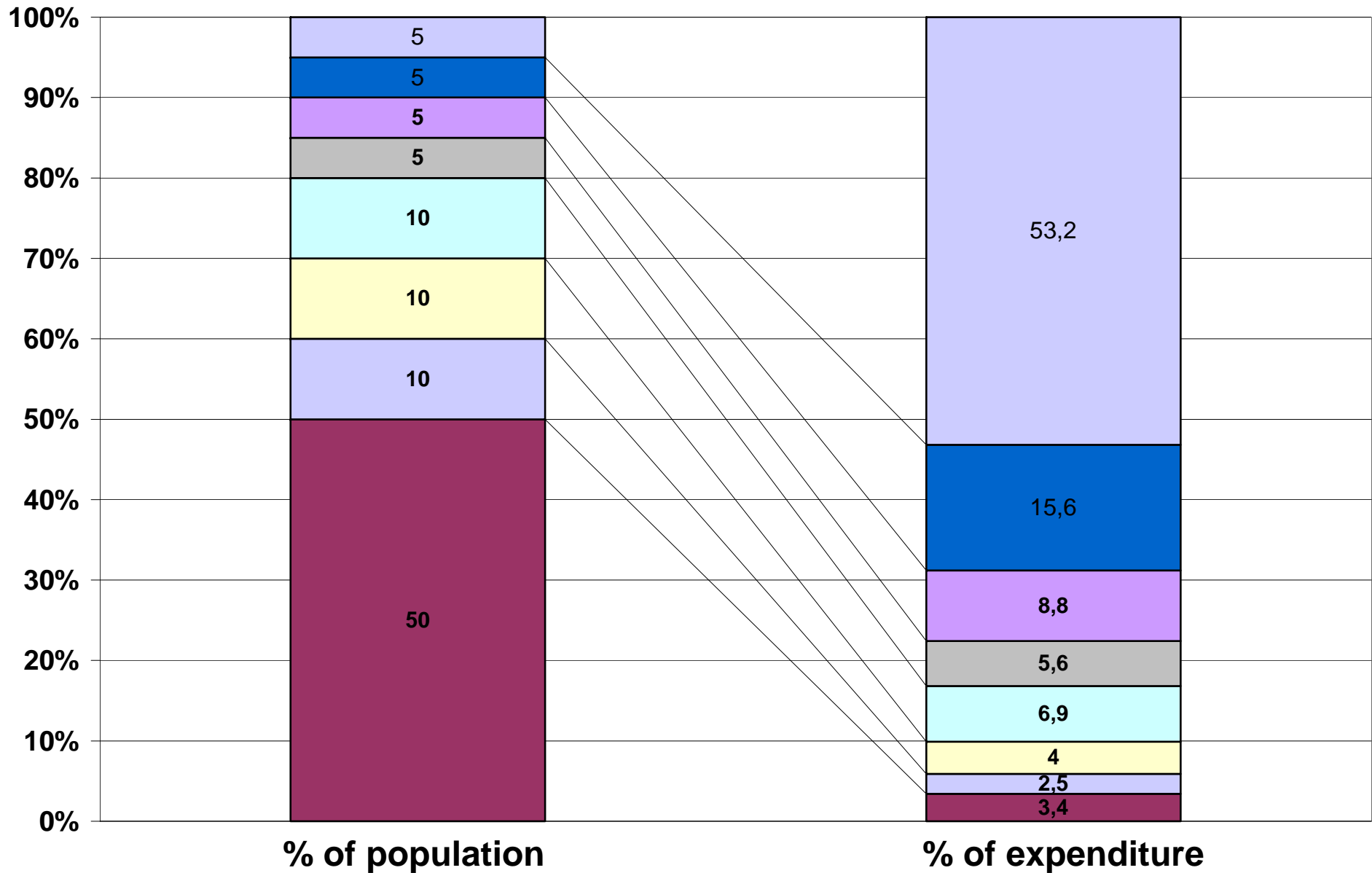
# Issues in pay-for-performance design

- Individuals vs. groups (institutions, all physicians in one department)
- Paying the right amount (US: 9% of income)
- Selecting the right performance measures
- Paying for improvement vs. reaching threshold (US: 70% threshold, 25% improvement)
- Priority for quality improvement of underserved populations?

# An extended framework



# Insurers need the right financial incentives, too: the well-known 20/80 distribution (better: 5/50 or 10/70 problem)





## **Chronic patients' cost-snaring – traditional approaches**

- no co-payments for services related to their disease, e.g. 'ALD' (30 mainly chronic diseases) in France
- lower annual limits on co-payments
- certain drugs require lower cost-sharing if the indication is deemed serious

# Chronic patients' cost-sharing – newer approaches

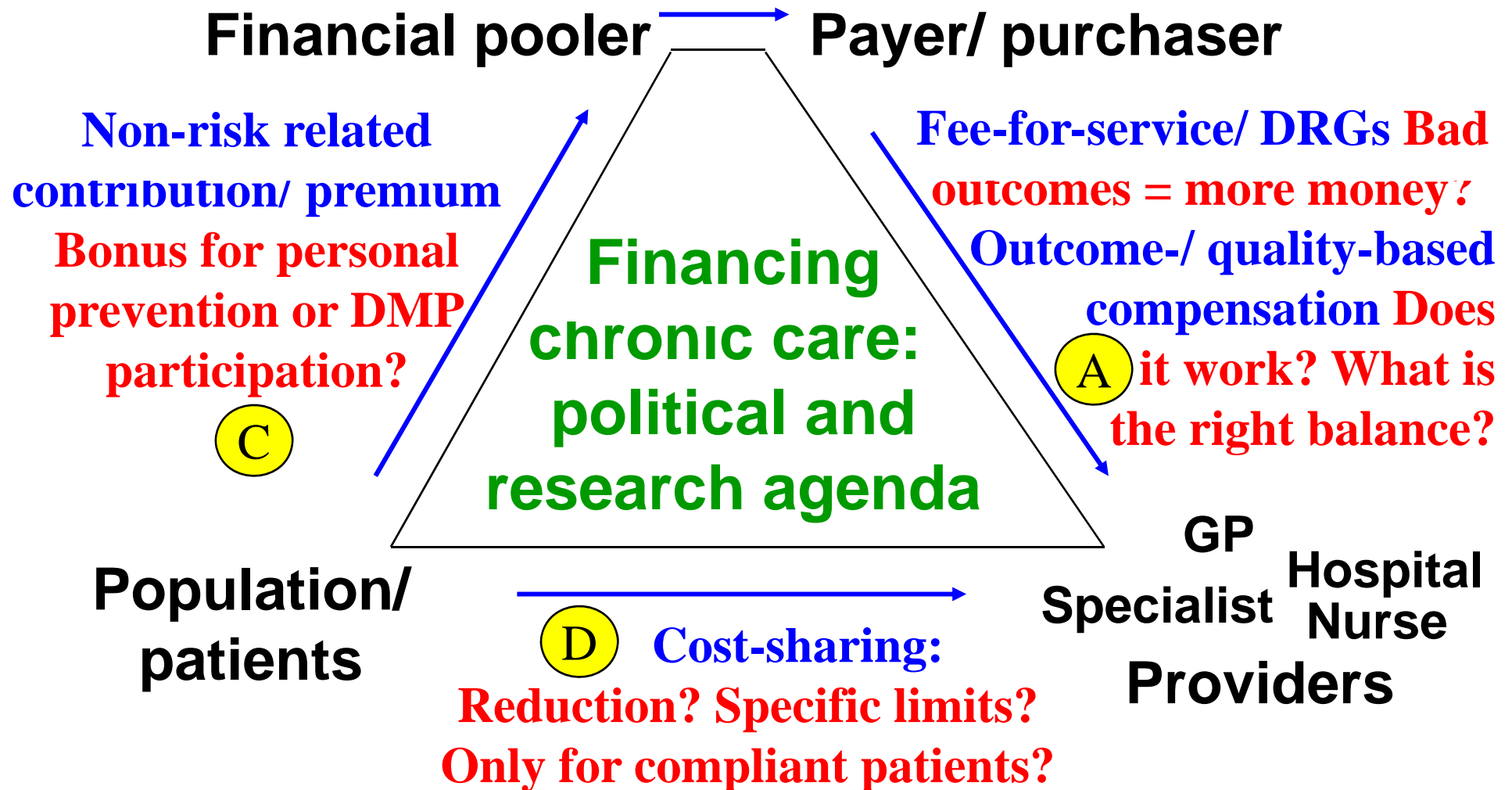
- 'ALD' exemption only if care protocol is established for each patient by their GP and signed by patient (France since 2004)
  - cost-sharing may be reduced or waived if patients enrol in DMPs
  - patients with chronic conditions/complex needs managed via a care plan/ inscribed in DMP receive rebates (Australia) or additional services (Germany)
- ↓
- 'ALD' exemption only if protocol is presented to every treating physician at each visit (France)
  - lower cost-sharing limit applies only if patient is compliant (Germany from 2007)

STRUCTURAL  
QUALITY

PROCESS  
QUALITY

**“Risk-adjusted” capitation** What is risk? Can risk be measured by treatment parameter (hospitalization, drug prescriptions)?

**B** Should DMP participation increase or decrease capitation?



## 7.3 Structural barriers to coordination

- Competing operation cultures and management approaches in different sectors
- Different ownership structures
- Separate and competing providers with no incentives to cooperate
- Rivalries between professional groups
- Lack of clarity about competencies and accountability

**-> Policy-makers must recognise that well-organised interests tend to benefit from fragmented care, so reforms aimed at improving coordination should be well-rehearsed and supported by strong political will.**

## 7.5 Evaluation culture

- Many aspects of managing CD are not properly *evaluated* -> effectiveness and cost-effectiveness of various prevention and treatment interventions not well established.
- Policy-makers are therefore not best equipped to make informed decisions.

**-> Policy-makers must ensure that evaluation based on rigorous methodology is an integral part of all strategies.**

**Existing data should be made available for research and review across different technologies, settings and providers.**

# Conclusions

- challenge of managing CD better is serious
- “proof“ that various strategies are effective in terms of health outcomes yet to come  
-> inbuilt evaluation important
- consideration of various strategies and dimensions (pharmaceuticals and medical devices, incentives, coordination, ICT, evaluation) important
- but: one size will not fit all -> local implementation
- *managing CD will not lead to immediate health expenditure savings but better health (if proven)  
-> economic growth -> more money available for health care*

**Presentation and further  
material at:**

**<http://mig.tu-berlin.de>**

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