The Economic Burden of Heart Failure

Davos

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ECPM®
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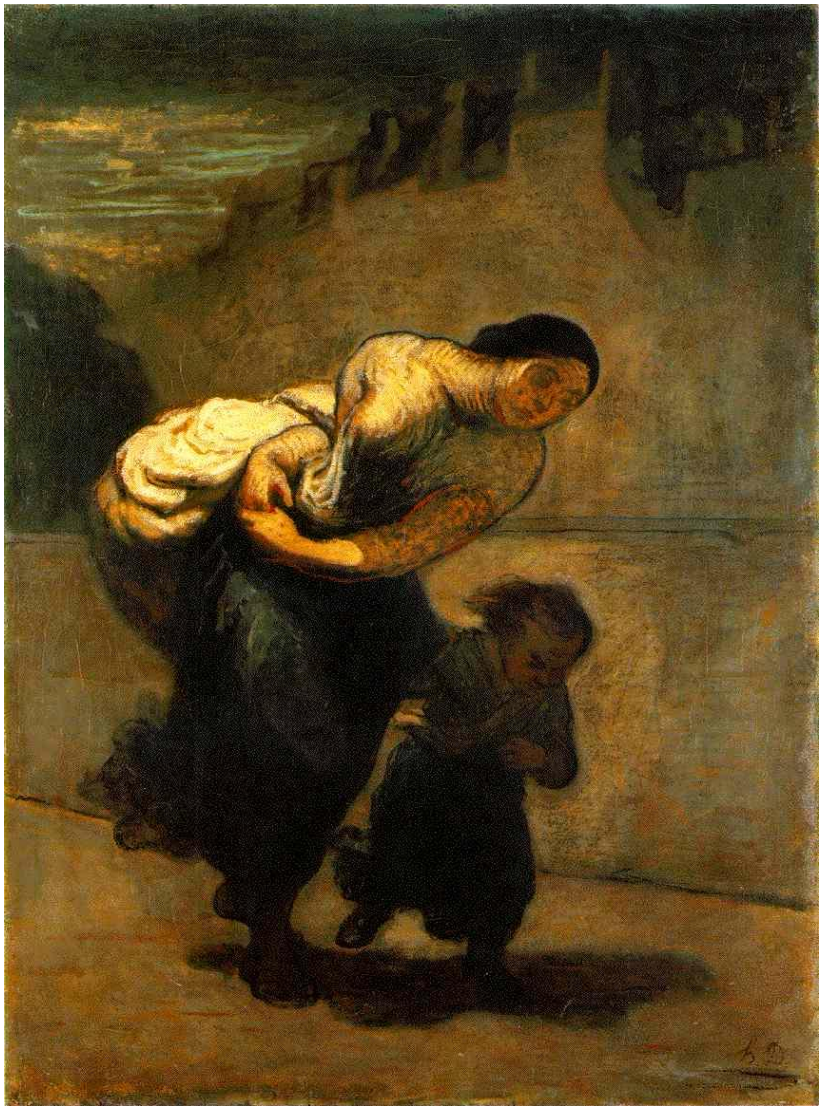
Overview of this lecture

- **Today: The burden of heart failure**
- **Tomorrow – What will it bring? What can we afford?**

Burden



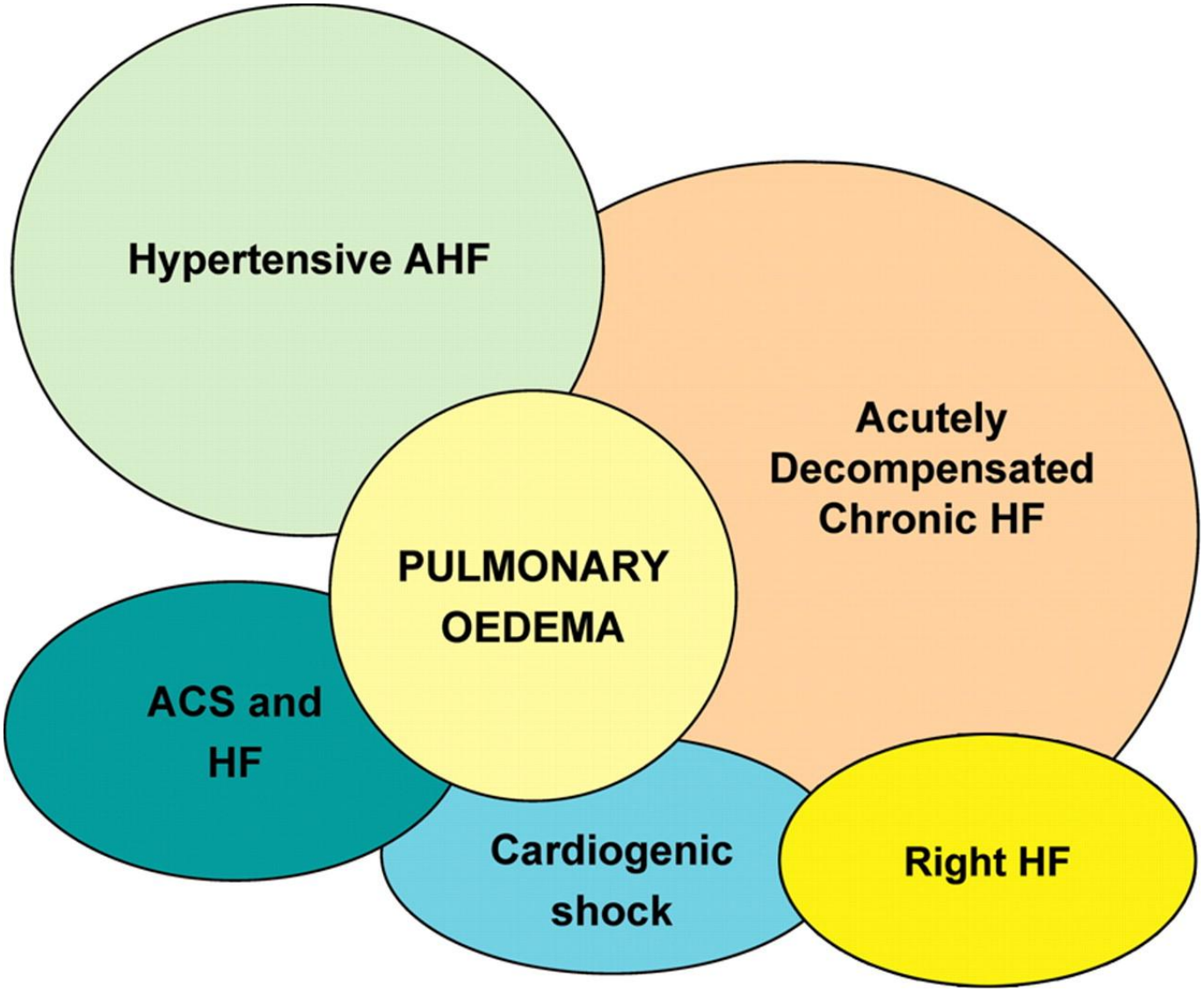
"A burden is a heavy weight that is difficult to carry.

Metaphorically it refers to anything difficult or troubling."

Daumier, Honoré (1808-79) ***The Burden***

Economic burden of disease

The Heart Failure Complex presents itself in many facets

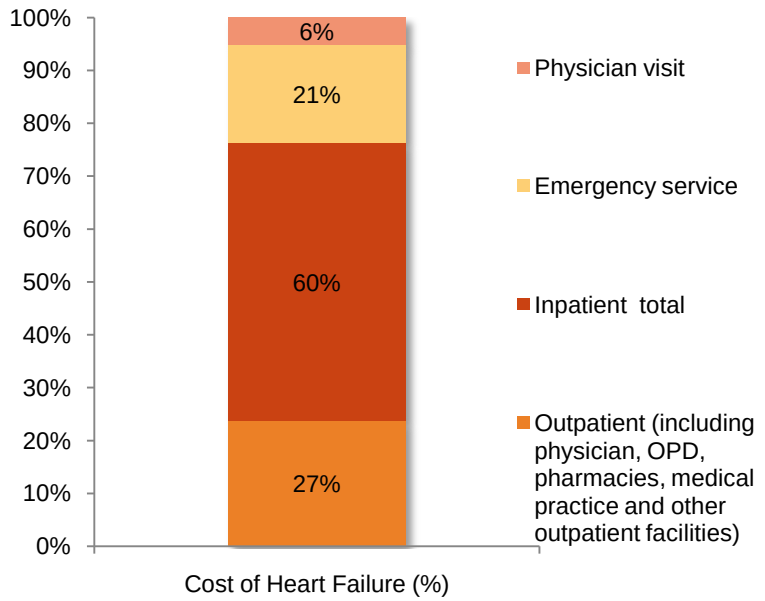


Direct hospital costs of heart failure mainly relate to the costs of inpatient hospital stays

Medical costs of heart failure (€ millions)

Cost of HF	[€] millions (2006)	% of total
Total direct cost	2 879	100
Outpatient (including physician, OPD, pharmacies, medical practice and other outpatient facilities)	784	27
Inpatient total	1 721	60%
Inpatient hospital stay	1 304	45%
Emergency service	57	21
Physician visit	162	6

Distribution of direct cost of HF, 2006 (%)



- **In 2006, the diagnosis of heart failure led to a cost to the German public health system of € 2.9 billion.**
- **Direct hospital costs of heart failure (€ 1.3 billion in Germany in 2006) mainly relate to the costs of inpatient hospital stays.**

Dtsch Arztebl Int 2009; 106(16): 269–75

Patients with specified events and risk for events within 28 days and 1 year of the index admission

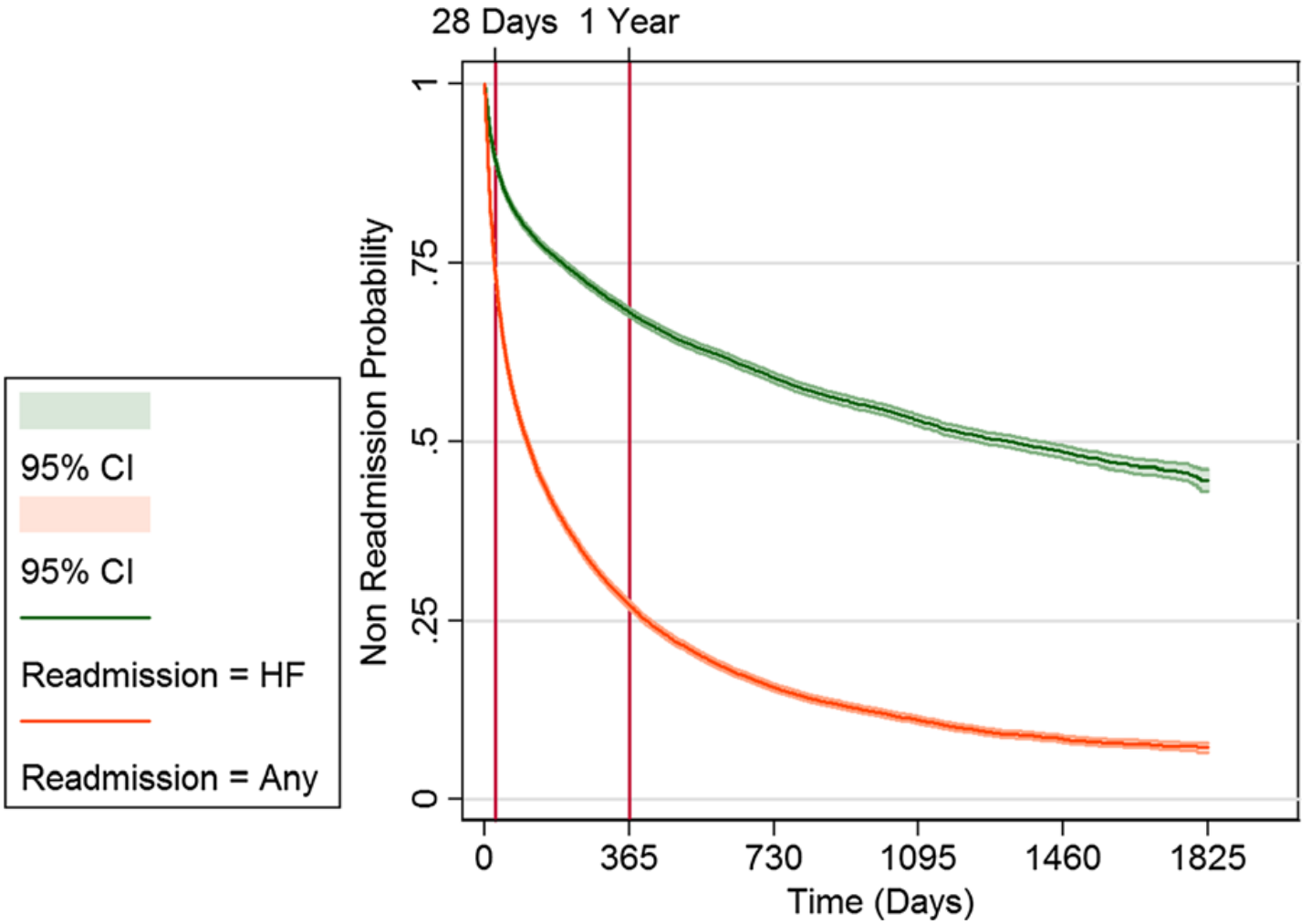
Outcome	At 28 days		Within 1 year	
	Number of Persons	Probability of Outcome†	Number of Persons	Probability of outcome†
Re-admission for any cause	7415	0.27	18493	0.73
Readmission - heart failure*	3007	0.11	7848	0.32
All-cause mortality	2531	0.10	6890	0.28
Readmission or death	9471	0.35	21125	0.79
Readmission HF or death	5302	0.20	12556	0.49

* heart failure or hypertensive heart disease as principal separation code.
† derived from Kaplan-Meier curves.

Mean length of stay in days for index admission and readmissions

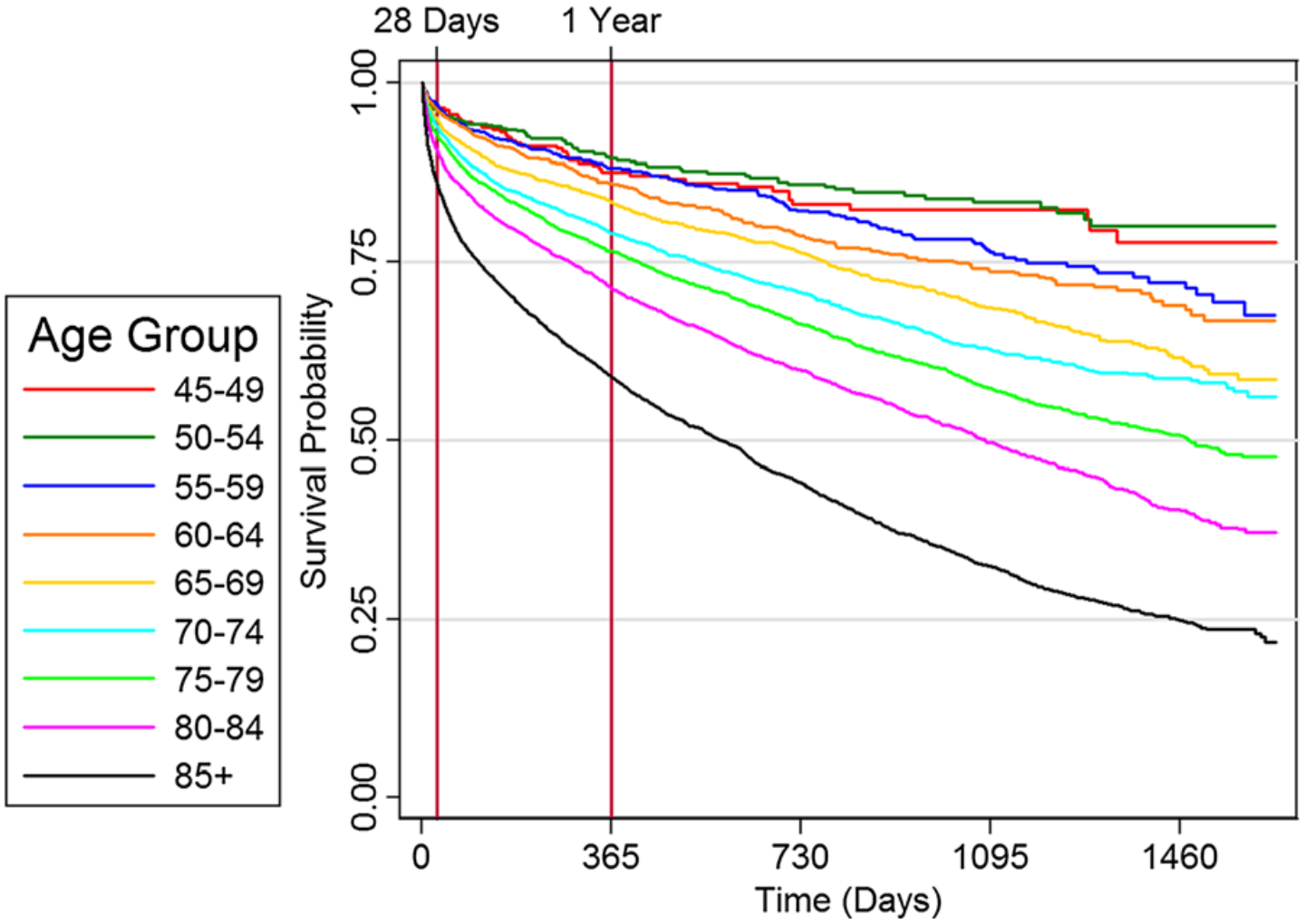
Age group	Number of patients	Mean LOS in days		
		Index admission Mean (SD)	Readmission for any cause Mean (SD)	Heart failure readmission* Mean (SD)
Whole population	29161	7.8 (18.1)	4.8 (12.1)	8.3 (12.1)
45 – 49 years	352	5.9 (6.5)	2.1 (6.0)	5.7 (7.6)
50 – 54	604	6.3 (7.9)	2.7 (5.5)	7.0 (7.2)
55 – 59	1009	5.9 (6.7)	2.4 (6.1)	8.0 (12.1)
60 – 64	1594	6.2 (6.0)	3.3 (7.5)	7.4 (8.3)
65 – 69	2244	6.6 (7.2)	3.6 (8.1)	7.9 (9.4)
70 – 74	3548	6.9 (7.8)	3.9 (9.0)	8.1 (9.8)
75 – 79	5240	7.2 (7.3)	4.7 (11.5)	8.2 (12.3)
80 - 84	6191	7.6 (9.5)	6.0 (12.8)	8.4 (9.5)
85+	8379	9.6 (31.2)	8.5 (20.4)	9.0 (15.8)

Kaplan-Meier curves for time to heart failure readmission and time to any readmission



Robertson et al. BMC Health Services Research 2012, 12:103

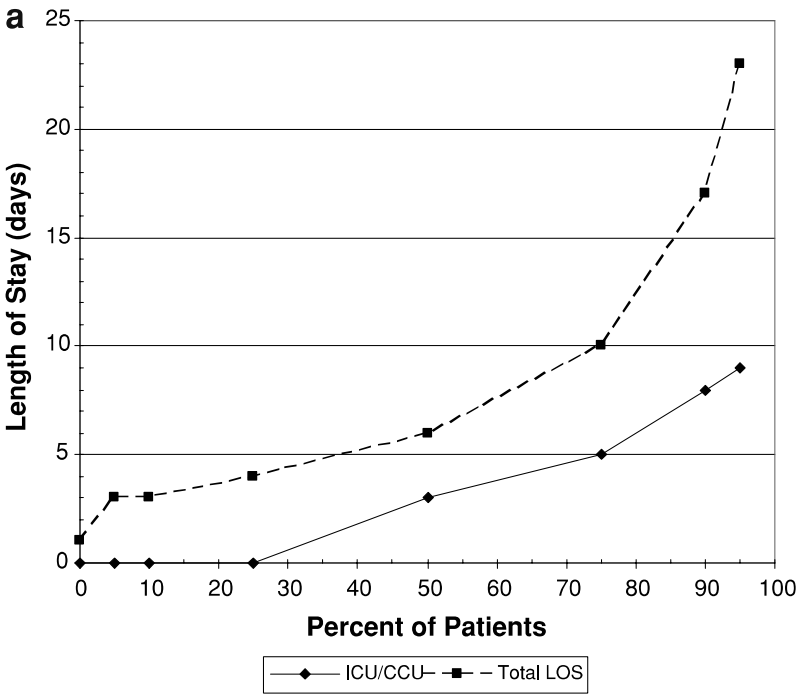
Kaplan-Meier curves for time to death for each 5 year age group for patients over 45 year of age

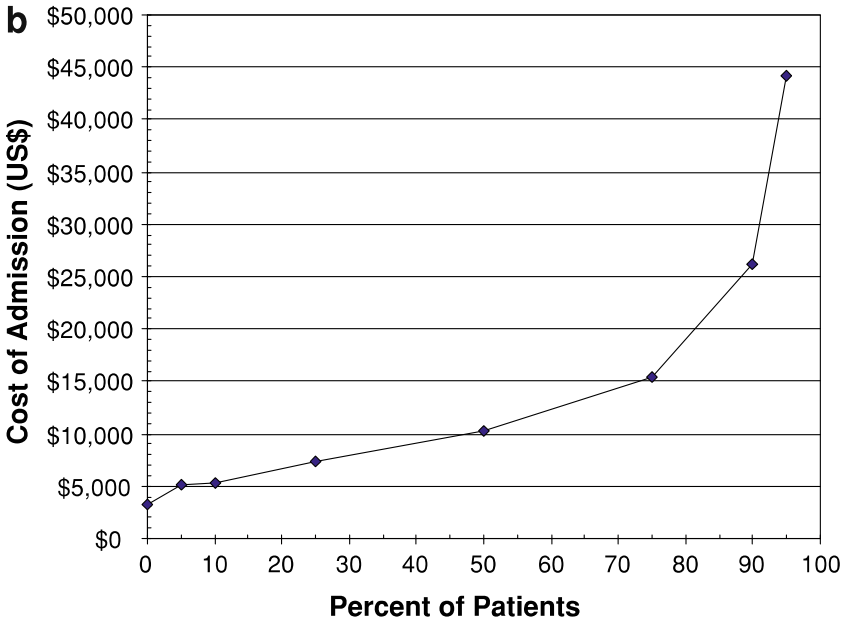


Robertson et al. BMC Health Services Research 2012, 12:103

Vilfredo Pareto, 1848–1923

Distribution of costs of patients with AHF in hospital



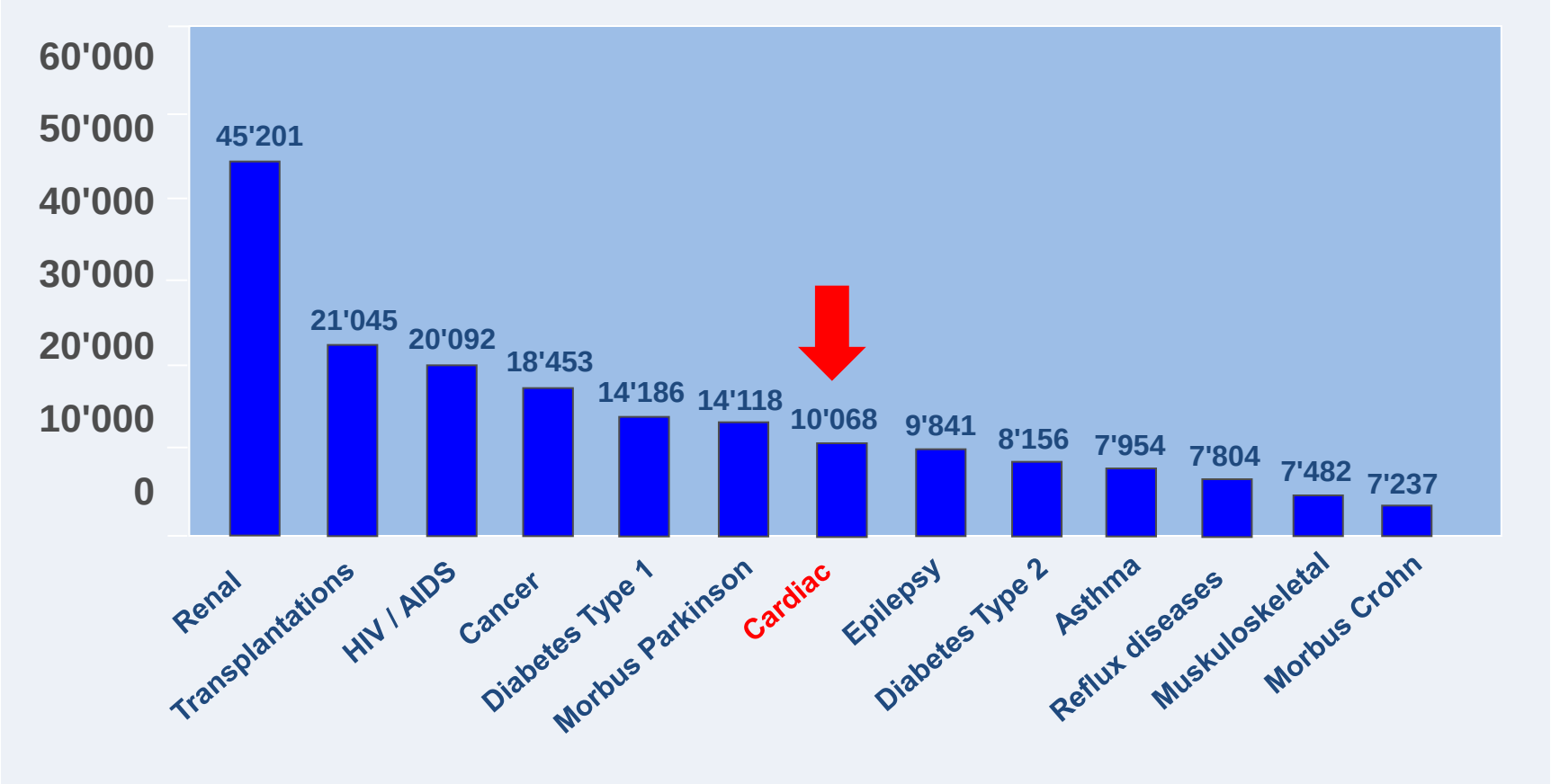


ITT Group Standard-of-care; REVIVE II Study

De Lissovoy G et al. Eur J Health Econ 2010; 11: 185-193

High cost cases (HCC) in Switzerland

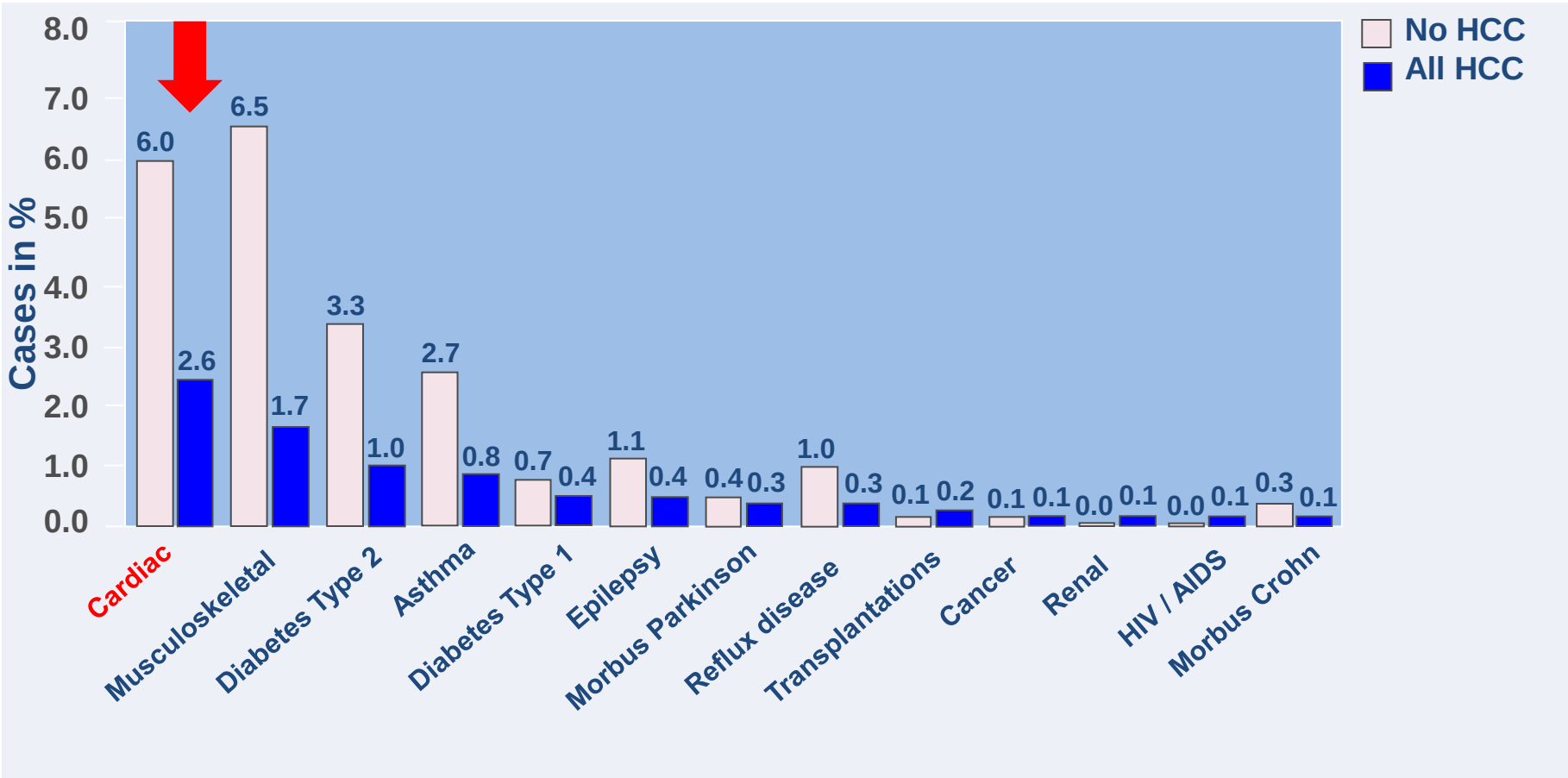
Average net payments (CHF) per case in diagnostic group per year, averages 2000-2004



Source: Engler, (database: CSS “sample western Switzerland“

High cost cases (HCC) in Switzerland

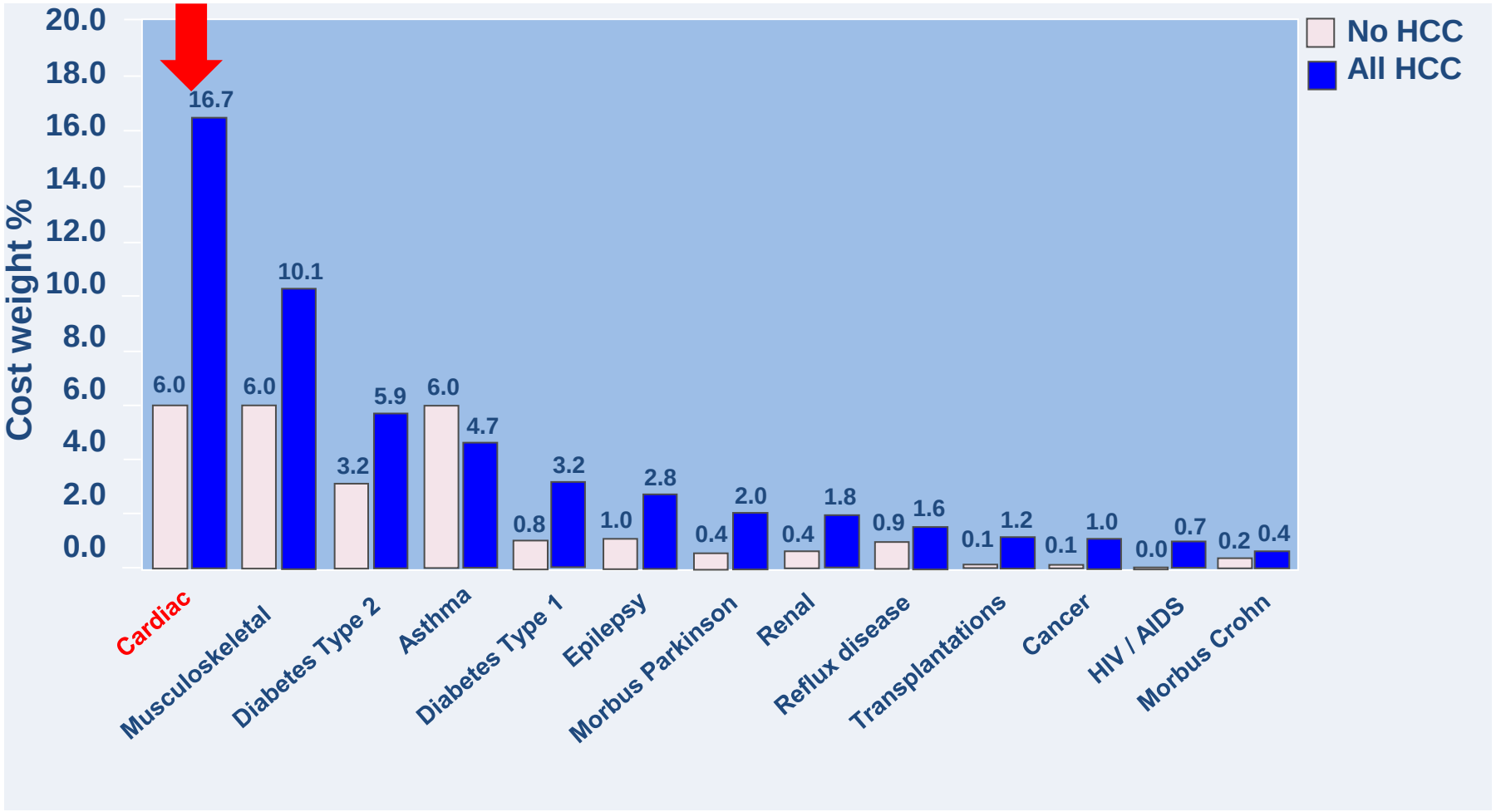
Average number of cases of diagnostic groups per year, average 2000-2004



Source: Engler, (database: CSS "sample western Switzerland"

High cost cases (HCC) in Switzerland

Cost weight of diagnostic groups per year, average 2000-2004



Source: Engler, (database: CSS “sample western Switzerland“

Diagnosis-related groups (DRGs)

F62A	Heart failure and shock with extremely severe complications, with dialysis or CPR or complicating diagnosis
F62B	Heart failure and shock with extremely severe complications, without dialysis, without CPR, without complicating diagnosis
F62C	Heart failure and shock without extremely severe complications

Diagnosis-related groups (DRGs)

Code	Description	Average length of stay (days)	Lower marginal length of stay (days)	Upper marginal length of stay (days)
F62A	Heart failure and shock with extremely severe complications, with dialysis or CPR or complicating diagnosis	13.8	4	27
F62B	Heart failure and shock with extremely severe complications, without dialysis, without CPR, without complicating diagnosis	12.4	3	25
F62C	Heart failure and shock without extremely severe complications	9.3	2	19

DRG-based estimate of acute heart failure cases in Switzerland

DRG	# cases	CaseMix	CaseMix-Index	Baserate (CHF)	Costs (CHF)/case	Total cases (CHF)
F62A	773	1'414.57	1.8300	8819	16'139	12'475'761
F62B	1'900	2'638.29	1.3886	8819	12'246	23'268'287
F62C	10'928	9'821.16	0.8987	8819	7'926	86'617'172

Benchmark Baserate AMC: 9533 CHF
Benchmark Baserate non AMC: 8721 CHF

Helsana Insurance Group, own calculations (M. Früh)

Helsana

Costs of CRT in Switzerland in 2011 (Helsana Insurance)

CHOP	Age group	# cases	CM	CMI	calculated Baserate (CHF)	Costs (CHF)	LOS total	ALOS
00.50_CRT-P Complete system	0-50	3	13.95	4.65	9'086	126'783	25	8
	51-60	7	27.37	3.91	9'086	248'722	31	4
	61-70	18	76.67	4.26	9'086	696'654	109	6
	71-80	53	204.45	3.86	9'086	1'857'696	248	5
	81-90	47	170.11	3.62	9'086	1'545'697	330	7
	91-	1	4.07	4.07	9'086	36'954	13	13
00.51_CRT-D Complete system	0-50	30	211.87	7.06	9'086	1'925'112	269	9
	51-60	56	396.13	7.07	9'086	3'599'356	302	5
	61-70	83	588.28	7.09	9'086	5'345'358	560	7
	71-80	79	554.81	7.02	9'086	5'041'193	431	5
	81-90	7	40.86	5.84	9'086	371'288	55	8
00.53_CRT-P Only pulse generator	0-50	3	9.56	3.19	9'086	86'830	15	5
	51-60	2	0.53	0.27	9'086	4'834	2	1
	61-70	14	46.41	3.32	9'086	421'700	104	7
	71-80	33	48.58	1.47	9'086	441'399	133	4
	81-90	26	47.72	1.84	9'086	433'585	145	6
	91-	2	3.58	1.79	9'086	32'511	2	1
00.54_CRT-D Only pulse generator	0-50	10	49.63	4.96	9'086	450'994	36	4
	51-60	17	82.50	4.85	9'086	749'646	42	2
	61-70	38	196.80	5.18	9'086	1'788'233	120	3
	71-80	41	210.85	5.14	9'086	1'915'849	176	4
	81-90	6	32.79	5.46	9'086	297'925	11	2

Total: CHF 27'418'319

Helsana Insurance Group, own calculations (M. Früh)

Helsana

Cardiovascular morbidity costs in Switzerland 2011 (Helsana Insurance)

Age group	Cardiac medication costs	Concomitant Medication costs	In-patient Costs	Outpatient Costs	Total
0-50	8'413'293	55'772'656	36'150'612	68'316'753	**168'653'314**
51-60	13'733'428	74'803'214	51'781'846	79'898'968	**220'217'456**
61-70	26'281'408	131'148'468	113'240'703	143'346'373	**414'016'951**
71-80	28'848'606	144'499'374	154'532'945	162'717'228	**490'598'153**
81-90	18'864'648	94'277'882	124'915'012	98'247'956	**336'305'498**
90-	2'771'116	13'835'411	19'324'120	12'420'562	**48'351'209**
Total	**98'912'498**	**514'337'004**	**499'945'237**	**564'947'841**	**1'678'142'581**

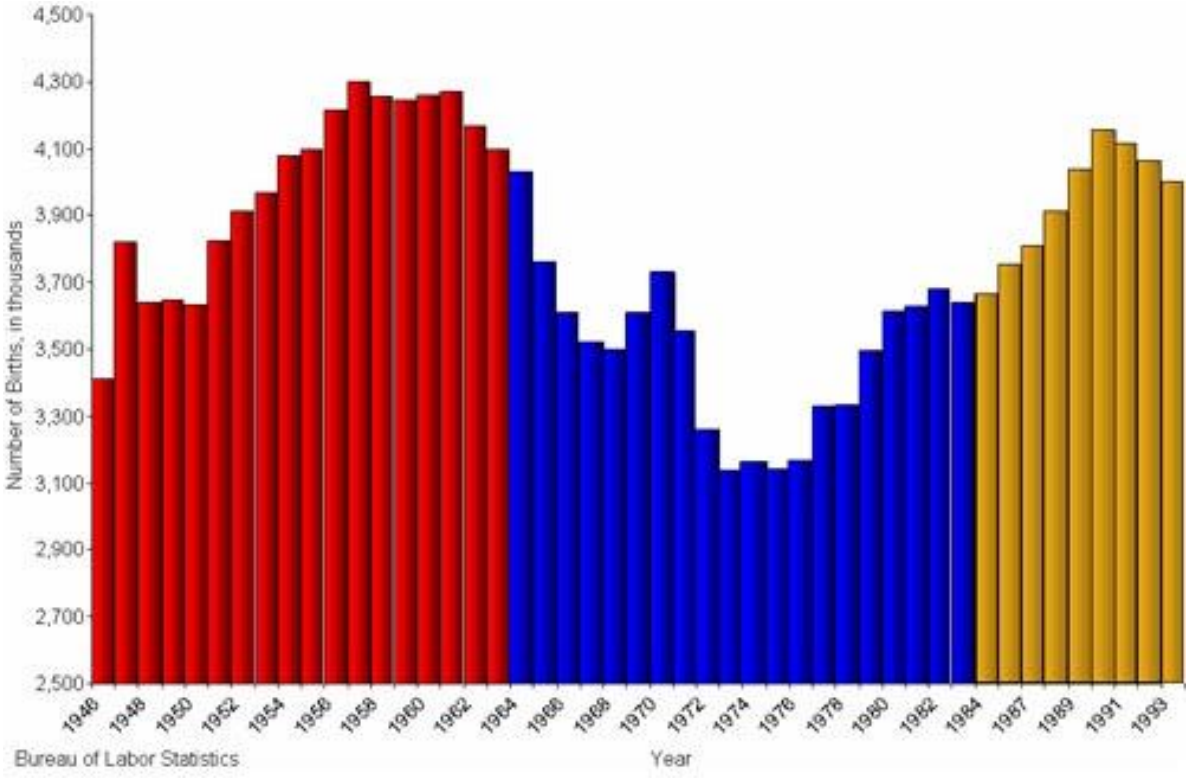
Helsana Insurance Group, own calculations (M. Früh)

Helsana

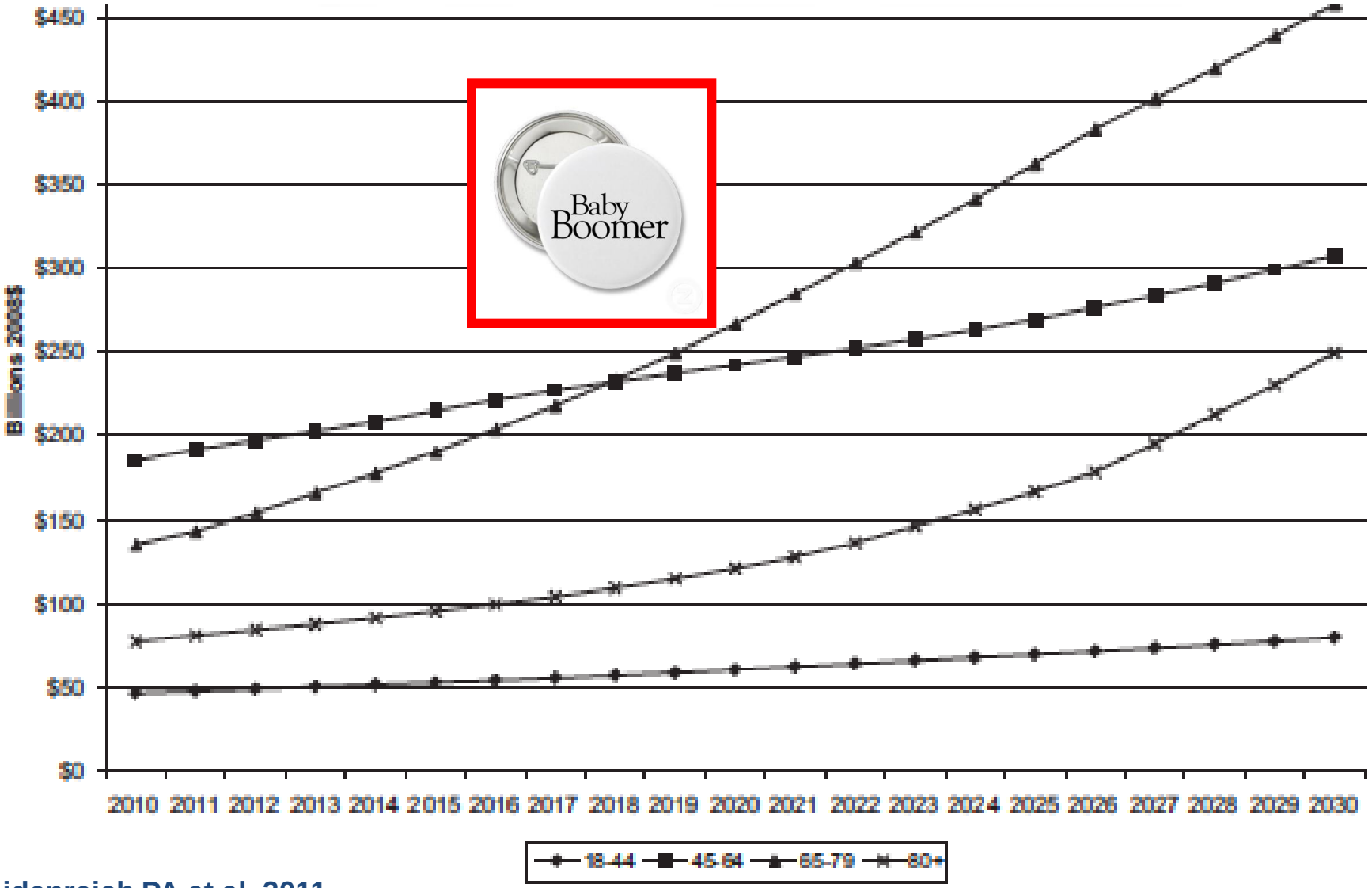
The future – What will it bring?

Most important determinants of future burden

Babyboomers

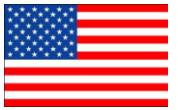


Projected total (direct and indirect) costs of all CVD by age, 2010 to 2030 (in billion 2008$).



Heidenreich PA et al. 2011

Projections of Crude CVD Prevalence (%), 2010–2030 in the United States



Year	All CVD*	Hypertension	CHD	HF	Stroke
2010	36.9	33.9	8.0	2.8	3.2
2015	37.8	34.8	8.3	3.0	3.4
2020	38.7	35.7	8.6	3.1	3.6
2025	39.7	36.5	8.9	3.3	3.8
2030	40.5	37.3	9.3	3.5	4.0
% Change	9.9	9.9	16.6	25.0	24.9

Heidenreich PA et al. 2011

Projected Direct (Medical) Costs of CVD, 2010–2030 (in Billions 2008$) in the United States

Year	All CVD*	Hypertension	CHD	HF	Stroke	Hypertension as Risk Factor†
2010	$272.5	$69.9	$35.7	$24.7	$28.3	$130.7
2015	$358.0	$91.4	$46.8	$32.4	$38.0	$170.4
2020	$470.3	$119.1	$61.4	$42.9	$51.3	$222.5
2025	$621.6	$155.0	$81.1	$57.5	$70.0	$293.6
2030	$818.1	$200.3	$106.4	$77.7	$95.6	$389.0
% Change	200	186	198	215	238	198

CVD indicates cardiovascular disease; CHD, coronary heart disease; HF, heart failure.

Heidenreich PA et al. 2011

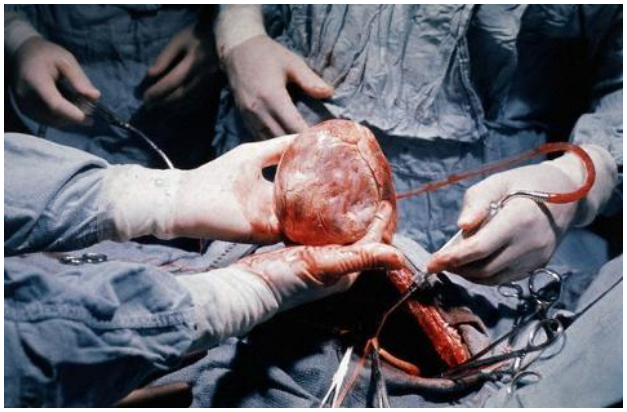
Projected Indirect (Lost Productivity) Costs of CVD, 2010–2030 (in Billions 2008$) in the United States

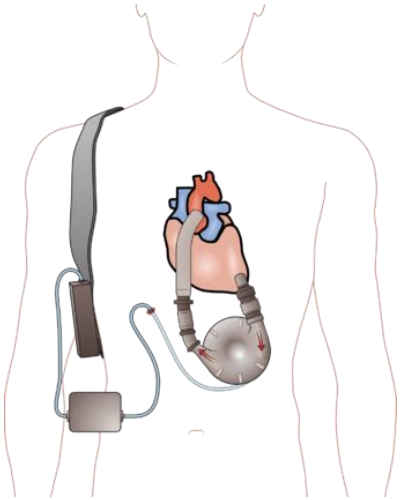
Year	All CVD*	Hypertension	CHD	HF	Stroke	Hypertension as Risk Factor†
2010	$171.7	$23.6	$73.2	$9.7	$25.6	$25.4
2015	$195.7	$27.2	$82.8	$11.3	$29.7	$29.3
2020	$220.0	$31.0	$92.0	$13.0	$34.0	$33.3
2025	$246.1	$35.1	$101.5	$15.1	$38.9	$37.8
2030	$275.8	$39.8	$112.3	$17.4	$44.4	$42.8
% Change	61	69	53	80	73	69

Heidenreich PA et al. 2011

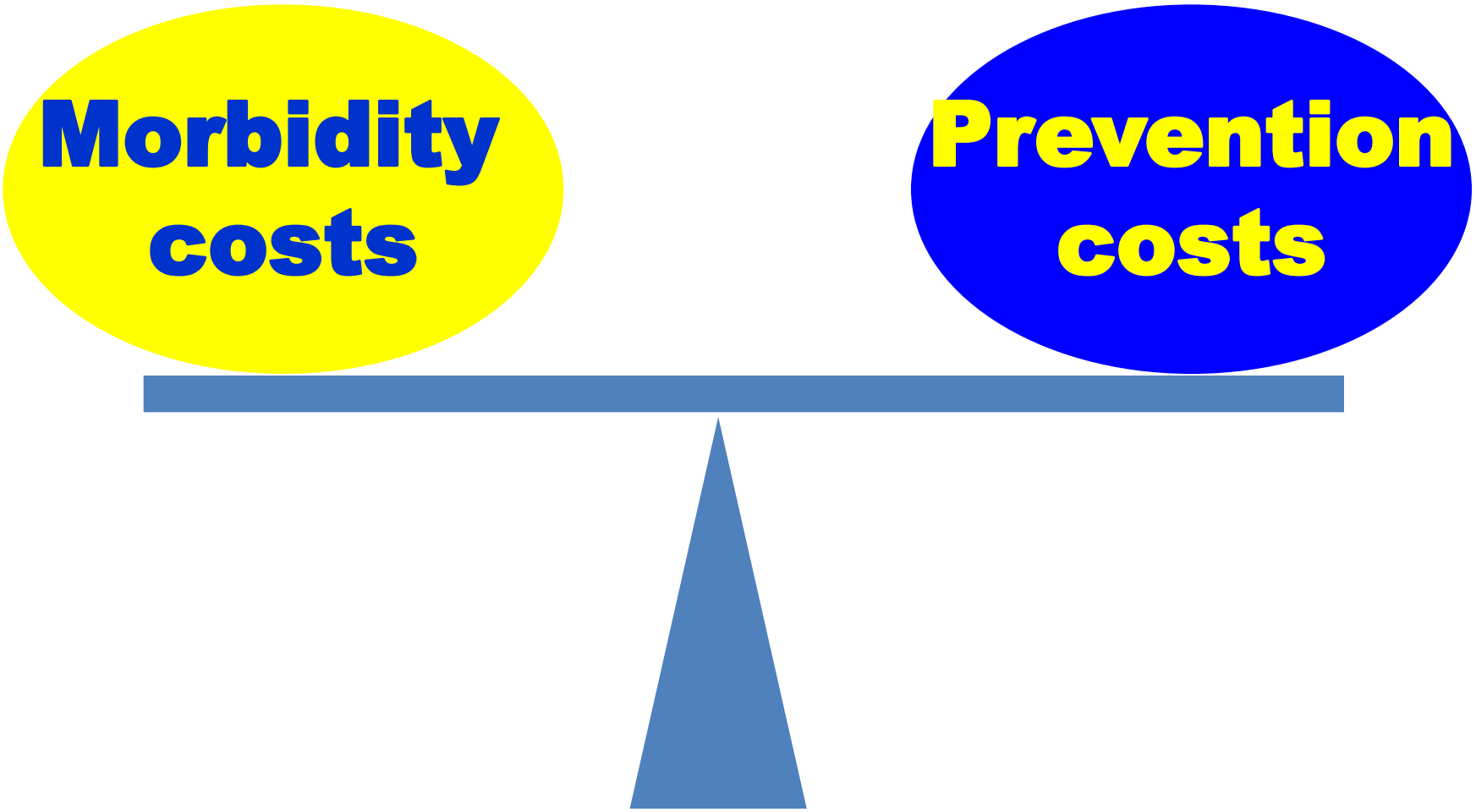
Most important determinants of future burden

Costly technologies

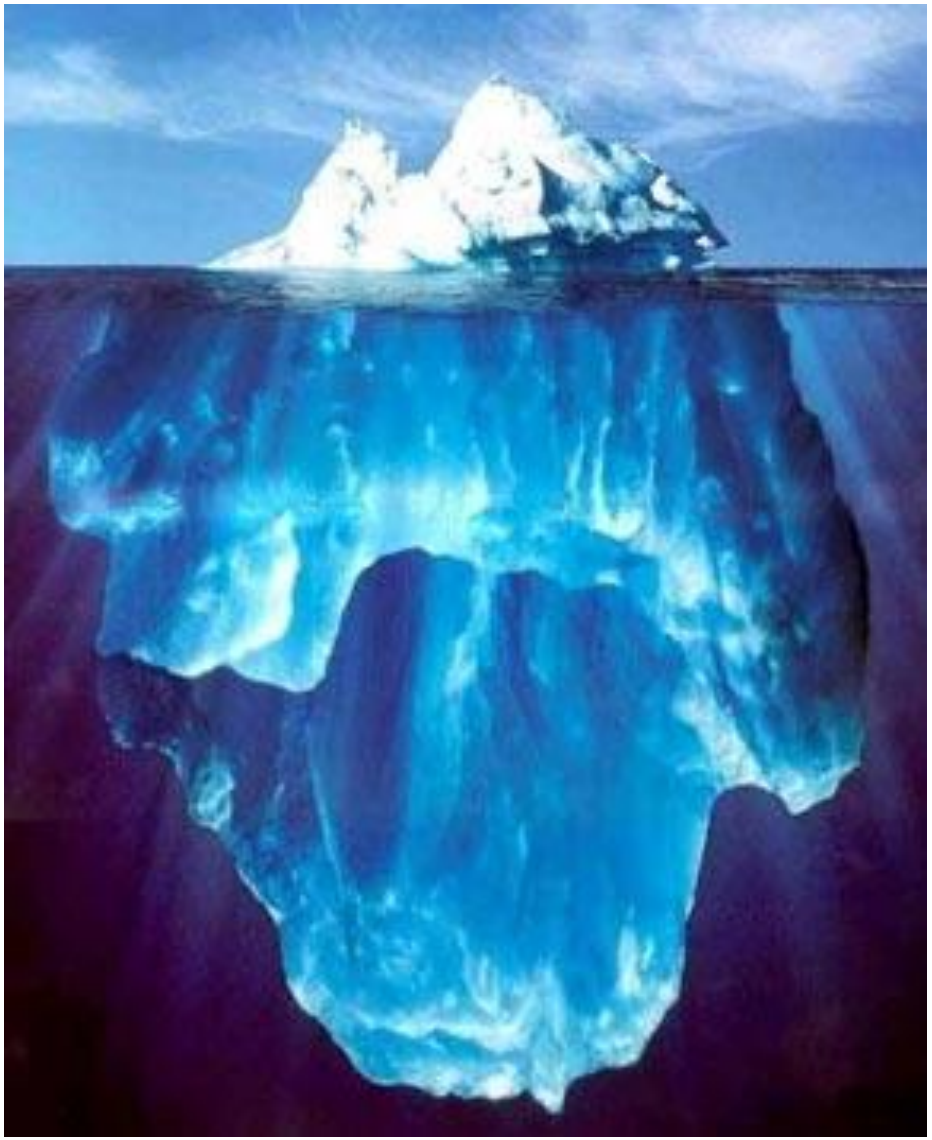




What about prevention?



Leveraging morbidity costs through prevention

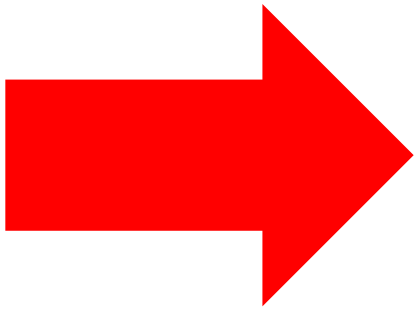


Preventive measures are available for most underlying conditions of HF

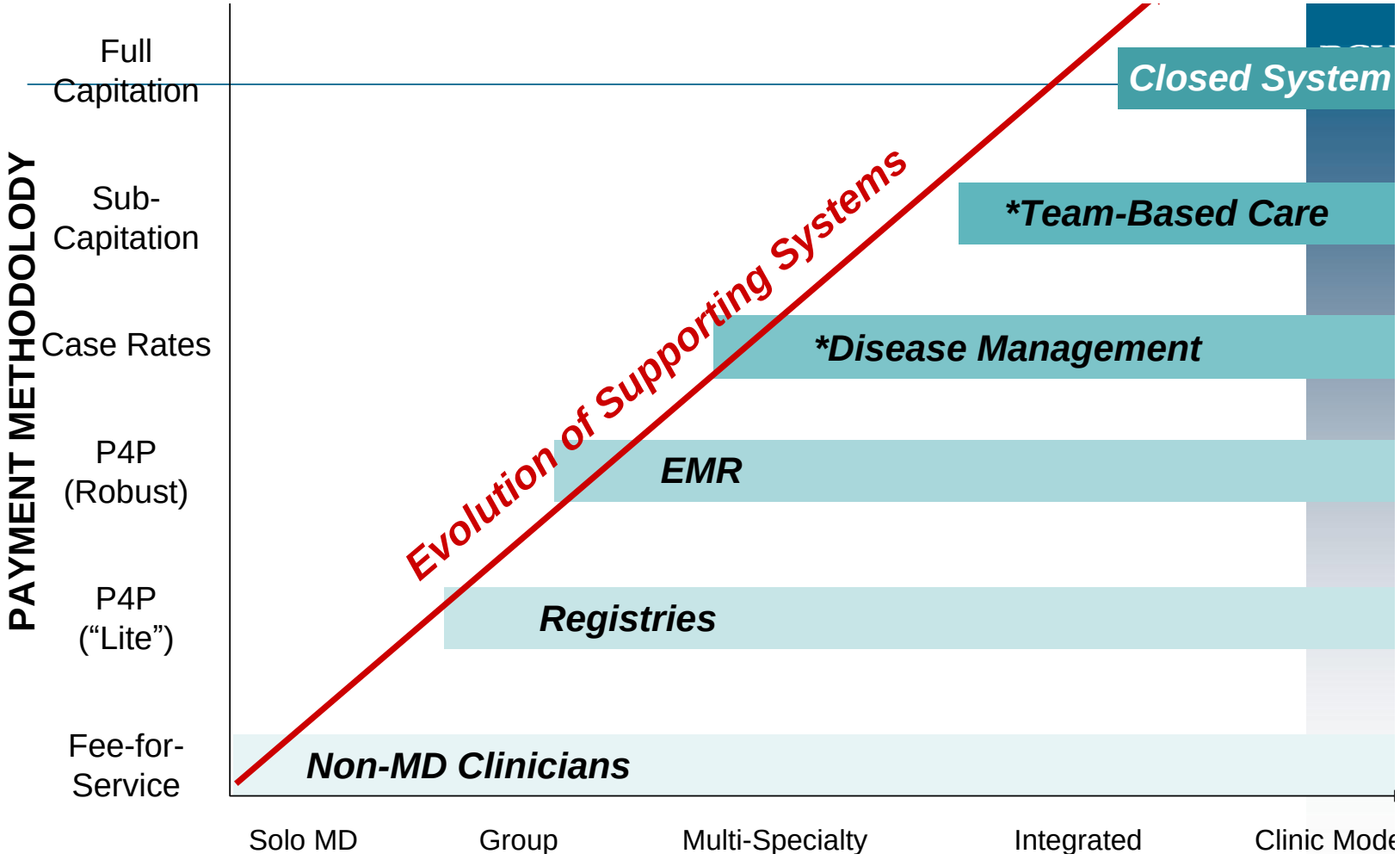
Characteristics	Total	Decomp. HF	Pulmonary oedema	Cardiogenic shock	Hypert. HF	Right HF
Underlying diseases (%)						
CHD	53.6	54.0	54.9	52.5	53.8	38.1
Hypertension	62.5	56.0	70.1	54.0	94.6	52.2
Diabetes mellitus	32.8	30.9	39.4	34.3	34.5	29.2
Atrial fibrillation/flutter	38.7	41.3	28.1	24.6	37.7	58.4
Previous stroke or TIA	13.3	12.4	15.7	11.8	16.0	13.3
Valvular disease	34.4	37.5	26.2	18.0	31.7	43.8
Renal failure	16.8	16.6	15.8	18.1	18.7	17.7
Anaemia	14.7	15.0	15.7	14.4	11.3	16.8
Chronic obstructive pulmonary disease	19.3	19.2	19.3	18.1	18.0	27.4
Pacemaker implanted	9.1	10.6	5.9	10.8	4.9	8.8
Dilated cardiomyopathy	19.3	21.8	11.4	10.2	20.2	15.9

Nieminnen MS et al. Eur Heart J 2006

Role of health plans



Evolving care models and reimbursement



A general question remains

Which **services shall be financed out of *solidarity* ?**

Acknowledgments

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Questions?

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