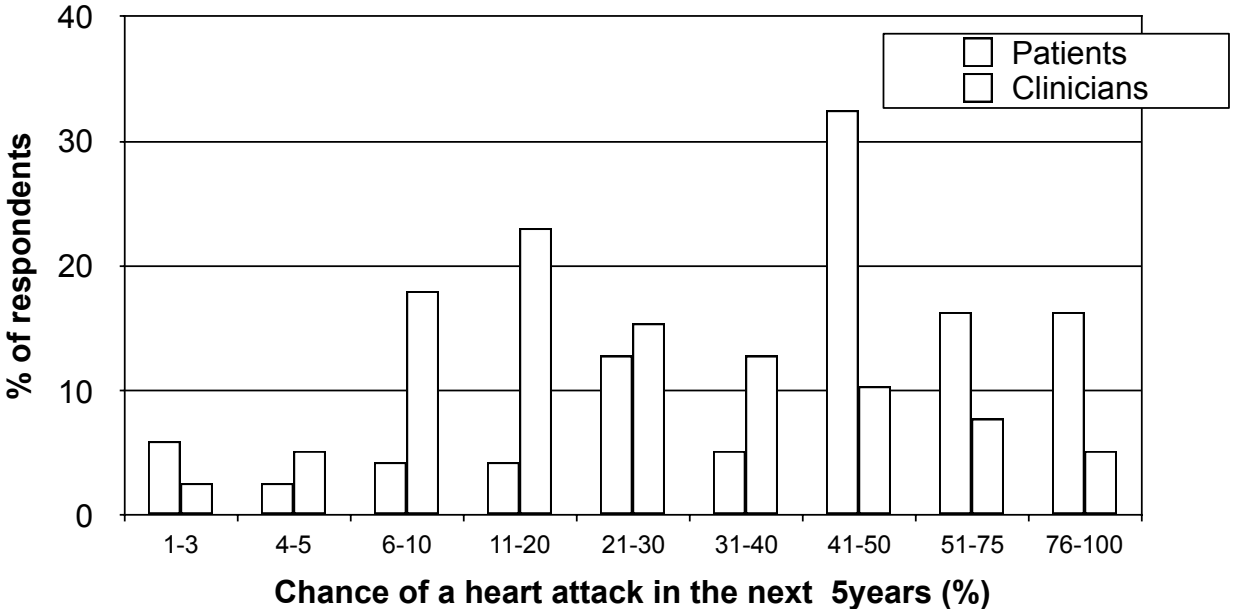
Numeracy, communication and shared decision making

Adherence is poor

- Roughly 25% of ALL new prescriptions are NEVER filled[1]
- Fewer than 30% of patients put on antidepressants continued them for 6 months[2]
- Only 1 in 3 patients started on antihypertensive or lipid-lowering therapy still taking at 6 months[3]
- Only 25% of elderly given a statin for CHD risk reduction regularly using at 5 years[4]

1) Am J Med 2011;124:1081.e9-1081.e22 2) Drug Benefit Trends 2000;12:7-12. 3) Arch Intern Med 2005;165:1147-52. 4) JAMA 2002;288:455-61

Perception of "high risk"



Side Effects: What Patients think when we say it's Uncommon?

Description	EU Assigned Meaning	Patients Perceived Chance
Very Common	>10%	65%
Common	1-10%	45%
Uncommon	0.1-1%	18%
Rare	0.01 – 0.1%	8%
Very Rare	<0.01%	2%

- Patients over estimated risk by 5 to 200 times.

Lancet 2002; 359: 853–54

307 subjects using a written questionnaire and interview.

Results

Patients	Median acceptable absolute % benefit threshold	% that would take a "safe" drug for 5 years		Absolute % benefit they felt they were getting from their drug	% who wanted to be told percent chance of benefit
		If benefit over 5 years was ≤ 5%	If benefit over 5 years was ≤ 5% AND their MD recommended it		
Post MI patients	20	32	69	70	79
On drugs	20	29	74	68	72
No drugs	30	21	56	-	84

Clin Med 2002;2:527-33

Osteoporosis medications

- Physicians estimate 69% adhere to osteoporosis meds
  - However, only 49% even fill their scripts
- When physicians & patients are given absolute fracture risk (versus simply high/mod/low)
  - Prescribing rates go down 7-10%
- What fracture risk should someone have before you offer bisphosphonate therapy?

Guidelines	Doctors	Patients
3%	10%	50%

1) Ann Intern Med. 2010;153:580-586. 2) Current Medical Research & Opinion 2010; 26 (4): 777–785. 3) Br J Sports Med. 2016 Jan;50(2):77-8. 4) Osteoporos Int. 2012; 23:2135–2140

Differing perceptions of intervention thresholds for fracture risk: a survey of patients and doctors

Did NOT ask patients to consider side effects or drug cost, just the dosing regimen, in the decision

"A typical patient in our study required a 50% absolute fracture risk and 50% relative risk reduction (giving an absolute risk reduction of 25%) before considering long-term drug therapy"

"A prominent current guideline for treatment to prevent fractures, based on cost-effectiveness analyses, recommends pharmacologic intervention at thresholds of 10- year risk of 20% for major osteoporotic fracture or 3% for hip fracture; applying these cut points, 125 (77%) of doctors in our study would recommend treatment, but only 24 (21%) of our patient cohort would consider treatment justified."

Osteoporos Int 2012;23:2135–40

Patients' Expectations of the Benefits and Harms of Treatments, Screening, and Tests
A Systematic Review

Tammy C. Hoffmann, PhD; Chris Del Mar, MD, FRACGP

for benefit 88% of study authors concluded that participants overestimated benefits

for harm 67% underestimated harm

JAMA Intern Med 2015;175:274-86

Estimates of baseline risk, absolute risk reduction - by speciality

Table 2. Estimates of Baseline Risk, Absolute Risk Reduction, and Relative Risk Reduction, by Specialty*

Risk	Medical Literature	Family Physicians†	General Internists†	Cardiologists†	Difference in Medians (95% CI)‡	
					FP − CD	IM − CD
	←			%		→
Hypercholesterolemia scenario: myocardial infarction within 5 years						
Baseline risk	~6	20 [10–50]	20 [10–35]	10 [5–15]	10 (5 to 18)§	10 (5 to 15)§
Absolute risk reduction	~1	8 [8–20]	5 [2–15]	3 [1–8]	3 (1 to 7)§	2 (0 to 5)§
Relative risk reduction	~18	41 [20–50]	33 [18–50]	33 [20–50]	3 (0 to 14)	0 (−8 to 9)
Isolated systolic hypertension scenario: stroke within 5 years						
Baseline risk	~8	24 [10–34]	20 [10–30]	10 [5–10]	12 (10 to 17)§	10 (5 to 15)§
Absolute risk reduction	~3	10 [5–20]	10 [5–15]	4 [2–6]	7 (5 to 10)§	5 (2 to 7)§
Relative risk reduction	~37	50 [40–67]	50 [40–60]	50 [31–60]	8 (0 to 17)‖	0 (0 to 10)
Left main coronary stenosis scenario: 3-year survival rate						
Baseline rate	~70	80 [60–90]	70 [50–88]	64 [50–75]	15 (5 to 20)§	5 (0 to 15)‖
Absolute improvement	~20	5 [0–25]	10 [0–30]	27 [15–45]	−20 (−25 to −12)§	15 (−21 to −8)§
Relative improvement	~29	6 [0–33]	13 [0–33]	29 [17–47]	−20 (−26 to −12)§	−16 (−22 to −6)§

* CD = cardiologists; FP = family physicians; IM = general internists.
† Values are expressed as median [interquartile range]; the interquartile range equals the range between the 25th and 75th percentiles.
‡ Differences in medians may not equal differences across the previous columns because they are generated from the median of all pairwise differences (17).
§ $P \leq 0.005$.
‖ $P \leq 0.05$.

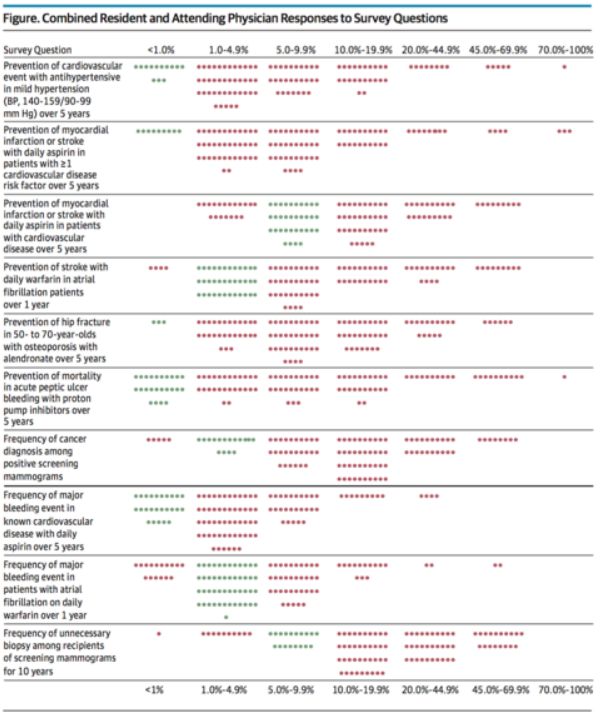
Ann Intern Med 1996;124:414-21

CHD risk estimation
53 residents, 8 fellows, 18 attending physicians

"The mean degree of over-estimation, expressed in relative terms, was larger for low-risk scenarios (mean physician estimate 7.8 times Framingham estimate), intermediate for medium risk scenarios (2.8 times), and smaller (1.5 times) for high-risk scenarios"

BMC Health Services Research 2003,3:13

JAMA Aug 29 2016 – paper survey to residents and attending internal medicine physicians – 18 questions – 117 people responded



Green dots indicate the correct response, and red, incorrect response. Each dot corresponds to 1 physician, and the number of dots in each column corresponds to number of responses. BP indicates blood pressure.

79% overestimated benefit and 66% overestimated harm – 67% were unconfident

Quality of Life & The Care of Patients?

- Quality of Life in Diabetes

Event	QOL Utility
Mild Stroke	0.70
Angina	0.64
Diabetic Neuropathy	0.66
Comprehensive Diabetes Care	0.64

Dialysis patients willing to trade
- 7 months of life to reduce weekly hospital visits from 4 to 3
- 15 months of life to improve travel restrictions (e.g. very to somewhat restricted)

Diabetes Care 2007;30:2478-83. CMAJ. 2012 Mar 20;184(5):E277-83.

Shared Informed Decisions: Do Patients Want It?

- Results vary but 27-55% of population wants[1]
- Factors[1]
  - presenting problem (more for procedures)
  - age (more if younger)
  - gender (more if female)
  - social class/education (more if more)
- "some patients clearly gain reassurance from the medical profession adopting the politically incorrect paternalistic approach."
  - Example: ~62% preferred doctors opinion over any presentation (pictures or numbers) for CVD interventions[1b]

1) BMJ 2000;321:867-71, Med Care 2000;38:335-41, Ann Fam Med 2011;9:121-127. Patient Education and Counseling 2011doi:10.1016/j.pec.2011.02.004 2) BMJ 2000;320:58

Patient preferences for shared decisions: A systematic review

Betty Chewning [a,*], Carma L. Bylund [b], Bupendra Shah [c], Neeraj K. Arora [d], Jennifer A. Gueguen [e], Gregory Makoul [f]

"In three quarters of the cancer studies and invasive procedure studies, the majority of patients preferred shared or autonomous decision making. In contrast, this was true for only about half of the studies with non- disease specific study populations or other chronic conditions, many of which incorporated hypothetical scenarios"

"studies suggest that the number of patients who prefer participation has increased over the past three decades so that the majority of patients prefer to participate in decisions during the encounter"

Patient Educ Couns (2011), doi:10.1016/j.pec.2011.02.004

What do Decision-Aids Accomplish

- **Time: 8 minutes less to 23 longer (median 2.55 minutes longer)**

	Usual care	Decision Aid	Studies (patients)
Knowledge score: from 0 (none) - 100 (perfect)	57%	70%	42 studies (10,842 patients)
Proportion who Understand Risk	30%	54%	19 studies (5868 patients)
Congruence between choice and values	32%	50%	13 studies (4670 patients)
Decisional conflict (<25 decisions made; >38 delayed decision)	13-49	7 lower	22 studies (4343 patients)
Decision made by Practitioner	17%	10%	14 studies (3234 patients)

Cochrane Database Syst Rev. 2014 Jan 28;1:CD001431.

Summary: Review of methods for promoting shared informed decision-making

- 91 studies
- Visual aids (icon arrays and bar graphs) improved understanding and satisfaction.
- Absolute risk > RRR for maximizing accuracy
  - But RRR more likely to get people to accept therapy.
- NNT reduces understanding.

Ann Intern Med. 2014;161:270-280.

Evidence-based risk communication

"There is likely no single best method of communicating probabilities to patients but rather several good options with some better suited to certain risk scenarios."

Ann Intern Med 2014;161:270-80

Recommended approaches

GENERAL SUGGESTIONS - these are "relative"
use percentages or natural frequencies(numerator/denominator)
use absolute terms
add bar graphs or icon arrays
use incremental risk format with icon arrays in the same array
avoid use of NNTs
if use relative risks add baseline risks

Ann Intern Med 2014;161:270-80

Thinking about numbers: Benefits

Intervention	Condition	Relative Risk Reduction
Bisphosphonate	Fracture	20% (non-vertebral) - 50% (hip)
Low Potency Statin	Cardiovascular Disease	25%
High Potency Statin	Cardiovascular Disease	35%
Warfarin	A Fib - Stroke	66%

Heart Failure

In systolic heart failure, 3 drugs do Big things

- Aldosterone antagonists[1,2] ~25%
- β-blockers[3] ~29%
- ACE inhibitors[4,5] ~23%

Assuming mortality= 25%/yr (after 1st hospitalization),[6]
Number needed to Treat are

- Aldosterone antagonists = NNT 16
  - 25% of 25% = 6.25% ➜ 100/6.25 = 16
- β-blockers = NNT 14
  - 29% of 25% = 7.25% ➜ 100/7.25 = 14
- ACE inhibitors = NNT 18
  - 23% of 25% = 5.8% ➜ 100/5.8 = 18

1. NEJM. 1999; 341:709–17. 2. NEJM. 2011; 364:11–21. 3. Arch Intern Med. 2000; 160:621–7. 4. JAMA. 1995; 273(18): 1450–6. 5. Lancet. 2000; 355:1575–81. 6. NEJM. 2006;355(3):260-9.