

## From **Tragic Choices**, Calabresi and Bobbitt, 1978

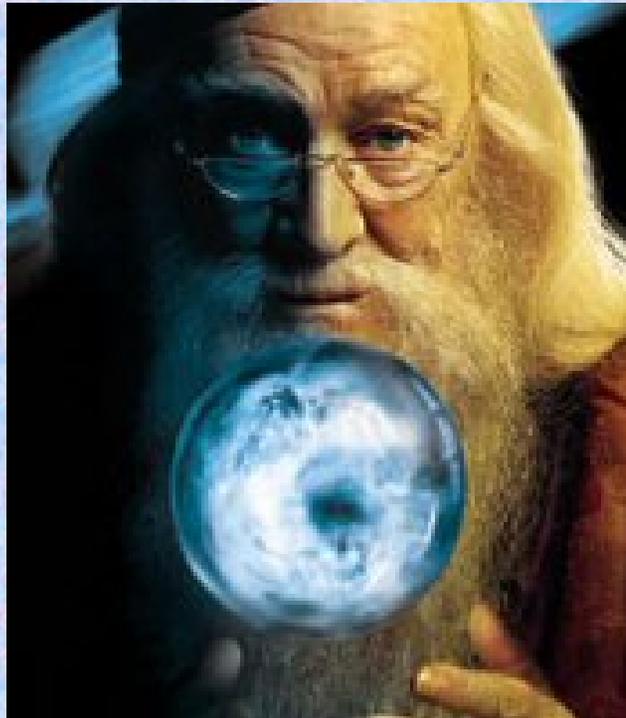
“We cannot know why the world suffers. But we can know how the world decides that suffering shall come to some persons and not to others. ... For it is in the choosing that enduring societies preserve or destroy those values that suffering and necessity expose.” (p 17)

“It is honesty which allows us to see clearly ... the ways, some subtle and some not honest, by which societies must cope. We want to live, but we cannot. We want men to be equal, but they are not. We want suffering to end, but it will not. Honesty permits us to know what is to be accepted and, accepting, to reclaim our humanity and struggle against indignity.” (p 26)

The all-time, bar-none, best quote ever about decision theory:

“It is not our abilities that show what we truly are— it is our choices”

--Albus Dumbledore



## Ultra-conservative Assumptions about Risk Come Naturally

“We have every reason to assume the worst, and we have an urgent duty to prevent the worst from occurring”

-President Bush, 2002

“Even if there was even a 1 in 10 chance that

Saddam Hussein was behind the 9/11 attack

maximum priority should be placed on eliminating that threat”

- Paul Wolfowitz, 2001

Not a trick question: “What do you call a well-conducted epidemiologic study where the best estimate of the odds ratio is 3.0 and there is a 94% chance that the  $OR > 1$  ??”

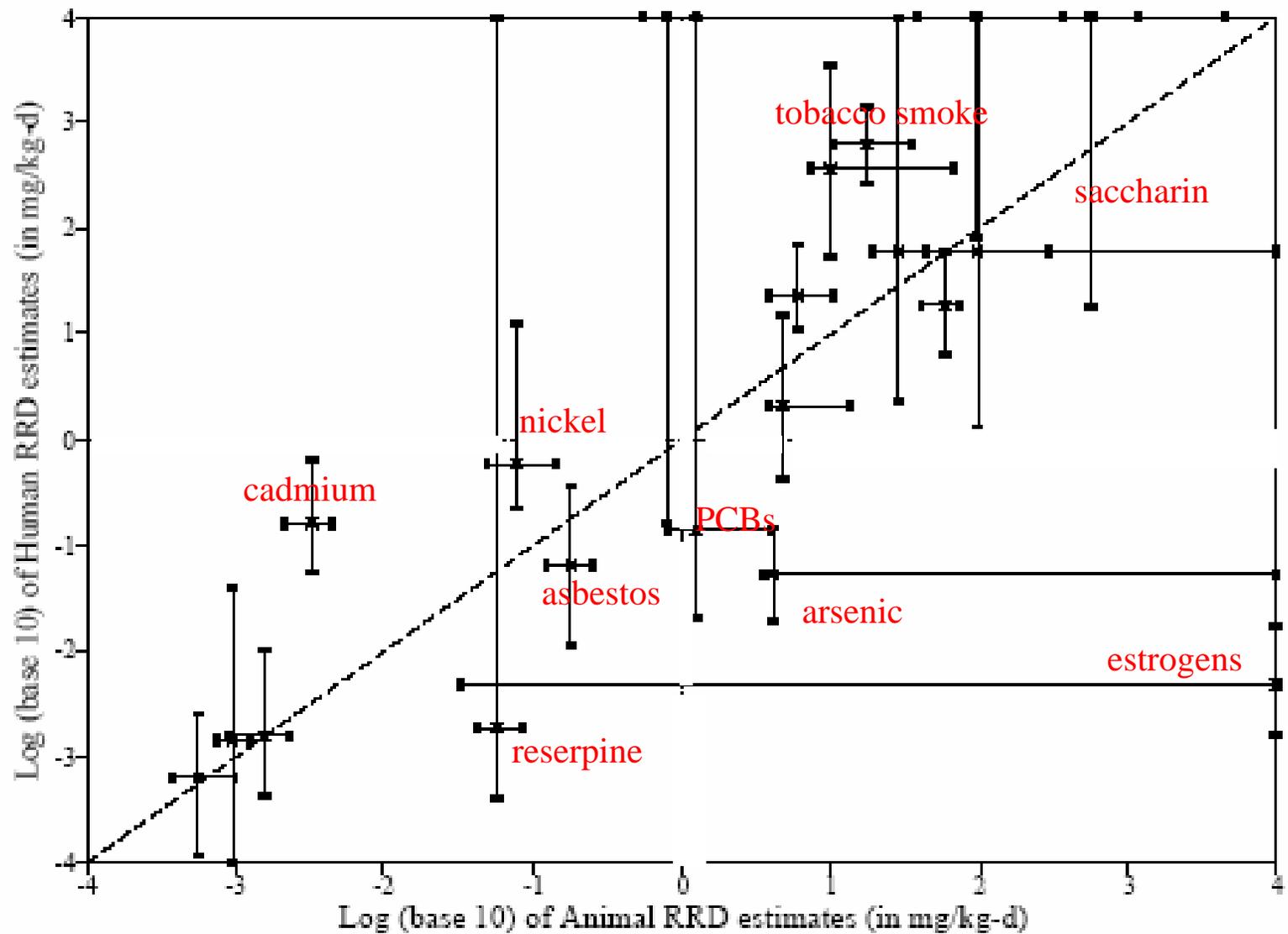
Choose the “Expected Value”–  
Or Can You Think of a Worse Idea?



## A Colossal *Non Sequitur*:

“The EPA has considered [the NAS recommendation] but has decided not to adopt a quantitative default factor for human differences in susceptibility [to cancer] when a linear extrapolation is used. In general, the EPA believes that the linear extrapolation is sufficiently conservative to protect public health. Linear approaches from animal data are consistent with linear extrapolation on the same agents from human data (Goodman and Wilson, 1991; Hoel and Portier, 1994)”

-- EPA Proposed Guidelines for  
Carcinogen Risk Assessment (1996)



The linear default is thought to generally provide an upper-bound calculation of potential risk at low doses, for example, a 1/100,000 to 1/1,000,000 risk. This upper bound is thought to be public-health protective at low doses for the range of human variation, considering the typical Agency target range for risk management of 1/1,000,000 to 1/10,000, although it may not completely be so (Bois et al., 1995) if pre-existing disease or genetic constitution place a percentage of the population at greater risk from exposure to carcinogens. The question of what may be the actual variation in human susceptibility is one that was discussed in general in the NRC (1994) report, as well as the NRC report on pesticides in children and infants (NRC, 1993b). NRC has recommended research on the question, and EPA and other agencies are conducting such research. Given the current state of knowledge, EPA will assume that the linear default procedure adequately accounts for human variation unless there is case-specific information for a given agent or mode of action that indicates a particularly susceptible subpopulation or lifestage, in which case the special information will be used.

# ALL Estimates are “Biased”

Estimate

Corresponding Value Judgment

	(Airplane ex.)	(Unc. in risk)	(Var. in risk)
<b>Mode</b>	Max. probability of arriving just as plane leaves	Max. probability that risk is exactly “acceptable”	Protect “most common person”
<b>Median</b>	50/50 chance of catching or missing flight	50/50 intervention is too risky/ too costly	Protect “typical person”
<b>Mean</b>	X minutes late and X minutes early equally bad	X units “overspending” = X “underspending”	Protect population on average
<b>95<sup>th</sup> %ile</b>	X min. late = 19 times worse than X min. early	X units “underspending” = 19 times worse than converse	Protect persons at increased exposure +/- or susceptibility

## These are BOTH Policy Statements: “Which Side Are You On?”

- “Policy makers should base their decisions about most health risks on the expected value of the risk, not the upper bound”
- “Verily I say unto you, inasmuch as ye have done it unto one of the least of these my brethren, ye have done it unto me ... Inasmuch as ye did it not to one of the least of these, ye did it not to me”

-Nichols and Zeckhauser, 1986

-Matthew 25: 40, 43