Medicine & the **Media**
The Challenge of Reporting on Medical Research

Using What You Have Learned: Numbers

Steven Woloshin, MD, MS
Center for Medicine in the Media
Dartmouth Institute, Lebanon, NH, USA

Il Pensiero Scientifico Editore

ProMIS

1

Session objectives

Illustrate problems with how numbers are communicated using real world examples – abridged but real.

To give practical guidance about ways to understand and communicate data to avoid exaggeration and confusion.

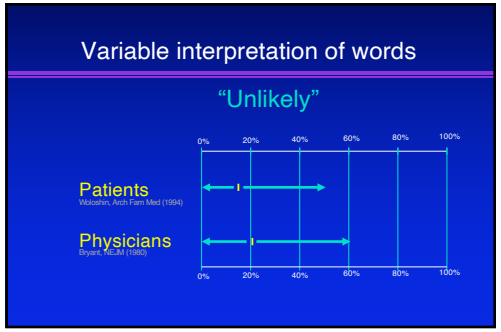
2

What do you think of Dr. Jones' answer?

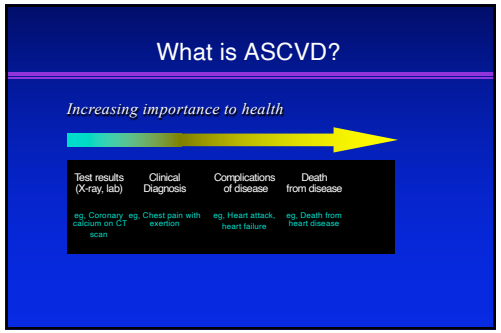
Mrs. Smith: "Doc, that Go Red for Women campaign got me thinking... what is my chance of heart disease and stroke?"

Dr Jones: [thoughtful pause] "It is unlikely

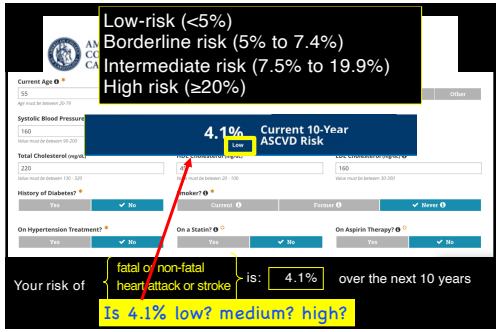
3



4



5



6

Risk Chart

Imagine 1000 women your age.
In the next 10 years, how many will die of....

Age		Breast Cancer	Lung Cancer	Heart Disease	All causes
55 yrs	*Never smoker*	6	2	8	55
	Current smoker	5	26	20	110

7

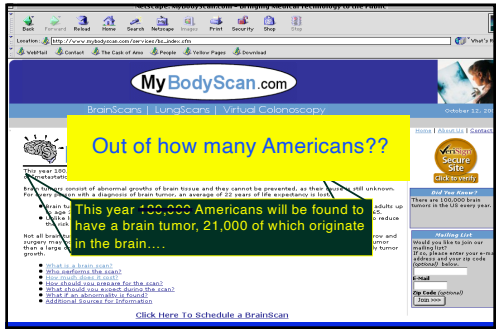
Specific Guidance on providing Risks

Use numbers if possible

Clarify outcome under consideration
- What are you talking about (e.g., getting vs. dying)?
- What is the time frame?

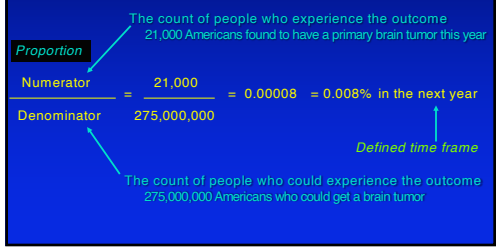
Provide context
- How dangerous (lethality)?
- Compare your risk to that of the "average person"
- Compare this risk to other risks.

8



9

REVIEW:
Anatomy of absolute risk statements



10

Framing

How simple changes in the format of otherwise identical information can influence perceptions.

People were more likely to choose surgery over medical treatment for lung cancer when told the chance of surviving surgery was 90% than when told the chance of dying during surgery was 10%.

MacNeil, et al. NEJM (1982)

11

Saying it both ways...

Imagine 100,000 Americans

In the next year,

8 will get brain cancer
99,992 will not get brain cancer

Balanced framing
BUT...
This can get cumbersome
May lead to data overload

12

Summary Guidance
Problems with numbers

Give numbers

Provide absolute risks with the other information you need to give them meaning.

Make the numbers complete

Talk about risk with both numerator (number who experienced the outcome) and denominators (out of how many).

Give readers a chance to think about the risk both ways (e.g. risk of dying and surviving).

Don't just report the numerator – give absolute risk

13

Read Example 2

14

What is the effect of tamoxifen?

"According to the cancer institute, the drug [tamoxifen] reduced the rate of breast cancers in women to 1 in 130 from 1 in 236 during the study."

15

Some formats are easier than others

Which is the bigger chance?

a. 1 in 236
b. 1 in 130

Which is the bigger chance?

a. 4 in 1000
b. 8 in 1000

16

Snively & Grimes

Asked 633 women attending university affiliated outpatient OB-Gyn clinics…

Which is bigger? `1 in 384 or 1 in 112` 56% correct

Which is bigger? `2.6 per 1000 or 8.9 per 10` 75% correct

17

Summary Guidance
Problems with numbers

Give numbers

Provide absolute risks with the other information you need to give them meaning

Make the numbers complete & easy

Talk about risk with both numerator (count of events) and denominators (out of how many).

Give readers a chance to think about the risk both ways (e.g. risk of dying and surviving).

To facilitate comparison of absolute risks, use frequencies with constant denominator (e.g. "X in 1000" not "1 in X").

18

Percentages better

Annals of Internal Medicine | ORIGINAL RESEARCH

Communicating Data About the Benefits and Harms of Treatment

A Randomized Trial

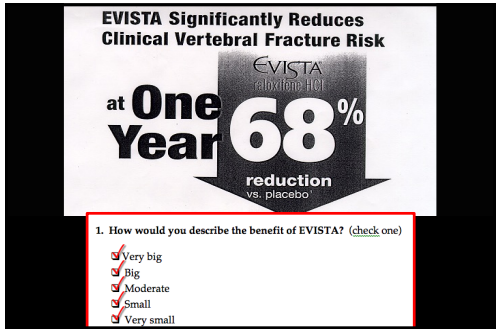
Tested comprehension of data presented in different formats

- Percents best
- X in 1000 format a close second
- Frequencies with changing denominators much worse.
- Combination - "6% or 60 in 1000" - adds little but clutter

19

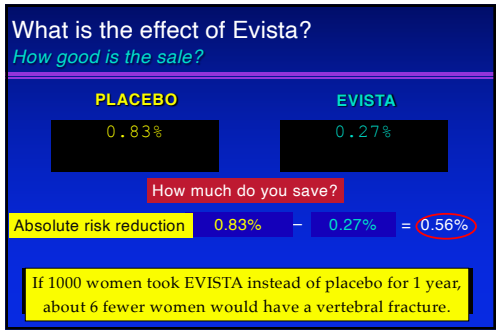
Read Example 3

20

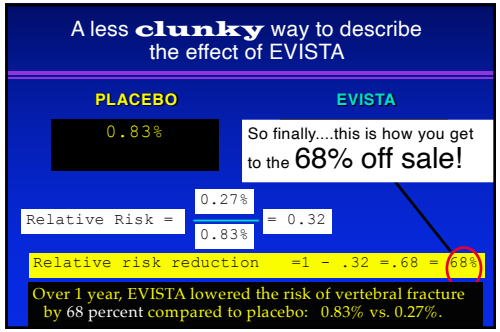


21

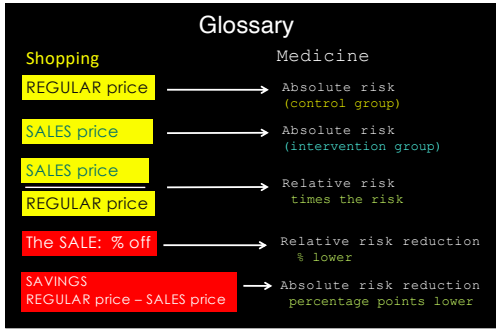
22



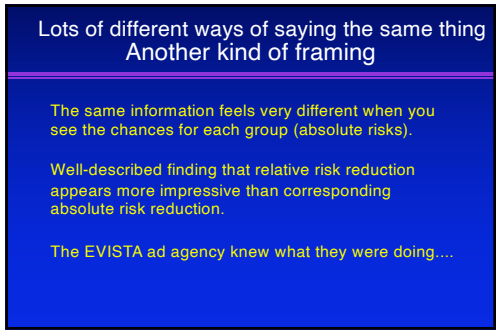
23



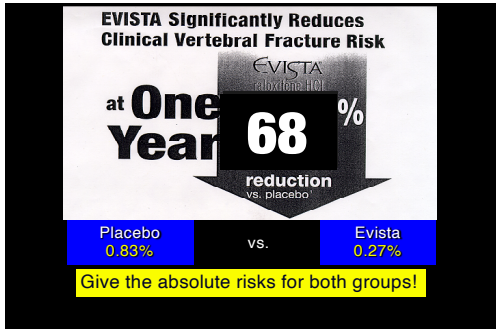
24



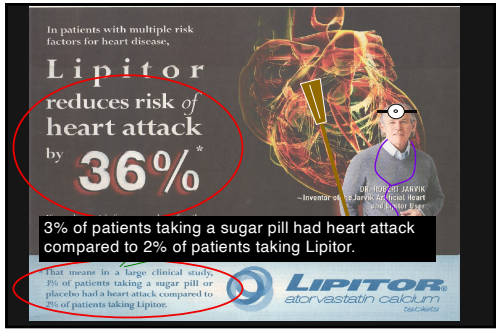
25



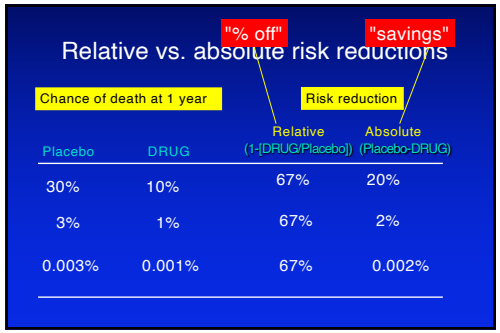
26



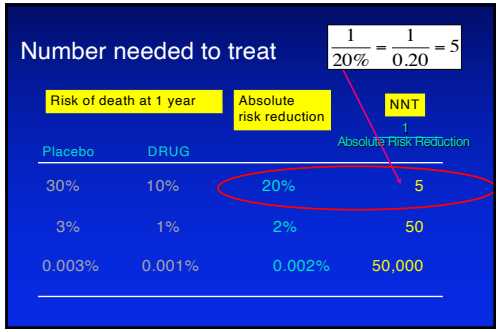
27



28



29



30

Evista: 0.27% vs. 0.83%

Use it in a sentence

Study : Absolute risks with outcome & time frame

The EVISTA group had about one third the risk of a painful spine fracture compared to placebo: 0.3% vs. 0.8% women had a spine fracture over 1 year.

`Relative risk reduction (RRR) = 0.68 = 68%`

EVISTA reduced the risk of a painful spine fracture by 68 percent compared to placebo: 0.3% vs. 0.8% women had a spine fracture over 1 year

`Absolute risk reduction (ARR) = 0.56%`

EVISTA lowered the risk of a painful spine fracture by 0.56 percentage points compared to placebo: 0.3% vs. 0.8% women had a spine fracture over 1 year

`Number needed to treat (NNT) = 178`

178 women would have to take EVISTA for a year to prevent 1 painful spine fracture.

31

Specific Guidance on Effect Sizes

Relative risk reductions (or relative risks) are not meaningful unless you provide the "regular price".

68% less….need to know 68% of what

Comparing absolute risks is most helpful.

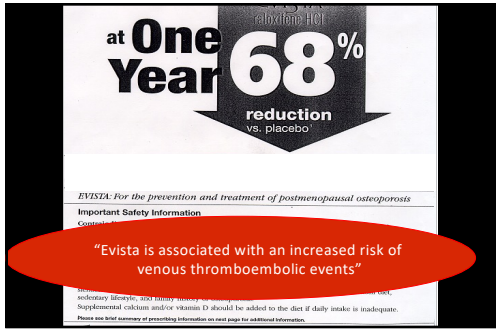
0.8% (placebo) vs. 0.3% (EVISTA)

Relative risks are helpful to compare effect sizes of different exposures.

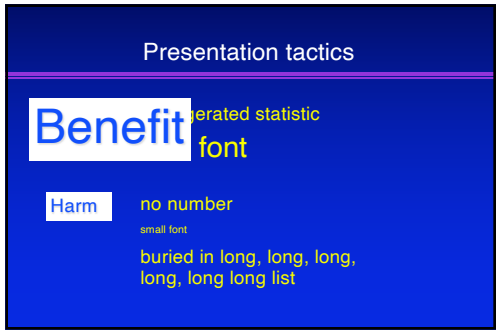
32

What about harms?

33



34



35

36

Understanding harm ALSO means comparing the absolute risks

Risk of venous thromboembolic event over 3 years

PLACEBO	EVISTA
0.35% (3.5 in 1000)	1.1% (11 in 1000)

Relative Risk = 1.1% / 0.35% = 3.1

% higher = 3.1 - 1 = 2.1 = 210%

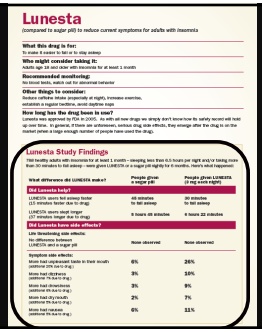
37

Over 3 years, what happened to postmenopausal women with osteoporosis who were given……

	PLACEBO	EVISTA
Benefit		
EVISTA reduced the chance of a painful spine fracture	3.5% 35 out of 1000	2.1% 21 out of 1000
Harm		
EVISTA increased the chance of a serious blood clot	0.35% 3.5 out of 1000	1.1% 11 out of 1000

Net effect of EVISTA per 1000 women:
14 fewer fractures
7.5 more serious blood clots

38



Simple tabular display of benefit and side effects data

39

Drug Box: National Randomized Trial

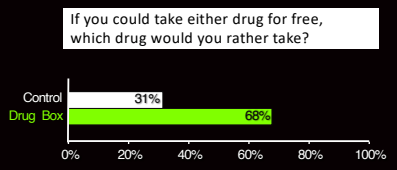
Study Features (n=231)

Real world challenge: Show people ads for 2 drugs treating the same condition.

The drugs have similar side effects but one is substantially more effective.

Can people choose the objectively *better* drug?

40



Annals of Internal Medicine 2009

41

FDA Risk Communication Advisory Committee Recommendations

FDA should adopt a single standard document for communicating essential information about pharmaceuticals which provides quantitative summaries of risks and benefits.

FDA should adopt the Drugs Facts Box format as its standard.

Advisory committee recommendations are non-binding: FDA usually follows them but doesn't have to.

42

43

Summary Guidance
Problems with numbers

Give numbers
Provide absolute risks with the other information you need to give them meaning.

Make the numbers complete & easy
Talk about risk with both numerator (number who experienced the outcome) and denominators (out of how many).
Give readers a chance to think about the risk both ways (e.g. risk of dying and surviving).
To facilitate comparison of absolute risks, use frequencies with constant denominator (e.g. "X in 1000" not "1 in X").

Presenting effect sizes
Relative risks should be accompanied by absolute risks for both benefit and harm.

44