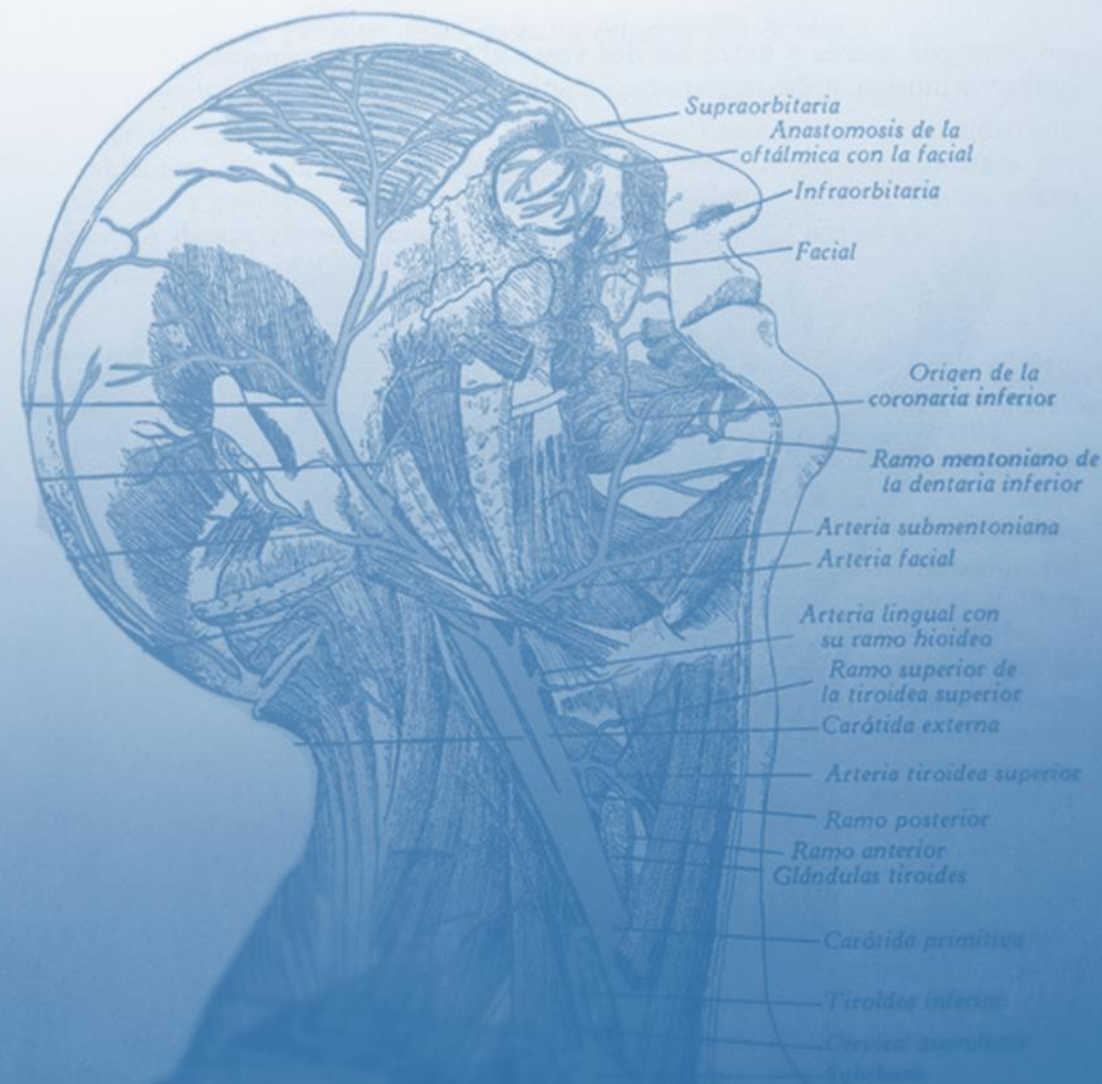


ΑΣΘΕΝΕΙΣ-
ΣΤΑΤΙΣΤΙΚΑ ΣΤΟΙΧΕΙΑ ΥΓΕΙΑΣ:
ΠΑΡΑΚΑΛΩ ΠΡΟΣΟΧΗ ΣΤΟ ΚΕΝΟ

PATIENTS-HEALTH STATISTICS:
PLEASE MIND THE GAP

Αντιγόνη Θεοδώρου, MSc
Medical Statistician



Data-driven patients to make informed decisions about their health



But how to give people the information they **need** to make good medical decisions?



What patients need to know...

- ✓ What are the **benefits**?
- ✓ What are the **risks**?
- ✓ What are the **alternatives**?
- ✓ What will happen **if I do nothing**?

“If citizens want to make informed decisions, they need more than trust: They need to understand health statistics.”

(Gigerenzer et al., 2008, Psychol Sci Public Interest)



Sources of health information

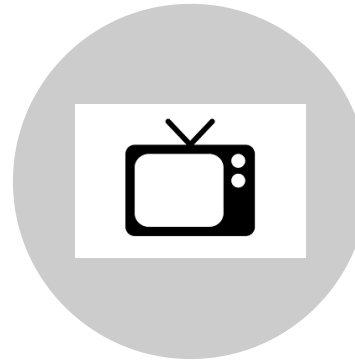
E. Simou, "Health information sources: trust and satisfaction",
International Journal of Healthcare, Oct 2015, vol.2, No.1.

90/100 Internet

79/100 Health professionals



Other sources....



Trouble with health statistics

“Some commonly used statistical concepts are hard to master not only for most patients, but for many professionals as well.”

F. Turone, “The trouble with health statistics” published in Cancer world, Sep 2018.

Link: <https://cancerworld.net/cancerworld-plus/the-trouble-with-health-statistics/>



Barriers to overcome

- *“Statistics, probably more so than any other aspect of research, is full of concepts and technical terms...”*
- No transparent framing of health information
- “Busy physician with limited time to keep abreast of medical research”
- The clinical results “are perceived by physicians as having limited usefulness” .
- *“Many physicians or researchers do not know or understand the medical evidence...”*
- Communication issues (D.P. Olson et al., 2010, Arch Inter Med)

BUT Interest, Confidence and **Ability** by patients’ perspective

(S. Woloshin, 2005, J Gen Intern Med)

No transparent framing of information

Examples

- **Contraceptive Pill Score; absolute risks vs relative risks**

“Absolute increase was only 1 in 7000 whereas the relative increase was indeed 100%.”

- **Positive Mammograms; natural frequencies vs relative frequencies/ conditional probabilities**

“What is the best answer to a woman about whether she has or what is the chance of breast cancer given that she has a positive mammogram? The majority of gynecologists overestimated the probability of cancer.”

- **Prostate cancer survival rates; mortality rates vs 5-year survival rates**

“Due to overdiagnosis and lead-time bias, changes in 5-year survival rates have no reliable relationship to changes in mortality.”

Helping Doctors and Patients Make Sense of Health Statistics

Gerd Gigerenzer,^{1,2} Wolfgang Gaissmaier,^{1,2} Elke Kurz-Milcke,^{1,2} Lisa M. Schwartz,³ and Steven Woloshin³

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Gigerenzer G, Gaissmaier W, Kurz-Milcke E, Schwartz LM, Woloshin S, “Helping Doctors and Patients Make Sense of Health Statistics”, Psychol Sci Public Interest. 2007;8(2):53-96.

Consequences of misunderstanding or misuse of health statistics

Based on previous examples

- **Contraceptive Pill;** *“..pill scare women, hurt the NHS and even hurt the pharmaceutical industry.”*
- **Positive Mammograms;** *“ Months after receiving a false-positive mammogram, 1 in 2 women reported considerable anxiety about mammograms and breast cancer and 1 in 4 reported that this anxiety affected their daily mood and functioning”*
- **Prostate cancer survival rates;** *“Looking at the incidence and mortality data together suggests that many American men have been unnecessarily diagnosed (i.e. overdiagnosed) with the prostate cancer during PSA era and have undergone unnecessary surgery and radiation treatment, which often leads to impotence and/or incontinence.”*

Susceptibility to manipulation of anxieties and hopes

Informed consent and shared decision making undermined

Considerable and unnecessary costs in NHS and pharma industry

Statistical point of view; **Statistical literacy** is a solution

A **minimal statistical literacy** focuses on the main concepts rather than the more advanced topics of variability:



- **Numbers, not only words**
- **Basic numeracy**; convert a percent to a proportion & vice versa, basic probability
- **Avoid bias** by using both positive and negative framing
- **Summary tables** with specific time frames and consistent denominators
- **Live with uncertainty**; no zero-risk, risk of what, risk time frame, risk size, reference population
- **Understand that screening tests may have benefits or harms**; (+) possibility of finding disease earlier/ (-) overdiagnosis, false positives/false negatives, translation of specificities & sensitivities, mortality reduction or improvement of QoL
- **Understand that treatments typically have benefits and harms**; comparing benefits (i.e. risk reduction) & harms (i.e. potentially life threatening side effects), size (i.e. absolute risks of outcomes with and without treatment)
- **Science behind the numbers**; quality of evidence, conflicts of interest

Benefits of statistical literacy

- ✓ Avoid misunderstanding and misuse of health statistics
- ✓ Informed patients >>> Informed decisions
- ✓ Improvement of patient - physician communication
- ✓ Improvement of health outcomes for patients; increase quality of health care
- ✓ Contribution to patient participation & engagement in clinical studies
- ✓ Reduce unnecessary costs



“Statistical literacy
is a necessary
precondition for an
educated
citizenship...”



“Understanding risks and
asking critical
questions...citizens can
develop a better-informed
and more relaxed attitude
toward their health”

Steps must go on...

- Using transparent visual and numerical forms
- Accurate advertisement leaflets by the pharma-industry
- Teaching statistical literacy as the art of solving real-word problems; medical training, corporate training, **patients associations training**
- Training on risk communication
- Teaching statistical thinking already in primary and secondary schools

WHO??



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