Revised Mammogram Recommendations, Nov., 2009

A female friend of yours is just turning 40. Concerned about the possibility of breast cancer, she had planned to get a mammogram in the next few months, despite her fears about excessive radiation. She has heard that a major national Task Force now advises waiting until 50, yet finds reassurances in Women's Health magazine about still following the old guidelines. You both were acquainted with another woman who was diagnosed unexpectedly with breast cancer at age 43 and died last year. Your friend is unsure how to interpret the apparently conflicting information and asks your advice. What analysis would you provide to help inform her decision? If you offer a recommendation or suggest what you would do in her situation, elaborate fully the relevant information.

Resource Documents:

Women's Health magazine article (8 Feb 2010)
  www.womenshealthmag.com/health/medical-tests?cat=18753&tip=18745
New York Times article (17 Nov 2009)
  www.ahrq.gov/clinic/uspstf09/breastcancer/brcanrs.htm#clinical
  www.ahrq.gov/clinic/uspstf09/breastcancer/brcanart.htm
editorial published in Annals of Internal Medicine (15 Feb 2010)
  www.annals.org/content/early/2010/02/12/0003-4819-152-8-201004200-00210.full

potential issues to comment on (scorable points):
• anecdotal reports v. systematic study
• credibility of news sources
• credibility/expertise of researchers vs. doctors vs. lay-women; expertise v. hearsay
• bias of political/gendered context of women's health (*AIM opinion polls)
• scientific change / relative scope of new vs. earlier evidence
• role of context in interpreting the science: yes/no recommendation vs. qualified by family history, risk factors, etc.
  • recognition of more info needed: role of risk factors in interpreting friend's case
• probabilistic nature of statistical analysis
• emotional context v. evidence
• role of financial interests (task force is not commercial)
• value vs. evidence-based elements of assessing "risk"
In November 2009, the author of "The Air Vent," a blog critical of global warming claims, received an anonymous note:

*We feel that climate science is, in the current situation, too important to be kept under wraps. We hereby release a random selection of correspondence, code and documents. Hopefully it will give some insight into the science and the people behind it.*

Included was a link to a file that contained over 1000 e-mails and other material apparently hacked from a server at the Climate Research Unit of the University of East Anglia in Britain. In the e-mails, climatologist Philip Jones, a leading member of the International Panel on Climate Change (IPCC), included comments about scuttling efforts to release data under a Freedom of Information Act request, a "trick" he used in graphing data, and strategies to limit the publication of critics in peer reviewed journals. James Delingpole, in a blog for England's *Telegraph*, promptly dubbed it "Climategate." The news sparked a flurry of comments by skeptics who presented this as proof of their repeated claims about fraud, collusion and conspiracy in climate science. Within a week, the term 'Climategate' could be found over 9 million times on the internet.

While sitting at lunch with two co-workers, one mentions how the case just proves that global warming is a joke. The other, an avid environmentalist, contends that scientists don't do things like that, indicating that the posted documents themselves are probably fraudulent. Amid mutual accusations of being misinformed and biased, they ask you set the other straight.

Comment on a what a well informed interpretation of events in this case might indicate about the conduct of science and the evidence for climate change.

**Resources:**

New York Times (21 Nov 2009): Andrew Revkin, "Hacked E-mail is New Fodder for Climate Dispute"

James Delingpole Blog, Telegraph.co.uk (20 Nov 2009) "Climategate: the final nail in the coffin of 'Anthropogenic Global Warming'"

Nature news brief (26 Nov 2009): "Storm clouds gather over leaked climate e-mails"

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**Some Scorable Concepts:**

- human context of science v. reliability of reasoning
- evaluating completeness & robustness of evidence
- credibility/expertise of climate scientists v. bloggers/bloggers' apparent sources
- nature of graphs (communicating science)
- professional norms of handling scientific data
Facilitated Communication of Coma Patient, Nov., 2009

In November 2009, National Public Radio reported:

Twenty-three years ago, a Belgian car-crash victim [Rom Houben] was diagnosed as being in a vegetative state. But doctors now say he appears to have been conscious the whole time. The man is now communicating using a special touchscreen. Neurologist Steven Laureys, who leads the Coma Science Group at the University of Liege in Belgium, says people in non-communicative states are misdiagnosed up to 40 percent of the time.

Other major news media, including CNN, Fox News, and MSNBC carried the remarkable story. Others were skeptical. In an internet blog, Steven Novella, a neurologist at Yale University, acknowledged that Laureys had "impressive expertise in coma and disorders of consciousness," yet characterized the patient's observed responses as "bogus facilitated communication" — namely, that "the facilitator [who helped the patient to spell out words on the touch screen] is doing the communicating, not Houben."

[? The head of the Belgian hospital enlists your help as an external reviewer and provides a modest budget for additional research on this important question. ?] What is your initial perspective on this case and how would you propose resolving the issue? If you propose further investigation, describe your experimental design and how it will help determine the legitimacy of the claims more decisively. Alternatively, explain how the available information is sufficient to provide a conclusive answer.

Resource Documents

24 Nov 2009 NPR story

CNN story:

Steve Novella blog, Nov. 2009:
http://www.theness.com/neurologicablog/?p=1286#more-1286

potential issues to comment on:
• credibility of NPR and other media
• credibility of Belgian neurologist (acknowledged by critic)
• role of prior beliefs (claims about misdiagnosis; non-brain "soul")
• role of emotional context ("wishful thinking")
• weight of evidence (Novella) against long-term recovery
• control for observer effect through a blind study OR similarity to other cases of undetected cueing (Ouija board, Clever Hans, ESP/psi-testing, etc.)
• repeated documentation of ineffectiveness of 'facilitated communication' (further study not warranted?); weight of other cases of undetected cueing (such as noted above)
Autism & the Measles Vaccine

In January 2009, the prestigious British medical journal Lancet formally retracted a 1998 article that linked a widely used measles-mumps-rubella vaccine to autism, a serious disorder of the nervous system. Studies criticizing the original report were published almost every year until 2004, when 10 of the 13 original co-authors withdrew their support for it. Meanwhile, amid concerns about the widely reported risks, many parents decided not to have their children vaccinated. In 2006 a 13-year-old boy became the first person in 14 years to die from measles in Britain. In 2008 the British government estimated that less than half the children in London and 3 million children nationally had not had the recommended two doses of the vaccine. Charges of misconduct against the lead researcher were filed in 2006, and it now appears that he received substantial funds to sponsor research that would support several patients' legal actions, although he did not report these. The researcher continues to claim no wrong-doing.

You have been appointed as a citizen-member of a panel to review this case and make recommendations: both about specific actions regarding the lead researcher and about general guidelines for reviewing and publishing scientific research and press coverage of health issues. If certain actions seem to have been warranted at certain dates (and were not done), provide information that justifies your view, and indicate how the system of review in science and/or science journalism could be changed accordingly to initiate action at an appropriate time.

Resources

overview: "Retracting a Medical Journal's Autism Study" (New York Times, 8 Feb 2010):
well.blogs.nytimes.com/2010/02/08/did-the-media-inflame-the-vaccine-autism-link/
timeline: "The 12-year controversy over a vaccine" (Telegraph, 29 Jan 2010):
www.telegraph.co.uk/health/healthnews/7091683/The-12-year-controversy-over-a-vaccine.html
"MMR-autism link doctor Andrew Wakefield defends conduct at GMC hearing" (Telegraph, 27 Mar 2008):
"A Short Form FAQ about the Wakefield GMC Case” (Age of Autism website, 28 Jan 2010):

Possible items in student response (what is "scorable")?:
• conflict of interest (not reported)
  • scale of negative consequences amplifies seriousness of any misconduct
• normal "self-correction" by subsequent studies
  • problem of delay in "self-correction"
  • [problem of] cost in "self-correction"
• quality standards of journal & crediblility
  • special status of vaccine study (public relevance) and/or exceptional scale of implications/potential error
• academic freedom/allowance of dissent/disagreement/new discoveries that challenge established knowledge
• role of journalism in public perceptions
  • context of risk-averse public (non-technical perceptions or anti-authoritarian pespectives)
• political context of authority in science and medicine
• anecdotal vs. systematic evidence/case-study versus controlled study/sample size
Beriberi in Java, 1896

It is 1895. You are the governor in Java, a large island of the Dutch territory in Southeast Asia, important in trading spices, coffee, sugar and other products. Recently, there has been a marked rise in the incidence of beriberi, a nervous degenerative disease, sometimes causing death. It is prominent in prisons and insane asylums and among the fleet crews that load the Dutch ships. (In Japan, it seems prevalent in the Army and Navy.) Dutch physician Christiaan Eijkman believes that the disease is caused by a bacterium in rice that, once in the stomach, transforms starch into a neurotoxin. An anti-toxin, he also claims, is present in the coating to the rice (which is "polished" off to yield white rice). Eijkman has just completed a joint study of the incidence of beriberi in Java prisons. The results are presented in Table 1.

(1) Identify at least one other possible explanation for beriberi, consistent with these results. Describe the design of an investigation to help determine which explanation is more justified.

(2) Given the possibility of alternative explanations, what action, if any, is warranted by the results in the interest of public health?

Resource Documents:

• Eijkman's results in Table 1.
• Discussion of other theories (in 1895) about beriberi.

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Possible scorables:
• The comparison (controlled study) of diets indicates that a correlation of beriberi with a polished rice diet.
  • Correlation does not justify causal conclusions.
  • While no statistical analysis of significance is presented, sample size seems sufficient and results seem definitive.
• The study controls for/excludes a role for other possible bacterial vectors (air, water, personal contact).
  • Contrasts with incidence in communities open to contagion.
• Cost of policy (economics)
• Personal autonomy of citizens (ethics)
• Alternative explanation
  • evidence for neurotoxin
  • evidence for anti-toxin
  • nutrient deficiency
  • "simplicity"/consilience of inductions
• Experimental design allows differentiation through appropriate controls or other features
  • ethics of human subject experimentation
  • use of model organisms