

Correspondence

Rat reality show blurs quality control

The governance of science, including the whole system of quality assurance, depends on specialist access to resources and publication. A new and radical engagement of the public in reality and crowd-sourced science is calling this principle into question.

Following the furor surrounding cancer claims for herbicide-resistant transgenic maize (*Nature* 489, 484; 2012; and *Nature* 492, 12; 2012), Russian scientists intend to run a 'rat reality show' that will be broadcast over the Internet around the clock. This year-long, real-time feeding experiment aims to test the safety of genetically modified food products (see go.nature.com/qkvzqe). Actually witnessing the experiment, the team suggests, will allow the public to draw their own conclusions. If the scientists are unable to fund the show from orthodox sources, they plan to crowd-source public funding.

It would be easy to dismiss such 'reality' experiments as a stunt — as frivolity leading to demagoguery. But social media are increasingly influencing mainstream scientific communication and could stimulate a spread in reality science, blurring the demarcations on which the legitimacy and quality assurance of science traditionally depend.

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Cancer goal: deadline will not erode trust

We at the US National Breast Cancer Coalition (NBCC) disagree with your assessment of our 2020 goal of knowing how to prevent breast cancer and its associated deaths (*Nature* 491, 637; 2012). Working towards that



goal will not erode public trust, as you suggest.

Nearly 500,000 women worldwide died of breast cancer last year, despite billions of dollars being invested in research. Many scientists believe that current funding systems favour 'safe' research over bold new ideas. As a result, progress is incremental, leading to slightly better treatments, surgical interventions and radiation regimes. These may provide some benefit, but bring no end to the disease itself.

Scientists and the NBCC need to work together to reorder priorities and change the conversation and culture of science. Trust is not lost when advocates call for a deadline and provide a blueprint for meeting it. But it is eroded when scientific infrastructure is unaccountable to the people intended to benefit from its output; when there is not enough emphasis on translating research discoveries to the clinic; and when published results cannot be replicated and marginal advances are over-hyped. Meanwhile, more and more people lose their lives.

Take a calculated risk with us. Let's reach for what might in fact be possible.

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Cancer goal: vaccine is cause for optimism

As the originator of the project to develop a preventive breast-cancer vaccine, which is supported by the US National Breast Cancer Coalition's (NBCC) 2020 deadline, I question your dismissal of this new approach (*Nature* 491, 637; 2012).

You base your pessimism on the genomic complexity of tumours and the length of time that clinical trials would take to test such a vaccine. But the genomic complexity apparent in mature tumours is not relevant for developing a preventive vaccine: the immune system needs only to be preactivated with antigens presented by the nascent tumour. Unstable RNA processing in a tumour is likely to be a richer source of these antigens than genomic mutations.

It could indeed take a decade or more to validate the treatment using today's clinical standards. But trials could be made shorter and less expensive if, for example, there were definitive ways to detect very early tumours.

You say that "discovery does not answer to deadlines", but accomplishment can. Given the alternatives, we should embrace this effort.

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Tie carbon emissions to consumers

Global carbon dioxide emissions soared from 22.7 billion tonnes in 1990 to 33.9 billion tonnes last year, despite 20 years of attempted mitigation (*Nature* 491, 656–658; 2012). The sizeable economic gaps between nations are largely responsible for the international deadlock in climate negotiations. A radically new approach is needed.

One solution would be to allocate common but differentiated responsibility for mitigating emissions to individual consumption activities, rather than to countries. Profligate consumers from both developed and emerging countries are the worst offenders for generating non-essential emissions. They should be held accountable for those emissions, irrespective of where they are generated.

Emissions produced after reallocating responsibility in this way could be quantified for nations, lifestyles or even every product consumed. This could be achieved by integrating the 'top-down' consumption-based accounting methods that are used to determine national total consumption emissions with 'bottom-up' carbon-footprint calculations based on analysis of products' life cycles (G. P. Peters *Curr. Opin. Environ. Sustain.* 2, 245–250; 2010). A living standard, together with a per capita emission quota, would be defined so that people worldwide could meet their basic living requirements without mitigation costs.

Such standardized measures would allow new cap-and-trade policies and carbon-taxing mechanisms to run smoothly and effectively across different consumption groups at a global scale (see M. Grubb *Nature* 491, 666–667; 2012).

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Sexism: measure journal objectivity

Your initiative to address the issue of sexism in publishing is laudable (*Nature* **491**, 495; 2012). But scientific editors may be biased in other ways that influence the publication process — and they are not in the best position to recognize and correct their own biases.

An independent, external assessment body that regularly evaluates editorial practices across scientific journals might be the answer. This would promote transparency and reassure authors that their work is being dealt with fairly. An 'objectivity factor' resulting from such an assessment could become a key metric of journal performance, alongside its impact factor.

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Sexism: control experimental bias

Implicit bias against women (*Nature* **491**, 495; 2012) has a record of influencing the design of experiments and collection of data in the life and mind sciences.

Over the past four decades, feminist scientists, historians and philosophers of science have presented case study after case study showing how sexist bias can distort scientific results. Examples include work by Rebecca Jordan-Young on brain-organization theory, Anne Fausto-Sterling on the biological study of sex differences and Anelis Kaiser on neuroimaging.

In the interest of greater accuracy, controls for sexist bias need to be more rigorous.
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Sexism: conferences should seek a balance

Conference committees and symposia chairs should follow *Nature's* lead and be more open and proactive about gender balance (*Nature* **491**, 495; 2012).

Publishing an online declaration of gender-balance policy would help. Data from each of the past, say, three meetings could also be posted online to indicate the percentage of women who were registrants, invited plenary and keynote speakers, session speakers, programme committee members, or session chairs. If there is a significant gap between the percentage of women attending the conference and the overall percentage of women speakers or committee members, then a policy overhaul may be called for.

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More trials needed to assess sleeping pills

Sam Fleishman suggests that the controlled use of sleeping pills helps to counter the life-disrupting consequences of insomnia (*Nature* **491**, 527; 2012). But, to our knowledge, there is no convincing evidence that sleep medication can reactivate the health-restoring functions of sleep.

Good-quality sleep improves cognitive performance, vigilance, memory and mood. Poor sleep is associated with potentially damaging physiological effects such as inflammation (M. R. Irwin *et al.* *Brain Behav. Immun.* **24**, 54–57; 2010), compromised immune-cell activity (E. Fondell *et al.* *Brain Behav. Immun.* **25**, 1367–1375; 2011) and telomere shortening (A. A. Prather *et al.* *J. Aging Res.* **2011**, 721390; 2011).

However, the regular use of sleeping pills has been linked with increased mortality and morbidity from infection, depression or cancer (see, for example, D. F. Kripke *et al.* *BMJ*

Open **2**, e000850; 2012).

Large randomizing trials are needed to evaluate the benefits and risks of sleeping pills so that they can be prescribed more responsibly.

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Toe-clipping vital to amphibian research

Keeping a record of the global decline of amphibian populations depends on the identification and marking of individuals in the field, commonly by toe-clipping. This work is under threat: the Brazilian federal government and non-governmental organizations want to prohibit toe-clipping without scientific justification.

Toe-clipping is a simple, cost-effective, minimally invasive marking technique that has been in use for decades in herpetological research. The Brazilian federal agency that enforces environmental policies, IBAMA, is claiming that the practice is a form of mutilation and should be a criminal offence under federal law (see go.nature.com/qkij7l; in Portuguese). The Brazilian Herpetological Society has protested against this anthropocentric position (see go.nature.com/thpwdg; in Portuguese) on the grounds that it would set back efforts to understand amphibian decline.

Brazil is home to the greatest amphibian diversity on Earth, but knowledge of population dynamics is scant and will remain so without access to reliable marking methods. We acknowledge that toe-clipping is not an ideal solution but, when properly implemented, it has minimal effects on amphibian survival and behaviour. Without this technique, it will be harder to obtain crucial information that could prevent amphibian species from becoming extinct (W. C. Funk *et al.* *Nature* **433**, 193; 2005).
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*On behalf of 5 co-signatories (see go.nature.com/5sgsqo for full list).

Missing data mean holes in tree of life

As part of the Open Tree of Life project (<http://opentreeoflife.org>), we surveyed publications covering all domains of life and found that most phylogenetic trees and nucleotide alignments from the past two decades have been irrevocably lost.

Of 6,193 papers we surveyed in more than 100 peer-reviewed journals, only 17% present accessible trees and alignments (used to infer relatedness). Contacting lead authors to procure data sets was only 19% successful. DNA sequences were deposited in GenBank for almost all these studies, but it is the actual character alignments that are pivotal for reproducing phylogenetic analyses. We estimate that more than 64% of existing alignments or trees are permanently lost.

This problem will increasingly hinder phylogenetic inference as the use of whole-genome data sets becomes common. Journals need to reinforce a policy of online data deposition, either as supplementary material or in repositories such as TreeBASE (<http://treebase.org>) or Dryad (<http://datadryad.org>) — including for data sets based on previously published sequences. Ecologists, evolutionary biologists and others will then have access to rigorous phylogenetics for testing their hypotheses.

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*On behalf of 8 co-signatories (see go.nature.com/gzqcr9 for full list).

CORRECTION

The Outlook article 'Genetics: Searching for answers' (*Nature* **491** (suppl. 7422), S4–S6; 2012) incorrectly stated that the Simons Simplex Collection consists of 3,000 blood samples taken from more than 700 people. In fact, it contains 13,000 blood samples taken from 3,000 people.