

THIS WEEK

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Stop vaccine misinformation

Distorted claims that undermine uptake of the human papillomavirus vaccine could leave a generation at risk.

Anti-vaccination campaigns and misinformation are a pernicious threat to public health. Outbreaks of measles — a serious disease that vaccination should have nearly eliminated — are rising around the world, for example. In this climate, it's heartening to see any effort to combat misinformation about vaccine safety. Over the past few months, tech giants such as Facebook, YouTube, Pinterest and Instagram have announced that they are taking at least small steps to reduce the spread of such content on their platforms.

But some scientists who publicly call out 'anti-vaxxers' are still under pressure. One of them is Japanese physician and writer Riko Muranaka, who now lives in Germany and lectures part-time at the Kyoto University School of Medicine in Japan. Muranaka has written extensively about the safety of a vaccine against the human papillomavirus (HPV), a major cause of cervical and other cancers — despite experiencing attacks on her integrity, and even threats of violence. Her persistence won her the 2017 John Maddox Prize for Standing up for Science, awarded by the UK charity Sense About Science and *Nature*.

On 26 March, a court in Tokyo ruled that Muranaka had defamed a medical scientist who claimed that the HPV vaccine could cause brain damage. Although the case against Muranaka was confined to a single charge of libel and did not address the underlying science, the repercussions of the ruling are cause for concern.

The World Health Organization recommends that teenaged girls be vaccinated against HPV (some countries extend this to boys). The Japanese government endorsed this recommendation in April 2013, but only two months later — after unconfirmed media reports of adverse reactions — it suspended all active promotion of the vaccine. It investigated the reports and, in 2014, announced them to be unsubstantiated. Still, it did not lift the suspension, with devastating effects: although overall vaccination rates are not publicly available in Japan, a study in Sapporo showed that uptake fell from around 70% before the suspension to 0.6% after (S. J. B. Hanley *et al. Lancet* **385**, 2571; 2015). The affair has also contributed to declines in HPV vaccination elsewhere in the world.

Muranaka's case centred on work by neurologist Shuichi Ikeda, who at the time was dean of medicine at Shinshu University in Matsumoto, Japan. In March 2016, Ikeda declared in a televised research presentation that the HPV vaccine had caused brain damage in mouse experiments. In June, Muranaka criticized the work in the Japanese-language business magazine *Wedge*, calling his presentation a fabrication.

The university subsequently investigated Ikeda's research and concluded that Ikeda did not commit scientific misconduct, but did overstate the conclusions of tentative results. Given this, the ministry wrote on its website that Ikeda's research had "proved nothing" about whether the side effects were caused by the HPV vaccine, and that Ikeda bears responsibility for misleading the public with an inappropriate presentation. But Ikeda, who left the university after the accusations and is now a physician in a general hospital, sued Muranaka for defamation. She lost, and she and *Wedge* were ordered to pay a fine of ¥3.3 million (US\$29,700). *Wedge* was told to delete mention of data fabrication from

the article, and to publish an apology. Muranaka says that she will appeal.

Still, the wider damage is done. Misinformation about the vaccine has left thousands of people at unnecessarily high risk of cancer. Despite mounting evidence of the vaccine's safety, the ministry is still debating whether to fully endorse it again. It should, as most countries do. And it should not let the ruling be wrongly used as fodder for anti-vaxxers.

If there is a silver lining for those who support Muranaka, it is this: the investigation that led Ikeda's university and the health ministry to censure him for misrepresenting his research was triggered by Muranaka's remarks, and the issue has since won global attention. She may have lost a battle, but the bigger war against vaccine misinformation goes on. ■

Brexit damage

The process of leaving the European Union is causing irreparable harm to research.

Utter chaos. Disaster. A national act of self-harm. All these terms have been used by leading scientists to describe the state of the United Kingdom's plans to leave the European Union. Their words capture just a fraction of the fury and frustration that many people feel at British politicians' mishandling of the Brexit process. As *Nature* goes to press, a no-deal Brexit is set for 12 April, unless parliamentarians can convince the EU to grant an extension.

Under almost any form of Brexit, science will be weakened or the United Kingdom's influence diminished. UK access to EU research funding schemes is far from guaranteed, and additional barriers to immigration seem inevitable. The agonizing, prolonged uncertainty is already affecting recruitment and damaging collaborations. The country's strong position in research rests on its reputation, openness, collaborations and ability to attract the world's best scientists, all of which Brexit will undermine. More broadly, communities in the United Kingdom remain polarized, and crucial issues such as health, education and social welfare are being neglected.

Before the 2016 referendum, *Nature* — like the vast majority of scientists — said that staying in the EU was better for science, that cooperation between member states had helped Europe to become a research powerhouse and that disrupting this was misguided. We still firmly hold that view.

Even the most seasoned political analyst cannot predict what will happen next. Amid the chaos, researchers can be astute observers, clear thinkers, calm investigators and rational speakers. They should continue to use those qualities, not only to oppose Brexit in any form that will harm science, but to look beyond it and repair the damage that has been done to research, relationships and communities. ■