



Journalist Fellowship Paper

# Hydroxychloroquine in Australia: a cautionary tale for journalists and scientists

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The story of hydroxychloroquine is a cautionary tale about the challenges of scientific misinformation in the modern age, *Joanna McCarthy* writes.



*Mask-wearing women hold stretchers near ambulances during the Spanish flu pandemic in St. Louis, Missouri, U.S. in October 1918. Library of Congress/Handout*

In October 1918, the devastating second wave of the influenza pandemic was reaching its peak. Close to 200,000 Americans would die in that month alone. The virus was killing young and healthy people, sometimes within hours of onset. The first infected ship had just arrived in Australian waters.<sup>1</sup>

As Australians braced for the virus' impact, newspapers were flooded with claims of surefire remedies, many of which have been documented by

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<sup>1</sup> National Museum of Australia. 2022. Defining moments: Influenza pandemic. [online] Available at: <<https://www.nma.gov.au/defining-moments/resources/influenza-pandemic>>.

historian Philippa Martyr.<sup>2</sup> “Cures? My goodness me, the vast amount of cures on the market are positively frightening, and everyone has a favourite cure,” wrote a journalist in the *Bendigo Independent* on 19 October 1918. “I pin my faith to one, you to another.”<sup>3</sup> “Our chemists are driving a brisk trade in patent influenza cures,” another paper reported in Orange, New South Wales.<sup>4</sup>

The *Richmond River Herald* ran a story out of New York in which an American doctor claimed “one drachm of infected mucus pasteurised and with filtered water injected subcutaneously” provided a “spontaneous cure”. Within days a young man was seen in a local chemist, clutching the newspaper clipping and sixpence in his hands, “his object being to secure that amount’s worth of the ‘cure’”.<sup>5</sup>

One New Zealand nurse claimed success gargling whisky a few times a day. She prescribed the same regimen for her patients, along with a few drops of whisky “inserted into the nostrils” and a course of quinine. In fact, she suggested everyone take “small doses of quinine during the course of the epidemic”, according to the *Wingham Chronicle* and *Manning River Observer*.<sup>6</sup>

One popular remedy prescribed by doctors around the world - despite a lack of evidence it worked - was the anti-malarial drug quinine.<sup>7</sup> It was promoted

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<sup>2</sup> Martyr, P., 2021. People dropped whisky into their noses to treat Spanish flu. Here’s what else they took that would raise eyebrows today. *The Conversation*, [online] Available at: <<https://theconversation.com/people-dropped-whisky-into-their-noses-to-treat-spanish-flu-heres-what-else-they-took-that-would-raise-eyebrows-today-167525>>.

<sup>3</sup> 1918. *The Bendigo Independent*. [Trove online database] <https://trove.nla.gov.au/newspaper/article/219787116>, National Museum of Australia. Canberra.

<sup>4</sup> 1918. *Leader (Orange)*. [Trove online database] <https://trove.nla.gov.au/newspaper/article/117849190>, National Library of Australia. Canberra.

<sup>5</sup> 1919. *The Richmond River Herald and Northern Districts Advertiser*. [Trove online database] <https://trove.nla.gov.au/newspaper/article/219787116>, National Library of Australia. Canberra.

<sup>6</sup> 1919. *The Wingham Chronicle and Manning River Observer*. [Trove online database] <https://trove.nla.gov.au/newspaper/article/166914012>, National Museum of Australia. Canberra.

<sup>7</sup> Spinney, L., 2020. What the 1918 flu pandemic can teach us about coronavirus drug trials. *The Guardian*, [online] Available at: <<https://www.theguardian.com/commentisfree/2020/apr/05/1918-flu-pandemic-coronavirus-drug-trials-scientists-treatments-evidence>>.

in newspaper advertisements from Britain to the United States.<sup>8</sup> British chemists and doctor's offices were "besieged" with demands for the drug, prompting concerns about panic-buying.<sup>9,10</sup> One chemist in Leicester even received an order for 10,000 doses of the drug, amid reports of shortages.<sup>11</sup>

### We learn from history that we do not learn from history

More than 100 years later, a descendant of quinine would play its own role in the desperate search for a treatment against a new, lethal and poorly understood virus.

On 7 January 2020, The Australian newspaper carried the country's first reports of "an unidentified illness in the central Chinese city of Wuhan".<sup>12</sup> Three weeks later, the first known cases were reported in Victoria and New South Wales.<sup>13</sup> On 11 February, it was given a name: nCoV-19, coronavirus disease (COVID-19).

By the time a global pandemic was declared on 11 March 2020, the virus had taken more than 4,000 people's lives and been detected in more than 100 countries.<sup>14</sup>

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<sup>8</sup> Freckelton QC, I., 2020. COVID-19: Fear, quackery, false representations and the law. *International Journal of Law and Psychiatry*, 72, p.101611.

<sup>9</sup> Spinney, op. cit.

<sup>10</sup> Honigsbaum, M., 2013. Regulating the 1918–19 Pandemic: Flu, Stoicism and the Northcliffe Press. *Medical History*, 57(2), pp.165-185.

<sup>11</sup> Anderson, S., 2020. Locum shortages, fake drugs and demand spikes: Spanish flu in C+D. C + D, [online] Available at: <<https://www.chemistanddruggist.co.uk/CD005230/Locum-shortages-fake-drugs-and-demand-spikes-Spanish-flu-in-CD>>.

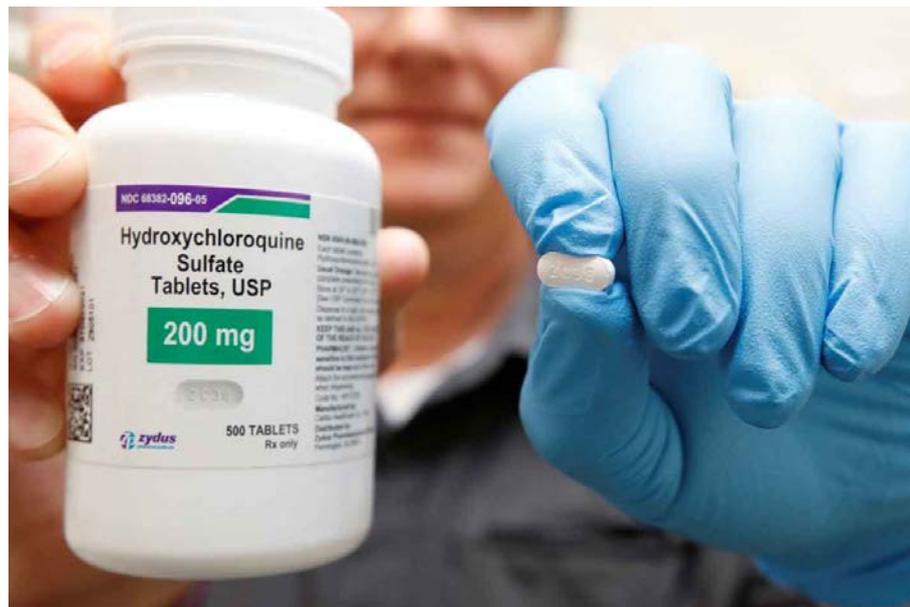
<sup>12</sup> DPA Newswire, 2020. Hong Kong toughens up amid fears of 'new SARS'. *The Australian*, [online] Available at: <<https://www.theaustralian.com.au/world/hong-kong-toughens-up-amid-fears-of-new-sars/news-story/da3a635798aa8f617cd6dbac10de711d>>.

<sup>13</sup> ABC News, 2020. Three cases of coronavirus confirmed in NSW, one in Victoria as death toll rises in China. [online] Available at: <<https://www.abc.net.au/news/2020-01-25/first-confirmed-coronavirus-case-australian-as-china-toll-rises/11900428>>.

<sup>14</sup> ABC News, 2020. WHO declares coronavirus COVID-19 a pandemic and warns situation in Iran and Italy could be replicated in other countries. [online] Available at: <<https://www.abc.net.au/news/2020-03-12/coronavirus-updates-who-declares-pandemic/12047598>>.

In those early months, without a vaccine on the horizon, the availability of cheap and effective treatments was the best hope of averting a global catastrophe. There was good reason to look at drugs that had been in use for decades, whose side effects were known and whose patents had long expired. Hydroxychloroquine – an advanced, synthetic form of quinine used for decades in the treatment of malaria and autoimmune conditions – was an obvious candidate.<sup>15</sup>

As with quinine 100 years earlier, hydroxychloroquine's potential received wide acclaim in early media reports. It was championed by some doctors and scientists. It led to drug shortages in Australia and around the world. It provided hope for ordinary people terrified by the wave of illness sweeping the globe. And – despite the initial high hopes of the scientific community – it would ultimately prove to be of little benefit.



*The drug hydroxychloroquine is displayed by a pharmacist at the Rock Canyon Pharmacy in Provo, Utah, U.S., May 27, 2020. REUTERS/George Frey*

The drug also became a *cause célèbre* in the anti-vaccine protest movements for whom the pandemic represented more sinister forces at work.<sup>16</sup> Central to

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<sup>15</sup> Ben-Zvi, I., Kivity, S., Langevitz, P. and Shoenfeld, Y., 2011. Hydroxychloroquine: From Malaria to Autoimmunity. *Clinical Reviews in Allergy & Immunology*, 42(2), pp.145-153.

<sup>16</sup> Scott, D., 2021. Why people who don't trust vaccines are embracing unproven drugs. *Vox*, [online] Available at:

their worldview was “a deep distrust of science [and] a strong belief in conspiracies, including the notion of ‘Big Pharma’ driving public policy,” political sociologist Josh Roose observed.<sup>17</sup> Seen through this lens, hydroxychloroquine was a cheap and effective “cure” being deliberately withheld to protect the vaccine profits of pharmaceutical companies or score points against political opponents.<sup>18</sup>

The story of hydroxychloroquine would show the difficulties of reporting on a flood of new and often contradictory scientific studies; the need for sober treatment of claims about “breakthroughs” and “cures”; the potential for fraud, sloppiness and overhype within science itself; the tendency of partisans to interpret science in ways that defend their ideology; the role of public figures in promoting false and misleading information; the acceleration of that misinformation on social media; and the dangers when science is politicised and becomes embroiled in conspiratorial culture wars.

The warnings were there early. In March 2020, the co-founders of Retraction Watch, Adam Marcus and Ivan Oransky, wrote in *Wired* magazine: “Much of the *blitzkrieg* of science that emerges in the coming days and weeks will turn out to be wrong, at least in part, and that’s not a bad thing.”<sup>19</sup> Scientists see this uncertainty as fundamental to the advancement of human knowledge, as assumptions are questioned, tested and overturned. But it posed a challenge for reporters dealing with an audience that was hungry for clear, practical advice – with little tolerance for ambiguity at a time when their lives had been dramatically upended. “There’s a serious downside to science having the public’s ear: today’s high-profile expert assertions can be

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<<https://www.vox.com/coronavirus-covid19/22686147/covid-19-vaccine-betadine-hydroxychloroquine-ivermectin-trump-conspiracy>>.

<sup>17</sup> Roose, J., 2021. Why the Victorian protests should concern us all. *The Conversation*, [online] Available at:

<<https://theconversation.com/why-the-victorian-protests-should-concern-us-all-172140>>.

<sup>18</sup> Jamieson, K., 2021. How conspiracists exploited COVID-19 science. *Nature Human Behaviour*, 5(11), pp.1464-1465.

<sup>19</sup> Marcus, A. and Oransky, I., 2020. *The Science of This Pandemic Is Moving at Dangerous Speeds*. [online] *Wired*. Available at:

<<https://www.wired.com/story/the-science-of-this-pandemic-is-moving-at-dangerous-speeds/>>.

disproven by tomorrow’s events,” a group of science communicators warned in April 2020.<sup>20</sup>

Journalists also had to hold public health officials and politicians to account and scrutinise the science they were using to justify harsh restrictions on the population – at a time when “the science” was anything but stable. We needed to distinguish between “legitimate democratic critique of scientifically informed policies on one hand and motivated science denial on the other.”<sup>21</sup>

Scientific consensus did indeed change dramatically during the first two years of the pandemic – on the extent to which the virus’ transmission was airborne, on the public health advice around wearing masks, on the extent to which blood clotting events could be attributed to the AstraZeneca vaccine, and of course, on the efficacy of hydroxychloroquine.

The pandemic felt like a “a real world experiment in demonstrating for us that the way science works, and the way in which science needs to be brought to bear on policy questions, is fundamentally marked by uncertainty,” UNESCO Chairholder in Science Communication for the Public Good Dr Sujatha Raman told me.<sup>22</sup>

Without clear communication of these uncertainties, the situation was ripe for exploitation by populist politicians and keyboard warriors.

This is just some of the context for what the World Health Organisation (WHO) labelled an ‘infodemic’: “an overabundance of information – some accurate and some not – occurring during an epidemic (which) makes it hard for people to find trustworthy sources and reliable guidance when they need it.”<sup>23</sup>

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<sup>20</sup> Scheufele, D., Krause, N., Freiling, I. and Brossard, D., 2020. How Not to Lose the COVID-19 Communication War. *Issues in Science and Technology*, [online] Available at: <<https://issues.org/covid-19-communication-war/>>.

<sup>21</sup> Lewandowsky, S., Armaos, K., Bruns, H., Schmid, P., Holford, D., Hahn, U., Al-Rawi, A., Sah, S. and Cook, J., 2022. When Science Becomes Embroiled in Conflict: Recognizing the Public’s Need for Debate while Combating Conspiracies and Misinformation. *The ANNALS of the American Academy of Political and Social Science*, 700(1), pp.26-40.

<sup>22</sup> Interview with Dr Sujatha Raman on 7 July 2022.

<sup>23</sup> 2020. *Novel Coronavirus(2019-nCoV) Situation Report*. 13th ed. [ebook] Geneva: World Health Organisation. Available at:

This essay reviews how Australian journalists navigated an avalanche of scientific (mis)information, particularly in its coverage of hydroxychloroquine. Drawing on academic literature and interviews with journalists, science communication experts and misinformation researchers, it looks at best practice for reporting on science and challenging misinformation in three contexts. First, when the science is highly uncertain and rapidly changing; secondly, when the science is error-prone or even fraudulent; and third, when the science is subject to intense politicisation. It looks at why misperceptions are so difficult to correct and reviews the evidence for what tools work to correct or inoculate against misinformation.

And it reminds us that the spread of misinformation is not always the work of nefarious actors lurking on social media networks; that it can inadvertently be reproduced by journalists and editors working in good faith to report science at great speed and under immense pressure, and whose work can have real-world consequences on the decisions people make to protect the health of themselves, their families and the broader community.

### Scientific misinformation in the COVID-19 pandemic

Misinformation, at its simplest definition, is information whose accuracy cannot be verified: “cases in which people’s beliefs about factual matters are not supported by clear evidence and expert opinion.”<sup>24</sup>

Some scholars draw a distinction based on intent: disinformation is “the intentional and systematic manipulation of information deceiving a target audience to cause public harm, generate profit and/or advance political goals.”<sup>25</sup> In reality, the lines between the two can blur: “Something that

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<<https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200202-sitrep-13-ncov-v3.pdf>>.

<sup>24</sup> Nyhan, B. and Reifler, J., 2010. When Corrections Fail: The Persistence of Political Misperceptions. *Political Behavior*, 32(2), pp.303-330.

<sup>25</sup> Vériter, S., Bjola, C. and Koops, J., 2020. Tackling COVID-19 Disinformation: Internal and External Challenges for the European Union. *The Hague Journal of Diplomacy*, 15(4), pp.569-582.

starts as misinformation can be picked up by disinformation agents with an agenda”.<sup>26</sup>

This essay is concerned with scientific misinformation in the context of the COVID-19 pandemic, broadly defined by Krause et al (2020) as “any messages that conflict with the best available evidence about COVID-19 and that would likely not be corrected if they were challenged.”<sup>27</sup>

Researchers argue the “best available” scientific evidence is a crucial distinction in the context of COVID-19.<sup>28</sup> Unlike areas for which there exists a scientific consensus based on decades of research – climate science, for example – there remained considerable uncertainty early in the pandemic about how the virus was transmitted, what interventions were warranted and how it was best treated.<sup>29</sup>

The “hydroxychloroquine wars” showed the blurred lines that can exist, as some scholars warn, between “legitimately contested” science and outright misinformation, and the difficulties journalists faced in delineating them.<sup>30</sup>

### How the hydroxychloroquine story started

In February 2020, early in-vitro and small human trials in China had shown promising results for chloroquine and its derivative, hydroxychloroquine, against COVID-19.<sup>31</sup> French microbiologist Didier Raoult, a respected

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<sup>26</sup> Wardle, C., 2019. *Understanding Information Disorder*. First Draft News. Available at: <<https://www.theaustralian.com.au/business/media/paul-keatings-decade-of-hatred-for-chris-uhlmann/news-story/ecf60647498c936d963fc02d099f9d69>>

<sup>27</sup> Krause, N., Freiling, I., Beets, B. and Brossard, D., 2020. Fact-checking as risk communication: the multi-layered risk of misinformation in times of COVID-19. *Journal of Risk Research*, 23(7-8), pp.1052-1059.

<sup>28</sup> Ibid.

<sup>29</sup> Pentzold, C., Fechner, D. and Zuber, C., 2021. “Flatten the Curve”: Data-Driven Projections and the Journalistic Brokering of Knowledge during the COVID-19 Crisis. *Digital Journalism*, 9(9), pp.1367-1390.

<sup>30</sup> Scheufele, D., Krause, N. and Freiling, I., 2021. Misinformed about the “infodemic?” Science’s ongoing struggle with misinformation. *Journal of Applied Research in Memory and Cognition*, 10(4), pp.522-526.

<sup>31</sup> Gao, J., Tian, Z. and Yang, X., 2020. Breakthrough: Chloroquine phosphate has shown apparent efficacy in treatment of COVID-19 associated pneumonia in clinical studies. *BioScience Trends*, 14(1), pp.72-73.

infectious diseases specialist with a reputation as a contrarian, was greatly enthused by these studies.

In late February he appeared in a YouTube video titled *Coronavirus: Game Over!*, declaring: “This is probably the easiest respiratory infection to treat of all. The only thing I’ll tell you is, be careful: soon the pharmacies won’t have any chloroquine left.”<sup>32</sup>



*French medicine professor Didier Raoult, arrives to attend a hearing at the National Assembly in Paris, France, June 24, 2020. REUTERS/Gonzalo Fuentes*

Raoult’s research hospital soon launched its own clinical trial. So promising were its initial findings that Raoult halted the trial after just six days so the outcomes could be shared. The study, published in the *International Journal of Antimicrobial Agents* on 20 March, reported that all six patients treated with hydroxychloroquine and the antibiotic azithromycin were “virologically cured”.<sup>33</sup>

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<sup>32</sup> Sayare, S., 2020. He Was a Science Star. Then He Promoted a Questionable Cure for Covid-19. *New York Times*, [online] Available at: <<https://www.nytimes.com/2020/05/12/magazine/didier-raoult-hydroxychloroquine.html>>.

<sup>33</sup> Gautret, P., Lagier, J., Parola, P., Hoang, V., Meddeb, L., Mailhe, M., Doudier, B., Courjon, J., Giordanengo, V., Vieira, V., Tissot Dupont, H., Honoré, S., Colson, P., Chabrière, E., La Scola, B., Rolain, J., Brouqui, P. and Raoult, D., 2020. Hydroxychloroquine and azithromycin

Despite the limitations of the study – notably its small size – the findings hit the mainstream media in a blaze of publicity. Raoult authorised New York lawyer Gregory Rigano, an early advocate for hydroxychloroquine, to promote the study’s findings before they were published.<sup>34</sup> “We have a strong reason to believe that a preventative dose of hydroxychloroquine is going to prevent the virus from attaching to the body, and just get rid of it completely,” Rigano told Fox News host Laura Ingraham on March 16. Ingraham hailed it as a “game changer”.<sup>35</sup>

On March 18, Ragano appeared on Fox News again. “What we’re here to announce is the second cure to a virus of all time,” he told host Tucker Carlson, describing the paper as “a well-controlled, peer-reviewed study that showed a 100% cure rate against coronavirus.”<sup>36</sup> A few days later, President Trump tweeted that hydroxychloroquine and azithromycin “have a real chance to be one of the biggest game changers in the history of medicine”.<sup>37</sup>

One of the core principles of medical reporting, according to the United Kingdom’s Science Media Centre, is this: “Don’t call something a ‘cure’ that is not a cure”.<sup>38</sup> The “best available” evidence for hydroxychloroquine suggested that journalists needed to treat Raoult’s findings with caution. French scientists pointed out limitations in the way Raoult had designed and conducted the study. The French Health Minister warned that only 24 people

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as a treatment of COVID-19: results of an open-label non-randomized clinical trial. *International Journal of Antimicrobial Agents*, 56(1), p.105949.

<sup>34</sup> Sayare, op cit.

<sup>35</sup> Ibid.

<sup>36</sup> Lee, K., 2020. The Renegade Scientist Behind Hydroxychloroquine, Donald Trump's Miracle Coronavirus Cure. *Esquire Magazine*, [online] Available at: <<https://www.esquire.com/uk/life/a32284282/hydroxychloroquine-donald-trump-coronavirus-cure-didier-raoult/>>.

<sup>37</sup> Cathey, L., 2020. Timeline: Tracking Trump alongside scientific developments on hydroxychloroquine. *ABC News (US)*, [online] Available at: <<https://abcnews.go.com/Health/timeline-tracking-trump-alongside-scientific-developments-hydroxychloroquine/story?id=72170553>>.

<sup>38</sup> Fox, F., 2012. *Ten best practice guidelines for reporting science & health stories*. [ebook] Science Media Centre (UK). Available at: <<https://www.sciencemediacentre.org/wp-content/uploads/2012/09/10-best-practice-guidelines-for-science-and-health-reporting.pdf>>.

were studied and the drug could cause heart complications in some patients.<sup>39</sup>

When scientists claim to have discovered a cure in record speed, the maxim of science communicator Carl Sagan applies: extraordinary claims require extraordinary evidence.<sup>40</sup> Experts warn that “much of what goes wrong” in science coverage lies in overhyping small or preliminary or one-off studies or promoting dramatic policy or behaviour changes on the basis of weak results.<sup>41</sup> The early media hype for Raoult’s study illustrates these dangers.

Meanwhile, in San Francisco, a microbiologist who had made her name fighting scientific fraud had spotted a number of irregularities in Raoult’s paper. Posting on her blog on 24 March, Elisabeth Bik noted that peer review appeared to have taken no more than a day; the control and treatment group had significant differences; and the study was not randomised. Most concerning, of the study’s initial 26 patients treated with hydroxychloroquine, six had dropped out of the study and so were not counted in its results. Two of those six had been transferred to intensive care, one had died and one had stopped taking the medication due to nausea: “So four of the 26 treated patients were actually not recovering at all,” Bik wrote.<sup>42</sup> In this context, Raoult’s “game over” results were looking much shakier.

On April 3, the International Society of Antimicrobial Chemotherapy issued a statement that the Raoult study published in its journal “does not meet the Society’s expected standards”.<sup>43</sup>

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<sup>39</sup> Braun, E., 2020. In France, controversial doctor stirs coronavirus debate. *Politico*, [online] Available at: <<https://www.politico.com/news/2020/03/30/in-france-controversial-doctor-stirs-coronavirus-debate-156889>>.

<sup>40</sup> This is one of the “golden rules” of science journalism cited in Fox, F., 2022. *Beyond the Hype: The Inside Story of Science’s Biggest Media Controversies*. London: Elliott & Thompson.

<sup>41</sup> *Ibid.*

<sup>42</sup> Bik, E., 2022. Thoughts on the Gautret et al. paper about Hydroxychloroquine and Azithromycin treatment of COVID-19 infections. [Blog] *Science Integrity Digest*, Available at: <<https://scienceintegritydigest.com/2020/03/24/thoughts-on-the-gautret-et-al-paper-about-hydroxychloroquine-and-azithromycin-treatment-of-covid-19-infections/>>.

<sup>43</sup> Voss, A., 2022. Statement on IJAA paper. [Blog] *International Society of Antimicrobial Chemotherapy*, Available at: <<https://www.isac.world/news-and-publications/official-isac-statement>>.

In the meantime, hydroxychloroquine was making a splash in Australia. On 17 March, under the headline, “*Coronavirus Australia: Queensland researchers find ‘cure’, want drug trial*”, *news.com.au* reported that “a team of Australian researchers say they’ve found a cure for the novel coronavirus and hope to have patients enrolled in a nationwide trial by the end of the month.”

Professor David Paterson from the Royal Brisbane and Women’s Hospital (RBWH) and University of Queensland was paraphrased saying the two drugs – understood to be an HIV drug and hydroxychloroquine – had “wiped out the virus in test tubes”. One of the drugs, given to some of the first COVID-19 patients in Australia, “had already resulted in ‘disappearance of the virus’ and complete recovery”. Professor Paterson, it continued, “said it wasn’t a stretch to label the drugs ‘a treatment or a cure’.”<sup>44</sup>

Professor Paterson appeared on commercial current affairs program *The Project* that evening to publicise hopes for a clinical trial. Asked whether describing the drug as a “treatment” was the same as calling it “a cure”, he responded: “Absolutely. We know that in the test tubes, and in the patients that have been studied so far, they’re able to recover and have no more evidence of virus in their system.”<sup>45</sup>

The next day the University of Queensland issued a press release confirming that the clinical trials would proceed, with dozens of hospitals taking part. Professor Paterson was quoted describing the drugs as a “potential cure for all”.<sup>46</sup> “Secret trial of AIDS, malaria medications ‘cures’ virus,” appeared one headline in *The West Australian* soon after.<sup>47</sup>

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<sup>44</sup> McPhee, Sarah: *Coronavirus Australia: Queensland researchers find ‘cure’, want drug trial* The Chronicle, March 17, 2020. Available at:

<<https://www.news.com.au/lifestyle/health/health-problems/coronavirus-australia-queensland-researchers-find-cure-want-drug-trial/news-story/93e7656da0cff4fc4d2c5e51706accb>>

<sup>45</sup> The Project, 2020. *Possible COVID-19 Cure*. [video] Available at:

<<https://www.facebook.com/watch/?v=703313707144463>>.

<sup>46</sup> Davey, M., 2022. Clive Palmer ad for coronavirus ‘cure’ cleared by Australian drug regulator. *Guardian Australia*, [online] Available at:

<<https://www.theguardian.com/australia-news/2020/apr/28/clive-palmer-ad-for-coronavirus-cure-cleared-by-australian-drug-regulator>>.

<sup>47</sup> Dunlevy, S. and Minear, T., 2020. Coronavirus crisis: Secret trial of AIDS, malaria medications ‘cures’ virus. *The West*, [online] Available at:

<<https://thewest.com.au/news/coronavirus/coronavirus-crisis-secret-trial-of-aids-malaria-medications-cures-virus-ng-b881494856z>>.

Lyndal Byford, head of news and partnerships at the Australian Science Media Centre, was watching the early coverage of hydroxychloroquine with frustration.

She'd been working with journalists from the earliest days of the pandemic, helping them “sort good science from bad [...] and cut through the hype,” connecting them with scientific experts to comment on the numerous studies that landed in their inbox each day.<sup>48</sup> “We want to work with journalists to help them get it right in the beginning,” she told me. At a time when people were desperate for information, she felt the pandemic provided an opportunity to increase the scientific literacy of Australians. “It was a good opportunity to say, ‘Here's why we're uncertain about these things and this is part of science: we don't have fixed views, we change when there's new evidence and that is the strength of science, not a weakness of it’.”

Research institutions have a responsibility not to overhype single studies or overstate the strength of the evidence, Byford said. In the case of hydroxychloroquine and ivermectin, she recalled drugs being “spruiked as cures for COVID at a stage where they had only been tested in petri dishes in labs, and some of them not even in animals”. While not singling out any institution, Byford said she believed there was a direct relationship between these overstated claims and the misinformation that followed. “When you sort of trace it back, why did those drugs in particular become such a focus?” she said. “There were a lot of press releases coming out of very learned institutions and universities making those sorts of claims from scientists and research organisations who probably should have known better.”

Byford said when science reporting does get it wrong, it's often because the journalist relied on these press releases without seeking an independent opinion. Amid fierce competition for scarce government and philanthropic funds, she acknowledges there is little incentive for media officers to exercise restraint. Overhyped press releases are a well-documented problem in science: in 2016, researchers analysed more than 500 press releases on biomedical and health-related science issued by peer-reviewed journals. Nearly a quarter of the press releases contained “more direct or explicit

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<sup>48</sup> Interview with Lyndal Byford on 27 June 2022.

advice” than the journal paper and more than a fifth contained “exaggerated causal statements” about correlational research.<sup>49</sup>

Similar research they conducted on the UK university sector in 2014 found an even greater rate of inflated claims: 40% of press releases provided exaggerated advice and a third claimed causation where there was only correlation.<sup>50</sup>

*Guardian Australia*’s medical reporter Melissa Davey was one of those who saw the University of Queensland press release and treated it with caution. “You just know that for there to be a “breakthrough” or a “cure”, it needs to have gone through so many rounds of clinical trials,” she told me. “Your alarm bells should be immediately going off.”<sup>51</sup>

Davey was the first Australian journalist to report extensively on scientists’ reservations about hydroxychloroquine. She cited infectious disease experts who warned that it was far from a proven treatment, that it could take several months for conclusive results and that it had been known to cause heart damage and toxicity. “There are good reasons media do not normally report on these clinical trials until they are complete and have undergone peer-review,” she wrote.<sup>52</sup>

## A secret overseas mission

Meanwhile, Clive Palmer – mining billionaire, former member of parliament and leader of the populist United Australia Party (UAP) – was optimistic about the drug’s potential. On 18 March a UAP press release announced he

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<sup>49</sup> Sumner, P., Vivian-Griffiths, S., Boivin, J., Williams, A., Bott, L., Adams, R., Venetis, C., Whelan, L., Hughes, B. and Chambers, C., 2016. Exaggerations and Caveats in Press Releases and Health-Related Science News. *PLOS ONE*, 11(12), p.e0168217.

<sup>50</sup> Sumner, P., Vivian-Griffiths, S., Boivin, J., Williams, A., Venetis, C., Davies, A., Ogden, J., Whelan, L., Hughes, B., Dalton, B., Boy, F. and Chambers, C., 2014. The association between exaggeration in health related science news and academic press releases: retrospective observational study. *BMJ*, 349(dec09 7), pp.g7015-g7015.

<sup>51</sup> Interview with Melissa Davey on 28 June 2022.

<sup>52</sup> Davey, M., 2020. Decades-old drug in two Australian trials related to Covid-19 but experts urge caution. *The Guardian*, [online] Available at: <<https://www.theguardian.com/australia-news/2020/mar/24/decades-old-drug-in-two-australian-trials-related-to-covid-19-but-experts-urge-caution>>.

had donated AUS\$1 million to the RBWH research fund for hydroxychloroquine trials.<sup>53</sup>

On 23 March he went further, announcing that he would personally fund the acquisition or manufacture of one million courses of hydroxychloroquine to be placed on the national stockpile for free use by the Australian people.<sup>54</sup> The health minister soon accepted the “generous” offer.<sup>55</sup> It was reported that Mr Palmer had “mobilised a \$50 million secret overseas mission” and “dispatched 10 people to secret locations across the globe and would bring back the highly sought-after drugs on a private jet.”<sup>56</sup>

Within days, Palmer took out a two-page advertisement in *The Australian* announcing the move. It used the same language of the earliest media coverage, reporting that hydroxychloroquine and the HIV drug could “wipe out the virus in test tubes” and quoting Professor Paterson that “it was not a stretch to describe the drug as a cure.”<sup>57</sup>

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<sup>53</sup> United Australia Party, 2020. *Palmer donates \$1 million to Royal Brisbane Hospital to fight coronavirus*. [online] Available at: <<https://www.unitedaustraliaparty.org.au/palmer-donates-1-million-to-royal-brisbane-hospital-to-fight-coronavirus/>>.

<sup>54</sup> United Australia Party, 2020. *Palmer agrees to fund the manufacture or acquisition of over 1,000,000 courses of Hydroxychloroquine for Australians*. [online] Available at: <<https://www.unitedaustraliaparty.org.au/palmer-agrees-to-fund-the-manufacture-or-acquisition-of-over-1000000-courses-of-hydroxychloroquine-for-australians/>>.

<sup>55</sup> Viellaris, R., 2020. Clive Palmer’s private plane and secret mission for drugs. *The Courier Mail*, [online] Available at: <<https://www.couriermail.com.au/coronavirus/clive-palmers-private-plane-and-secret-mission-for-drugs/news-story/d38675ab6ce0144b1f4d2d084de7f980>>.

<sup>56</sup> Ibid.

<sup>57</sup> Davey, M., 2020. TGA investigating Clive Palmer-funded ads claiming hydroxychloroquine can cure coronavirus. *Guardian Australia*, [online] Available at: <<https://www.theguardian.com/world/2020/mar/27/experts-condemn-clive-palmer-funded-ads-claiming-hydroxychloroquine-can-cure-coronavirus>>.



*Australian billionaire Clive Palmer speaking at a news conference to announce his plan to build Titanic II in 2013. REUTERS/Olivia Harris*

Davey reported that the university was “caught off guard” by the advertisements and had not been consulted about Professor Paterson’s inclusion. She noted that the university had since edited its press release to remove Professor Paterson’s description of the treatments as a “potential cure for all” and to add a clarifying statement. “I have never suggested these drugs be used before a trial establishes their efficacy,” Professor Paterson was quoted in the release. “Unfortunately, my comments have on some occasions been used out of context.”<sup>58</sup>

I asked the University of Queensland about their decision to amend the media release. In a statement (included in full here as Appendix A), it said that in those early months of the pandemic there was “a voracious appetite for news that would provide hope”. It said at all times Professor Paterson was interviewed in the context of a robust, randomised clinical trial: “There was no intention for any suggestion that it was already proven as a ‘cure’ for the coronavirus.” The media release was amended because the university was “uncomfortable with the way the story was being reported” and wanted to “prevent misrepresentation”. Hydroxychloroquine had shown promise in lab testing and “there was a clear sense of urgency to understand the virus [and]

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<sup>58</sup> Ibid.

possible treatments.” There’s little doubt scientists and media officers, like many journalists, were acting in good faith and at great speed at a time when scientific advances were desperately needed.

Clive Palmer remained bullish about the drug’s prospects. In late April, he placed a [three-page advertisement](#) in News Corp newspapers where he announced he had bought 32.9 million doses of the drug. He suggested its use in Australian hospitals was responsible for the country’s low death rate and flattening curve, a claim RMIT ABC Fact Check labelled “baseless”.<sup>59,60</sup>

**The Palmer Foundation COVID-19 Response and Action**

The Palmer Foundation has acquired 32.9 million doses of hydroxychloroquine for treating Australians, free of charge. Part of this is a significant quantity of the active pharmaceutical ingredient, which will enable the manufacture of the tablets right here in Australia.

For details on all these developments, and many more, please visit [palmerfoundation.com.au](http://palmerfoundation.com.au)

Clive Palmer’s advertisement. Source: Palmer Foundation website

Despite warnings about the paucity of evidence, headlines in Australian media between March and August 2020 continued to tout hydroxychloroquine as a “cure”: “Australia to get virus ‘miracle drug’ soon”

<sup>59</sup> Kelly, V., 2020. Clive Palmer takes out three-page ads promoting purchase of malaria drug, hydroxychloroquine. *Mumbrella*, [online] Available at: <<https://mumbrella.com.au/clive-palmer-takes-out-three-page-ads-promoting-purchase-of-malaria-drug-hydroxychloroquine-626121>>.

<sup>60</sup> RMIT ABC Fact Check, 2020. *ABC News*, [online] p.Clive Palmer says hydroxychloroquine contributed to Australia’s low COVID-19 death rate. Is he correct?. Available at: <<https://www.abc.net.au/news/2020-05-21/has-hydroxychloroquine-helped-australia-flatten-the-death-curve/12256996>>.

(*news.com.au*), “Scripts for hyped COVID-19 cure restricted” (*Daily Telegraph*), “Aussies import Trump’s virus ‘cure’ drug” (*The Canberra Times*), and “Virus ‘cure’ imports at record rate” (*The Courier Mail*).<sup>61,62,63,64</sup>

Byford told me she often fields complaints about headlines from scientists. “We always tell [them] to not read the headline but read the story when they get enraged about how something’s been covered,” she said, noting that headlines are often written by sub-editors “who don’t necessarily write the stories”. The crafting of a modest, heavily qualified headline doesn’t necessarily sit well with the journalistic incentive to grab a reader’s attention and attract clicks.

The overhyped media coverage was indeed capturing public attention. In late March, the federal government was warned that patients who needed the drug for other conditions were missing out amid shortages.<sup>65</sup> On 4 April the ABC reported that it had “been flooded with audience questions about ... whether hydroxychloroquine could provide a cure”.<sup>66</sup> By May, more than 6,000 illegally-imported tablets had been seized at the border.<sup>67</sup>

What relationship might be observed between these early news reports on hydroxychloroquine and the misinformation that followed? Journalists and

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<sup>61</sup> Sutton, C., 2020. Australia to get virus ‘wonder drug’ soon. *news.com.au*, [online] Available at:

<<https://www.news.com.au/lifestyle/health/health-problems/coronavirus-australia-to-get-virus-wonder-drug-soon/news-story/e617f96559172b572607794e176bbd30?amp>>.

<sup>62</sup> Dunlevy, S., 3 April 2020. Scripts for hyped COVID-19 cure restricted. *Daily Telegraph*.

<sup>63</sup> The Canberra Times, 2022. Aussies import Trump’s virus ‘cure’ drug. [online] Available at: <<https://www.canberratimes.com.au/story/6750357/aussies-import-trumps-virus-cure-drug/>>.

<sup>64</sup> The Courier Mail, 4 August 2020. Virus ‘cure’ imports at record rate.

<sup>65</sup> Knaus, C., 2022. Lupus sufferers pleaded for hydroxychloroquine before Clive Palmer’s doses were destroyed. *Guardian Australia*, [online] Available at: <<https://www.theguardian.com/australia-news/2021/oct/15/lupus-sufferers-pleaded-for-hydroxychloroquine-before-clive-palmers-doses-were-destroyed>>.

<sup>66</sup> Bogle, A. and Taylor, T., 2020. What do hydroxychloroquine, ibuprofen and blood type have to do with coronavirus? Looking at the COVID-19 myths causing confusion. *ABC News*, [online] Available at: <<https://www.abc.net.au/news/health/2020-04-04/coronavirus-three-pervasive-health-myths-busted/12106820>>.

<sup>67</sup> Australian Border Force, 2020. *Hydroxychloroquine seized at the border*. [online] Available at: <<https://www.abf.gov.au/newsroom-subsite/Pages/Hydroxychloroquine-seized-at-border-08-05-2020.aspx>>.

editors were undoubtedly working in good faith and at great speed as they scrambled to keep audiences informed. But media academics warn that “problematic journalism” – whether the result of poor research or sloppy verification or “sensationalising that exaggerates for effect” – can allow misinformation “to originate in or leak into the real news system”.<sup>68</sup> Much of the misinformation in medical reporting happens when “initial findings” are overhyped and then fail to stand up in subsequent meta-analyses; one study found that journalists rarely inform the public when these initial findings they reported are later overturned.<sup>69</sup>

### One of the biggest retractions in modern history

Fortunately, there were also examples of best practice in science journalism among those reporting on early hydroxychloroquine science. These stories looked closely at how research was conducted, evaluated study designs, explained the importance of sample sizes and contextualised new findings within the existing body of research; all hallmarks of best practice.<sup>70</sup>

“A large study by the WHO should have more reliable results in the coming months,” ABC’s science writers Tegan Taylor and Ariel Bogle wrote. “The answer: science takes time.” Nine Newspapers’ science writer Liam Mannix wrote: “Most new drugs that show promise as potential COVID-19 cures will not end up working, scientists caution, and many are toxic.” Lyndal Byford told Mannix that claims about alternative treatments as a “breakthrough” or “the cure for COVID-19” could undermine public trust in science: “There is a fine line between hope and hype.”

As the hydroxychloroquine ‘infodemic’ raged, these specialist science reporters showed how news outlets can help combat and even inoculate the audience against misinformation.

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<sup>68</sup> Ireton, C. and Posetti, J., 2018. *Journalism, 'Fake News' & Disinformation: Handbook for Journalism Education and Training*. Paris: UNESCO.

<sup>69</sup> Dumas-Mallet, E., Smith, A., Boraud, T. and Gonon, F., 2017. Poor replication validity of biomedical association studies reported by newspapers. *PLOS ONE*, 12(2), p.e0172650.

<sup>70</sup> As described in Swire-Thompson, B. and Lazer, D., 2022. Reducing Health Misinformation in Science: A Call to Arms. *The ANNALS of the American Academy of Political and Social Science*, 700(1), pp.124-135; Guenther, L., Bischoff, J., Löwe, A., Marzinkowski, H. and Voigt, M., 2017. Scientific Evidence and Science Journalism. *Journalism Studies*, 20(1), pp.40-59.

Communication scholars Nisbet and Fahy describe journalists as “knowledge brokers” in the field of science communication, from whom “readers learn not only about the basic facts of science but also how scientific research is conducted, interpreted, communicated, and contested.” They apply “weight of evidence reporting” – “a technique in which journalists seek out and convey where the preponderance of expert opinion lies on an issue” – rather than giving equal weight to outliers. “You like to interview enough people so that you start getting the same answers back and you know that you’ve plumbed the depths, that you’ve got a consensus view,” science writer Dyani Lewis told me.<sup>71</sup>

Knowledge brokers challenge the public misconception which “envisions scientists ‘proving’ or ‘disproving’ asserted “facts” through conclusive experiments”.<sup>72</sup> Or as Ed Yong, who won a Pulitzer Prize for his reporting on COVID-19, put it: “The best science writers learn that science is not a procession of facts and breakthroughs, but an erratic stumble toward gradually diminished uncertainty.”<sup>73</sup>

“Some scientists make the mistake of thinking that journalists are their partners in getting information about science out there, and that’s a misunderstanding,” reflected the *New York Times* science reporter Apoorva Mandavilli during the first year of covering COVID-19. “Journalists are not scientists’ friends, nor their partners. We’re actually there to hold them accountable.”<sup>74</sup>

The story of hydroxychloroquine is also a story about the need for journalists to hold scientists to account. It’s a story that demonstrates how misinformation can prosper “in and about science” itself.<sup>75</sup> The pandemic had triggered what Ed Yong described as “the biggest pivot in the history of

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<sup>71</sup> Interview with Dyani Lewis on 20 June 2022.

<sup>72</sup> Kahan, D., Scheufele, D. and Jamieson, K., 2017. Introduction: Why Science Communication?. *The Oxford Handbook of the Science of Science Communication*.

<sup>73</sup> Yong, E., 2021. *What Even Counts as Science Writing Anymore?*. [online] The Atlantic. Available at:

<<https://www.theatlantic.com/science/archive/2021/10/how-pandemic-changed-science-writing/620271/>>.

<sup>74</sup> Makri, A., 2021. What do journalists say about covering science during the COVID-19 pandemic?. *Nature Medicine*, 27(1), pp.17-20.

<sup>75</sup> West, J. and Bergstrom, C., 2021. Misinformation in and about science. *Proceedings of the National Academy of Sciences*, 118(15).

modern science,” as scientists from every discipline brought their own expertise to the greatest public health crisis in decades.

More than 74,000 COVID-19 papers were listed in the biomedical library PubMed in the first year alone.<sup>76</sup> As hospitals reached capacity and case numbers continued their exponential climb, there was good reason to throw out many of the old rules of scientific practice. But in scientists’ rush to carry out and communicate their research as soon as possible, rigour sometimes became a casualty of speed. The best science reporters played a dual role during this time: explaining and helping their audience build trust in “good science”; while interrogating, uncovering and exposing “bad science” – and even fraud – when it occurred.

“It’s a tight, difficult line to walk as a medical reporter,” Davey told me. “On one hand, you want the general public to trust the science and believe science and rely on good science. On the other hand, you’re saying, ‘There are people who exploit science out there. There are really prestigious, so-called safe journals that get it wrong.’”

Davey urges reporters to be honest and transparent: “You have to go to that extra level [where you] explain to your readers, ‘Here’s why you can trust these organisations, here’s why they sometimes get it wrong, but here’s why you can still trust this process’,” she said.

Davey’s commitment to scrutinising science and holding scientists accountable triggered “one of the biggest retractions in modern history”.<sup>77</sup>

On 22 May 2020, *The Lancet* published a peer-reviewed study based on data from 96,000 patients in 671 hospitals that found an increased rate of death and heart problems in patients treated with the drug.<sup>78</sup> The fallout was

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<sup>76</sup> Yong, E., 2020. *How Science Beat the Virus*. [online] The Atlantic. Available at: <<https://www.theatlantic.com/magazine/archive/2021/01/science-covid-19-manhattan-project/617262/>>.

<sup>77</sup> Heathers, J., 2020. The Lancet has made one of the biggest retractions in modern history. How could this happen?. *Guardian*, [online] Available at: <<https://www.theguardian.com/commentisfree/2020/jun/05/lancet-had-to-do-one-of-the-biggest-retractions-in-modern-history-how-could-this-happen>>.

<sup>78</sup> Mehra, M., Desai, S., Ruschitzka, F. and Patel, A., 2020. RETRACTED: Hydroxychloroquine or chloroquine with or without a macrolide for treatment of COVID-19: a multinational registry analysis. *The Lancet*.

immediate: the World Health Organisation and research bodies around the world called a halt to trials of the drug.<sup>79</sup>

But in Melbourne, Davey had become aware of some irregularities with the data the study used. She spoke to an epidemiologist who made a “throwaway comment [that] he wasn’t quite sure how they got [the data].” When she probed further, he said he wasn’t aware of any hospital reporting systems that would have recorded it.

Davey made more calls; senior epidemiologists in Victoria and New South Wales told her they didn’t believe the data existed. ‘OK, that’s the story,’ she recalled thinking. As she scoured Twitter and science blogs, she saw other scientists raising questions about their country’s data. “Errors happen all the time,” she told me. “But when data doesn’t add up and you can’t figure out how it was even achieved, usually it’s a red flag for much bigger problems with the story.”

Davey published her findings on 27 May: the death and hospitalisation rates reported by *The Lancet*, which had been provided by a private “healthcare data analytics” firm, Surgisphere, didn’t match up with the numbers recorded by Johns Hopkins University; and it wasn’t clear how the Australian data was obtained in the first place, given it isn’t publicly available. Davey had contacted seven Australian hospitals; none had provided their data to Surgisphere. *The Lancet* told her it had asked the authors to provide clarification; one of the co-authors said he was also seeking these answers from Surgisphere with “the utmost urgency”.<sup>80</sup> When Surgisphere refused to provide the full data set for independent audit, the study’s co-authors asked for the study to be retracted, saying they could “no longer vouch for the veracity of the primary data sources”. The prestigious *New England Journal of*

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<sup>79</sup> ABC/Wires, 2020. WHO suspends hydroxychloroquine trial for coronavirus patients due to safety concerns. *ABC News*, [online] Available at: <<https://www.abc.net.au/news/2020-05-26/who-pauses-trial-of-hydroxychloroquine-for-coronavirus-patients/12285652>>.

<sup>80</sup> Davey, M., 2020. Questions raised over hydroxychloroquine study which caused WHO to halt trials for Covid-19. *Guardian Australia*, [online] Available at: <<https://www.theguardian.com/science/2020/may/28/questions-raised-over-hydroxychloroquine-study-which-caused-who-to-halt-trials-for-covid-19>>.

*Medicine* soon followed suit, retracting a separate COVID-19 paper also based on Surgisphere data.<sup>81</sup>

It was the most high-profile but far from the only example of science “getting it wrong” during the pandemic. In a field where career progression depends on getting published and being frequently cited, scientists have strong incentives to deliver dramatic, eye-catching results. Ed Yong says this pull towards “speed, short-termism, and hype at the expense of rigour” was intensified by COVID-19: “With an anxious world crying out for information, any new paper could immediately draw international press coverage – and hundreds of citations”.<sup>82</sup>

### The role of journalism when science gets it wrong

A 2012 study found that two thirds of retractions in biomedical and life sciences were due to misconduct, including fraud or suspected fraud (43.4%), duplicate publication (14.2%), and plagiarism (9.8%).<sup>83</sup> As of July 2022, more than 240 COVID-19 scientific papers have been retracted or withdrawn.<sup>84</sup>

When “misinformation in and about science” prospers, journalists become the unwitting conduits of false and misleading information.

Perhaps the most common pitfall came from reporting on preprints – studies that are made available publicly before they undergo peer review – without acknowledging their preliminary status. In the biomedical field, preprints serve a vital function “speeding up research that could lead to the development of vaccines and treatments”.<sup>85</sup> Their use surged during the pandemic, as did the attention they were given by journalists. “It was such a

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<sup>81</sup> Boseley, S. and Davey, M., 2020. Covid-19: Lancet retracts paper that halted hydroxychloroquine trials. *The Guardian*, [online] Available at: <<https://www.theguardian.com/world/2020/jun/04/covid-19-lancet-retracts-paper-that-halt-ed-hydroxychloroquine-trials>>.

<sup>82</sup> Yong, E., 2020., op. cit.

<sup>83</sup> Fang, F., Steen, R. and Casadevall, A., 2012. Misconduct accounts for the majority of retracted scientific publications. *Proceedings of the National Academy of Sciences*, 109(42), pp.17028-17033.

<sup>84</sup> Retraction Watch. 2022. *Retracted coronavirus (COVID-19) papers*. [online] Available at: <<https://retractionwatch.com/retracted-coronavirus-covid-19-papers/>>.

<sup>85</sup> Kwon, D., 2020. How swamped preprint servers are blocking bad coronavirus research. *Nature*, 581(7807), pp.130-131.

fast-evolving issue and the stakes were so high in terms of (the virus) costing lives,” the ABC’s medical reporter Sophie Scott told me. “People were so desperate to have information.”<sup>86</sup>

Of the 125,000 COVID-related scientific papers released in the first 10 months, just under a quarter were preprints, nearly a third of which were covered by news organisations.<sup>87</sup> “I’d never reported on preprints,” recalled science writer Bianca Nogrady, president of the Science Journalists Association of Australia, “and then all of a sudden they became the absolute frontline of scientific publishing.”<sup>88</sup>

There were early concerns about how these preprints were being reported in the media. In March 2020, preprint servers bioRxiv and medRxiv added a warning to their papers urging journalists not to report preprints as “established information”; the Australian Academy of Science president Professor John Shine made the same plea.<sup>89</sup> There are signs the warnings were falling on deaf ears.

An analysis of more than 450 English-language articles published by 15 digital content providers before June 2020 found that more than 40% did not frame preprints as uncertain at all, not even mentioning the papers were yet to undergo peer review.<sup>90</sup> Dyani Lewis, who won the Eureka Prize for longform science journalism for her coverage of COVID-19 modelling, told me she believes these caveats are the bare minimum; journalists should also seek independent comment before publishing on a preprint.

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<sup>86</sup> Interview with Sophie Scott on 14 July 2022. Scott spoke to me in her personal capacity, not on behalf of the ABC.

<sup>87</sup> Fraser, N., Brierley, L., Dey, G., Polka, J., Pálffy, M., Nanni, F. and Coates, J., 2021. The evolving role of preprints in the dissemination of COVID-19 research and their impact on the science communication landscape. *PLOS Biology*, 19(4), p.e3000959.

<sup>88</sup> Interview with Bianca Nogrady on 27 June 2022.

<sup>89</sup> Davey, M., 2020. Australia’s chief scientist warns against claims of breakthroughs on coronavirus cures. *Guardian Australia*, [online] Available at: <<https://www.theguardian.com/australia-news/2020/apr/30/australias-chief-scientist-warns-against-claims-of-breakthroughs-on-coronavirus-cures>>.

<sup>90</sup> Flerackers, A., Riedlinger, M., Moorhead, L., Ahmed, R. and Alperin, J., 2021. Communicating Scientific Uncertainty in an Age of COVID-19: An Investigation into the Use of Preprints by Digital Media Outlets. *Health Communication*, 37(6), pp.726-738.

Warnings that “low quality” preprints had the potential “to derail public debate and feed conspiracy theories” were soon validated. In one notorious example, a preprint from the University of Ottawa vastly overstated the risk of heart inflammation from the Moderna and Pfizer vaccines; scientists calculated a one-in-1,000 risk when it was closer to one-in-25,000.<sup>91</sup> By the time they withdrew the preprint eight days after its release, the damage was done: the preprint was tweeted more than 11,000 times in its first week; the false “one-in-1,000” figure was cited on-air by podcaster Joe Rogan.<sup>92</sup>

In another example, a preprint claiming ivermectin reduced COVID-19 death rates by more than 90% was withdrawn amid disputed allegations of plagiarism and data manipulation – but not before it had “skewed” two meta-analyses on the drug’s efficacy and been endorsed on the *Wall Street Journal* op-ed pages.<sup>93</sup> The *WSJ* op-ed authors, fellows at the Hoover Institution, issued a correction explaining they were unaware of the retraction: “We have egg on our faces.”<sup>94</sup>

### The four horsemen of irreproducibility

Preprints weren’t the only challenge for journalists. As *The Lancet* retraction showed, peer review was far from failsafe, especially when the review comes at great speed. One preprint server, MedRxiv, reported that the median peer review time for COVID-19 preprints published in journals was just 72 days – twice as fast as for preprints on other topics.<sup>95</sup> In any case peer review is “not

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<sup>91</sup> Miller, A., 2021. A Canadian COVID-19 study that turned out to be wrong has spread like wildfire among anti-vaxxers. *CBC News*, [online] Available at:

<<https://www.cbc.ca/news/health/covid-19-vaccine-study-error-anti-vaxxers-1.6188806>>.

<sup>92</sup> Qiu, L., 2022. Fact-Checking Joe Rogan’s Interview With Robert Malone That Caused an Uproar. *New York Times*, [online] Available at:

<<https://www.nytimes.com/2022/02/08/arts/music/fact-check-joe-rogan-robert-malone.html>>.

<sup>93</sup> Davey, M., 2021. Huge study supporting ivermectin as Covid treatment withdrawn over ethical concerns. *Guardian Australia*, [online] Available at:

<<https://www.theguardian.com/science/2021/jul/16/huge-study-supporting-ivermectin-as-covid-treatment-withdrawn-over-ethical-concerns>>;

<sup>94</sup> Henderson, D. and Hooper, C., 2021. Writers Missed Ivermectin Study Retraction. *Wall Street Journal*, [online] Available at:

<<https://www.wsj.com/articles/egyptian-ivermectin-study-retracted-covid-11627527903>>.

<sup>95</sup> Else, H., 2020. How a torrent of COVID science changed research publishing — in seven charts. *Nature*, 588(7839), pp.553-553.

designed to catch every logical or methodological error in a scientific study, let alone to detect deliberate fraud.”<sup>96</sup>

Journalists need to be aware that a number of shoddy research practices can compromise outcomes. These were famously described by Professor of Neuropsychology Dorothy Bishop as the “four horsemen of irreproducibility”: P-hacking (where only “statistically significant” analyses are reported); HARKing (“hypothesising after results are known”); publication bias (where researchers and journals are less likely to publish studies that show no impact); and low statistical power (for example, where a study has a small sample size).<sup>97</sup> Journalists should also be aware that poor-quality science can also find its way into “predatory journals” which offer “minimal or non-existent” peer review and exist purely to extract publication fees.<sup>98</sup>

Exposing these examples of scientific misconduct is a fundamental duty of science journalism. Sophie Scott, for example, chose not to cover the now-retracted *Lancet* paper linking the MMR vaccine to autism because its problems were apparent early on; instead she worked on a series of stories which highlighted these flaws and refuted the findings. Other times she’s uncovered outright scientific fraud. “I don’t think it undermines science as a whole,” she said. “It’s an important part of keeping people accountable.”

In fact Nisbet and Fahy argue that this work of “knowledge brokers” like Davey and Scott can actually increase public trust in the work of science. “When controversies related to fraud, bias, interpretation, scandal, hype, honest errors, or conflicts of interest emerge,” they argue, “those who are attentive to this form of journalism are more likely to be able to judge when such behaviours are outliers or the norm.”<sup>99</sup>

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<sup>96</sup> Goldstein, C., Murray, E., Beard, J., Schnoes, A. and Wang, M., 2020. Science Communication in the Age of Misinformation. *Annals of Behavioral Medicine*, 54(12), pp.985-990.

<sup>97</sup> Bishop, D., 2019. Rein in the four horsemen of irreproducibility. *Nature*, 568(7753), pp.435-435.

<sup>98</sup> West and Bergstrom, op. Cit. For a guide on spotting these papers, see Bergstrom, C. and West, J., 2019. *Tools - How do you know a paper is legit?*. [online] How do you know a paper is legit?. Available at: <[https://www.callingbullshit.org/tools/tools\\_legit.html](https://www.callingbullshit.org/tools/tools_legit.html)>.

<sup>99</sup> Nisbet and Fahy, op. cit.

At its best, then, science journalism that holds scientists accountable for misconduct helps demonstrate that “no individual scientist should enjoy unchecked status as an unquestionable authority” and that “collective adjudication and contestation of claims ... is an integral part of the scientific process.”<sup>100</sup>

Finally, journalists covering COVID-19 also needed to be cognisant of whether the doctors or scientists they were seeking comment from were recognised experts in their field. The pandemic had seen a flood of “epistemic trespassing” where “thinkers who have competence or expertise to make good judgments in one field” move into an area outside their field of specialisation.<sup>101</sup> To avoid this, the UK Media Centre urged its network of experts “to stick to their disciplines when responding to media queries about COVID-19”.<sup>102</sup> “There's no point getting an epidemiologist to comment on detailed treatment of a viral illness or an ER doctor to comment on the public health implications of masking,” Nogrady told me.

In Melbourne, a group of doctors – described as “general practitioners, urologists, psychiatrists and surgeons” – were profiled in local media reports advocating for hydroxychloroquine and ivermectin.<sup>103</sup> While they believed they were “performing a public service”, they were soon hit with a “cease and desist” letter from the TGA ordering them to take down material promoting the drugs from their website.<sup>104</sup>

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<sup>100</sup> Southwell, B., Brennen, J., Paquin, R., Boudewyns, V. and Zeng, J., 2022. Defining and Measuring Scientific Misinformation. *The ANNALS of the American Academy of Political and Social Science*, 700(1), pp.98-111.

<sup>101</sup> Ballantyne, N., 2018. Epistemic Trespassing. *Mind*, 128(510), pp.367-395.

<sup>102</sup> Fleming, N., 2020. Coronavirus misinformation, and how scientists can help to fight it. *Nature*, 583(7814), pp.155-156.

<sup>103</sup> Piovesan, A., 2021. Melbourne doctors urge officials to consider hydroxychloroquine, ivermectin in fight against COVID-19. *Herald Sun*, [online] Available at: <<https://www.heraldsun.com.au/leader/north/melbourne-doctors-urge-officials-to-consider-hydroxychloroquine-ivermectin-in-fight-against-covid19/news-story/94bad96aa12afe947f6fb726d34a25d8>>.

<sup>104</sup> Simons, M., 2021. Melbourne doctors under review for promoting discredited Covid treatment. *Guardian Australia*, [online] Available at: <<https://www.heraldsun.com.au/leader/north/melbourne-doctors-urge-officials-to-consider-hydroxychloroquine-ivermectin-in-fight-against-covid19/news-story/94bad96aa12afe947f6fb726d34a25d8>>.

News organisations can also face a dilemma covering scientists recognised as specialists in a relevant field but whose views sit outside the mainstream. Media scholars argue “weight of evidence” reporting “can include contrasting viewpoints” but should always tell the audience “where the bulk of evidence lies”.<sup>105</sup>

Retired immunologist Robert Clancy was an advocate for hydroxychloroquine frequently cited by Australian MP Craig Kelly. In February 2021, *Sydney Morning Herald* published an opinion piece by Clancy touting the drug’s benefits alongside an opinion piece by epidemiologist Catherine Bennett arguing there was insufficient evidence.<sup>106</sup>

The effect was to falsely suggest an evenly balanced debate within the scientific community. To address this, the newspaper added a note from Liam Mannix to the op-eds stating that “[t]he evidence shows hydroxychloroquine and ivermectin are not effective in treating or preventing COVID-19.” Clancy was also interviewed on radio stations ABC Newcastle and 6PR.<sup>107</sup> The University of Newcastle issued a statement that it “does not consider Robert Clancy a subject matter expert on COVID-19.”<sup>108</sup>

Sometimes there’s a “grain of truth” in the perspectives of outlier scientists which should be acknowledged, Dr Raman told me, “but that doesn’t mean

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<sup>105</sup> Guenther, L., Bischoff, J., Löwe, A., Marzinkowski, H. and Voigt, M., 2017, op. cit.

<sup>106</sup> Clancy, R., 2020. I’m the virus expert cited by MP Craig Kelly. Vaccines are critical, but he’s not all wrong. *Sydney Morning Herald*, [online] Available at: <<https://www.smh.com.au/national/i-m-the-virus-expert-cited-by-mp-craig-kelly-vaccines-are-critical-but-he-s-not-all-wrong-20210204-p56zfc.html>>; Bennett, C., 2021. Wait for the science – why we shouldn’t be rushed on COVID drugs. *Sydney Morning Herald*, [online] Available at: <<https://www.smh.com.au/national/wait-for-the-science-why-we-shouldn-t-be-rushed-on-covid-drugs-20210204-p56zog.html>>.

<sup>107</sup> ABC Radio Newcastle, 2021. ‘I base my comments on science’: Emeritus professor Robert Clancy defends hydroxychloroquine stance. [online] Available at: <<https://www.abc.net.au/newcastle/programs/drive/robert-clancy-hydroxychloroquine/13127348>>; Clancy, R., 2021. ‘The worst 24 hours of my life’: Immunologist responds to Craig Kelly controversy. *6PR Perth*, [online] Available at: <<https://www.6pr.com.au/the-worst-24-hours-of-my-life-immunologist-responds-to-craig-kelly-controversy/>>.

<sup>108</sup> Parris, M., 2021. Vice Chancellor Alex Perinsky says Newcastle University professor backing Liberal MP’s COVID-19 claims “not an expert.” *Newcastle Herald*, [online] Available at: <<https://www.newcastleherald.com.au/story/7111340/newcastle-uni-says-professor-backing-kelly-virus-claims-not-an-expert/>>.

that the overall conclusion they're drawing is the one that we should advocate for.”

### The story could have ended there

By August 2020, the scientific community’s hopes for hydroxychloroquine had dimmed. Australian scientists dropped hydroxychloroquine from their clinical trials, citing growing evidence including “a large and well-designed study” by Oxford University and the World Health Organisation showing that the drug was not effective in treating COVID-19.<sup>109</sup> The drug’s rise and fall “may represent the most rapid medical reversal in recent history,” observed a group of immunology researchers at the time, “a full ‘pendulum swing’ from early enthusiasm to wide scepticism.”<sup>110</sup>

The story of hydroxychloroquine might have ended there; a matter of clinical judgement by scientists who looked at the best available evidence and found it wanting. Instead, the story reached its denouement in a fierce and increasingly bitter public debate that played out in the Australian media. It revealed what can happen when belief in science becomes a marker of political identity. It became a case study in how misinformation can prosper when science is politicised.

What does it mean to say science is politicised? Bolsen and Druckman say it occurs “when an actor emphasises the inherent uncertainty of science to cast doubt on the existence of scientific consensus”. This undermines scientific decision-making “as groups conduct campaigns with the goal of altering public policy to advance a favoured agenda”.<sup>111</sup>

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<sup>109</sup> AustralaSian COVID-19 Trial, 2020. AustralaSian COVID-19 Trial (ASCOT) removes hydroxychloroquine and lopinavir/ritonavir arms of the trial. [online] Available at: <<https://www.ascot-trial.edu.au/blogs/news/australasian-covid-19-trial-ascot-removes-hydroxychloroquine-and-lopinavir-ritonavir-arms-of-the-trial>>.

<sup>110</sup> Sattui, S., Liew, J., Graef, E., Coler-Reilly, A., Berenbaum, F., Duarte-García, A., Harrison, C., Konig, M., Korsten, P., Putman, M., Robinson, P., Sirolich, E., Ugarte-Gil, M., Webb, K., Young, K., Kim, A. and Sparks, J., 2020. Swinging the pendulum: lessons learned from public discourse concerning hydroxychloroquine and COVID-19. *Expert Review of Clinical Immunology*, 16(7), pp.659-666.

<sup>111</sup> Bolsen, T. and Druckman, J., 2015. Counteracting the Politicization of Science. *Journal of Communication*, 65(5), pp.745-769.

The pandemic, Druckman argues, was “riddled with partisans misusing and misconstruing science.” He says the nature of the scientific enterprise makes it vulnerable to this exploitation in that it “incentivises criticism, cannot provide definitive proof, and is practised by a relatively small, homogenous group of experts.”<sup>112</sup>

The entry of polarising political figures into the hydroxychloroquine debate set the stage for politicisation early on; it led to people “reflexively adopting positions supported by in-party elites and opposing those offered by out-party elites”.<sup>113</sup>

A wealth of studies confirm the role political ideology played in individual responses to COVID-19 science. Studies in the United States found that conservatives rated COVID-19 as less threatening than liberals and were more likely to believe the media was exaggerating the risks.<sup>114</sup> Another U.S. study found that conservatives and liberals alike could “mis-calibrate COVID-19 risks”: while conservatives were less likely to believe COVID-19 statements supported by evidence (for example, that vaccines reduce deaths and hospitalisation), liberals were more likely to believe that science provided answers even where it did not (for example, believing the risk of outdoor transmission is high).<sup>115</sup>

This polarisation is not surprising. Cognitive psychologists have long known our brains are highly motivated to defend our political identities and prior beliefs when assessing new information. This process, known as partisan-motivated reasoning, often outweighs our motivation towards holding accurate beliefs.<sup>116</sup> We tend to give more weight to evidence which

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<sup>112</sup> Druckman, J., 2022. Threats to Science: Politicization, Misinformation, and Inequalities. *The ANNALS of the American Academy of Political and Social Science*, 700(1), pp.8-24.

<sup>113</sup> Hegland, A., Zhang, A., Zichettella, B. and Pasek, J., 2022. A Partisan Pandemic: How COVID-19 Was Primed for Polarization. *The ANNALS of the American Academy of Political and Social Science*, 700(1), pp.55-72.

<sup>114</sup> Calvillo, D., Ross, B., Garcia, R., Smelter, T. and Rutchick, A., 2020. Political Ideology Predicts Perceptions of the Threat of COVID-19 (and Susceptibility to Fake News About It). *Social Psychological and Personality Science*, 11(8), pp.1119-1128.

<sup>115</sup> Graso, M., Henwood, A., Aquino, K., Dolan, P. and Chen, F., 2022. The dark side of belief in Covid-19 scientists and scientific evidence. *Personality and Individual Differences*, 193, p.111594.

<sup>116</sup> National Academies of Sciences, Engineering, and Medicine, 2020. Encouraging Adoption of Protective Behaviors to Mitigate the Spread of COVID-19.

supports our prior beliefs (confirmation bias) and discount that which discredits them (disconfirmation bias) to help ease the psychological discomfort of holding two contradictory positions at once (cognitive dissonance).<sup>117</sup>

The way journalists report science often cues the audience to engage their partisan biases: “A news story might emphasise the political debate about an issue over the science, which then encourages the audience member to think about the issue in terms of his or her ideology.”<sup>118</sup>

It means audiences will often evaluate science journalism based on the extent to which a scientific position accords with their cultural identity and personal values.<sup>119</sup> A meta-analysis across 56 nations showed that “values, ideologies, worldviews and political orientation” are greater predictors of belief in climate change science than education level or even experience of extreme weather events.<sup>120</sup> Researchers have also pointed out that sharing misinformation online is a way of signalling this cultural or political identity; a way to “affiliate themselves with like-minded others,” communications scholar Alice Marwick argues. “What is important is not the accuracy of the information shared, but the identity that it signals.”<sup>121</sup>

This polarisation played out in the debate over hydroxychloroquine in Australia. “To believe in its efficacy is often a way to indicate support for President Trump or an ideological scepticism of the medical establishment, entirely disconnected from the science,” ABC technology reporter Ariel Bogle observed.

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<sup>117</sup> Scheufele, D. and Krause, N., 2019. Science audiences, misinformation, and fake news. *Proceedings of the National Academy of Sciences*, 116(16), pp.7662-7669; Freiling, I., Krause, N., Scheufele, D. and Brossard, D., 2021. Believing and sharing misinformation, fact-checks, and accurate information on social media: The role of anxiety during COVID-19. *New Media & Society*, p.146144482110114.

<sup>118</sup> Akin, H., 2017. Overview of the Science of Science Communication. *The Oxford Handbook on the Science of Science Communication*,.

<sup>119</sup> Kahan, D., 2017. On the Sources of Ordinary Science Knowledge and Extraordinary Science Ignorance. In: K. Hall Jamieson, D. Kahan and D. Schuefele, ed., *The Oxford Handbook of the Science of Science Communication*. [online] Oxford. Available at: <<http://10.1093/oxfordhb/9780190497620.013.4>>.

<sup>120</sup> Hornsey, M., Harris, E., Bain, P. and Fielding, K., 2016. Meta-analyses of the determinants and outcomes of belief in climate change. *Nature Climate Change*, 6(6), pp.622-626.

<sup>121</sup> Marwick, A., 2018. Why Do People Share Fake News? A Sociotechnical Model of Media Effects. *Georgetown Law Technology Review*, 2, pp.474-512.

In late July 2020, a video of US doctors claiming hydroxychloroquine was a cure for coronavirus went viral after being shared by President Trump, Donald Trump Junior and Madonna. The clip was removed by Facebook but “right-wing and conspiratorial online communities – including those in Australia – made a point of keeping the video available online,” Bogle reported.<sup>122</sup>

A number of conservative newspaper columnists also campaigned for Australian health authorities to authorise use of the drug. They often suggested the resistance to the drug was driven by animosity towards President Trump.<sup>123</sup>

“Australian politicians, medico-bureaucrats and journalists would rather let hundreds die than admit Trump may be right about using hydroxychloroquine to cure coronavirus,” wrote Andrew Bolt.<sup>124</sup>

Hydroxychloroquine was also heavily promoted by commentators on Australia’s Sky News Australia, as documented by ABC’s Media Watch in

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<sup>122</sup> Bogle, A., 2020. Hydroxychloroquine is a poor coronavirus treatment but a perfect parable for our times. *ABC News*, [online] Available at: <<https://www.abc.net.au/news/science/2020-08-01/hydroxychloroquine-coronavirus-drug-now-right-wing-ideology/12510812>>.

<sup>123</sup> See eg McCrann, T., 2020. Dan Andrews’ ban on drug is Trump Derangement Syndrome. *Herald Sun*, [online] Available at: <<https://www.heraldsun.com.au/business/terry-mccrann/terry-mccrann-dan-andrews-ban-on-drug-is-trump-derangement-syndrome/news-story/81911d0022d6d2688dfd5b8cd7f68d9a>>; McCrann, T., 2020. When one man’s poison is another’s medicine. *The Australian*, [online] Available at:

<<https://www.theaustralian.com.au/business/economics/when-one-mans-poison-is-another-s-medicine/news-story/263cda24ea01a50ecc9418e667887495>>; Bolt, A., 2020. Morrison Government banning hydroxychloroquine makes no sense. *Herald Sun*, [online] Available at: <<https://www.heraldsun.com.au/news/andrew-bolt-morrison-government-banning-hydroxy-chloroquine-makes-no-sense/news-story/178d6f912298066a4ad529bfcf42ae83>>.

<sup>124</sup> Bolt, A., 2020. Australians left to die instead of Trump’s coronavirus cure being used. *Herald Sun*, [online] Available at: <<https://www.heraldsun.com.au/news/opinion/andrew-bolt/andrew-bolt-australians-left-to-die-instead-of-trumps-coronavirus-cure-being-used/news-story/62dfef105fe561162acff8d3ea063d3f>>.

April 2020, October 2020 and February 2021.<sup>125</sup> In August 2021, YouTube removed Sky News Australia from its platform for seven days for violating its “medical misinformation” policies, saying it didn’t allow content “that encourages people to use hydroxychloroquine or ivermectin to treat or prevent the virus”.<sup>126</sup>

In August 2020, another Australian political figure entered the fractious public debate over the drug, this time from within the federal government’s own ranks. Craig Kelly had been a member of parliament since 2010. He had a long record of questioning climate science and his large social media following saw him dubbed “one of Australia’s most influential politicians on Facebook”.<sup>127</sup> In early August, he posted about hydroxychloroquine on Facebook 18 times over two days: “[C]ontinuing to ban this drug is negligent ... Australian lives should not be a risk because of Trump Derangement Syndrome.”<sup>128</sup> The *Daily Telegraph* [reported](#) that Kelly claimed the World Health Organisation had “faked” the now-retracted *Lancet* study.<sup>129</sup>

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<sup>125</sup> Barry, P., 2020. Hydroxychloroquine disappoints. *ABC Media Watch*, [online] Available at: <<https://www.abc.net.au/mediawatch/episodes/hydroxy/12190376>>; Barry, P., 2020. Hydroxy spurned. *ABC Media Watch*, [online] Available at: <<https://www.abc.net.au/mediawatch/episodes/hydroxy/12758806>>; Barry, P., 2021. Kelly World. *ABC Media Watch*, [online] Available at: <<https://www.abc.net.au/mediawatch/episodes/kelly/13131728>>.

<sup>126</sup> Taylor, J., 2021. Sky News Australia purges several videos from YouTube after ban over Covid misinformation. *Guardian Australia*, [online] Available at: <<https://www.theguardian.com/media/2021/aug/04/sky-news-australia-purges-several-videos-from-youtube-after-ban-over-covid-misinformation>>.

<sup>127</sup> Hall, J., 2020. Critical drug supply running low after Donald Trump wrongfully said it could cure virus. *news.com.au*, [online] Available at: <<https://www.news.com.au/finance/work/leaders/coronavirus-critical-drug-supply-running-low-after-donald-trump-wrongfully-said-it-could-cure-virus/news-story/26775b19b236fab9a232d335f27a9be>>; Taylor, J. and Davies, A., 2021. Craig Kelly and George Christensen top performers on Facebook – and they want to keep it that way. *Guardian Australia*, [online] Available at: <<https://www.theguardian.com/australia-news/2021/jan/12/kelly-christensen-top-performers-on-facebook-and-they-want-to-keep-it-that-way>>.

<sup>128</sup> McSweeney, J., 2020. Craig Kelly supports controversial COVID drug hydroxychloroquine. *Daily Telegraph*, [online] Available at: <<https://www.dailytelegraph.com.au/news/nsw/mp-supports-hydroxychloroquine-strongly-discouraged-as-a-covid-treatment-by-australian-authorities/news-story/83597135ced27776b3be836f02159d95>>.

<sup>129</sup>

<https://www.dailytelegraph.com.au/news/nsw/mp-supports-hydroxychloroquine-strongly-discouraged-as-a-covid-treatment-by-australian-authorities/news-story/83597135ced27776b3be836f02159d95> .

Misinformation researchers have noted how conspiratorial beliefs often involve “not only a wilful rejection of scientific consensus but also false attributions of intent to members of the scientific community.”<sup>130</sup> “There is a special place in hell awaiting those that have been part of the war on hydroxychloroquine for political reasons,” Kelly claimed. “They have the blood of tens of thousands on their hands.”<sup>131</sup>

Australia was being “governed by medical bureaucrats that are part of a mad, insane cult,” he told anti-vaccine protestors in Melbourne.<sup>132</sup> Having been counselled by the Prime Minister to heed expert medical advice, he quit the government in February 2021. Two months later, he was banned from Facebook for violating its misinformation policies.<sup>133</sup> In August, he accepted an offer to become leader of Palmer’s United Australia Party.

### Look for “the tipping point”

Journalists and news organisations faced a dilemma about what treatment to give views expressed by politicians such as Craig Kelly which run counter to the best available scientific evidence.

Misinformation researchers have long warned about the dangers of amplifying false claims: “Reporting too early gives unnecessary oxygen to rumours or misleading content that might otherwise fade away,” said Claire Wardle from the NGO First Draft News. “Reporting too late means the falsehood takes hold and there’s really nothing to do to stop it.”<sup>134</sup>

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<sup>130</sup> Scheufele, D. and Krause, N., op. cit.

<sup>131</sup> Butler, J., 2022. Liberal MP’s ‘dangerous’ hydroxychloroquine claim asks if Vic premier should be jailed. *The New Daily*, [online] Available at: <<https://thenewdaily.com.au/news/2020/08/03/craig-kelly-hydroxychloroquine-claim/>>.

<sup>132</sup> Knause, C., 2022. Craig Kelly billed taxpayers to fly to Melbourne anti-lockdown rallies. *Guardian Australia*, [online] Available at:

<<https://www.theguardian.com/australia-news/2022/apr/08/craig-kelly-billed-taxpayers-to-fly-to-melbourne-anti-lockdown-rallies>>.

<sup>133</sup> Visentin, L., 2021. Craig Kelly permanently booted from Facebook for COVID-19 misinformation. *Sydney Morning Herald*, [online] Available at: <<https://www.smh.com.au/politics/federal/craig-kelly-permanently-booted-from-facebook-for-covid-19-misinformation-20210426-p57mg6.html>>.

<sup>134</sup> Wardle, C., 2018. Five Lessons for Reporting in an Age of Disinformation. [Blog] *Medium*, Available at: <<https://medium.com/1st-draft/5-lessons-for-reporting-in-an-age-of-disinformation-9d98f0441722>>.

It's all the more complicated by the fact many fringe actors actively seek mainstream media attention and celebrate negative coverage as further evidence "they are close to uncovering some deeper truth."<sup>135</sup>

But that calculation changes when a false claim is circulated by a politician or high-profile public figure. "It's already way past the tipping point," First Draft News' Asia Pacific researcher Stevie Zhang told me.

Indeed, there is evidence that "top-down misinformation" shared by politicians, celebrities and other public figures has wide currency; the Reuters Institute surveyed 225 pieces of misinformation early in the pandemic and found misinformation by public figures made up just one fifth of the sample but accounted for more than two thirds of total social media engagement.<sup>136</sup>

For this reason, many misinformation researchers urge journalists to do more to integrate fact-checking of public figures into their daily reporting. "Journalists cannot leave it to fact-checking organisations to do the journalistic work of verifying questionable claims that are presented by sources," Ireton and Posetti write. "The ability of news practitioners to go beyond "he said, she said" journalism, and to investigate the veracity of claims made by those being covered has to be improved."<sup>137</sup>

Bruns, Hurcombe and Harrington also urge reporters to avoid "unchecked 'stenographic' reportage" of false claims from public figures and "adopt a more proactive stance in addressing and debunking controversial and deviant views."<sup>138</sup>

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<sup>135</sup> Bruns, A., Hurcombe, E. and Harrington, S., 2021. Covering Conspiracy: Approaches to Reporting the COVID/5G Conspiracy Theory. *Digital Journalism*, pp.1-22.

<sup>136</sup> Simon, F., Howard, P. and Kleis Nielsen, R., 2020. *Types, sources, and claims of COVID-19 misinformation*. [online] Reuters Institute for the Study of Journalism. Available at: <<https://reutersinstitute.politics.ox.ac.uk/types-sources-and-claims-covid-19-misinformation>>.

<sup>137</sup> Ireton, C. and Posetti, J., op. cit.

<sup>138</sup> Bruns, A., Hurcombe, E. and Harrington, S., op. cit.

## The role of the “continued influence effect”

That said, the evidence for the efficacy of fact-checking – that is, its ability to change the mind of someone who is misinformed – is mixed. Misinformation is, as researchers like to say, “sticky”.

“Virtually no work has been successful at completely eliminating the effects of misinformation,” writes communications scholar Michael Cacciatore in a review of the research literature. “However, some studies have shown promise for reducing misperceptions.”<sup>139</sup>

From the outset, journalists should be aware that fact-checking comes with risks; debunking false or misleading may inadvertently backfire if not approached with care: “[I]t is extremely difficult to return the beliefs of people who have been exposed to misinformation to a baseline similar to those of people who were never exposed to it.”<sup>140</sup> That means that repeating a false claim – even in the form of a correction – can increase its familiarity and strength in the recipient’s mind.<sup>141</sup>

This is known as the “continued influence effect” (CIE), a phenomenon described as “the central conundrum in research on misinformation”.<sup>142</sup> Researchers describe the CIE as “the tendency for information that is initially presented as true, but later revealed to be false, to continue to affect memory and reasoning”.<sup>143</sup>

In one example, a handout prepared by US health authorities outlining the “myths versus facts” on vaccination succeeded in correcting misperceptions initially, but just half an hour later recipients were more likely to recall the

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<sup>139</sup> Cacciatore, M., 2021. Misinformation and public opinion of science and health: Approaches, findings, and future directions. *Proceedings of the National Academy of Sciences*, 118(15).

<sup>140</sup> Lewandowsky, S., Ecker, U., Seifert, C., Schwarz, N. and Cook, J., 2012. Misinformation and Its Correction: Continued Influence and Successful Debiasing. *Psychological Science in the Public Interest*, 13(3), pp.106-131.

<sup>141</sup> Scheufele, D. and Krause, N, op. cit.

<sup>142</sup> Lewandowsky, S., Ecker, U., Seifert, C., Schwarz, N. and Cook, J, op. cit.

<sup>143</sup> Cacciatore, M., op. cit.

myths than if someone had never given them the handout at all.<sup>144</sup> One cognitive explanation relates to our tendency to build “mental models” to explain unfolding events; if a correction retracts a key piece of information in that model, we are left without a coherent explanation and so will revert to the original misperception.<sup>145</sup>

### Provide an alternative causal explanation

Fortunately, there is some evidence for strategies which have been shown to reduce the continued influence effect. A meta-analysis in 2018 found that, in general, corrective messages have a “moderate influence” on belief in misinformation and are more successful when paired with an “appeal to coherence” in the form of an “alternative causal explanation”.<sup>146</sup> Simply advising the audience that President Barack Obama was not born in Kenya, the authors explain, is less effective than pairing it with an explanation for how and why the “birther” conspiracy emerged.

To be most effective, “the alternative narrative should be plausible, should account for the information that was removed by the retraction, and should explain why the misinformation was believed to be correct.”<sup>147</sup> A news item about Didier Raoult’s study by news.com.au reporter Gavin Fernando provided the explanation that the study “was too small and lacked the detail and rigour to be classed as evidence of a legitimate treatment” and had since been disendorsed by the journal’s publishers. He cited four other hydroxychloroquine studies which had not yielded positive results.<sup>148</sup> This “appeal to coherence” allows the individual to update their “mental model” about the Raoult study: “Once people are exposed to a coherent message

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<sup>144</sup> Schwarz, N., Sanna, L., Skurnik, I. and Yoon, C., 2007. Metacognitive Experiences and the Intricacies of Setting People Straight: Implications for Debiasing and Public Information Campaigns. *Advances in Experimental Social Psychology*, 39, pp.127-161.

<sup>145</sup> Lewandowsky, S., Ecker, U., Seifert, C., Schwarz, N. and Cook, J., op. cit.

<sup>146</sup> Walter, N. and Murphy, S., 2018. How to unring the bell: A meta-analytic approach to correction of misinformation. *Communication Monographs*, 85(3), pp.423-441.

<sup>147</sup> Cacciatore, op. cit.

<sup>148</sup> Fernando, G., 2020. TV host warns viewers not to take anti-malarial drug to prevent COVID-19. *news.com.au*, [online] Available at:

<<https://www.news.com.au/world/coronavirus/global/coronavirus-treatment-what-is-hydroxychloroquine-and-is-it-really-safe-to-take/news-story/0ec94ba186fe2d7eda0371efef728e53>>.

that can explain the chain of events, they will be more likely to substitute the false information with the retraction.”<sup>149</sup>

The Debunking Handbook, co-authored by more than 20 misinformation scholars, puts it most simply: “For debunking to be effective, it is important to provide detailed refutations. Provide a clear explanation of (1) why it is now clear that the information is false, and (2) what is true instead.”<sup>150</sup>

### Provide a warning before repeating a false claim

Another evidence-based strategy is to warn the reader before they are exposed to misinformation, and to do so as early as possible in a news report.<sup>151</sup> This could be as simple as labelling a politician’s claim “false” before it is repeated, particularly in the headline and opening paragraphs.

“Often news consumers don't read past the headlines,” Stevie Zhang told me. A headline such as “*Critical drug supply running low after Donald Trump wrongfully said it could cure virus*” (*news.com.au*) effectively primes the reader against misinformation, whereas the headline “*Palmer seizes on lifted ban for drug, claims it vindicates his COVID stance*” (*Brisbane Times*) would be more effective if it explicitly labelled the claim as false, rather than the correction arriving in the ninth paragraph.<sup>152,153</sup>

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<sup>149</sup> Walter, N. and Murphy, S., op. cit.

<sup>150</sup> Lewandowsky, S., Cook, J., Ecker, U. K. H., Albarracín, D., Amazeen, M. A., Kendeou, P., Lombardi, D., Newman, E. J., Pennycook, G., Porter, E. Rand, D. G., Rapp, D. N., Reifler, J., Roozenbeek, J., Schmid, P., Seifert, C. M., Sinatra, G. M., Swire-Thompson, B., van der Linden, S., Vraga, E. K., Wood, T. J., Zaragoza, M. S. (2020). The Debunking Handbook 2020. Available at <https://sks.to/db2020>.

<sup>151</sup> Cacciatore, M., op. cit.

<sup>152</sup> Hall, J., 2020. Critical drug supply running low after Donald Trump wrongfully said it could cure virus. *news.com.au*, [online] Available at: <<https://www.news.com.au/finance/work/leaders/coronavirus-critical-drug-supply-running-low-after-donald-trump-wrongfully-said-it-could-cure-virus/news-story/26775b19b236fafb9a232d335f27a9be>>.

<sup>153</sup> Parnell, S., 2022. Palmer seizes on lifted ban for drug, claims it vindicates his COVID stance. *Brisbane Times*, [online] Available at: <<https://www.brisbanetimes.com.au/national/queensland/palmer-seizes-on-lifted-ban-for-drug-claims-it-vindicates-his-covid-stance-20220407-p5abm3.html>>.

In summary, the co-authors of the *Debunking Handbook* suggest a four-part strategy to make sure corrective messages “stick”:

- Lead with the fact if it’s clear, pithy, and sticky – make it simple, concrete, and plausible. It must “fit” with the story.
- Warn beforehand that a myth is coming – mention it once only.
- Explain how the myth misleads.
- Finish by reinforcing the fact – multiple times if possible. Make sure it provides an alternative causal explanation.<sup>154</sup>

### The role of motivated reasoning

The continued influence effect is not the only potential barrier to correcting misinformation. Some researchers also warn that fact-checking is less effective in highly-charged environments where the recipient is motivated to defend their existing beliefs, political identities or value systems.<sup>155</sup>

Political scientist Brendan Nyhan, for example, reviewed the evidence in 2021 and concluded that fact-checking is “somewhat effective” but the accuracy-increasing effects “often do not last or accumulate; instead, they frequently seem to decay or be overwhelmed by cues from elites and the media promoting more congenial but less accurate claims.”<sup>156</sup>

Despite the prevalence of fact-checks addressing Craig Kelly’s claims, for example, there was no shortage of what Nyhan describes as “more congenial but less accurate claims” being circulated that those with a partisan allegiance to Kelly could seek out.

Misinformation scholars also point out motivated reasoning isn’t prompted by an individual’s lack of information or knowledge about a subject: indeed,

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<sup>154</sup> Lewandowsky, S., Cook, J., Ecker, U. K. H., Albarracín, D., Amazeen, M. A., Kendeou, P., Lombardi, D., Newman, E. J., Pennycook, G., Porter, E. Rand, D. G., Rapp, D. N., Reifler, J., Roozenbeek, J., Schmid, P., Seifert, C. M., Sinatra, G. M., Swire-Thompson, B., van der Linden, S., Vraga, E. K., Wood, T. J., Zaragoza, M. S., op. cit.

<sup>155</sup> Scheufele, D. and Krause, N., op cit.; Krause, N., Wirz, C., Scheufele, D. and Xenos, M., 2019. Fake News: A New Obsession with an Old Phenomenon?. In: J. Katz and K. Mays, ed., *Journalism and Truth in an Age of Social Media*. Oxford: Oxford University Press, pp.58-78.

<sup>156</sup> Nyhan, B., 2021. Why the backfire effect does not explain the durability of political misperceptions. *Proceedings of the National Academy of Sciences*, 118(15).

the greater their knowledge, the more likely they are to accept or reject evidence in ways which defend their prior beliefs.<sup>157</sup>

Two experimental studies in the U.S. found that those who were highly knowledgeable about politics more readily accepted arguments (on gun control and affirmative action) that conformed with their prior attitudes and applied greater critical scrutiny to those that contradicted them. Even when confronted with balanced arguments for and against, people tended to “strengthen their attitudes in ways not warranted by the evidence”.<sup>158</sup>

On the other hand, there is some evidence that the effects of partisan-motivated reasoning can be reduced: a 2019 study of more than 10,000 participants showed that people across the ideological spectrum are capable of updating false beliefs with corrective information, although the authors did not know how lasting these effects were.<sup>159</sup>

Some of the strategies researchers have put forward as a way of motivating the audience away from “biased processing” and towards accuracy include:

- **Reducing partisan and ideological cues.** Brendan Nyhan urges journalists to avoid false balance on matters of scientific consensus – “the habit of balancing messages from experts on issues where scientific consensus exists with citations to polarising opponents” – and emphasise instead the views of nonpartisan experts.<sup>160</sup> The perceived credibility of the source matters: other researchers have suggested fact-checking organisations work to build trust with partisan audiences who hold suspicions about mainstream media.<sup>161</sup> They recommend partnering with highly-trusted organisations; national science agency the CSIRO, for example, is the most trusted science institution in Australia.<sup>162</sup>

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<sup>157</sup> Scheufele, D. and Krause, N., op. cit.

<sup>158</sup> Taber, C. and Lodge, M., 2006. Motivated Skepticism in the Evaluation of Political Beliefs. *American Journal of Political Science*, 50(3), pp.755-769.

<sup>159</sup> Wood, T. and Porter, E., 2016. The Elusive Backfire Effect: Mass Attitudes' Steadfast Factual Adherence. *SSRN Electronic Journal*.

<sup>160</sup> Nyhan, B., op. cit.

<sup>161</sup> Krause, Freiling, Beets and Brossard, op. cit.

<sup>162</sup> CSIRO, 2014. *Community attitudes science and technology in Australia*. [online] Available at: <<https://publications.csiro.au/rpr/download?pid=csiro:EP145330&dsid=DS1>>.

- **Tailoring corrections and affirming the audience’s worldview.** In the context of the pandemic, this means “understanding people’s lived experience”; recognising, for example, that downplaying the severity of the virus (or indeed, believing that hydroxychloroquine is an effective treatment) might be a psychological “adaptive strategy” for precarious workers in frontline industries.<sup>163,164</sup> It also means recognising that some communities may have reason to distrust medical or government authorities. For example, a Reuters fact-check refuting allegations that the Australian army was forcibly vaccinating Indigenous people acknowledged “the historical mistreatment of Indigenous Australians, which includes the forced removal of children from their families.”<sup>165</sup>
- **Acknowledging the audience’s values and concerns.** Conspiracy theories have power because they rely on “intricate narratives expressing personal and cultural values”; researchers argue that journalists seeking to counter misinformation should do the same.<sup>166</sup> In their view, “emotionally-flat ‘fact-checks’” about COVID-19 will struggle to compete against the highly emotive human interest stories often deployed in misinformation. They urge journalists and fact-checkers to “make careful use of emotions, possibly by trying to connect corrective information to values many people hold, to concerns that audiences have, and to what they deem important.”<sup>167</sup> This may mean acknowledging that many ordinary people who put their faith in hydroxychloroquine held genuine fears about the deadly impact of the virus and in some cases, genuine fears about taking a vaccine. Ridiculing or stigmatising fears about vaccines naturally does little to increase trust among those who need to be persuaded. Stevie Zhang recalls a lot of “moralising” about the vaccine in Australian media coverage early in the vaccine rollout. “It was like, ‘if

<sup>163</sup> Lewandowsky, S., Ecker, U., Seifert, C., Schwarz, N. and Cook, J., op. cit.

<sup>164</sup> Lewandowsky, S., Armaos, K., Bruns, H., Schmid, P., Holford, D., Hahn, U., Al-Rawi, A., Sah, S. and Cook, J., op. cit.

<sup>165</sup> Reuters Fact Check, 2021. Fact Check - Indigenous Australians are not being forcibly vaccinated against COVID-19. [Blog] *Reuters*, Available at: <<https://www.reuters.com/article/factcheck-coronavirus-australia-idUSL1N2SN1OE>>.

<sup>166</sup> Lazić, A. and Žeželj, I., 2021. A systematic review of narrative interventions: Lessons for countering anti-vaccination conspiracy theories and misinformation. *Public Understanding of Science*, 30(6), pp.644-670.

<sup>167</sup> Krause, N., Freiling, I., Beets, B. and Brossard, D., op. cit.

you don't take the vaccine, then you're a bad person'. But there are lots of people who do have legitimate questions about the vaccine and aren't necessarily asking those questions in bad faith," they told me. "It's exactly the sort of environment that makes it ripe for exploitation by bad faith actors, because they're like, 'Oh, the mainstream society isn't sympathetic to your questions.'" Returning to effective strategies:

- **Promote cross-partisan conversations.** There's evidence that individuals are more likely to privilege accuracy over defence of prior beliefs when they face "social expectations of being held publicly accountable for one's opinions".<sup>168</sup> A body of research recognises that this "accountability effect" makes people "more likely to increase cognitive effort devoted to understanding multiple sides of an issue and to carefully evaluate relevant information".<sup>169</sup> Therefore, some researchers argue "the ability and willingness of citizens to connect with non-like-minded others in meaningful debate is at the very core of combating false or misleading information."<sup>170</sup> The media could play a role here in regularly hosting and promoting these cross-partisan conversations through talkback radio, community forums and round table discussions aimed at "helping individuals develop basic competencies for engaging in such conversations in a civil fashion."<sup>171</sup>
- **Help inoculate the audience against misinformation.** Some studies have found audiences can be "inoculated" against false and misleading information by giving the audience specific warnings and education about the common misinformation techniques they may encounter – for example, "false balance" reporting and the use of "fake experts".<sup>172</sup> Video games in which players are introduced to common misinformation strategies – "impersonation, polarisation, the use of emotions such as moral outrage, conspiracy theories,

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<sup>168</sup> Krause, N., Wirz, C., Scheufele, D. and Xenos, M., op. cit.

<sup>169</sup> Ibid.

<sup>170</sup> Ibid.

<sup>171</sup> Ibid.

<sup>172</sup> Cook, J., Lewandowsky, S. and Ecker, U., 2017. Neutralizing misinformation through inoculation: Exposing misleading argumentation techniques reduces their influence. *PLOS ONE*, 12(5), p.e0175799.

trolling, and discrediting” – have also shown promise.<sup>173</sup> Journalists and news outlets could play a role in pre-emptively educating audiences about these techniques; their ability to reach mass audiences can bring these promising interventions to scale.

### Fact-checking as accountability journalism

Finally, and notwithstanding the difficulties of challenging misperceptions, it’s worth noting that fact-checking is valuable in its own right for the impact it has in holding public figures accountable. One field experiment found that politicians who were sent reminders of the “reputational threat” posed by fact-checkers were less likely to make false claims.<sup>174</sup> Fact-checking, argues Brendan Nyhan, helps “increase the political costs of making false claims by sanctioning political elites who do so in a more salient and public manner.”

To this end, he recommends fact-checkers run tallies of the numbers of false claims made by political figures and conduct live fact-checking during political programming. Communications scholars Graves and Wells agree: “Being sensitive to the importance of factual accountability, and calling out both breaches and reinforcements of this critical norm, may be one of the most important roles for journalists today.”<sup>175</sup>

Fact-checking, in this view, is an important form of “accountability journalism”, valuable for its impact on combating misinformation within public discourse even if its ability to combat misperceptions within individuals has some limitations.<sup>176</sup> The prime minister’s direction that Craig Kelly must heed expert medical advice, amid a tide of publicity, might be

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<sup>173</sup> Traberg, C., Roozenbeek, J. and van der Linden, S., 2022. Psychological Inoculation against Misinformation: Current Evidence and Future Directions. *The ANNALS of the American Academy of Political and Social Science*, 700(1), pp.136-151.

<sup>174</sup> Nyhan, B., op cit.

<sup>175</sup> Graves, L. and Wells, C., 2019. From Information Availability to Factual Accountability: Reconsidering How Truth Matters for Politicians, Publics, and the News Media. In: J. Katz and K. Mays, ed., *Journalism and Truth in an Age of Social Media*. Oxford: Oxford University Press.

<sup>176</sup> Luengo, M. and García-Marín, D., 2020. The performance of truth: politicians, fact-checking journalism, and the struggle to tackle COVID-19 misinformation. *American Journal of Cultural Sociology*, 8(3), pp.405-427.

seen as one measure of fact-checking providing some degree of political accountability in the story of hydroxychloroquine.

## Closing thoughts

“I think we can agree that during this pandemic we’ve been living through a time of great uncertainty,” the head of Australia’s clinical evidence taskforce Julian Elliot told a media conference in August 2020. “Even early in the pandemic, it was quite clear that Australian clinicians were being bombarded with claim and counterclaim, conflicting guidance about the best treatments or the best care for people with COVID-19.”<sup>177</sup>

By August 2020, however, his team had assessed the weight of evidence and concluded with “high certainty” it was not effective against COVID-19 with “strong evidence it has significant harms.”<sup>178</sup>

This essay has reviewed how Australian journalists covered this weight of evidence for hydroxychloroquine. Drawing on academic literature and interviews with practitioners, it looked at the lessons that might be learned about science journalism in the age of misinformation. What emerges are a number of principles about best practice in science journalism and fact-checking. According to these principles, journalists should:

- report on emerging science with caution; avoid overhyping single studies or advocating large-scale policy or behaviour changes on the basis of modest evidence;
- understand that science rarely advances in singular “breakthroughs” but represents a long, slow and collective march towards “gradually diminished uncertainties”;
- explain these uncertainties to the audience and trust that they can accept these methods as a strength rather than limitation of science;

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<sup>177</sup> National COVID-19 Clinical Evidence Taskforce, 2022. *A/Prof Julian Elliott joins Victorian Premier Daniel Andrews at media conference 26/8/20*. [video] Available at: <[https://www.youtube.com/watch?v=C3sa\\_pfRyvc](https://www.youtube.com/watch?v=C3sa_pfRyvc)>.

<sup>178</sup> Mannix, L., 2022. Thumbs down for hydroxychloroquine from government virus taskforce. *Sydney Morning Herald*, [online] Available at: <<https://www.smh.com.au/national/thumbs-down-for-hydroxychloroquine-from-government-virus-taskforce-20200806-p55j76.html>>.

- be aware that press releases and public relations for scientific studies can themselves be overhyped; verify their claims by reading the scientific paper and noting its limitations;
- be willing to scrutinise scientists and hold them accountable for shoddy practices, recognising the professional incentives that can distort findings;
- avoid false balance; seek out independent scientific opinion, identify where the weight of evidence lies and contextualise outlier science within the existing body of research;
- beware the politicisation of science; know that partisans can exploit science's inherent uncertainties in order to cast doubt on matters of consensus;
- recognise the challenges of correcting misinformation; it can continue to influence those who are exposed and can meet resistance if it is inconsistent with a person's ideological worldview, cultural identity and prior beliefs;
- ensure that fact-checking offers alternative causal explanations which plausibly account for how and why the misinformation emerged;
- warn audiences before they are exposed to misinformation, for example, noting a "false claim" early in the story and before it is repeated and ideally in the headline;
- avoid partisan and ideological cues when reporting matters of facts and science and instead emphasise the views of non-partisan, trusted experts;
- tailor corrections to specific audiences, affirming their worldview, social values and legitimate concerns about a new and unknown virus and its impact on their lives and livelihoods;
- promote cross-partisan conversations in which audience members engage with the views of non-like minded others, which has been shown to increase cognitive efforts towards accuracy;
- bring to scale interventions shown to inoculate the audience against misinformation, helping them identify strategies including impersonation, polarisation, the use of emotions such as moral outrage, conspiracy theories, trolling, and discrediting; and
- intervene early and often to fact-check false claims disseminated by politicians and other public figures; and recognise that doing so

creates an environment in which public figures can face reputational damage for spreading false and misleading information.

## The epilogue

There are a few notable postscripts to the story of hydroxychloroquine in Australia.

In July 2021, a group of researchers suggested that the media hype surrounding the drug may have distorted Australia's research priorities.

They noted there were six simultaneous trials funded for hydroxychloroquine in the first year of the pandemic and none for public health communication, community transmission prevention or Long COVID symptoms. "Extensive media coverage and public opinion may have influenced prioritisation of interventions that were not particularly promising," the authors concluded.<sup>179</sup> "It was a bandwagon effect," lead author Professor Angela Webster told Liam Mannix. "Everyone investigating the same thing in different ways is not helpful."<sup>180</sup>

In October 2021, one tonne of the hydroxychloroquine purchased by Clive Palmer was destroyed. It had sat unclaimed in a Melbourne warehouse for eight months, the result of a standoff between Palmer's foundation and the federal government. The government had warned the foundation in May 2020 that it wouldn't take any more shipments; Palmer's foundation wanted the additional purchases to go to the national stockpile. In the end, *Guardian Australia* reported that the 5 million additional doses were destroyed.<sup>181</sup>

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<sup>179</sup> Seidler, A., Aberoumand, M., Williams, J., Tan, A., Hunter, K. and Webster, A., 2021. The landscape of COVID-19 trials in Australia. *Medical Journal of Australia*, 215(2), p.58.

<sup>180</sup> Mannix, L., 2021. Experts blast local research into COVID treatments, decry lack of effort to understand vaccine take-up. *Sydney Morning Herald*, [online] Available at: <<https://www.smh.com.au/national/experts-blast-local-research-into-covid-treatments-decry-lack-of-effort-to-understand-vaccine-take-up-20210719-p58aw0.html>>.

<sup>181</sup> *Guardian Australia* also noted that it was not suggesting Palmer directed the drugs be destroyed. Knause, C. and McGowan, M., 2021. One tonne of Clive Palmer hydroxychloroquine sent for destruction after dispute with TGA. *Guardian Australia*, [online] Available at: <<https://www.theguardian.com/australia-news/2021/oct/13/five-million-doses-of-hydroxychloroquine-destroyed-after-stand-off-between-clive-palmer-and-government>>.

Clive Palmer continued to tout hydroxychloroquine's benefits. In February 2022 he contracted COVID-19; Sky News Australia reported his claim a team of US doctors had "fast tracked" him onto drug trials so he could be treated with hydroxychloroquine and ivermectin.<sup>182</sup>

The United Australia Party ran an election campaign promising to allow "alternative treatments to COVID-19 (including anti-virals) that have shown extraordinary success where administered in many overseas countries."<sup>183</sup>

Despite running the most expensive campaign in Australian history, the party's primary vote failed to climb above 5% in the May 2022 election.<sup>184</sup> Craig Kelly won fewer than 8% of first preference votes in his seat.<sup>185</sup>

It was deputy chief health officer Nick Coatsworth who made what might appear to be the obvious point about the evidence for hydroxychloroquine. "We have tonnes of hydroxychloroquine in this country, which was really generously donated by Clive Palmer," he told a press conference. "There are no circumstances where we as government or clinicians would sit on several tonnes' worth of hydroxychloroquine in the national medical stockpile if it were useful for COVID-19; we would be giving it to patients right now. But unfortunately it's not."<sup>186</sup>

By December 2021, the 6% of Australians who were unvaccinated made up half the patients who had been in intensive care over the previous six

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<sup>182</sup> Gleeson, P., 2022. Clive Palmer refused ICU treatment while battling COVID-19 in favour of taking ivermectin and hydroxychloroquine. *Sky News Australia*, [online] Available at: <<https://www.skynews.com.au/australia-news/coronavirus/clive-palmer-refused-icu-treatment-while-battling-covid19-in-favour-of-taking-ivermectin-and-hydroxychloroquine/news-story/c6fc9735e2e93c2a2ebbc987198e2f9c>>.

<sup>183</sup> United Australia Party. 2022. *National Policy - United Australia Party*. [online] Available at: <[https://www.unitedaustraliaparty.org.au/national\\_policy](https://www.unitedaustraliaparty.org.au/national_policy)>.

<sup>184</sup> Martin, S., 2022. Clive Palmer's massive advertising spend fails to translate into election success for United Australia party. *Guardian Australia*, [online] Available at: <<https://www.theguardian.com/australia-news/2022/may/22/clive-palmers-massive-advertising-spend-fails-to-translate-into-electoral-success>>.

<sup>185</sup> Green, A., 2022. Hughes - Federal Election 2022. *ABC News*, [online] Available at: <<https://www.abc.net.au/news/elections/federal/2022/guide/hugh>>.

<sup>186</sup> Australian Department of Health and Aged Care, 2020. *Deputy Chief Medical Officer press conference about COVID-19 on 28 August 2020*. [online] Available at: <<https://www.health.gov.au/news/deputy-chief-medical-officer-press-conference-about-covid-19-on-28-august-2020>>.

months.<sup>187</sup> Medical staff reported critically ill patients arriving at hospital and begging, too late, to receive the jab. “Then there are the family members, pressuring doctors to prescribe bogus medicines they have heard about online,” *Guardian Australia* reported, “‘trying to go toe-to-toe’ over the phone with the registrar, pushing some unproven treatment.”<sup>188</sup> Scientific misinformation had real and tragic effects.

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<sup>187</sup> Robinson, N. and Baxendale, R., 2022. Unvaxxed 12 times more likely to be ICU patients. *The Australian*, [online] Available at: <<https://www.theaustralian.com.au/nation/numbers-confirm-covids-a-disease-of-the-unvaxxed-as-icus-are-showing/news-story/e14c456e0de0a81bd15d3f87739824f7>>.

<sup>188</sup> Kelly, C. and Shepherd, T., 2021. ‘If I’d known, I would have got it’: on the frontline of Australia’s ‘pandemic of the unvaccinated’. *Guardian Australia*, [online] Available at: <<https://www.theguardian.com/australia-news/2021/dec/04/if-id-known-i-would-have-got-it-on-the-frontline-of-australias-pandemic-of-the-unvaccinated>>.

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# Appendix A

## Full statement from the University of Queensland

*In the early months of 2020, the world's attention was firmly focused on the emerging pandemic, with a voracious appetite for news that would provide hope. There was a clear sense of urgency to understand the virus, possible treatments and preventative measures such as vaccines. In response, the scientific and medical community became a trusted voice and a source of research on possible ways to combat COVID-19.*

*Hydroxychloroquine was one drug included in a multi-site clinical trial led by the Doherty Institute, that included the Brisbane/RBWH trial supervised by Professor Paterson. The drug – already safety-tested and approved for another use – had shown promise as a potential treatment in lab testing. If it proved to be effective in humans, the drug could be rolled out relatively quickly.*

*Testing the effectiveness of hydroxychloroquine in patients with COVID-19 was the next step in the long-established scientific process. At all times, Professor Paterson was interviewed about the drug in the context of a robust, randomised clinical trial. There was no intention for any suggestion that it was already proven as a 'cure' for the coronavirus.*

*Reports of a 'mystery donor' to an RBWH Foundation appeal fuelled interest in the story, and Professor Paterson referred in dozens of interviews in the week following the first reports to the possibility that one or both the therapies being assessed in the trial could be "potentially effective" or a "potential cure". He stressed the importance of large-scale clinical trials to determine whether the potential treatments were effective or whether patients' were recovering from infection on their own.*

*Meanwhile, the hydroxychloroquine story globally was gaining momentum, with accounts of significant off-label use. Uncomfortable with the way the story was being reported, a decision to add a contextual statement and remove a quote was made - to prevent misrepresentation of the University's article - which had been posted a few days after the first media reports of the trial on 16 March.*

*The University takes a responsible approach when communicating about science and research, with a robust system of checks and balances in place. UQ supports academic freedom and respects the rights of researchers to speak within their area of expertise.*

*Professor Paterson is the Director of UQCCR and is also a consultant infectious diseases physician at the Royal Brisbane and Women's Hospital and Australia's most cited researcher in the field of Microbiology.*

[ENDS]