


Blaming the unvaccinated during the COVID-19 pandemic: the roles of political ideology and risk perceptions in the USA

Maja Graso ^{1,2}, Karl Aquino,³ Fan Xuan Chen,⁴ Kevin Bardosh^{5,6}

► Additional supplemental material is published online only. To view, please visit the journal online (<http://dx.doi.org/10.1136/jme-2022-108825>).

¹University of Groningen Faculty of Behavioural and Social Sciences, Groningen, Netherlands

²Otago Business School, University of Otago, Dunedin, New Zealand

³Marketing and Behavioural Science Division, University of British Columbia, Vancouver, British Columbia, Canada

⁴Department of Psychology, University of Illinois Urbana-Champaign, Urbana, Illinois, USA

⁵School of Public Health, University of Washington, Seattle, Washington, USA

⁶Edinburgh Medical School, University of Edinburgh, Edinburgh, UK

Correspondence to

Dr Maja Graso, University of Groningen Faculty of Behavioural and Social Sciences, Groningen 9712 TS, Netherlands; m.graso@rug.nl

Received 5 December 2022
Accepted 19 May 2023



© Author(s) (or their employer(s)) 2023. No commercial re-use. See rights and permissions. Published by BMJ.

To cite: Graso M, Aquino K, Chen FX, et al. *J Med Ethics* Epub ahead of print: [please include Day Month Year]. doi:10.1136/jme-2022-108825

ABSTRACT

Individuals unvaccinated against COVID-19 (C19) experienced prejudice and blame for the pandemic. Because people vastly overestimate C19 risks, we examined whether these negative judgements could be partially understood as a form of scapegoating (ie, blaming a group unfairly for an undesirable outcome) and whether political ideology (previously shown to shape risk perceptions in the USA) moderates scapegoating of the unvaccinated. We grounded our analyses in scapegoating literature and risk perception during C19. We obtained support for our speculations through two vignette-based studies conducted in the USA in early 2022. We varied the risk profiles (age, prior infection, comorbidities) and vaccination statuses of vignette characters (eg, vaccinated, vaccinated without recent boosters, unvaccinated, unvaccinated-recovered), while keeping all other information constant. We observed that people hold the unvaccinated (vs vaccinated) more responsible for negative pandemic outcomes and that political ideology moderated these effects: liberals (vs conservatives) were more likely to scapegoat the unvaccinated (vs vaccinated), even when presented with information challenging the culpability of the unvaccinated known at the time of data collection (eg, natural immunity, availability of vaccines, time since last vaccination). These findings support a scapegoating explanation for a specific group-based prejudice that emerged during the C19 pandemic. We encourage medical ethicists to examine the negative consequences of significant C19 risk overestimation among the public. The public needs accurate information about health issues. That may involve combating misinformation that overestimates and underestimates disease risk with similar vigilance to error.

The development of effective vaccines has helped reduce COVID-19 (C19) mortality, particularly among individuals over 50 years of age.^{1 2} In response, public health experts have strongly encouraged people of all ages to protect themselves, their fellow citizens and their society's healthcare systems by getting vaccinated. The widely communicated benefits of vaccinations led many people to view them as the way out of the pandemic. However, such emphasis on C19 vaccination as critical to pandemic mitigation efforts also created a social situation in which those who remained unvaccinated faced prejudice³ and were criticised for placing others' lives at risk, contributing to overwhelming healthcare systems and being partly responsible for prolonging restrictions of various forms.⁴ These individuals also experienced

hostile sentiments and public shaming,⁵ loss of employment and denial of access to normal social life,⁶ calls to deny them medical care⁷ and even celebrations of their deaths on websites such as sorry-antivaxxer.com.

The present research examines whether the general prejudice against the unvaccinated³ is perceived by observers as being warranted. One could argue that it is. Those who take this position can claim that C19 remains a serious threat to health, thus framing non-compliance as a form of social deviance that compromises efforts to control the virus. From this perspective, hostile reactions against the unvaccinated are not primarily intended to discriminate against them, but are a morally defensible application of social control methods for the collective benefit of society.^{8 9} Indeed, the internet site that featured unvaccinated people's deaths claims to have a prosocial purpose of deterring others from spreading misinformation on social media.

From another perspective, however, treating the unvaccinated as a uniquely responsible public health threat is not justified by the severity of the threat C19 poses and the effectiveness of C19 vaccines. It also has problematic ethical implications. One outcome of categorizing the unvaccinated as socially deviant and applying pressure to induce compliance is *scapegoating*, a practice that emerges in threatening or deeply uncertain situations.¹⁰ Scapegoating is generally defined as blaming an individual or a group of people who are not necessarily and solely responsible for an undesirable outcome.¹⁰⁻¹³ Once culprits are identified, blame becomes easier to assign and those recipients become seen as underserving of respect or humanity.

We examine whether negative sentiments towards the C19 unvaccinated can be considered a form of *scapegoating* (vs a protective response against social deviants). To be clear, we make no attempt to identify a threshold after which any social threat becomes *sufficiently* dangerous to *justify* punishment or ostracism of those who do not comply with widely endorsed mitigation measures. However, because perceptions of what is harmful can vary and, if erroneous, can lead to suboptimal actions,¹⁴ we call attention to how negative judgements can be misdirected. Specifically, because C19 represents a highly uncertain situation,¹⁵ and there is evidence that people overestimate C19 risks,¹⁶⁻¹⁸ the ill will directed against the unvaccinated could lead to unjustified blaming of people who are not as much of a threat to public health as many believed.

CHALLENGING THE ASSUMPTION THAT THE UNVACCINATED DESERVE BLAME

Consider the two most widely communicated benefits of vaccinations: protecting one's self and others. C19 disproportionately impacts the elderly and those with severe comorbidities such as obesity, heart disease and cancer.^{19–26} The age distribution of the virus and the role of comorbidities were well known from early data from Wuhan, China.²⁴ According to these data sources, an unvaccinated person who is not vulnerable to getting seriously ill from C19 due to their age and general fitness (eg, a person under the age of 50 without major comorbidities) has a generally low likelihood of becoming severely ill and burdening the hospital system, even if they do become infected (under 1%).

Of course, self-protection is not the only benefit of vaccines. Even if the vaccinated person is not at high risk of getting seriously ill, they may reduce their chances of passing the virus on to somebody who is.²⁷ This rationale has been a common moral justification for mandating vaccination in general.²⁸ Yet, as early as mid-2021, it was known that C19-vaccinated individuals could acquire an infection and transmit the virus to others.^{29–32} At the height of their infection, both vaccinated and unvaccinated individuals have similar viral loads,³² though vaccination may expedite the clearance of the virus.³⁰ The effectiveness of the primary vaccination series as well as boosters decreases over time.^{33,34} Subsequent variants of concern in 2021, notably Delta and Omicron, also reduced aspects of vaccine benefits.²⁷ Moreover, there has been ambiguity about the benefits versus risks of C19 vaccination for low-risk groups,³⁵ especially children and young people under 30 years old.³⁶

Finally, the added benefits of vaccination for those who have already had a C19 infection have also been the subject of debates and consideration.^{37–39} Unlike the USA, European Union countries recognised the protective benefits of natural immunity in 2021⁴⁰ and did not require those with a prior infection to get vaccinated, at least for a period of time (eg, 90 or 180 days). Recent reviews have since confirmed what was known early during the pandemic: a prior infection confers significant natural immunity against reinfection and severe disease.^{41–47}

Regardless of the reasons why the unvaccinated should not be blamed for prolonging the pandemic, public sentiment in 2021 and 2022 was decidedly hostile towards them^{3–5, 48} and in support of mandating vaccinations for all.⁴⁹ Further reason to suspect that blaming the unvaccinated for prolonging the pandemic may be unwarranted is based on the actual risks posed by C19. Consider data showing how people's estimation of C19-related risks was disproportionately greater than what the available evidence indicated.^{17, 18} As we report below, these perceptions were not uniformly distributed across populations. Numerous independent polls and studies from 2020 and 2021 show that people differed greatly in their C19 risk estimates, and these differences can be partly traced to political ideology.

C19 RISK ESTIMATION AND POLITICAL IDEOLOGY IN THE USA

Political ideology may influence scapegoating of the unvaccinated for two reasons. First, liberals are more likely to show greater concern over C19 than conservatives. Liberals are more likely to comply with C19 restrictions, get vaccinated, and reject conspiracy theories that devalue the threat posed by C19.^{18, 50–53} Liberals also view those who do not conform to the existing mandates as more harmful and impure.⁵⁴

Second, representative polls done prior to data collection suggest that liberals were more likely to overestimate C19 risks. A Franklin Templeton-Gallup Economics of Recovery Study conducted in the second half of 2020 asked US residents to

estimate the percentage of C19 infections that result in hospitalisation (the correct number at the time was between 1% and 5%¹⁸). The poll showed that around 41% of Democrats (and 28% of Republicans) estimated this rate to be 50% or higher, and more Republicans (26%) than Democrats (10%) estimated the hospitalisation rate correctly at 1%–5%.¹⁸ A Gallup poll conducted in August (2021) showed that 41% of Democrats (vs 22% of Republicans) estimated that the unvaccinated have 50%+ chance of being hospitalised. When estimating the risk for the vaccinated individuals, the pattern reversed such that 42% of Democrats (vs 33% of Republicans) reported the risk to be below 1%.¹⁷ Finally, a Rasmussen national survey conducted in January 2022⁵⁵ documented that nearly half of Democrats (48%) thought that the governments should be able to fine or imprison individuals who publicly question the efficacy of the existing C19 vaccines on social media, news or other publications (vs 14% of Republicans and 18% of unaffiliated voters).

Beliefs that go unexamined or are not updated when confronted with new information can have a darker, maladaptive side.^{14, 56} Thus, there is a potential for undesirable social consequences arising from liberals' (relative to conservatives') elevated concern about C19. Liberals' greater likelihood to overestimate C19 risks and the moral importance they assign to C19 mitigation⁵⁷ could increase their animus towards the unvaccinated, as evidenced by scapegoating.

PRELIMINARY EMPIRICAL EVIDENCE FOR SCAPEGOATING

We sought to better understand the predictors of negative judgments about the unvaccinated individuals. Based on the theoretical foundation and information available at the time of data collection in early 2022, we tested the following hypotheses. First, we expected that people would be more likely to scapegoat an unvaccinated (than a vaccinated, or unvaccinated-recovered individual). We expected this effect to emerge regardless of proportionate risk considerations that would suggest that scapegoating of the unvaccinated individual is unwarranted (ie, age, comorbidities, timing and history of vaccination or prior infection). Second, we examined whether liberals would be more likely to scapegoat the unvaccinated (relative to the vaccinated) individual than conservatives.

In early 2022, we conducted two vignette-based studies, where we asked US participants to evaluate the characters of different risk profiles. We summarise the design and provide the results highlights below, *but we direct our readers to online supplemental file 1 (supplementary online material, SOM) for detailed statistical reporting, analyses and complete materials.* SOM also includes a preliminary study.ⁱ We declare no competing interests. We make our data available here: https://osf.io/vjur3/?view_only=88a91782e6124c9b81f66db3c8bd8745 (ref⁵⁸; data set).

Study 1: are people more likely to scapegoat the unvaccinated (vs vaccinated) regardless of the risk factors?

Our first study asked participants to evaluate four fictional characters with varying risk profiles and vaccination statuses. Two low-risk characters were Katy 21 and Mark 38 who had no comorbidities. According to data available at the time,^{19–26, 59–61} their risks of hospitalisations and deaths were below <1%. Two high-risk characters were Mary (78, no comorbidities) and Richard (53, severe comorbidities). According to same sources,

ⁱThe preliminary study was similar to study 1, except it did not include the unvaccinated-recovered condition. We observed the same patterns as those reported here (see SOM for complete descriptions).

Table 1 Study 1 means: scapegoating and participant estimates of C19 risks (hospitalisation, dying and non-recovery) by character and vaccination condition (vaccinated, unvaccinated, unvaccinated-recovered)

Character (age, risk profile)	Measures	Risk estimates	Vaccinated condition	Unvaccinated condition	Unvaccinated and recovered
		%*	Mean	Mean	Mean
Katy (21, low)	Scapegoating		1.52	3.24	3.15
	Hospitalisation	<1	13.71	28.40	23.69
	Dying	<1	6.37	16.19	13.08
	Non-recovery†	NA	7.12	16.95	13.79
Mark (38, low)	Scapegoating		1.21	3.04	2.68
	Hospitalisation	<1	12.02	31.72	27.78
	Dying	<1	6.73	18.39	15.81
	Non-recovery	NA	7.48	18.64	15.72
Mary (75, high)	Scapegoating		1.26	3.40	2.82
	Hospitalisation	<20	32.06	57.68	42.15
	Dying	<10	20.49	38.86	27.41
	Non-recovery	NA	19.79	36.10	27.58
Richard (53, high)	Scapegoating		1.67	3.43	3.15
	Hospitalisation	~5	38.75	64.39	45.99
	Dying	<10	24.52	42.31	30.40
	Non-recovery	NA	23.26	41.82	29.75

*Age-stratified severe and fatal C19 outcome estimates by the character in the prevaccination era (2020). Estimate ranges are conservative values based on several sources available at the time of data collection.^{19–26 59 60} All of these risks would be substantially lower in January 2022 when the experiment was conducted due both to vaccination and natural immunity. The Centers for Disease Control and Prevention (CDC) estimated that more than 40% of adults aged 18–49 had had a prior C19 infection at this time, while slightly less than 70% had been vaccinated.⁷⁵

†We do not estimate the chances that the character will *never* recover.

C19, COVID-19; NA, not available.

their risks of hospitalisations were below 20%, and risks of dying were below 10%.

Participants read all four character descriptions. Each character was either: (a) fully *vaccinated* (ie, three doses); (b) *unvaccinated*; or (c) *unvaccinated but recovered* from a past infection of C19 which they contracted *before* vaccines were available to them. We measured scapegoating using a previously established assessment¹¹. Specifically, we asked participants to indicate on a scale from 1=*not at all* to 6=*very much* the extent to which the character is: (1) to be blamed for the effects of hospital staff shortages, (2) at fault for C19 deaths and hospitalisation and (3) guilty of severely jeopardising his/her community's public health. We also asked participants to estimate the likelihood that the character will: (1) be hospitalised for severe illness, (2) die and (3) not recover.

The results are based on 570 American residents recruited through Mechanical Turk (MTurk; $M_{age}=40.22$, $SD=12.65$, 43% men). Results highlights are presented in [table 1](#) and [figure 1](#); detailed analyses backing all of our conclusions are presented in the SOM.

We observed that people were more likely to scapegoat the unvaccinated or unvaccinated-recovered (vs vaccinated) character, regardless of their risk profiles. Participants also consistently *overestimated* the chances that a low-risk character would be hospitalised, die or never recover from C19 (a proxy for postviral syndrome, *long COVID*⁶²) regardless of their vaccination status, thus supporting our speculation that the blame of the unvaccinated is disproportional. Conservatives were equally unlikely to scapegoat all characters, while liberals were more likely to scapegoat the unvaccinated ones, including the one who was unvaccinated-recovered ([figure 1](#)).

Study 2: are people more likely to scapegoat the low-risk unvaccinated (even if contrasted against a low-risk vaccinated person who is not up to date)?

In our second study (February 2022), we asked 193 participants from MTurk ($M_{age}=39.19$, $SD=12.44$, 47.4% men) to evaluate

a 28-year-old, low-risk male character who is 'in general, fit, healthy, and enjoys spending as much time outdoors as he can. He spends most of his work time outside by himself'. Participants were randomly assigned to a condition in which the character has either:

- 'contracted COVID-19 in May of 2021 (around the time when he was eligible to receive his vaccine). He did not seek medical attention, and he recovered fully', or
- 'received two doses of the COVID-19 vaccine in May of 2021 when he was eligible to get it (he does not plan on getting a booster)'.

Being unvaccinated for more than 6 months, both characters may pose a risk of transmission as the benefits of prior infection and vaccination both wane.³⁴ We relied on the same measures we used in study 1 except we used a longer, eight-item version of scapegoating ($\alpha=0.98$).

We observed that people were more likely to blame the unvaccinated but recovered low-risk character (see [table 2](#)) and that this effect was associated with the same political ideology effects from our previous study (ie, liberal individuals were more likely to scapegoat the unvaccinated-recovered vs vaccinated than conservatives; see [figure 2](#)).

GENERAL DISCUSSION

We examined whether the animosity that people showed towards the unvaccinated during the C19 pandemic could be partly understood as scapegoating (as opposed to a reasonable response to a person's culpability). We supported our theoretical predictions in two empirical studies and one pretest conducted in early 2022. We relied on vignettes about characters with different profiles, where all information except vaccination status was held constant. Our results showed that people judged the unvaccinated (vs vaccinated) individuals as more responsible and blameworthy for overwhelming the healthcare system,

Effect of Target Character's Vaccination Status on Scapegoating by Political Orientation

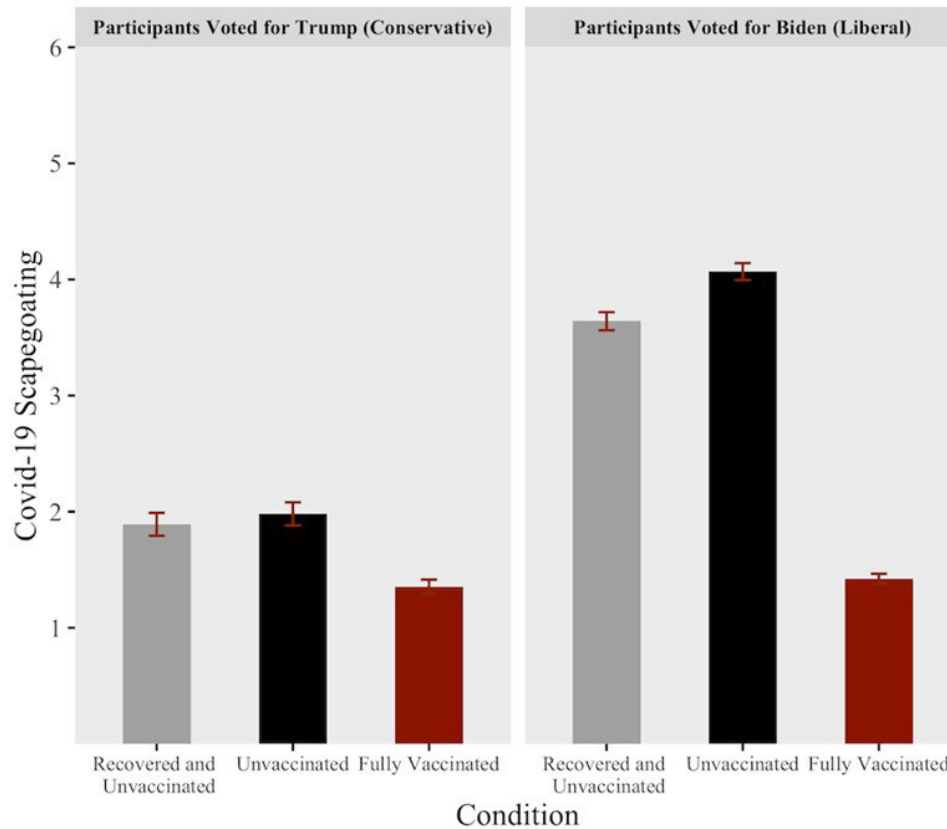


Figure 1 Study 1: interaction between political orientation and vaccination status condition on COVID-19 (C19) scapegoating (aggregate of all characters).

jeopardising public health efforts and prolonging the pandemic. Importantly, these judgements emerged even for characters who, according to scientific evidence available at the time, were at exceedingly low risk of hospitalisations and who had recovered from a prior infection when vaccines became available (study 1). We also found these effects when the low-risk unvaccinated-recovered character was contrasted against a counterpart who was vaccinated more than 6 months ago (study 2). On average, the participants' ratings for the vaccinated characters fell in the lower range, while ratings of the unvaccinated characters fell within the middle range of the scapegoating scale (ie, suggesting moderate levels of blame). Finally, we observed that liberals were

more likely than conservatives to blame the unvaccinated (vs vaccinated) characters.

Recall that what makes blame assignment a form of scapegoating (vs a justified response to a social threat) is that it is driven by fear or based on unfounded or inaccurate facts.^{10 11 13 63 64} We provide evidence that the scapegoating of the unvaccinated was not grounded in available empirical facts, but a miscalibration of risk. Our evidence for this is that while participants recognised that the elderly and people with severe comorbidities were at higher risk of hospitalisations or deaths (vs low-risk characters), they consistently overestimated the risks of C19, especially for the unvaccinated people who are not in a known high-risk group.

Table 2 Study 2: Descriptive statistics and T test results.

Dependent variable and condition		M	SD	T	Df	P	95% CI
Scapegoating	Vax	1.58	1.06	-7.80	191	<0.0001	(-1.93 to -1.15)
	U-R	3.13	1.64				
Risk of Hospitalisation* %	Vax	16.59	18.30	-4.63	191	<0.0001	(-22.09 to -8.78)
	U-R	32.02	27.36				
Risk of Death* %	Vax	6.88	14.76	-3.78	190	<0.0001	(-17.40 to -5.36)
	U-R	18.26	25.76				
Risk of Non-recovery* %	Vax	8.21	15.92	-3.75	191	<0.0001	(-18.60 to -5.66)
	U-R	20.34	27.70				

Vax = vaccinated for C19 six months ago (without booster); U-R = unvaccinated/recovered from C19 six months ago. Scapegoating was assessed on a scale from 1 (not at all) to 6 (very much).

*According to data available in 2022, the chances that a 28-year old fit and healthy man who was unvaccinated and had never been infected with C19 before would get seriously ill or die if he contracts C19 was < 1% (also see Table 1 notes for additional citations).

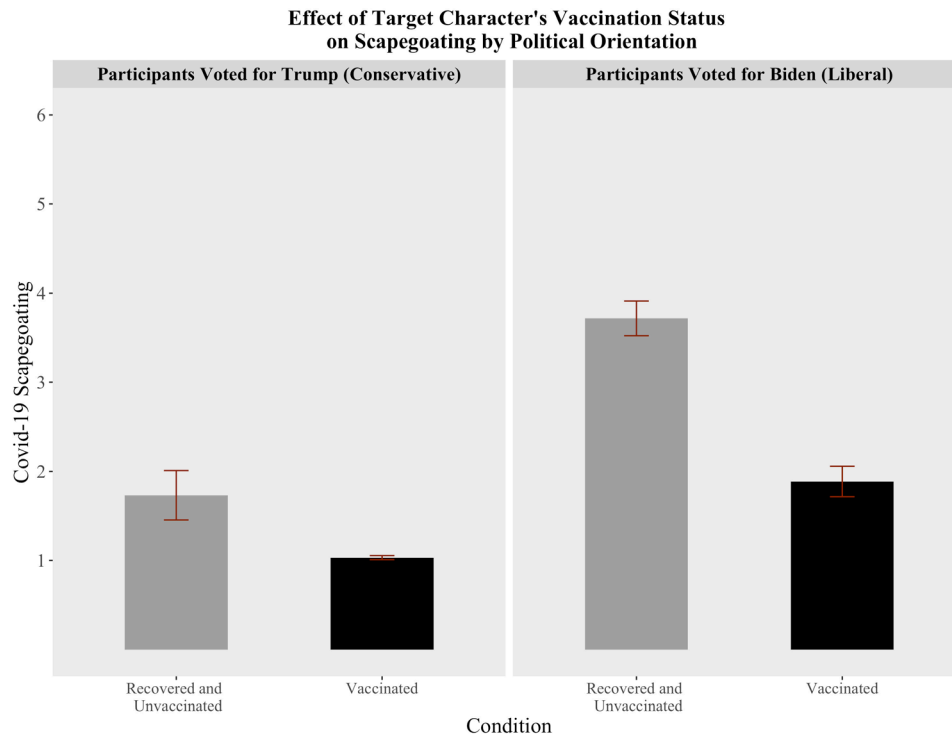


Figure 2 Study 2: interaction between political orientation and vaccination status condition (vaccinated/not boosted vs unvaccinated/recovered) on scapegoating.

These inaccurate risk estimates comport with results from representative sample-based studies available at the time.^{17 18 55} The final contributing factor to misperceptions, and another indication of scapegoating, was the failure to consider the protective effects of prior infection, which were known according to the evidence available at the time of our data collection.^{40 43}

IMPLICATIONS FOR MEDICAL ETHICS, SCIENCE COMMUNICATIONS AND IDEOLOGICAL DIVISIONS

Humans often react to threats by applying generalisations driven by a miscalibration of risks, selective information retrieval or the unwillingness to update beliefs based on new information.^{14 56} Our data provide evidence that these processes led some people to use a single piece of information—vaccination status—as a heuristic for making judgements about the culpability of individuals, regardless of whether or not they are statistically at risk of needing care, pose a grave threat to others, have recovered from the virus and whether the vaccinated individuals have not been boosted for many months. These overgeneralisations and the resulting scapegoating are not without social and ethical implications.

One social consequence is that scapegoating can subject people to ostracism, discrimination and, in extreme cases, even violence and persecution.^{10 11 13 63 64} While we did not seek to document these consequences in our studies, scapegoating risks reinforcing public attitudes that may be based as a justification for discrimination. For instance, multiple policies were implemented in the USA to pressure individuals to get vaccinated, including employer mandates and vaccine passports. Although widely supported,⁴⁹ these policies did not consider the protective effects of prior infection or the age-based risk distribution of severe disease outcomes. There is some evidence that they generated adverse societal consequences, such as reactance, and increased vaccine scepticism and social polarisation,⁶ among

others. Therefore, because the C19 pandemic showed how the public's understanding of health information could impact social cohesion, we strongly recommend that the medical community considers the downstream and negative impacts of presumptively well-intentioned guidelines.

Second, scapegoating implies that the blame is either under-estimated or disproportional. Thus, we encourage public health researchers, practitioners and science communicators to consider the implications of relying primarily on fear-based approaches to mitigating the harms caused by C19.⁶⁵ For example, if 35% of US adults believed that at least half of C19 infections require hospitalisation,¹⁸ it suggests a significant health communication failure. A result is that it can lead people to turn against and blame each other when doing so is not justified by available facts, which may not have been adequately presented to the public. We submit that a relevant ethical question that public health officials should debate is whether it is morally obligatory for them to correct misinformation regardless of whether it overestimates or underestimates of C19 risk.

Third, our findings also show the impact of citizens' political ideology on scapegoating. We did not test the sources of liberals' greater likelihood to scapegoat the unvaccinated individuals, but we encourage further investigation of whether media exposure could be a contributing factor. Just as conservative media and politicians are culpable for misinformation leading people to underestimate certain C19 risks,^{66 67} it is possible that liberal outlets introduced misinformation in the opposite direction. For instance, Rachel Maddow of MSNBC, an outlet with a decidedly liberal audience,⁶⁸ noted in March 2021: 'Now we know that the vaccines work well enough that the virus stops with every vaccinated person.'⁶⁹ However, this claim was not possible to make at that time,⁷⁰ nor was it true. The original clinical trials did not test for effectiveness on transmission.⁷¹ Early evidence, and reasonable deduction from the research in vaccinology

and virology, suggested that the vaccines would not fully stop transmission. By April 2021, more than 10 000 vaccine breakthrough infections had been officially reported across the USA (a substantial undercounting), 10% of which had been hospitalised and 2% of which had died.⁷² An outbreak investigation by the Centers for Disease Control and Prevention in July 2021 found that 74% of cases linked to a summer event in Massachusetts were vaccinated and most were symptomatic.⁷³ Therefore, we argue that it is important to correct the dubious claims made by both sides of the political spectrum, as both may distort risk and fuel polarisation.

LIMITATIONS AND FUTURE DIRECTIONS

Our study has limitations that must be acknowledged. First, because there is some between-country variation in antipathy towards the unvaccinated,³ it is unclear whether our findings would replicate in a non-US sample or in samples other than MTurk that tend to have more liberal than conservative participants. Second, we caution researchers to interpret our results and our assumptions based on the time period during which we conducted this study (January and February 2022) and, if replicating our relationships, use updated information. Third, we only assessed scapegoating judgements and we did not document behaviour towards the unvaccinated. Fourth, our findings are specific to the context of C19 vaccinations and are not meant to draw any inferences about vaccinations in general (eg, influenza or routine childhood vaccinations; see Giubilini et al.⁷⁴). Fifth, while many of our observed risk estimates align with the data from representative samples collected at the same time, individuals' risk estimations can be notoriously inaccurate and often unstable.¹⁴ Future research should continue investigating the relationship between C19 risk estimation and social outcomes using a wider variety of risk indicators. Finally, no scientific study could ever determine *the point*—if any—at which punishment of social deviants or scapegoating unvaccinated people is morally or socially justifiable.

Contributors MG: conceptualisation and design. KA: theoretical foundation. FXC: analyses. KB: theoretical foundation and medical ethics implications. MG is the guarantor.

Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by the University of Otago Human Ethics Committee under reference number D20-088: 'COVID-19: Perceptions, Attitudes, and Consequences'. We confirm that the participants were provided with information sheet and informed consent forms before they began the study. Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available in a public, open access repository. All data relevant to the study are included in the article or uploaded as supplementary information.

Supplemental material This content has been supplied by the author(s). It has not been vetted by BMJ Publishing Group Limited (BMJ) and may not have been peer-reviewed. Any opinions or recommendations discussed are solely those of the author(s) and are not endorsed by BMJ. BMJ disclaims all liability and responsibility arising from any reliance placed on the content. Where the content includes any translated material, BMJ does not warrant the accuracy and reliability of the translations (including but not limited to local regulations, clinical guidelines, terminology, drug names and drug dosages), and is not responsible for any error and/or omissions arising from translation and adaptation or otherwise.

ORCID iD

Maja Graso <http://orcid.org/0000-0003-1504-5896>

REFERENCES

- Meslé MMI, Brown J, Mook P, et al. Estimated number of deaths directly averted in people 60 years and older as a result of COVID-19 vaccination in the WHO European region, December 2020 to November 2021. *Euro Surveill* 2021;26(47).
- Jia KM, Hanage WP, Lipsitch M. Excess COVID-19-associated deaths among the unvaccinated population ≥ 18 years old in the United States, May 30 – December 4, 2021. *Epidemiology*. Preprint.
- Bor A, Jørgensen F, Petersen MB. Discriminatory attitudes against unvaccinated people during the pandemic. *Nature* 2023;613:704–11.
- Campion-Smith B. Toronto Star front-page design exacerbated division between readers. greater care should have been taken. 2021. Available: https://www.thestar.com/opinion/public_editor/2021/08/28/toronto-star-front-page-design-exacerbated-division-between-readers-greater-care-should-have-been-taken.html
- Savulescu J, Giubilini A. Shaming Unvaccinated people has to stop. We've turned into an angry mob and it's getting ugly. *The Conversation*; 2021. Available: <https://theconversation.com/shaming-unvaccinated-people-has-to-stop-weve-turned-into-an-angry-mob-and-its-getting-ugly-173137>
- Bardosh K, de Figueiredo A, Gur-Arie R, et al. The unintended consequences of COVID-19 vaccine policy: why mandates, Passports and restrictions may cause more harm than good. *BMJ Glob Health* 2022;7:e008684.
- Yong E. It's a terrible idea to deny medical care to unvaccinated people: the Atlantic. 2022. Available: <https://www.theatlantic.com/health/archive/2022/01/unvaccinated-medical-care-hospitals-omicron/621299/>
- Fehr E, Fischbacher U. Third-party punishment and social norms. *Evolution and Human Behavior* 2004;25(2):63–87.
- Carlsmith KM, Darley JM. Psychological aspects of retributive justice. *Adv Exp Soc Psychol* 2008;40:193–236.
- Gilmore N, Somerville MA. Stigmatization, scapegoating and discrimination in sexually transmitted diseases: overcoming 'them' and 'us'. *Soc Sci Med* 1994;39(9):1339–58.
- Rothschild ZK, Landau MJ, Sullivan D, et al. A dual-motive model of scapegoating: displacing blame to reduce guilt or increase control. *J Pers Soc Psychol* 2012;102:1148–63.
- Gibson JL, Howard MM. Russian anti-Semitism and the scapegoating of Jews. *Brit J Polit Sci* 2007;37:193–223.
- Zawadzki B. Limitations of the scapegoat theory of prejudice. *The Journal of Abnormal and Social Psychology* 1948;43:127–41.
- Sunstein CR. Averting catastrophe. In: *Averting catastrophe: Decision theory for COVID-19, climate change, and potential disasters of all kinds*. NYU Press, 27 April 2021.
- Jones DS. History in a crisis - lessons for COVID-19. *N Engl J Med* 2020;382:1681–3.
- Menebo MM. COVID-19 is viewed as severe as tumor and HIV; perceptions towards COVID-19. *Psychol Health Med* 2022;27(1):237–48.
- Rothwell J, Witters D. Us adults' estimates of COVID-19 hospitalization risk: Gallup. 2021. Available: <https://news.gallup.com/opinion/gallup/354938/adults-estimates-covid-hospitalization-risk.aspx>
- Rothwell J, Desai S. How misinformation is distorting Covid policies and behaviors. 2020. Available: <https://www.brookings.edu/research/how-misinformation-is-distorting-covid-policies-and-behaviors/>
- Courjon J, Contenti J, Demonchy E, et al. Covid-19 patients age, Comorbidity profiles and clinical presentation related to the SARS-CoV-2 UK-variant spread in the southeast of France. *Sci Rep* 2021;11:18456.
- de Siqueira JVV, Almeida LG, Zica BO, et al. Impact of obesity on hospitalizations and mortality, due to COVID-19: A systematic review. *Obes Res Clin Pract* 2020;14:S1871-403X(20)30553-6:398–403..
- Ioannidis JPA, Axfors C, Contopoulos-Ioannidis DG. Second versus first wave of COVID-19 deaths: shifts in age distribution and in nursing home fatalities. *Environmental Research* 2021;195(1):110856.
- Ioannidis JPA, Axfors C, Contopoulos-Ioannidis DG. Population-level COVID-19 mortality risk for non-elderly individuals overall and for non-elderly individuals without underlying diseases in pandemic epicenters. *Environ Res* 2020;188:S0013-9351(20)30785-4:109890..
- Liu W, Yang C, Liao Y-G, et al. Risk factors for COVID-19 progression and mortality in hospitalized patients without pre-existing comorbidities. *J Infect Public Health* 2022;15:S1876-0341(21)00376-2:13–20..
- Zhou F, Yu T, Du R, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective cohort study. *The Lancet* 2020;395(10229):1054–62.
- Pawlowski C, Venkatakrishnan AJ, Ramudu E, et al. Pre-existing conditions are associated with COVID-19 patients' hospitalization, despite confirmed clearance of SARS-CoV-2 virus. *EClinicalMedicine* 2021;34.
- Zerbo O, Lewis N, Fireman B, et al. Population-based assessment of risks for severe COVID-19 disease outcomes. *Influenza Other Respir Viruses* 2022;16:159–65.
- Marcelin JR, Pettifor A, Janes H, et al. Covid-19 vaccines and SARS-CoV-2 transmission in the era of new variants: a review and perspective. *Open Forum Infect Dis* 2022;9(5).
- Giubilini A. The ethics of vaccination Palgrave Pivot Cham. 2019.
- Eyre DW, Taylor D, Purver M, et al. Effect of COVID-19 vaccination on transmission of Alpha and Delta variants. *N Engl J Med* 2022;386:NEJMoa2116597:744–56..
- Singanayagam A, Hakki S, Dunning J, et al. Community transmission and viral load kinetics of the SARS-CoV-2 delta (B.1.617.2) variant in vaccinated and unvaccinated individuals in the UK: a prospective, longitudinal, cohort study. *Lancet Infect Dis* 2022;22(2):183–95.

- 31 Chadeau-Hyam M, Wang H, Eales O, et al. SARS-Cov-2 infection and vaccine effectiveness in England (REACT-1): a series of cross-sectional random community surveys. *Lancet Respir Med* 2022;10:355–66.
- 32 Acharya CB, Schrom J, Mitchell AM. No significant difference in viral load between vaccinated and unvaccinated, asymptomatic and symptomatic groups when infected with sars-cov-2 delta variant. *Infectious Diseases (except HIV/AIDS)*. 2021. Preprint.
- 33 Ferdinands JM, Rao S, Dixon BE, et al. Waning 2-dose and 3-dose effectiveness of mRNA vaccines against COVID-19-associated emergency department and urgent care encounters and hospitalizations among adults during periods of Delta and Omicron variant predominance - VISION Network, 10 States, August 2021-January 2022. *MMWR Morb Mortal Wkly Rep* 2022;71(7):255–63.
- 34 Levine-Tiefenbrun M, Yelin I, Alapi H, et al. Viral loads of Delta-variant SARS-CoV-2 breakthrough infections after vaccination and booster with BNT162b2. *Nat Med* 2021;27(12):2108–10.
- 35 Fraiman J, Erviti J, Jones M, et al. Serious adverse events of special interest following mRNA COVID-19 vaccination in randomized trials in adults. *Vaccine* 2022;40:5798–805.
- 36 Bardosh K, Krug A, Jamrozik E. Covid-19 vaccine boosters for young adults: a risk benefit assessment and ethical analysis of mandate policies at universities. *J Med Ethics* n.d.:medethics–2022.
- 37 Spellberg B, Nielsen TB, Casadevall A. Antibodies, immunity, and COVID-19. *JAMA Intern Med* 2021;181:460–2.
- 38 Alejo JL, Mitchell J, Chang A, et al. Prevalence and durability of SARS-Cov-2 antibodies among unvaccinated US adults by history of COVID-19. *JAMA* 2022;327:1085–7.
- 39 Planas D, Bruel T, Grzelak L. Sensitivity of infectious sars-cov-2 b.1.1.7 and b.1.351 variants to neutralizing antibodies. *Immunology*. 2021. Preprint.
- 40 Block J. Vaccinating people who have had COVID-19: Why doesn't natural immunity count in the US. *BMJ* 2021;374:2101.
- 41 Pilz S, Theiler-Schwetz V, Trummer C, et al. SARS-Cov-2 Reinfections: overview of efficacy and duration of natural and hybrid immunity. *Environ Res* 2022;209:112911.
- 42 Flacco ME, Acuti Martellucci C, Baccolini V, et al. Risk of reinfection and disease after SARS-Cov-2 primary infection: meta-analysis. *Eur J Clin Invest* 2022;52:e13845.
- 43 Kojima N, Klausner JD. Protective immunity after recovery from SARS-Cov-2 infection. *Lancet Infect Dis* 2022;22:12–4.
- 44 Stein C, Nassereldine H, Sorensen RJD, et al. Past SARS-CoV-2 infection protection against re-infection: a systematic review and meta-analysis. *Lancet* 2023;401(10379):833–42.
- 45 Bobrovitz N, Ware H, Ma X, et al. Protective effectiveness of previous SARS-Cov-2 infection and hybrid immunity against the Omicron variant and severe disease: a systematic review and meta-regression. *Lancet Infect Dis* 2023;23:S1473-3099(22)00801-5:556–67..
- 46 Gazit S, Shlezinger R, Perez G, et al. Severe acute respiratory syndrome Coronavirus 2 (SARS-COV-2) naturally acquired immunity versus vaccine-induced immunity, Reinfections versus breakthrough infections: A retrospective cohort study. *Clin Infect Dis* 2022;75:ciac262:e545–51..
- 47 Diani S, Leonardi E, Cavezzi A, et al. Sars-Cov-2—the role of natural immunity: A narrative review. *J Clin Med* 2022;11:6272:21..
- 48 Kampf G. COVID-19: stigmatising the unvaccinated is not justified. *The Lancet* 2021;398(10314):10314.
- 49 Lazarus JV, Wyka K, White TM, et al. A survey of COVID-19 vaccine acceptance across 23 countries in 2022. *Nat Med* 2023;29:366–75.
- 50 Conway LG, Woodard SR, Zubrod A, et al. Why are conservatives less concerned about the coronavirus (COVID-19) than liberals? comparing political, experiential, and partisan messaging explanations. *Pers Individ Dif* 2021;183:111124.
- 51 Gollwitzer A, Martel C, Brady WJ, et al. Partisan differences in physical distancing are linked to health outcomes during the COVID-19 pandemic. *Nat Hum Behav* 2020;4:1186–97.
- 52 Kerr J, Panagopoulos C, van der Linden S. Political polarization on COVID-19 pandemic response in the United States. *Pers Individ Dif* 2021;179:110892.
- 53 Galston WA. For COVID-19 vaccinations, party affiliation matters more than race and ethnicity. 2021. Available: <https://www.brookings.edu/blog/fixgov/2021/10/01/for-covid-19-vaccinations-party-affiliation-matters-more-than-race-and-ethnicity/>
- 54 Rosenfeld DL, Tomiyama AJ. Moral judgments of COVID-19 social distancing violations: the roles of perceived harm and impurity. *Pers Soc Psychol Bull* 2022;48:766–81.
- 55 Rasmussen. Covid-19: Democratic voters support harsh measures against unvaccinated: Rasmussen reports, 2022. Available: https://www.rasmussenreports.com/public_content/politics/partner_surveys/jan_2022/crosstabs_heartland_covid_january_5_2022
- 56 Kuran T, Sunstein CR. Availability cascades and risk regulation. *Stanford Law Review* 1999;51:683.
- 57 Graso M, Chen FX, Reynolds T. Moralization of COVID-19 health response: asymmetry in tolerance for human costs. *J Exp Soc Psychol* 2021;93:104084.
- 58 Blaming the unvaccinated during the Covid-19 pandemic: The roles of political ideology and risk perceptions in the USA. Open science framework. 2022. Available: https://osf.io/vjur3/?view_only=88a91782e6124c9b81f66db3c8bd8745
- 59 Herrera-Espósito D, de Los Campos G. Age-specific rate of severe and critical SARS-Cov-2 infections estimated with multi-country Seroprevalence studies. *BMC Infect Dis* 2022;22:311:311..
- 60 CDC. Weekly updates by select demographic and geographic characteristics [Center for Disease Control and Prevention]. 2021. Available: https://www.cdc.gov/nchs/nvss/vsrr/covid_weekly/index.htm#Comorbidities
- 61 Economist. See how age and illnesses change the risk of dying from COVID-19. Economist; 2021. Available: <https://www.economist.com/graphic-detail/covid-pandemic-mortality-risk-estimator>
- 62 Haslam A, Olivier T, Prasad V. The definition of long Covid used in interventional studies. *Eur J Clin Invest* 2023:e13989.
- 63 Savun B, Gineste C. From protection to persecution: threat environment and refugee scapegoating. *Journal of Peace Research* 2019;56:88–102.
- 64 Douglas T. *Scapegoats: transferring blame*. Routledge, 1995.
- 65 Stolow JA, Moses LM, Lederer AM, et al. How fear appeal approaches in COVID-19 health communication may be harming the global community. *Health Educ Behav* 2020;47:531–5.
- 66 Ruisch BC, Moore C, Granados Samayoa J, et al. Examining the Left-Right divide through the lens of a global crisis: ideological differences and their implications for responses to the COVID-19 pandemic. *Polit Psychol* 2021;42:795–816.
- 67 Rothwell J, Makridis C. Politics is wrecking America's pandemic response: the Brookings Insitute. 2020. Available: <https://www.brookings.edu/blog/up-front/2020/09/17/politics-is-wrecking-americas-pandemic-response/>
- 68 AllSides. Allsides media bias chart. AllSides; 2023. Available: <https://www.allsides.com/media-bias/media-bias-chart>
- 69 MSNBC. Transcript: the Rachel Maddow Show, 3/29/21. MSNBC; 2021. Available: <https://www.msnbc.com/transcripts/transcript-rachel-maddow-show-3-29-21-n1262442>
- 70 Mallapaty S. Can COVID vaccines stop transmission? Scientists race to find answers. *Nature* 19, 2021.
- 71 Doshi P. Will covid-19 vaccines save lives? Current trials aren't designed to tell us. *BMJ* 2020:m4037.
- 72 Birhane M, et al. CDC COVID-19 Vaccine Breakthrough Case Investigations Team, CDC COVID-19 Vaccine Breakthrough Case Investigations Team. Covid-19 vaccine breakthrough infections reported to CDC — United States, January 1–April 30, 2021. *MMWR Morb Mortal Wkly Rep* 2021;70:792–3.
- 73 Brown CM, Vostok J, Johnson H. Outbreak of SARS-COV-2 infections, including COVID-19 vaccine breakthrough infections, associated with large public gatherings. *MMWR Morb Mortal Wkly Rep* 2021;70:1059–62.
- 74 Giubilini A, Savulescu J, Pugh J, et al. Vaccine mandates for healthcare workers beyond COVID-19. *J Med Ethics* 2023;49:211–20.
- 75 Clarke KEN, Jones JM, Deng Y, et al. Seroprevalence of infection-induced SARS-COV-2 antibodies — United States. *MMWR Morb Mortal Wkly Rep* 2022;71:606–8.