



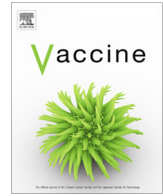
Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Contents lists available at ScienceDirect

Vaccine

journal homepage: [www.elsevier.com/locate/vaccine](http://www.elsevier.com/locate/vaccine)

## Strategic silences, eroded trust: The impact of divergent COVID-19 vaccine sentiments on healthcare workers' relations with peers and patients

Leonardo W Heyerdahl<sup>a,\*</sup>, Stef Dielen<sup>b</sup>, H el ene Dodion<sup>b</sup>, Carla Van Riet<sup>c</sup>, ToTran Nguyen<sup>b</sup>, Clarissa Simas<sup>d</sup>, Lise Boey<sup>c</sup>, Tarun Kattumana<sup>c,e</sup>, Nico Vandaele<sup>c</sup>, Heidi J. Larson<sup>d</sup>, Koen Peeters Grietens<sup>b,f</sup>, Tamara Giles-Vernick<sup>a</sup>, Charlotte Gryseels<sup>b</sup>

<sup>a</sup> Department of Global Health, Anthropology and Ecology of Disease Emergence Unit, Institut Pasteur, Paris, France

<sup>b</sup> Socio-Ecological Health Research Unit, Institute of Tropical Medicine, Antwerp, Belgium

<sup>c</sup> Access-To-Medicines Research Centre, KU Leuven, Belgium

<sup>d</sup> Vaccine Confidence Project and London School of Hygiene and Tropical Medicine, United Kingdom

<sup>e</sup> Husserl Archives, Research Center for Phenomenology and Continental Philosophy, Institute of Philosophy, KU Leuven, Belgium

<sup>f</sup> School of Tropical Medicine and Global Health, Nagasaki University, Nagasaki, Japan

### ARTICLE INFO

#### Article history:

Received 5 August 2022

Received in revised form 14 October 2022

Accepted 15 October 2022

Available online xxxxx

### ABSTRACT

**Background:** Polarized debates about Covid-19 vaccination and vaccine mandates for healthcare workers (HCWs) challenge Belgian HCWs ability to discuss Covid-19 vaccine sentiments with peers and patients. Although studies have identified drivers of HCWs vaccine hesitancy, they do not include effects of workplace interactions and have not addressed consequences beyond vaccine coverage.

**Methods:** Interviews and focus group discussions with 74 HCWs practicing in Belgium addressed Covid-19 vaccine sentiments and experiences of discussing vaccination with peers and patients.

**Results:** Most participating HCWs reported difficulties discussing Covid-19 vaccination with peers and patients. Unvaccinated HCWs often feared that expressing their vaccine sentiments might upset patients or peers and that they would be suspended. Consequently, they used social cues to evaluate others' openness to vaccine-skeptical discourses and avoided discussing vaccines. Surprisingly, some vaccine-confident HCWs hid their vaccine sentiments to avoid peer and patient conflicts. Both vaccinated and unvaccinated HCWs observed that unvaccinated patients occasionally received suboptimal care. Suboptimal care was central in unvaccinated HCW unwillingness to express their vaccine sentiments to peers. Both vaccinated and unvaccinated HCWs described loss of trust and ruptured social relations with peers and patients holding divergent vaccine sentiments.

**Discussion:** Belgian HCW perceived Covid-19 vaccines as a risky discussion topic and engaged in "strategic silences" around vaccination to maintain functional work relationships and employment in health institutions. Loss of trust between HCW and peers or patients, along with suboptimal patient care based on vaccination status, threaten to weaken Belgium's, and by implication, other health systems, and to catalyze preventable disease outbreaks.

  2022 The Author(s). Published by Elsevier Ltd.

### 1. Introduction

Healthcare workers (HCWs) have been a key target population for Covid-19 vaccination campaigns because of their contact with high-risk patients [1]. Despite relatively high vaccination rates in

this group, some HCWs have been found to hesitate or to refuse Covid-19 vaccination [2].

HCWs are among the most trusted source for lay vaccine decisions in Europe [3], including for Covid-19 vaccines [4]. HCW vaccine refusal can potentially increase the infection risk for patients with whom these workers are in contact and can overwhelm healthcare systems because of rising numbers of Covid-19 patients and staff on sick leave. These high stakes have encouraged countries to introduce vaccine mandates for HCWs (e.g., France, Greece, Austria) or to consider such mandates, as in Belgium [5].

*Abbreviations:* HCW, Healthcare Worker; IDI, In-Depth Interview; FGD, Focus Group Discussion; ICU, Intensive Care Unit.

\* Corresponding author at: 25 rue du Dr Roux, Paris 75015, France.

E-mail address: [leonard.heyerdahl@pasteur.fr](mailto:leonard.heyerdahl@pasteur.fr) (L.W Heyerdahl).

<https://doi.org/10.1016/j.vaccine.2022.10.048>

0264-410X/  2022 The Author(s). Published by Elsevier Ltd.

The Covid-19 pandemic has catalyzed substantial research on HCW vaccine hesitancy, following decades of reports that HCW vaccine coverage has been insufficient for influenza [6] and even more so for the 2009 H1N1 epidemic [7,8]. Much research has addressed the drivers of HCW vaccine hesitancy, notably demographics [9,10], political affiliation [11], education level [12], as well as HCW perceptions of safety and vaccine development conformity, efficacy and usefulness, and trust in institutions [8,13]. Other studies have explored the consequences of HCW vaccine hesitancy by measuring vaccine coverage among HCWs [8,14], and to a lesser extent, among patients in their care [15].

Addressing vaccine hesitancy, however, requires a public health capacity to understand and dialogue about individual and group vaccine concerns [16,17]. During the implementation of a prior study of vaccine sentiments in the Belgian population (Project “Transvaxx”, funded by the Fund for Scientific Research of Flanders, Belgium), unvaccinated HCWs were often unwilling to participate in group discussions out of fear of being recognized as vaccine hesitant among their peers. HCWs’ ability to share their concerns with others may be limited by the tense epidemiological and political contexts of successive Covid-19 waves and legislation mandating vaccines. We conceptualized this phenomenon as unspoken vaccine hesitancy, as we reported in previously published correspondence [18]. From November 2021 to February 2022, we studied unspoken vaccine hesitancy among HCWs by analyzing their vaccine sentiments, vaccine uptake decisions, their experiences of interacting with peers and patients regarding Covid-19 vaccinations and the consequences for their social relations.

Given the mutable nature of vaccine hesitancy, a more dynamic view of this phenomenon is needed [19]. The aim of the current study was to obtain a better understanding of how HCWs in engagement with their peers and patients experience, debate, silence, cultivate or address vaccine hesitancy. We also sought insight into the consequences of these interactions, not just for vaccine coverage, but working relations within health care teams and between HCWs and patients.

## 2. Methods

### 2.1. Study design

A mixed methods study using In-Depth Interviews (IDIs), Focus Group Discussions (FGDs) was carried out among HCWs practicing in the Flanders or Brussels regions in Belgium.

### 2.2. Study population

Inclusion criteria were the following: being an adult HCW practicing or studying in the Brussels or Flanders regions in Belgium. HCWs with different profiles were recruited including nurses, medical doctors, specialists, dentists, psychologists and ambulance drivers.

### 2.3. Data collection

We used purposive sampling techniques, including snowball sampling, to recruit participants for IDI and FGD between November 2021 and February 2022. Participants were recruited by email, either contacted directly by the researchers when they already knew each other from prior research, or, indirectly by (the head of) clinics, hospitals, medical faculties or labour unions, who were contacted to forward the invitation to their

HCW staff or students. As the research took place during the peak of the Covid-19 Omicron wave, all FGDs were carried out online, using secure Zoom rooms. IDIs were carried out online or in person –with social distancing and masks, in French or Dutch according to participants’ preference. Question guides addressed virus perception and susceptibility; efficacy and usefulness of vaccines; safety of vaccines; trust in political, scientific and media institutions; perception of Belgium’s vaccination strategy; characteristics of safe spaces for vaccination discussions and current climate of these interactions with peers, patients, relatives and others.

### 2.4. Data analysis

FGD and IDI recordings were transcribed verbatim by students supervised by three researchers. Transcripts were imported into Dedoose  software (SocioCultural Research Consultants, LLC version 9.0.46) for qualitative analysis. An initial coding tree was based on the categories of the question guide and inspired by the Health Belief Model and the 7C scale of vaccination readiness [20]. Sub-codes were created inductively to reflect specific participants’ answers. All codes, their definition and applicability were discussed within the coding team in depth during weekly research meetings and in between meetings through a dedicated private instant messaging Discord channel. Due to the changing context of the research and consequent adaptations in the study implementation, memos of each research activity were written to document analytical insights and the evolving research context. Emerging themes were triangulated among different participant profiles to account for richer perspectives and nuances of described phenomena (for instance: *differential care practices with respect to non-vaccinated patients*). Saturation of information was reached, whereby participants’ answers in the later IDI and FGD did not offer novel insights into the topics of interest. Key concepts used in the paper are defined in Table 1.

### 2.5. Ethics

The study was approved by the Institutional Review Board of the Institute of Tropical Medicine in Antwerp, Belgium (IRB/RR/AC/170) and by the Social and Societal Ethics Committee of the KU Leuven University (G-2021 11 2078).

## 3. Results

From November 2021 to February 2022, 41 IDI and 8 FGDs were conducted with 74 HCWs; 3 participants had no contact with patients and thus were not included in the analysis. Participants included physiotherapists, family doctors, assistant nurses, specialized doctors, and intensive care unit nurses among other health-care profiles (Table 2–6).

Our results are divided in three sections. First, we present how participating HCWs connect with and think about patients and peers with divergent sentiments regarding Covid-19 vaccines. Second, we present how HCW expressed their vaccine sentiment to patients and peers. Finally, we present strategies that HCW employ to navigate the difficult climate of interaction, including interpreting social cues to peer or patient vaccine sentiments, avoiding vaccine-related discussions, and using strategic silence and cutting ties.

**Table 1**  
Concept Definitions.

Concept	Definition and use
Vaccine sentiments	These sentiments include personal opinion and emotional response to vaccines and may evolve over time and by vaccine. In this article, we characterize vaccine sentiments as ranging from confidence to skepticism (defined below). Although they may help to characterize perceptions, all concepts encapsulating individual framing of vaccines are constructs and simplifications of experienced realities. The results section offers more nuanced understandings of experienced vaccine sentiments and their consequences for participants.
Vaccine confidence	Vaccine confident individuals trust the effectiveness, safety, usefulness of Covid-19 vaccines and the institutions promoting them.
Vaccine skepticism	Vaccine skeptical individuals hold negative sentiments towards the Covid-19 vaccines and often distrust institutions promoting them. In contrast with vaccine confidence, vaccine skepticism is as an intermediate stance between vaccine hesitancy (encompassing a broad range of sentiments), and vaccine refusal (more restricted and not accounting for those with negative emotions towards vaccines but who are nonetheless vaccinated).
Vaccine sentiment and vaccination status	Depending on the context, participants in the article may be presented and regrouped by their vaccination status (their decision), or by their vaccine sentiments (their opinion and emotional response). These two sets of relations with vaccines do not completely overlap because some individuals may hold sentiments that appear to contradict their vaccination status. Vaccination status is indicated for all cited participants with the number of doses received.
Divergent vaccine sentiments	Vaccine divergent individuals have opposing sentiments or opinions regarding Covid-19 vaccines and vaccination.
Vaccine related tensions	Used to discussing actual conflicts regarding vaccination, i.e disagreements over the moral obligation for HCWs to be vaccinated, backlash against HCW vaccine skeptical discourses with patients.
Difficult climate of interaction regarding vaccines	A social space and work environment filled with tension and potential conflict.

### 3.1. HCW perceptions of and attitudes towards patients and peers with divergent vaccine sentiments

#### 3.1.1. Interacting with vaccine divergent patients

Patient vaccination decisions elicited emotional and practical reactions among HCWs. Both vaccinated and unvaccinated participants recalled hearing peers complaining about and denigrating unvaccinated Covid-19 patients. For vaccinated HCWs and ICU nurses in particular, unvaccinated and hospitalized Covid-19 patients were often a major point of tension. Although one nurse would typically care for several patients simultaneously, each Covid-19 patient in intensive care required the attention of several nurses for long periods of time. The influx of Covid-19 patients, many of whom were unvaccinated, also meant that HCW had to abandon their usual activities to reinforce intensive care teams. Caring for unvaccinated Covid-19 patients was often deemed a complication for HCWs, and they were often perceived as more annoying or rude than vaccinated patients. Moreover, as one nurse who normally worked in the emergency room but was mobilized to care for Covid-19 patients in ICUs and who had initially delayed her Covid-19 vaccination indicated, these patients could have

**Table 2**  
Participants Profile.

Profile	Count
Ambulance driver & first aid worker	2
Assistant nurse	1
Assistant nurse student	1
Dentist	6
Educator/health care provider to disabled and mental health patients	1
Medical doctor	(17)
–general medicine	4
–general medicine & homeopathy	2
–specialist	10
Medical student	3
Midwife	3
Nurse	(29)
–general practice	14
–general practice & public health student	3
–general practice & physiotherapy student	1
–Intensive Care Unit (ICU)	7
–pediatrics	1
–psychiatry	1
–head nurse	2
Physiotherapist	5
Psychologist	3
Psychology student	1
Total	71

**Table 3**  
Participants Gender.

Gender	Frequency
Female	43
Male	29
Total	71

**Table 4**  
Participants Age Range.

Age range	Frequency
20–29	17
30–39	20
40–49	15
50–59	11
60–69	6
Undisclosed	2
Total	71

**Table 5**  
Participants Care Context.

Care context	Frequency
Community level care	30
Hospital care – ICU	7
Hospital care – other	27
long term care facilities	7
Total	71

**Table 6**  
Participants Covid-19 Vaccination Status.

Covid-19 vaccination status	Frequency
0 dose	27
1 dose	2
2 doses	7
3 doses or equivalent of full vaccination	28
Undisclosed	3
Vaccinated (no detail)	4
Sum	71

avoided their fates. Instead, she noted, unvaccinated Covid-19 patients overwhelmed staff and coerced them into witnessing severe illness and death.

We discuss it a lot among colleagues because there is a particular form of suffering in treating the unvaccinated. A certain frustration, I would say, in treating or in losing – because people die– the unvaccinated, who could have avoided that for themselves and for us, had they been vaccinated.

[(BR\_22\_01\_21, Nurse, general practice & public health student, 3 doses)]

Several vaccinated HCWs also complained they had difficulties maintaining cordial relations with patients who refused vaccination despite being informed that they were at risk. The caregiver-patient relationship was also affected when unvaccinated patients seemed too distrustful of their HCWs. For instance, one nurse recalled patients insisting on seeing the label of the routine vaccine they were receiving, suspecting that she would trick them into getting a Covid-19 vaccine.

Vaccine skeptical HCWs criticized vaccinated patients by stressing that they had a false sense of security after receiving the Covid-19 vaccine. A vaccine skeptical specialist claimed he had been infected by a vaccinated patient who did not wear a mask in his facility. Vaccine skeptical HCWs also expressed their disappointment in patients' "trivial" motives for accepting vaccination, such as the ability to travel. Others felt they had needlessly put their jobs at risk when warning their patients against getting vaccinated:

Now in the month of May when, let's say, the social punishment of the unvaccinated took place, I had an incredible number of patients who simply walked into my office and said "sorry but you know, we got vaccinated anyway, because we want to go out, we want to travel and so on" and I have to tell you very honestly, I was really struggling with that. [...] It was on a Friday evening [...] I just burst into tears, I said: "this is not possible! Did I put my head under the guillotine for this?"

[(FL\_R1\_B\_04, Medical doctor, general medicine & homeopath, 0 dose)]

### 3.1.2. Interacting with vaccine divergent peers

Both vaccine confident and skeptical HCWs often claimed that their vaccination decisions were heavily discussed and morally judged by their peers. Many described situations where they felt "attacked" by colleagues with divergent vaccine sentiments. Some claimed that they "no longer recognize[d] colleagues" or they had discovered disappointing personality traits, including gullibility, irritability, or not taking patients interests to heart. One vaccine confident participant, responsible for communications through a health professional association website, indicated receiving hostile emails, and even threats via social media to damage her car. She surmised that HCWs who were unhappy with the association's promotion of Covid-19 vaccines, were the sources of these threats.

Unvaccinated HCW reported they were criticized by their colleagues for being egocentric and not protecting their patients. Several participants noted that each HCW's vaccination status was easily known within medical care units; vaccination sessions were often done in open rooms entailing limited privacy and creating substantial tensions among colleagues. One ambulance driver and first aid worker noted that his vaccinated peers expressed hostility towards unvaccinated individuals and used peer pressure to promote vaccination in the station:

We are being asked to be good boys and get shot [*piquer* in French, used colloquially to refer to lethal injections in veterinary practice] like every-one else. That's the overall atmosphere at the station. It's not easy at all because it is a man's world, a bit macho, the remarks are harsh. I heard that the unvaccinated should be kicked out on the spot, as fast as possible, that the unvaccinated deserve to die.

[(BR\_22-02-01, Ambulance driver and first aider, 0 doses)]

Besides being accused by vaccinated colleagues of being irresponsible (that is, not fully protecting patients and colleagues by accepting vaccination or not showing the example), they also felt ridiculed and not taken seriously. One specialist who delayed vaccination but then accepted a first vaccine dose despite her doubts, felt unsupported by peers when she suffered severe symptoms that she attributed to the vaccine. She decided not to accept a second or third dose.

That sensation in my arm just gradually got worse. Up until three weeks ago, I could barely move my arm up and I could hardly put my coat on. I had loss of strength in my left arm for months. [...] At one point I asked my boss "what should I do?", because I turned to those who had given me the advice [to get vaccinated]. Right, I said like "so, I have this". And then they say "that's weird. uhm". Then they turn around and they don't say anything, they don't tell you where to go, who you should see for treatment or check-ups.

[(FL\_R1\_B\_FGD speaker 6, Medical doctor, specialist, 1 dose)]

Several vaccine skeptical participants questioned the claim that vaccination was part of HCW modeling of healthy lifestyles for their patients. They not only questioned the safety of vaccination, but also contended that already-burdened HCWs should not be expected to perform healthy behaviors in other domains of life (e.g. food, sports, tobacco consumption). One care provider underscored the tensions of this logic, querying.

Shouldn't we forbid all nurses to drink alcohol, smoke, eat red meat, or take out a gym membership because they have to exercise, get eight or nine hours of sleep a night because that's good, and you have to set an example. Why should there be sick nurses walking around, that's all right, nothing against those people, but the government forces them to do shifts that are not human, they have to have a late one, a former one, in between they have five hours of sleep. The food in the hospitals is no good. You just do so much overtime, your whole life is just made so unhealthy by the shifts.

[(FL\_21-12-20\_SD, Educator/health care provider to disabled and mental health patients, 3 doses)]

Several participants mentioned experiencing mental health issues that they related to the difficult climate of interaction regarding vaccines. One psychologist, for instance, claimed she was suffering from depression because of vaccine-related tensions in her workplace and her perceived inability to discuss her concerns. Similarly, a nurse indicated she was seeking psychological support following vaccine-related tensions. An ambulance driver indicated he took prescribed antidepressants and was on sick leave because he felt he could not face the peer and administrative pressures to receive Covid-19 vaccination.



### 3.2. Healthcare workers' expressions of vaccine sentiments towards patients and peers

#### 3.2.1. Patients

Particularly for vaccine skeptical HCWs, expressing vaccine sentiments or revealing one's vaccination status to patients was generally difficult and required caution. Two concerns guided their consequent reluctance to share this information. First, HCWs feared professional backlash resulting from patient complaints to their supervisors. HCWs frequently cited examples of colleagues who had been suspended following patient denunciation.

It is more out of fear of what might happen afterwards [talking freely about vaccines], we don't know them [patients at the hospital], there is no established trust relationship. In my nutrition consultations I talk more openly about vaccines because there I have a pre-established relationship with patients [...] In the hospital it is quite a taboo subject, [...] by making statements that go against it we are taking risks. So, it is true that [not revealing vaccine sentiments] it is more out of fear of letters or accusations being written.

[(BR\_R1\_B\_07, Nurse, general practice, 0 dose)]

A second concern was linked to patient anxieties. HCWs claimed that patients expected their healthcare providers to support their own vaccine confidence; they were unsettled and disoriented after learning of the professionals' doubts. One nurse who had long postponed his vaccination recalled the challenges of advising patients about Covid-19 vaccines.

I saw that every time I tried it [to inform his patients that he was not vaccinated], they felt bad afterwards. According to them, I should not have that stance [being skeptical to Covid-19 vaccines], instead I should be the one who encourages them to get vaccinated. So, I had a hard time expressing myself in front of patients.

[(BR\_R1\_C\_03, Nurse, general practice & public health student, vaccinated, no detail)]

#### 3.2.2. Peers

Among vaccine confident HCWs, a nurse and public health student contended that discussing vaccines was easy, so long as every-one accepted that opinions could diverge. Several HCWs, most of whom had accepted Covid-19 vaccines, found it relatively easy to discuss and to support vaccine-related concerns among peers. A few HCWs in leadership roles also described positive interactions regarding vaccines when they initiated one-on-one discussions with staff members or during presentations by specialists sharing the latest knowledge on Covid-19 vaccines. Opening up about vaccine anxieties with peers could sometimes be experienced as liberating, an opportunity to receive counsel from trusted colleagues. For instance, one nurse and public health student initially delayed her vaccination because she feared a specific adverse event. Once she decided to confide in her closest colleagues, they reassured her that her concerns were unfounded. Some gently mocked her for the specificity of her concern. When she eventually received the vaccination, she felt liberated from her indecision.

Yet some vaccine confident HCWs experienced difficulties voicing their vaccine sentiments. For instance, one fully vaccinated physiotherapist felt unable to tell her supervisor, who often discussed her vaccine skepticism and with whom she did not agree.

Most vaccine skeptical participants experienced difficulties in interacting with their superiors, contending that there was no space to discuss, to provide informed consent, to express doubt

about the vaccination strategy or to adapt the expectation of HCW vaccination to individual circumstances. There were a few exceptions however, after listening to other focus group participants share their difficult climate of interaction with colleagues, one vaccine skeptical senior dentist noted that she felt fortunate because she felt her vaccine confident colleagues respected her decision not to vaccinate. A few other vaccine skeptical HCWs expressed their vaccine sentiments but only with close colleagues.

### 3.3. Healthcare workers' strategies to navigate vaccine-related tensions with patients and peers

#### 3.3.1. Providing less care for patients

Several vaccine-confident nurses who worked directly with Covid-19 patients confessed that although they treated all patients, they provided unvaccinated Covid-19 patients with only the minimal required care:

Unvaccinated people, on the other hand, they get their care, whatever they need, but I'm not going to go the extra mile for them, because I'm like "you could have prevented this, you shouldn't be occupying this bed, because you're a healthy thirty-something and you just didn't want to get vaccinated and now you're lying here screaming in my bed on intensive care, and you're asking me all kinds of things."

[(FL\_22-01-10\_SD\_IDI, Nurse, ICU, 3 doses)]

One vaccine confident HCW noticed that some colleagues wrote by hand "unvaccinated" across Covid-19 patients' files. She considered this practice unethical because it unnecessarily disclosed medical information that fostered stigma and discriminatory treatment.

Several participants caring for unvaccinated Covid-19 patients emphasized that exhaustion, the lack of beds and human resources were key contributors to tensions with unvaccinated patients.

When I get out, I've worked two days straight. I've worked 12 h in a row on Tuesday – we are Thursday, right? – 12 h on Tuesday, 12 h on Wednesday with half an hour of lunch break. How could I feel fine when on the 11th hour there is a man who is unwell because he did not get his vaccine? How am I supposed to react? [laughs nervously].

[(BR\_22\_02\_03, Nurse, ICU, 2 doses will not take the third)]

One vaccine confident physician further indicated that tensions with Covid-19 patients perceived as responsible for their illness was not new in hospitals. He worried, however, that reproaching unvaccinated Covid-19 patients for their illness could set a precedent and normalize unequal treatment:

[I see] an ethical problem behind this logic, it would mean that if you smoke, then we are not going to treat you anymore, your heart attack, you smoked, you should not have smoked. You drank, you have a liver problem, deal with it alone. We are going towards an absence of solidarity. The person has not behaved ideally, we completely ignore the genetic factors that will push the person to not be able to resist addictions, we will ignore the fact that social inequalities mean that we do not have access to a quality diet and that therefore we become more prone to cardiovascular diseases. In that case we completely change our model of society, and we pay less taxes, throw the baby in the water, if he can swim, he swims, if he can't swim, well, it's natural selection. I'm caricaturing, I don't think it's funny, but if we go down that path let's say it clearly: we're changing the model [...] but that's not what I signed up for.

[(BR\_22\_02\_04, Medical doctor, general medicine, 3 doses)]

### 3.4. Using social cues to pro-actively intuit vaccine sentiments

Several HCWs indicated that they looked for social cues to open the vaccination discussion. In particular, vaccine skeptical HCWs, prior to sharing their vaccination status or talking transparently about the vaccines, would often conjecture whether patients had doubts or if they would be open to vaccine skepticism.

With patients, one must be careful because we [usually] do not know the person, when we know the person, we can talk more openly [...] With patients, one must see what idea they have [regarding vaccines] and remain super factual, scientific and refrain from imposing something, I find that very important. Now, when I have patients in the emergency room who voice doubts or if I feel that... you know, it's really green light, red light [to openly discuss vaccine concerns or not].

[(BR\_R1\_B\_07, Nurse, general practice, 0 dose)]

How patients described unvaccinated individuals was also a cue for HCWs to evaluate whether or not to reveal their vaccination status and sentiments:

I have a number of patients who do talk about it, you know, about their worries and their fears. These are people who know what my [vaccination] status is. But the majority of my patients don't know, um... And that's because of the things I hear them say, how they look at [not being vaccinated].

[(FL\_22-02-10\_SD\_IDI, Psychologist, 0 dose)]

HCWs also noted their interlocutors' ability to pick up cues of their vaccine sentiments. For instance, a nurse's lack of hostility regarding a Covid-19 patient's choice not to vaccinate could be perceived by the patient as a clue that they shared skepticism towards vaccines:

[with Covid-19 patients] I do my anamnesis and I don't ask whether or not they are vaccinated, and several patients have told me 'Oh, you are not vaccinated!' and [at first] I wondered to myself "but how?", I did not understand how they could know and then one told me "It's the first time that I am cared for without being blamed".

[(BR\_R1\_A\_06, Nurse, ICU, 0 dose)]

#### 3.4.1. Avoiding discussions and having strategic silences about vaccines

Avoiding vaccine discussion with peers has become a common practice among vaccine skeptical HCWs and to a lesser extent, among vaccine confident HCWs. Whereas a few participants considered silences around vaccination discussions to be involuntary, the consequence of a heavy workload, most participants reported actively avoiding such discussions with peers.

For vaccine skeptical HCWs, denigrating comments about unvaccinated individuals and discriminatory care for unvaccinated Covid-19 patients compelled their own silence about vaccination.

It's difficult because it's the first time that I keep quiet and, in general, I am very honest, and I say everything. But in this case, we are in a situation in which I no longer dare talking about it [vaccines]. Just listening to how doctors and nurses talk about the unvaccinated, it makes me sick. When I am triaging patients, they are a meter and half away from the door and I hear doctors saying "but if he is not vaccinated, he can just die!" [short sigh] it's really difficult.

[...inhales sharply] during the last series of nightshifts I heard one colleague say 'well our unit is exemplary, we're 100 % vaccinated', I said "oh, really?", I did not say anything [that she is not vaccinated], and two minutes later, in her next sentence she said "anyways, the unvaccinated are kamikazes". I thought

to myself "ok [sighs], I won't go into the subject". If I ever decide to talk about it, I know I will live hell on earth and I don't want to expose myself to that for now.

[(BR\_R1\_A\_06, Nurse, ICU, 0 dose)]

A few unvaccinated HCWs also relied on medical confidentiality or therapeutic neutrality to justify their refusal to divulge their vaccination status to anyone in their work environment, even when asked by patients.

Yet vaccinated HCWs also deployed a similar silence. One fully vaccinated but vaccine skeptical ICU nurse first shared her hesitancy with her colleagues, but as her colleagues overcame their concerns and received vaccination, they started framing unvaccinated or skeptical HCWs as "stupid" and she felt increasingly isolated. She thus resorted to silence, no longer acknowledging her vaccine concerns with her peers except with a few who, she knew, still shared her concerns.

Many participants avoided vaccine-related discussions to maintain functional work relationships. A fully vaccinated nurse said her team steered clear of the subject to "keep good working relationships", and as a team leader, she limited her own vaccine communication to forwarding institutional vaccine-related decisions to her staff with no additional comments.

For several unvaccinated HCWs, however, silence regarding their vaccination status and sentiments was also perceived as a condition to keep their jobs. Two HCWs in training mentioned that they preferred remaining silent about their vaccination status. They feared that their vaccination status might disrupt their education and prevent them from finishing their internships. As one mentioned, although vaccination was not yet mandatory for HCWs, she was nonetheless asked about her vaccination status during a job interview. She eventually chose to receive a COVID vaccination because she saw no viable alternative.

Such issues were not limited to junior HCWs. An unvaccinated specialist mentioned that she avoided vaccine discussions with colleagues as a "survival strategy". Vaccine confident HCWs inadvertently encountered this strategic silence in health institutions, because several acknowledged that they had never engaged with vaccine hesitant peers prior to the study focus group discussions.

#### 3.4.2. Avoiding or limiting vaccine recommendations to perceived risk populations

Some vaccine confident participants recommended vaccination to all eligible patients in accordance with the official public health strategy. Others tried to communicate the benefits and risks as neutrally as possible to facilitate their patients' informed decisions.

Several vaccine skeptical participants who were not medical doctors recommended that their patients discuss vaccine uptake with their family doctors. Vaccine skeptical medical doctors had comparatively less leeway to avoid vaccine conversations. Indeed, they saw it as their duty to warn patients for the vaccine's uncertainties or dangers, information they perceived to be absent in public debate. They mentioned that they limited their vaccination recommendations to patients whom they considered to be truly at risk for severe Covid-19, notably those with co-morbidities or the elderly.

#### 3.4.3. Cutting professional and private social ties

Several participants maintained that they ruptured their relations with colleagues or friends with divergent sentiments regarding Covid-19 vaccines. One unvaccinated specialist stated that among his medical "friends for 25 years", he could only discuss with one, whom he had earlier supervised.

Similarly, a vaccine confident nurse and public health student stated that she no longer meets with an unvaccinated colleague

and friend because she “hangs out with people who think like her, people who are angry” (BR\_22\_01\_21, 3 doses).

Although several participants recounted social ruptures, other hoped to restore these social ties. One fully vaccinated nurse and public health student (BR\_22\_01\_21), aware that vaccine related tensions have affected her interactions with some vaccine divergent friends and colleagues, nevertheless maintained her contact with them, contending that there would be a collective return to “our normal selves” after the pandemic.

#### 3.4.4. A shared unwillingness to listen

Difficulties speaking about vaccine sentiments aligned with several participants’ observation that they were increasingly unwilling to listen to those who disagreed with them about COVID vaccination. One fully vaccinated nurse and physiotherapy student recognized that he was less willing to listen to vaccine skeptical colleagues’ arguments, at the same time blaming colleagues with divergent vaccine sentiments of the same inability to listen. Our participants contended that all parties needed to listen to one other for proper dialogue to occur, a prerequisite that was frequently unmet.

Each one gets his arguments out, doesn’t listen to the other’s arguments and then afterwards is even more convinced of his own arguments. And I’m probably guilty of that myself. So that’s why I feel a little frustrated, because usually in those conversations you don’t get anywhere.

[(FL\_22-02-03\_SD\_IDI, Nurse, general practice and physiotherapy student, 3 doses)]

Several participants also felt a certain fatigue towards the ‘pandemic’ and ‘vaccines’ as discussion subjects and preferred avoiding the topics whenever possible. Consequently, many felt that when individuals had already decided it was pointless to continue the discussion.

## 4. Discussion

This study moved beyond the drivers of HCW vaccine hesitancy and coverage to explore qualitatively the nature of HCW vaccine discussions with peers and patients and to characterize how divergent vaccine sentiments and conflict avoidance strategies (re) shaped HCWs’ social interactions within health care structures.

Peterson et al. [8] conclude their review of drivers of vaccine hesitance with an Other category in which they relate newspapers stories of HCWs who felt demonized by their peers and bullied into vaccinating [21,22]. Few studies, however, have investigated HCW interactions with peers and patients with divergent vaccine sentiments or the influence of interpersonal relations on vaccine hesitancy and confidence. Holzmann-Littig and colleagues conducted a survey among HCWs, finding that their Covid-19 vaccine hesitancy was strongly associated with having hesitant relatives [23]. They did not, however, offer insights into the social dimensions of vaccine hesitancy in health care structures, specifically how workplace interactions among HCWs and with patients can facilitate hesitancy and its multifarious consequences.

We found that vaccine skeptical HCWs often experienced unspoken vaccine hesitancy. Our results align with survey findings from the United Kingdom, in which unvaccinated HCWs strongly requested an opportunity to discuss their concerns [24]. Importantly, we additionally found that several vaccine confident HCWs also experienced similar unease in discussing their vaccination status and sentiments. Overall, both vaccine skeptical and confident HCWs in Belgium appeared to face a difficult climate of interaction regarding vaccines, a situation that may well be replicated in other countries.

For our participants, this unwillingness to voice vaccine sentiments was closely related to the stakes of open disagreement over vaccines, including loss of professional legitimacy and authority, dysfunctional work relationships, or job loss.

In addition to these professional consequences, several participants described the erosion of trust and respect among peers and patients. Indeed, several unvaccinated HCWs mentioned that they did not sufficiently trust some of their patients to discuss vaccines openly. Other participants expressed disappointment with patients who had decided to receive a Covid-19 vaccination for purportedly trivial motives or despite their warnings. Vaccine confident HCWs sometimes blamed unvaccinated Covid-19 patients for their own illnesses and for overloading healthcare staff, declaring that they or their peers would treat them but would not provide as much care as they would for vaccinated patients.

These findings echo experiences of patient stigma and health-care disparities for other conditions, such as obesity [25], HIV/AIDS [26], and lung cancer [27], which some commentators have contended are preventable and self-inflicted [28].

Wear and colleagues [29], for instance, found that HCW perceptions of obesity as a “preventable” condition made obese patients “fair game” for derogatory and cynical humor in clinical settings. Penner et al. [28], however, contend that obese patients were more subject to mockery than other patients with “preventable” conditions because in contrast to other forms of stigma, they lacked legal protection, so that discourses against overweight people persisted because of cultural tolerance. Similarly, vaccine skeptical participants often stressed their shock at the open attacks and derogatory comments toward unvaccinated individuals. Beyond the clinic, public acceptance of mocking the unvaccinated was illustrated at the highest political levels, when national leaders identified unvaccinated citizens as a danger to collective safety [30] or publicly expressed satisfaction at “annoying” them [31].

Similar to HIV/AIDS-related patient stigma in the early stages of the AIDS epidemic [32], early in the Covid-19 pandemic Covid-19 patients as well as HCW caring for them were often stigmatized. After the massive introduction of Covid-19 vaccines the dynamics of stigma changed. Our results show unvaccinated Covid-19 patients and unvaccinated HCWs (regardless of their Covid-19 status) were often identified as “risky” because their conditions put others at risk for Covid-19 transmission. This form of stigma could be carried out by HCW who had previously been impacted by early pandemic and pre vaccination HCW stigma or post vaccination roll out as temporarily vaccine hesitant HCW. Interestingly, vaccinated individuals could also be accused of spreading the disease under the assumption that they were overconfident in the vaccines’ ability to stop transmission and were less compliant with mask use and other protective behavior.

One distinguishing feature of the Covid-19 climate of tension around vaccination related to its totalizing nature. Although patients with HIV/AIDS and obesity were reproached for their conditions, in the Covid-19 pandemic, both patients and HCWs were at risk of developing and transmitting Covid-19 and at the time of this study, could have received vaccination for their own and others’ protection. Such potential protection has never been possible for those living with obesity or HIV. Another specificity of the Covid-19 pandemic was that unvaccinated individuals were also blamed for consuming precious hospital resources (HCW labor, supportive therapies, ICU beds). Such resources were sorely stretched during epidemic waves and exacerbated by an already-underfunded the health system.

Once vaccinated, participants previously experiencing Covid-19 vaccine anxieties did not always sympathize with those still gripped by these worries; some expressed irritation at unvaccinated peers and patients.



To avoid conflicts with vaccine divergent peers and patients, participants reported adaptive strategies, including strategic silence, avoidance, cue-picking and performed ambiguity. When interacting with peers and patients, participant HCWs often hid their vaccine sentiments and vaccination status. Some avoided giving advice about vaccination. Others, notably vaccine skeptical HCWs, tried to intuit their interlocutors' vaccine sentiments, hinted at their own sentiments, or adopted ambiguity when discussing vaccines. HCW disparaging comments about unvaccinated patients were the most common reason that vaccine skeptical HCWs were reluctant to discuss vaccines with their peers. These negative discourses and attitudes towards unvaccinated patients were an indirect means of encouraging vaccination as a social norm among peers and avoiding direct confrontation with them.

Our study's insights into the workplace relations influencing HCW vaccine hesitancy has several public health implications.

First, unspoken vaccine hesitancy can undermine HCW capacity to manage their vaccine-related concerns and may impact vaccine coverage among HCWs.

Second, vaccine skeptical HCWs experience difficulties advising patients regarding vaccination and thus may not encourage vaccine confidence. This consequence can reduce a general population's vaccine coverage, because HCWs are the most influential sources of laypersons' vaccine decisions [3] and have been identified as key messengers to promote vaccination [33].

Third, mental health issues may arise among HCWs who silence their vaccine sentiments or who experience vaccine-related conflicts at work. This is detrimental for the wellbeing of individual HCWs and of entire medical staffs, who may suffer higher workloads as a result, with increased risks of professional accidents and moral injury.

Fourth, suboptimal care of unvaccinated patients constitutes a health equity issue, one that may be experienced as abusive, may trigger mental health problems, and should be addressed accordingly. Tensions with unvaccinated Covid-19 patients was often described as exacerbated by a context of HCW work overload and lack of hospital resources including beds. Initiatives to maintain equitable care regardless of vaccine status may fall short without addressing the chronic problem of overworked frontline health personnel and the lack of beds and equipment, including in Europe [34].

Finally, the erosion of peer and patient-caregiver trust and suboptimal patient care based on vaccination status threatens to weaken health systems where such polarized debates around Covid-19 are taking place. Trust between patient and caregivers is a key factor for positive health outcomes [35], and past interactions with HCWs is of critical importance in cultivating public trust in the health system [36]. A recent systematic review found that multi-component and dialogue driven initiatives were key to reducing vaccine hesitancy [17], a finding echoed by another review of HCW Covid-19 vaccine hesitancy [8]. Our study demonstrates that not only does dialogue help tackle vaccine hesitancy, it may also be crucial in reducing the negative consequences of HCW vaccine divergence, in fostering HCW-patient trust, and in ensuring the robustness of a healthcare system.

## 5. Limitations

Because our study addressed vaccine sentiments and climate of interaction regarding vaccines within healthcare practices and institutions, our sample may be biased towards HCWs who were vaccine skeptics or were frustrated by their inability to express their concerns. In addition, the sample size and composition may not be representative of the HCW population of the Flanders and Brussels regions. Nevertheless, we did not set out to measure the

prevalence of difficulties to discuss vaccines among the HCW population. Rather, we sought to address wide-ranging profiles of HCWs experiencing such difficulties, reasons and strategies for addressing these challenges, and their adapted professional relationships and patient care practices. These objectives and interactions could only be captured by the qualitative dialogic tools used. Closed-ended questions would not have elicited the complex responses that our approach used, although with the foundation provided by qualitative tools, quantitative surveys could investigate the prevalence of the phenomena of vaccine-related silences, tensions, or suboptimal care related to vaccine divergence.

## Funding

The project was funded by the Vaccine Confidence Fund [Grant No. VCF 018]. The funder had no part in the writing of the manuscript or the decision to submit for publication.

## CRediT authorship contribution statement

**Leonardo W Heyerdahl:** Conceptualization, Investigation, Writing – original draft. **Stef Dielen:** Investigation, Writing – original draft. **H  l  ne Dodion:** Investigation, Writing – original draft. **Carla Van Riet:** Conceptualization, Investigation, Writing – original draft. **ToTran Nguyen:** Investigation, Writing – original draft. **Clarissa Simas:** Conceptualization, Writing – review & editing. **Lise Boey:** Investigation, Writing – review & editing. **Tarun Kattumana:** Conceptualization, Writing – original draft. **Nico Vandaele:** Conceptualization, Supervision, Writing – review & editing. **Heidi Larson:** Conceptualization, Supervision, Writing – review & editing. **Koen Peeters Grietens:** Conceptualization, Supervision. **Tamara Giles-Vernick:** Conceptualization, Supervision, Writing – review & editing. **Charlotte Gryseels:** Conceptualization, Investigation, Writing – original draft.

## Data availability

Anonymized transcript segments gathered by themes are available via application to the Institute of Tropical Medicine Ethical Review Board (managed access).

## Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Koen Peeters Grietens reports financial support was provided by Vaccine Confidence Fund. Heidi J Larson reports a relationship with Ellen MacArthur Foundation that includes: funding grants. Heidi J Larson reports a relationship with Johnson & Johnson that includes: funding grants. Heidi J Larson reports a relationship with UNICEF that includes: funding grants. Koen Peeters Grietens reports a relationship with Research Foundation Flanders that includes: funding grants.

## Acknowledgments

The authors are grateful to the respondents for their time and trust when participating in in depth-interviews and focus group discussions.

## References

- [1] World Health Organization. WHO SAGE values framework for the allocation and prioritization of COVID-19 vaccination, 14 September 2020. World Health Organization; 2020.

- [2] Biswas N, Mustapha T, Khubchandani J, Price JH. The nature and extent of COVID-19 vaccination hesitancy in healthcare workers. *J Commun Health* 2021;1–8.
- [3] Foster PJI, Laverty AA, Filippidis FT. Perceptions of the safety of vaccines and vaccine associated knowledge levels in Europe: a 2019 cross-sectional study in 28 countries. *Prev Med* 2022;159:. <https://doi.org/10.1016/j.ypmed.2022.107071>.
- [4] Heyerdahl LW, Vray M, Lana B, Tvardik N, Gobat N, Wanat M, et al. Conditionality of COVID-19 vaccine acceptance in European countries. *Vaccine* 2022;40:1191–7.
- [5] Superior Health Council. Covid safe ticket (3G vs 2G or 1G) and mandatory vaccination in the context of COVID-19 pandemic and Omicron. Brussels: SHC; 2022.
- [6] Schmid P, Rauber D, Betsch C, Lidolt G, Denker M-L. Barriers of influenza vaccination intention and behavior – a systematic review of influenza vaccine hesitancy, 2005–2016. *PLoS ONE* 2017;12:. <https://doi.org/10.1371/journal.pone.0170550>.
- [7] Blasi F, Aliberti S, Mantero M, Centanni S. Compliance with anti-H1N1 vaccine among healthcare workers and general population. *Clin Microbiol Infect* 2012;18(Suppl. 5):37–41. <https://doi.org/10.1111/j.1469-0691.2012.03941.x>.
- [8] Peterson CJ, Lee B, Nugent K. COVID-19 vaccination hesitancy among healthcare workers—a review. *Vaccines* 2022;10:948. <https://doi.org/10.3390/vaccines10060948>.
- [9] Dror AA, Eisenbach N, Taiber S, Morozov NG, Mizrahi M, Zigron A, et al. Vaccine hesitancy: the next challenge in the fight against COVID-19. *Eur J Epidemiol* 2020;35:775–9. <https://doi.org/10.1007/s10654-020-00671-v>.
- [10] Painter EM, Ussery EN, Patel A, Hughes MM, Zell ER, Moulia DL, et al. Demographic characteristics of persons vaccinated during the first month of the COVID-19 vaccination program – United States, December 14, 2020–January 14, 2021. *MMWR Morb Mortal Wkly Rep* 2021;70:174–7. doi: 10.15585/mmwr.mm7005e1.
- [11] Toth-Manikowski SM, Swirsky ES, Gandhi R, Piscitello G. COVID-19 vaccination hesitancy among health care workers, communication, and policy-making. *Am J Infect Control* 2022;50:20–5. <https://doi.org/10.1016/j.ajic.2021.10.004>.
- [12] Janssen C, Maillard A, Bodelet C, Claudel A-L, Gaillat J, Delory T, et al. Hesitancy towards COVID-19 vaccination among healthcare workers: a multi-centric survey in France. *Vaccines* 2021;9:547. <https://doi.org/10.3390/vaccines9060547>.
- [13] Li M, Luo Y, Watson R, Zheng Y, Ren J, Tang J, et al. Healthcare workers' (HCWs) attitudes and related factors towards COVID-19 vaccination: a rapid systematic review. *Postgrad Med J* 2021.
- [14] Hall VJ, Foulkes S, Saei A, Andrews N, Oguti B, Charlett A, et al. COVID-19 vaccine coverage in health-care workers in England and effectiveness of BNT162b2 mRNA vaccine against infection (SIREN): a prospective, multicentre, cohort study. *The Lancet* 2021;397:1725–35. [https://doi.org/10.1016/S0140-6736\(21\)00790-X](https://doi.org/10.1016/S0140-6736(21)00790-X).
- [15] Zar ebska-Michaluk D, Rzymiski P, Moniuszko-Malinowska A, Brzdek M, Martonik D, Rorat M, et al. Does hospitalization change the perception of COVID-19 vaccines among unvaccinated patients? *Vaccines* 2022;10:476. <https://doi.org/10.3390/vaccines10030476>.
- [16] Larson HJ. *Stuck: how vaccine rumors start—and why they don't go away*. Oxford University Press; 2020.
- [17] Jarrett C, Wilson R, O'Leary M, Eckersberger E, Larson HJ. Strategies for addressing vaccine hesitancy – a systematic review. *Vaccine* 2015;33:4180–90. <https://doi.org/10.1016/j.vaccine.2015.04.040>.
- [18] Heyerdahl LW, Dielen S, Nguyen T, Riet CV, Kattumana T, Simas C, et al. Doubt at the core: unspoken vaccine hesitancy among healthcare workers. *Lancet Reg Health – Europe* 2022;12. <https://doi.org/10.1016/j.lanepe.2021.100289>.
- [19] Larson HJ, Gakidou E, Murray CJL. The vaccine-hesitant moment. *N Engl J Med* 2022;387:58–65. <https://doi.org/10.1056/NEJMr2106441>.
- [20] Geiger M, Rees F, Lilleholt L, Santana AP, Zettler I, Wilhelm O, et al. Measuring the 7Cs of vaccination readiness. *Eur J Psychol Assess* 2022;38:261.
- [21] Holley P. She's leading the fight against mandatory vaccines in Texas. She also happens to be a nurse. 2021.
- [22] Barnard A, Ashford G, Vigdor N. These health care workers would rather get fired than get vaccinated. *The New York Times*; 2021.
- [23] Holzmann-Littig C, Braunisch MC, Kranke P, Popp M, Seeber C, Fichtner F, et al. COVID-19 vaccination acceptance and hesitancy among healthcare workers in Germany. *Vaccines* 2021;9:777. <https://doi.org/10.3390/vaccines9070777>.
- [24] Bell S, Clarke RM, Ismail SA, Ojo-Aromokudu O, Naqvi H, Coghill Y, et al. COVID-19 vaccination beliefs, attitudes, and behaviours among health and social care workers in the UK: a mixed-methods study. *PLoS ONE* 2022;17:. <https://doi.org/10.1371/journal.pone.0260949>.
- [25] Phelan SM, Burgess DJ, Yeazel MW, Hellerstedt WL, Griffin JM, van Ryn M. Impact of weight bias and stigma on quality of care and outcomes for patients with obesity. *Obes Rev* 2015;16:319–26.
- [26] Horsman JM, Sheeran P. Health care workers and HIV/AIDS: a critical review of the literature. *Soc Sci Med* 1995;41:1535–67.
- [27] Tran K, Delicaet K, Tang T, Ashley LB, Morra D, Abrams H. Perceptions of lung cancer and potential impacts on funding and patient care: a qualitative study. *J Cancer Educ* 2015;30:62–7.
- [28] Penner LA, Phelan SM, Earnshaw V, Albrecht TL, Dovidio JF. Patient stigma, medical interactions, and health care disparities: a selective review. In: *The Oxford handbook of stigma, discrimination, and health*. New York, NY, USA: Oxford University Press; 2018. p. 183–201.
- [29] Wear D, Aultman JM, Varley JD, Zarconi J. Making fun of patients: medical students' perceptions and use of derogatory and cynical humor in clinical settings. *Acad Med* 2006;81:454–62.
- [30] Saletan W. How Joe Biden is winning the culture war over vaccines He's singling out anti-vaxxers as public enemy No. 1. *SlateCom*; 2021.
- [31] Schofield H. Covid: French uproar as Macron vows to 'piss off' unvaccinated. 2022; published online Jan 5. <https://www.bbc.com/news/world-europe-59873833> (accessed Sept 15, 2022).
- [32] McKay RA. Patient zero and the making of the AIDS epidemic. University of Chicago Press; 2017. doi: 10.7208/9780226064000.
- [33] Callaghan T, Washburn D, Goidel K, Nuzhath T, Spiegelman A, Scobee J, et al. Imperfect messengers? An analysis of vaccine confidence among primary care physicians. *Vaccine* 2022;40:2588–603. doi: 10.1016/j.vaccine.2022.03.025.
- [34] Iacobucci G. Covid-19: underfunding of health workforce left many European nations vulnerable, says commission. *BMJ: Br Med J (Online)* 2021:372.
- [35] Rolfe A, Cash-Gibson L, Car J, Sheikh A, McKinstry B. Interventions for improving patients' trust in doctors and groups of doctors. *Cochrane Database Systemat Rev* 2014. <https://doi.org/10.1002/14651858.CD004134.pub3>.
- [36] Khullar D. Building trust in health care—why, where, and how. *JAMA* 2019;322:507–9. <https://doi.org/10.1001/jama.2019.4892>.