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Aversion to pragmatic randomized controlled trials: Three survey experiments with clinicians and laypeople

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Aversion to pragmatic randomized controlled trials: Three survey experiments with clinicians

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Abstract

Objectives: Pragmatic randomized controlled trials (pRCTs) are essential for determining the real-world safety and effectiveness of healthcare interventions. However, both laypeople and clinicians often demonstrate experiment aversion: preferring to implement either of two interventions for everyone rather than comparing them to determine which is best. We studied whether clinician and layperson views of pRCTs for Covid-19 or other interventions became more positive early in the pandemic, which increased both the urgency and public discussion of pragmatic randomized controlled trials.

Design: Randomized survey experiments

Setting: A large academic medical center in the Northeastern U.S., online research participant platform

Participants: 2,149 clinicians and 2,909 laypeople in 2020 and 2021

Main outcome measures: Participants read vignettes in which a hypothetical decision-maker who sought to improve health could choose to implement intervention A for all, implement intervention B for all, or experimentally compare A and B and implement the superior intervention. Participants rated and ranked the appropriateness of each decision. Experiment aversion was defined as the degree to which a participant rated the experiment below their lowest-rated intervention.

Results: In a survey of laypeople, compared to pre-pandemic results from the same vignettes, we found no decrease in aversion to experiments involving catheterization checklists and hypertension drugs. Nor were either laypeople or clinicians less averse to Covid-19 versions of

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these vignettes. Finally, both laypeople and clinicians, on average, exhibited aversion toward other Covid-19 experiments (comparing different vaccines, and different proning, school reopening, and mask protocols). Across all vignettes and samples, 28% to 57% of participants expressed experiment aversion, whereas only 6% to 35% expressed experiment appreciation by rating the trial higher than the participant's highest-rated intervention.

Conclusions: Advancing evidence-based medicine through pRCTs will require anticipating and addressing experiment aversion among patients and healthcare professionals.

Registration: https://osf.io/u945y/?view_only=a901fde13ddb423899074eb79964c6cd

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Summary box Strengths and limitations of this study The decision-science approach used in this paper enables assessment of aversion towards pragmatic randomized controlled trials (pRCTs) in large and diverse samples of laypeople and clinicians. The size of the experiment aversion effect is assessed in eight pRCT vignettes in the layperson sample and four pRCT vignettes in the clinician sample. The vignettes describe a range of pRCTs from pharmaceutical medical interventions to nonpharmaceutical medical interventions to public health interventions, and within and without the context of the Covid-19 pandemic. The large sample sizes ensured sufficient statistical power to detect experiment aversion in each vignette and sample. The samples may not perfectly represent all healthcare professionals or members of the general public. Participants expressed attitudes and judgments about the appropriateness of carrying out pRCTs or implementing policies, but were not in a position to make a real decision to execute the pRCTs or policies.

INTRODUCTION

Pragmatic randomized controlled trials (pRCTs) are crucial for understanding how to safely, effectively, and equitably prevent and treat disease and deliver healthcare. Randomized evaluation is the gold standard in medicine, largely because it permits one to infer that an intervention caused an outcome, such as efficacy. Randomized experiments have repeatedly upended conventional clinical wisdom and the results of observational studies [1,2] and are urgently needed to evaluate new technologies [3,4]. Compared to more explanatory trials, trials that are further towards the pragmatic end of the spectrum [5] evaluate effectiveness of the intervention in more real-world contexts. Such pragmatism is critical for ensuring that causal evidence from randomized evaluation speaks to the effects of interventions in the circumstances in which they would be implemented (or maintained).

Yet despite their importance to healthcare quality and safety, pRCTs often prove controversial—even when they compare interventions that are within the standard of care or are otherwise unobjectionable, and about which the relevant expert community is in equipoise. Several recently published pRCTs—including SUPPORT [6], FIRST [7], and iCOMPARE [8] have received considerable criticism from physician-scientists, ethicists, and regulators [9,10] and in the public square [11–14]. Although criticisms of pRCTs can be complex, nuanced, and sometimes valid, many appear to reflect a rejection of the very idea that a randomized experiment was conducted, as opposed to simply giving everyone one of the interventions that was trialed. Our research applies concepts and methods from the behavioral and decision sciences to systematically explore whether, when, and why people might genuinely object to running pRCTs in healthcare, public health, and other domains.

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In prior studies—inspired by several "notorious pRCTs," including technology industry "A/B tests" [15–17]—we confirmed that substantial shares of both laypeople and clinicians can be averse to randomized evaluation of efforts to improve health [18,19]. People rated a pRCT designed to compare the effectiveness of two interventions as significantly less appropriate than the average appropriateness of implementing either one, untested, for everyone. We called this phenomenon the "A/B effect" [18]. In some cases, the lower average rating of an experiment could be driven not by dislike of experiments, per se, but by many raters' belief that one of the experiment's arms is inferior to the other [18,19]. Importantly, such beliefs are often based on intuition rather than evidence and have the potential to undermine evidence-based medicine. Yet this form of experiment rejection is not illogical, given the individual's own beliefs. We also, however, documented a more peculiar (if no less dangerous) phenomenon of "experiment aversion," which occurred when people rated the pRCT as significantly less appropriate than implementing *their own* least-preferred intervention contained within the trial. In this pattern of decision-making, in other words, people who perceive that one intervention is good and the other is less good prefer that everyone receive the less good (or even bad) intervention rather than half the people receiving the better one, and without comparing the two to determine whether one is really better than the other [19]. Such judgments could reflect a more general skepticism about or opposition to pRCTs, at least within specific domains of inquiry. For instance, people may be averse to the inequality or disparate treatment that is necessarily (temporarily) imposed by any RCT (pRCT or otherwise), the uncertainty signaled by agents (often trusted experts) who decide they do not already know what works and need to conduct a pRCT, the process of assigning people to treatments "randomly" as opposed to using expert judgment, or something else viewed

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as undesirable. Both patterns of negative sentiments about experiments can impede efforts to assure and improve health outcomes.

The Covid-19 pandemic presented the potential for an inflection point in attitudes towards pRCTs. In April 2020, 72 Covid-19 drug trials were already underway [20] and more traditional, explanatory RCTs became daily, front-page news. Because explanatory and pragmatic RCTs share many key features that participants in our prior research often cited as partial explanations for their lower ratings of experiments—including random assignment to different conditions [18]—that sustained exposure to explanatory RCTs might have educated people about the value of healthcare pRCTs, too, and/or made them seem less exceptional and more normative. Our previous research also suggests that another cause of experiment aversion is an illusion of knowledge—a (mis)perception that experts already must know what works best and should simply implement those interventions without further study. But Covid-19 was a novel disease, and—at least in the case of pharmaceutical interventions—no sensible person thought the correct treatments were already obvious. People therefore may have been less averse to Covid-19 pRCTs (e.g., trials comparing Covid-19 proning protocols or masking rules) than to pRCTs that test interventions for familiar conditions or problems, such as hypertension or hospital-acquired infections. On the other hand, because of the urgency attached to Covid-19, people may have been more averse to Covid-19 RCTs, being even less inclined to risk giving someone a treatment that might turn out to "lose" in a comparison study [21,22]. Finally, even if the pandemic did not affect public attitudes towards explanatory or pragmatic RCTs, it could have affected the attitudes of clinicians, many of whom were involved in Covid-19 research. Because clinicians strongly influence whether particular RCTs are conducted (both explanatory and pragmatic), their attitudes matter.

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Here, we investigated attitudes towards pRCTs in the first year of the pandemic by conducting a series of preregistered studies between August 2020 and February 2021. First, we used decision-making vignettes from our previous work to ask whether the extraordinary publicity around (primarily explanatory) Covid-19 RCTs reduced general healthcare experiment aversion by the public. Next, we adapted these vignettes to determine whether the public was averse to pRCTs on pharmaceutical and/or non-pharmaceutical interventions (NPIs) for Covid-19. Finally, we recruited two large clinician samples to investigate how their attitudes compared to those of laypeople. All three studies were randomized survey experiments in which participants first read about a decision-maker faced with a problem who either implemented one of two interventions (A or B) or ran an experiment to compare them (and then implemented the superior one). Participants then evaluated how appropriate each of those three decisions was.

METHODS

Lay Sentiments About pRCTs

In August 2020, we used the CloudResearch service to recruit 700 adult crowd workers on Amazon Mechanical Turk living in the U.S. to participate in a brief online survey (see Table S4 for detailed description of the lay participant sample, including education, income, and political ideology). These services provide samples that are broadly representative of the U.S. population and are well-accepted in social science research as providing as good or betterquality, diverse samples of research participants than common convenience samples such as student volunteers, with results that are similar to probability sampling methods [23–25]. We included laypeople as participants in our studies because they are typically included in pRCTs as

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patients or (in the case of some public health pRCTs and pRCTs in other domains) as members of the public and are therefore important stakeholders.

Each participant first read a vignette that described a problem that the decision-maker could address in one of three ways (see Table 1 for examples; see pp. 8-13 and Table S3 in the Supplemental Materials [SM] for text and motivations for all vignettes): by implementing intervention A for all patients or relevant members of the public (A); by implementing intervention B for all patients or relevant members of the public (B); or by conducting an experiment in which patients or relevant members of the public are randomly assigned to A or B and the superior intervention is then implemented for all (A/B). Next, following standard methods in social and moral psychology for evaluating decisions [26], participants rated each option on a scale of appropriateness from 1 ("very inappropriate") to 5 ("very appropriate"), with 3 as a neutral midpoint. Participants then rank-ordered the options from best to worst and provided demographic information.

Participants were randomly assigned to read one of two vignettes: (1) In Best Anti-Hypertensive Drug, some doctors in a walk-in clinic prescribe "Drug A" while others prescribe "Drug B" (both of which are affordable, tolerable, and FDA approved), and "Dr. Jones" prescribes either A for all his hypertensive patients, B for all those patients, or runs a randomized experiment to compare the effectiveness of A and B. (2) In Catheterization Safety Checklist, a hospital director similarly considers two locations where he might display a safety checklist for clinicians—on badges or posters—or does an experiment to decide (see Table 1). All vignettes describe an RCT that is highly pragmatic in nature (i.e., high on PRECIS-2 eligibility, recruitment, setting, organization, follow-up, and primary outcome domains [5]). For instance, all patients with the relevant condition who attend the clinic/hospital for care become members

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of the trial and the trial is situated within the clinic/hospital where their care would typically take place. (Similarly, in the public health scenarios, all students in the school district and all residents of the state where these trials occur are included in the trial.) In addition, our vignettes are silent about whether consent will be obtained. Trials that include only those who opt into them are less pragmatic if they are testing the effectiveness of an intervention that would be imposed on people as a matter of policy or practice. IRBs customarily waive consent when it would make low-risk pRCTs impracticable, including by rendering the results uninformative about how an intervention would fare in practice [27]. In separate work, we found that substantial shares of people object to such experiments even when we specify that consent will be obtained [28].

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Table 1

Vignette text for Catheterization Safety Checklist and Ventilator Proning

	Catheterization Safety Checklist	Ventilator Proning
Background	Some medical treatments require a doctor to insert a plastic tube into a large vein. These treatments can save lives, but they can also lead to deadly infections.	Some coronavirus (Covid-19) patients have to be sedated and placed on a ventilator to help them breathe. Even with a ventilator, these patients can have dangerously low blood oxygenation levels, which can result in death. Current standards suggest that laying ventilated patients on their stomach for 12-16 hours per day can reduce pressure on the lungs and might increase blood oxygen levels and improve survival rates.
Intervention A	A hospital director wants to reduce these infections, so he decides to give each doctor who performs this procedure a new ID badge with a list of standard safety precautions for the procedure printed on the back. All patients having this procedure will then be treated by doctors with this list attached to their clothing.	A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.
Intervention B	A hospital director wants to reduce these infections, so he decides to hang a poster with a list of standard safety precautions for this procedure in all procedure rooms. All patients having this procedure will then be treated in rooms with this list posted on the wall.	A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 15-16 hours per day.
A/B test	A hospital director thinks of two different ways to reduce these infections, so he decides to run an experiment by randomly assigning patients to one of two test conditions. Half of patients will be treated by doctors who have received a new ID badge with a list of standard safety precautions for the procedure printed on the back. The other half will be treated in rooms with a poster listing the same precautions hanging on the wall. After a year, the director will have all patients treated in whichever way turns out to have the highest survival rate.	A hospital director thinks of two different ways to save as many ventilated Covid-19 patients as possible, so he decides to run an experiment by randomly assigning ventilated Covid-19 patients to one of two test conditions. Half of these patients will be placed on their stomach for 12-13 hours per day. The other half of these patients will be placed on their stomach for 15-16 hours per day. After one month, the director will have all ventilated Covid-19 patients treated in whichever way turns out to have the highest survival rate.

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We define the "A/B Effect" as the degree to which participants' ratings of the A/B test were lower than the average of their ratings of implementing A and B [18]. "Experiment aversion" is the degree to which participants rated the A/B test lower than their own lowest-rated intervention (either A or B for each person) [19]. "Experiment appreciation" is the opposite: the degree to which the experiment is rated higher than each participant's highest-rated intervention. For all measures, we calculated Cohen's d. We analyzed data using R version 4.3.0. (See SM for details of samples, statistical power, and data analyses.) [Blinded for review] IRB determined that these surveys were exempt (IRB# 2017-0449).

Lay Sentiments About Covid-19 pRCTs

Between August 2020 and January 2021, we recruited 2,209 additional laypeople in the same manner described above. They read, rated, and ranked six new vignettes involving Covid-19 interventions (N = 339–450 per vignette). Four vignettes were based on Covid-19-related interventions that were discussed, tested, and/or implemented at the time: Masking Rules (which described two masking policies, of varying scope); School Reopening (two school schedules designed to increase social distancing); Best Vaccine (two types of vaccine—mRNA versus inactivated virus); and Ventilator Proning (two protocols for positioning ventilated Covid-19 patients; see Table 1). The other two vignettes—Intubation Safety Checklist and Best Corticosteroid Drug—were adapted from the first study to apply to Covid-19.

Clinician Sentiments About Covid-19 pRCTs

Between November 2020 and February 2021, clinicians (14% physicians, 10% physician assistants, 68% nurses of all levels, 8% other) in a large academic medical center in the U.S. read, rated, and ranked one of four Covid-19-related vignettes (Masking Rules: n = 349;

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Intubation Safety Checklist: n = 271; Best Corticosteroid Drug: n = 275; Best Vaccine: n = 1254) from the second study (see Table S5 for detailed description of the clinician sample, including research methods training and experience and number of years in the medical field). (In these samples, because survey responses were made fully anonymous to encourage greater participation and honest responding, we were unable to restrict participation in later waves to clinicians who had not participated in earlier waves. Therefore, some clinicians who completed the Best Vaccine vignette may have earlier completed the Masking Rules, Intubation Safety Checklist, and Best Corticosteroid Drug vignettes.)

RESULTS

Lay Sentiments About pRCTs

We found substantial negative reactions to A/B testing in both vignettes (Table 2A), replicating our pre-pandemic findings [18,19]. Although in most cases the mean rating of the A/B test was near the neutral midpoint, implementing policies was substantially preferred to A/B testing (Figure 1A) and large proportions of participants objected to the A/B test (Figure 1B). In Catheterization Safety Checklist (Figure 1A), we found evidence of the A/B Effect: participants rated the A/B test significantly below the average ratings they gave to implementing interventions A and B (d = 0.69, 95% CI: (0.53, 0.85); Table S6A). Here, 41% \pm 5% (95% CI) of participants expressed experiment aversion (rating the A/B test lower than their own lowest-rated intervention; d = 0.25, 95% CI: (0.11, 0.39); Table S6A). When ranking the three options from best to worst, only 32% placed the A/B test first, while 48% placed it last (Table S6A).

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We also observed an A/B Effect in Best Anti-Hypertensive Drug (Figure 1B); d = 0.52, 95% CI: (0.36, 0.68); Table S6A), where 44% ± 5% also expressed experiment aversion (d = 0.46, 95% CI: (0.30, 0.52); Table S6A). Notably, participants were averse to this experiment even though there is no reason to prefer "Drug A" to "Drug B," and patients are effectively already randomized to A or B based on which clinician happens to see them—which occurs wherever unwarranted variation in practice determines treatments, such as walk-in clinics and emergency departments. Here, however, similar proportions of people ranked the A/B test best and worst (50% vs. 45%; p = 0.16; Table S6A).

These levels of experiment aversion near the height of the pandemic were slightly (but not significantly) higher than those we observed among similar laypeople in 2019 ($41\% \pm 5\%$ in 2020 vs. $37\% \pm 6\%$ in 2019 for Catheterization Safety Checklist, p = 0.31; $44\% \pm 5\%$ in 2020 vs. $40\% \pm 6\%$ in 2019 for Best Anti-Hypertensive Drug, p = 0.32) [19].

[Figure 1]

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Table 2						1846 t, in	
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Notes. Experiment Aversion refers to the difference		•				6, <u>2</u>	

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Lay Sentiments About Covid-19 pRCTs

In all six Covid-19 vignettes, we found evidence of the A/B Effect (Table 2B). In three, however, we did not find experiment aversion: Best Vaccine, Best Corticosteroid Drug, and School Reopening. In the first two of these, participants rated the two interventions very similarly and the experiment only slightly lower (Figure 2B). These vignettes also elicited the largest proportion of participants (65% in Best Vaccine and 56% in Best Corticosteroid Drug; Table S6B) in any vignette who ranked the A/B test best among the three options, compared to 31–34% of participants who ranked it worst (Table S6B). In School Reopening, experiment aversion was not observed because participants on average clearly preferred intervention B to A and rated the experiment similar to intervention A [29,30]. 53% of participants ranked intervention B as the best of the three options (compared to 17% choosing intervention A and 30% choosing the A/B test; Table S6B).

In the other three vignettes, participants rated the A/B test condition as significantly less appropriate than their lowest-rated intervention (Masking Rules: d = 0.56, 95% CI: (0.41, 0.71); Ventilator Proning: d = 0.17, 95% CI: (0.04, 0.30); Intubation Safety Checklist: d = 0.36, 95% CI: (0.21, 0.49)). These levels of aversion to Covid-19 RCTs are similar to the levels of aversion to non-Covid-19 RCTs both before [19] and during the pandemic (see above).

[Figure 2]

Clinician Sentiments About Covid-19 pRCTs

We observed an A/B effect in all four vignettes. In two, clinicians, like laypeople, were also significantly experiment averse (Masking Rules: d = 0.74, 95% CI: (0.57, 0.91; Table S6C);

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Intubation Safety Checklist: d = 0.30, 95% CI: (0.15, 0.45); Table S6C). In Best Vaccine, clinicians, like laypeople, did not show any significant difference in their ratings of the A/B test and their lowest-rated intervention (d = -0.03, 95% CI: (-0.10, 0.04); Table S6C). Again, like laypeople, 58% of clinicians ranked the vaccine A/B test as the best of the three options, the highest proportion of any clinician-rated vignette.

Clinicians differed from laypeople in their response to Best Corticosteroid Drug. Laypeople did not show experiment aversion, but clinicians rated the A/B test as significantly less appropriate than their lowest-rated intervention (d = 0.49, 95% CI: (0.32, 0.66); Table S6C). This difference may be due to clinicians' greater familiarity with the treatment of Covid-19. Clinicians may also have seen an urgent need for any drugs to treat Covid-19 [22] and thus rated adopting a clear treatment intervention as more appropriate than an RCT.

[Figure 3]

Heterogeneity in Experiment Aversion

Collapsed across studies, political ideology explained 1.5% of the variance in sentiments about experiments, with conservatives slightly less averse to experiments than liberals. Less or no variation was explained by all other demographics, including educational attainment (0.2%), STEM degree (0.1%), and prescribers versus other clinicians (0.2%); see Tables S8-11 in SM for further discussion.

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DISCUSSION

In three preregistered survey experiments, we observed considerable experiment aversion among laypeople during the first year of the Covid-19 pandemic, despite increased exposure to

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the nature and purpose of (largely explanatory) RCTs. Neither laypeople nor clinicians were overall less averse to Covid-19 pRCTs, despite the fact that confidence in anyone's knowledge of what works should have been even more circumscribed than in the everyday contexts of hypertension and catheter infections. To the contrary, most Covid-19 vignettes were met with experiment aversion. This is consistent with an emphasis during the pandemic that we must "do" instead of "learn," a false dichotomy that fails to recognize that implementing an untested intervention is itself a nonconsensual experiment from which, unlike an RCT, little or nothing can be learned [31–33]. Similarly, across all vignettes and samples, between 28% and 57% of participants demonstrated experiment aversion, while only 6%–35% demonstrated experiment appreciation (by rating the pRCT higher than their highest-rated intervention).

Although in most cases the mean rating of the A/B test was near the neutral midpoint, in none of our 12 studies were more people appreciative of than averse to the pRCT, in none was the average pRCT rating higher than the average intervention rating, and in none was the pRCT rating higher than each participant's highest-rated intervention, on average. Notably, unlike trials with placebo or no-contact controls, the A/B tests in our vignettes compared two active, plausible interventions, neither of which was obviously known ex ante to be superior. Yet substantial shares of participants still preferred that one intervention simply be implemented without bothering to determine which (if either) worked best.

The most positive sentiment towards experiments was observed in both laypeople and clinicians in the vignettes involving Covid-19 drugs and vaccines. Here we observed the highest proportions of participants who demonstrated experiment appreciation (31%–46%) and who ranked the pRCT first (49%–65%). This result could be explained by differences in the pRCT length (ranging from one to twelve months) and perceived severity of the pRCT outcome ("best

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outcome" and "fewest cases of Covid-19" in Best Corticosteroid and Best Vaccine, respectively vs., e.g., "highest survival rate" in Ventilator Proning). But this result is also consistent with our previous findings that the illusion of knowledge—here, the belief that either the participant herself or some expert already does or should know the right thing to do and should simply do it—biases people to prefer universal intervention implementation to pRCTs [18,19]. Rightly or wrongly, both laypeople and clinicians might (a) appropriately recognize that near the start of a pandemic, no one knows which existing drugs, if any, are safe and effective in treating a novel disease, and that new vaccines need to be tested, yet (b) fail to sufficiently appreciate the level of uncertainty around NPIs like masking, proning, and social distancing, which can also benefit from rigorous evaluation. This is consistent with the dearth of RCTs (explanatory or pragmatic) of Covid-19 NPIs [34]: of the more than 4,000 Covid-19 trials registered worldwide as of August 2021, only 41 tested NPIs.33 Explaining critical concepts like clinical equipoise or unwarranted variation in medical and NPI practice alike might diminish experiment aversion.

While our lay participant samples were large, diverse, and demographically similar to the general U.S. population (see Table S4), they may not be perfectly representative of other populations. Similarly, because the clinician sample was largely made up of individuals with only some research training and experience, these results may not generalize to clinicians who have extensive research training and experience and conduct RCTs (or pRCTs) themselves. Importantly, however, the support of non-investigator clinical and operational leaders is often needed to conduct a pRCT, and administrator-clinicians do not always have substantial research experience. Moreover, in both samples, our primary goal was not to estimate the percentage of people in the general population who hold negative views of pRCTs, but rather to ascertain experimentally whether laypeople and clinicians display the patterns of negative sentiments

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about pRCTs that we have found previously [18,19], when confronted with vignettes during, or about, a novel situation (the Covid-19 pandemic). Thus, though the sample may not perfectly represent all healthcare professionals or members of the general public, the results demonstrate the repeated presence of negative sentiments, and a lack of positive sentiments, towards experiments across eight distinct situations among segments of populations whose opinions matter.

Furthermore, because experiment aversion and appreciation are likely socio-cultural phenomena, we should expect that the presence or size of the effects we report may differ among societies and over time. However, contrary to recent claims [35], the similarity in aversion to experiments between laypeople and clinicians suggests that these results generalize across populations that differ in their level of knowledge of RCTs. In addition, our findings here and elsewhere [18,19] show that experiment aversion occurs in health and non-health scenarios and, within the health domain, in both clinical and public health scenarios, and regarding both pharmaceutical and non-pharmaceutical interventions.

Finally, as noted above, all vignettes discussed in this paper are silent about whether the consent of patients and/or clinicians would be obtained. Previous work that did not directly compare judgments about pRCTs versus treatment implementation suggests that when given the option, laypeople prefer to be asked for consent (e.g., for a study comparing the effectiveness of two marketed hypertension drugs, a scenario somewhat related to one of ours [36,37]). Additionally, other research has found neither experiment aversion nor appreciation (as we define it here and elsewhere [28]) after introducing a critical element of voluntariness by asking respondents how likely they would be to "choose to be treated" at a hospital that is conducting a pRCT. In separate work, we found that when vignettes explicitly specify that prior consent is

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obtained, negative sentiment towards pRCTs is reduced—but not eliminated [28]. However,

individual consent would undermine the external validity of pRCTs, and is anyhow rarely feasible in such settings [27,38,39], e.g., tests of policy interventions such as providing safety checklists and promulgating public health rules.

Critics rightly note that RCTs have limited external validity when they employ overly selective inclusion/exclusion criteria or are executed in ways that deviate from how interventions would be operationalized in diverse, real-world settings. However, the solution is not to abandon randomized evaluation, but to incorporate it into routine clinical care and healthcare delivery via pRCTs [1,39–41]. It has been many years since the U.S. Institute of Medicine urged research of many varieties to be embedded in care [42]. More recently, the UK Royal College of Physicians and National Institute for Health and Care Research issued a joint position statement similarly advocating the integration of research into care [43]. In addition, the U.S. Food and Drug Administration now promotes pRCTs to support post-marketing monitoring and other regulatory decision-making [44,45], a priority also highlighted in the UK Medicines and Healthcare products Regulatory Agency's 2021-2023 Delivery Plan [46] and guidance on RCTs [47]. Pragmatic RCTs have been fielded successfully and informed healthcare practice and policy [38,48,49], but they remain far from ubiquitous and they require buy-in to be successful, as shown by the case of a Norwegian school reopening trial during the pandemic that was abandoned due to lack of such support [50,51]. Broadening the use of pRCTs will require not only redoubling investment in interoperable electronic health records and recalibrating regulators' views of the comparative risks of research versus idiosyncratic practice variation,1 but also anticipating and addressing experiment aversion among patients and healthcare professionals.

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DATA AVAILABILITY

Participant response data, preregistrations, materials, and analysis code have been deposited in Open Science Framework

(https://osf.io/6p5c7/?view_only=eaeb95cb754247028f1d1ed94414cbd2).

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Figure Captions

Figure 1

Lay Sentiments About pRCTs

[figure uploaded separately]

Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highest-rated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2—"very inappropriate" or "somewhat inappropriate"— on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.

Figure 2

Lay Sentiments About Covid-19 pRCTs

[figure uploaded separately]

Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated

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intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highestrated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2—"very inappropriate" or "somewhat inappropriate"— on a 1-5 scale) to implementing intervention A, intervention B, and the A/B test. Figure 3 Clinician Sentiments About Covid-19 pRCTs [figure uploaded separately] Notes. (A) Mean appropriateness ratings, on a 1-5 scale, with SEs, for intervention A. intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highestrated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness

ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a

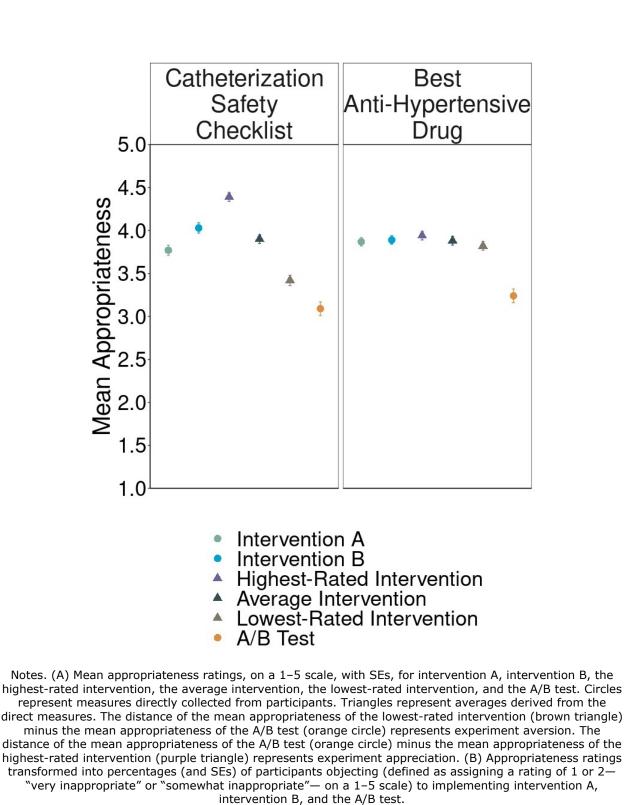
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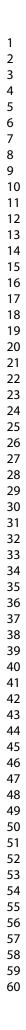
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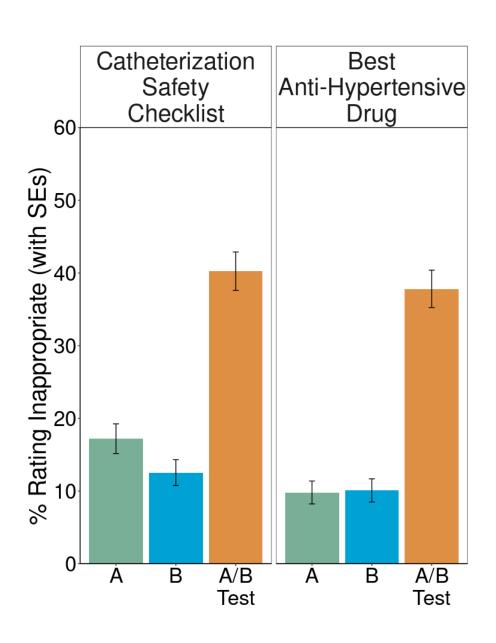
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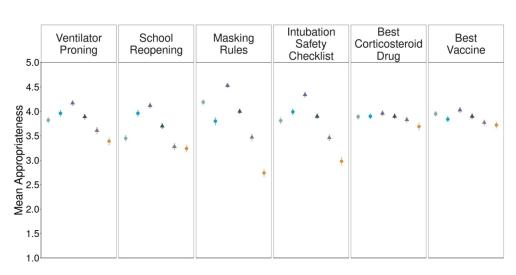




Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highest-rated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2— "very inappropriate" or "somewhat inappropriate"—on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.

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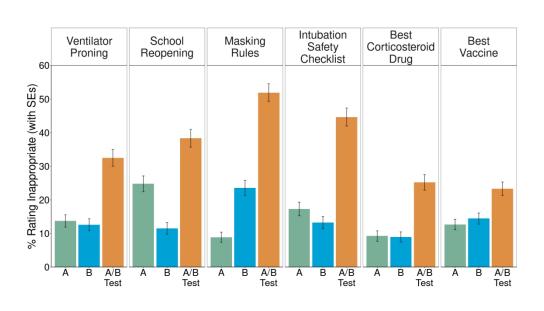
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Intervention A A Highest-Rated Intervention Lowest-Rated Intervention Intervention B A Average Intervention

Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highest-rated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2– "very inappropriate" or "somewhat inappropriate" on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.

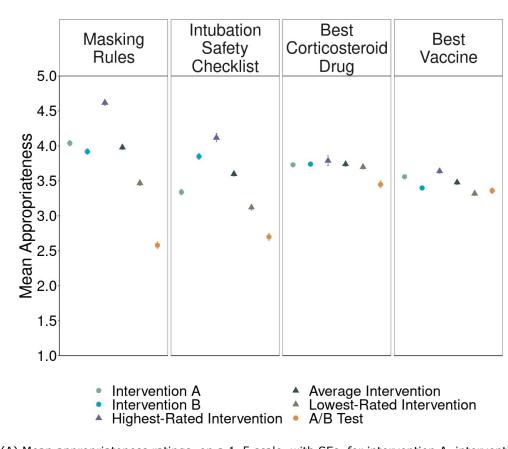
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Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highest-rated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2– "very inappropriate" or "somewhat inappropriate"—on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.

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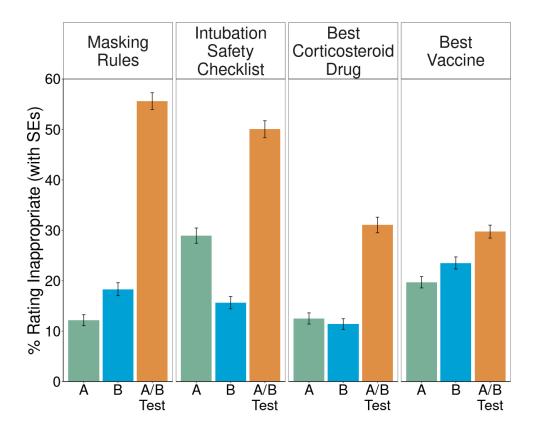
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Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highest-rated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2— "very inappropriate" or "somewhat inappropriate"— on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.

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Notes. (A) Mean appropriateness ratings, on a 1-5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highest-rated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2-"very inappropriate" or "somewhat inappropriate"— on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.

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Aversion to pragmatic randomized controlled trials among clinicians and laypeople

Supplemental Materials

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Methods

In the main text, we grouped the vignettes thematically into three sets: "Lay Sentiments About pRCTs," "Lay Sentiments About Covid-19 pRCTs," and "Clinician Sentiments About Covid-19 pRCTs." However, when we collected data, we grouped our vignettes differently such that we started with vignettes that we have used in previous published work and their respective Covid-19 derivatives, then we developed and tested novel Covid-19 specific vignettes separately, and then, again separately, we tested a Covid-19 vaccine vignette. We followed a similar pattern in our clinician sample: we first tested three Covid-19 specific vignettes (two which were derivatives of vignettes from our previous work, one which was new to this work) and then separately, we tested a Covid-19 vaccine vignette. These groupings are important for understanding how participants were randomly assigned to vignettes and why there are slight discrepancies (or large discrepancies in the case of the Best Vaccine vignette in the clinician sample¹) in the number of participants in each vignette (see Table S1).

Table S1

Population, sample	size, and dates of data collection for	each vignette		
Preregistration #	Vignette	Population	Sample size	Dates of data collection
1	Catheterization Safety Checklist	MTurk workers	343	August 13, 2020
	Intubation Safety Checklist	MTurk workers	347	August 13, 2020
	Best Anti-Hypertensive Drug	MTurk workers	357	August 13, 2020
	Best Corticosteroid Drug	MTurk workers	357	August 13, 2020
2	Masking Rules	MTurk workers	360	September 30-October 2, 2020
	School Reopening	MTurk workers	339	September 30-October 2, 2020
	Best Vaccine (ambiguous version)*	MTurk workers	350	September 30-October 2, 2020
	Ventilator Proning	MTurk workers	357	September 30-October 2, 2020
3	Intubation Safety Checklist	Clinicians	271	November 13-December 9, 2020
	Best Corticosteroid Drug	Clinicians	275	November 13-December 9, 2020
	Masking Rules	Clinicians	349	November 13-December 9, 2020
4	Best Vaccine	MTurk workers	450	January 8, 2021
5	Best Vaccine	Clinicians	1254	January 25-February 9, 2021

Note. Within each data collection batch, participants were randomly assigned to one of the vignettes. In the clinician sample (preregistration #3), clinicians saw all three vignettes in randomized order. The sample size reported here is the number of clinicians who saw that vignette first.

*Our first attempt at the Best Vaccine vignette included wording that unintentionally made the experiment condition less averse. For this reason, this vignette is not included in the main analyses.

¹ The Best Vaccine vignette was combined with another study that required a sample size much larger than the sample sizes in our previous vignette studies to have adequate statistical power.

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For clarity, in the main text of this article we used different names for the vignettes than those used in the preregistrations and in previous publications (see Table S2).

Table S2

Original vignette names from preregistrations and previous work and corresponding name in main text

Original vignette name	Main text vignette name Hospital
Safety Checklist (also called Checklist)	Catheterization Safety Checklist Best
Drug: Walk-In Clinic (also called Best Drug)	Best Anti-Hypertensive Drug
Checklist (Covid-19)	Intubation Safety Checklist
Best Drug (Covid-19)	Best Corticosteroid Drug
Ventilator Proning	Ventilator Proning
School Reopening	School Reopening
Mask Requirements	Masking Rules
Modified Covid-19 Vaccines	Best Vaccine
Vaccine Distribution	(not reported in main text)

Note. Vignette names in this article were changed from those in previous work and in our preregistrations in order to clarify the content for readers.

Preregistrations, sample sizes, and power analyses

Our research questions, power analyses and sample sizes, and analysis plans were all preregistered at Open Science Framework (OSF) before data collection. These sample size precommitments are copied from each preregistration document which can be found on OSF at https://osf.io/u945y/?view_only=a901fde13ddb423899074eb79964c6cd.

Preregistration 1 (Catheterization Safety Checklist, Best Anti-Hypertensive Drug, Intubation Safety Checklist, Best Corticosteroid Drug vignettes):

"We predict that, using a two-tailed, paired t-test with $\alpha = .05$ within each scenario, participants will rate the A/B test condition as significantly less appropriate than their own average rating of the two policy conditions, mean(A,B). This is the test for the "A/B Effect." Recruiting 350 participants for each scenario provides 95% power to detect an effect as small as d = 0.19, which is substantially smaller than the effect sizes we have observed using the Hospital Safety Checklist and Best Drug: Walk-In Clinic vignettes in past research."

Preregistration 2 (Ventilator Proning, School Reopening, Masking Rules, and Best Vaccine (initial ambiguous version) vignettes):

"We predict that, using a two-tailed, paired t-test with $\alpha = .05$ within each scenario, participants will rate the A/B test condition as significantly less appropriate than their own average rating of the two policy conditions, mean(A,B). This is the test for the "A/B Effect." Recruiting 350

participants for each scenario provides 95% power to detect an effect as small as d = 0.19, which is substantially smaller than the effect sizes we have observed using the Hospital Safety Checklist and Best Drug: Walk-In Clinic vignettes in past research."

Preregistration 3 (Clinicians; Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes):

Note that because of time constraints around the possible starting dates of our clinician surveys, we launched this study before preregistering it, and we did not report an explicit power analysis before collecting the data. Because this study follows a similar structure to the studies above, however, it was reasonable to apply the previous sample size and power analysis considerations. We did, however, preregister our approach and research plan twice during this study: once during data collection, before any analyses had been conducted, and again after all data had been collected (but before analyzing any of them).

Preregistration 3.1: "At the time of this preregistration, we have received 655 complete responses. No data have been explored or analyzed at this point. We will conduct an interim analysis on this dataset using the same analyses we have previously preregistered, and we may continue to collect more data from this population."

Preregistration 3.2: "Data collection is now complete and we have closed the survey. On 11/24/2020, we conducted an interim analysis on 601 complete responses. Since then, we have received an additional 295 complete responses, to which we remain blind."

Preregistration 4 (Best Vaccine):

"We recruited 350 participants for the original Covid-19 vaccines study. Because we are running this study to determine whether even a small effect emerges, we will increase the sample size to 450 participants. This provides 80% power to detect an effect as small as d = 0.13 in a repeated- measures, two-tailed t-test, and 95% power to detect an effect as small as d = 0.17."

Preregistration 5 (Clinicians; Best Vaccine):

"Our previous survey of healthcare providers resulted in approximately 900 complete responses; we expect a similar response rate for this survey. This sample size provides 95% power to detect an effect as small as d = 0.12 using a two-tailed, repeated measures t-test. Even if we only receive 600 complete responses, we will have 95% power to detect an effect as small as d = 0.15."

Procedure and design

Several aspects of the procedure and experimental design were consistent across the studies reported here. Below, we describe these consistent features and note in specific studies where we deviated from them.

For the lay participant samples, we used the CloudResearch service to recruit crowd workers on Amazon Mechanical Turk (MTurk) to participate in a 3–5-minute survey experiment. These services provide samples that are broadly representative of the U.S. population and are well-accepted in social science research as providing as good or better-quality data than convenience samples such as student volunteers, with results that are similar to probability sampling methods [1,2]. Participants were excluded from recruitment in any of the studies reported here if they had participated in any of our previous studies on this topic. Across all laypeople vignettes, the completion rate of participants starting the survey was 91.5%. The [blinded for review] IRB determined that these anonymous surveys were exempt (IRB# 2017-0449).

For the clinician samples, we recruited healthcare providers (including physicians, physician assistants, nurse practitioners, and nurses) from a large health system in the Northeastern U.S via email. Each provider received either one or two emails about the study during the recruitment window. In the first clinician study (Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes), we first tested the email recruitment system by sending out the survey invitation email to just 200 clinicians. Clinicians who completed the survey based on this survey invitation were included in the final sample. Then, all clinicians were sent the recruitment email on November 19, 2020, followed by a reminder email on December 3, 2020. In the second clinician study (Best Vaccine), the initial recruitment email was sent January 25, 2021, with the follow-up email sent February 2, 2021. In the first clinician study, 5,925 clinicians were emailed and 895 completed the survey. In the second clinician study, 6,993 clinicians were emailed and 1,254 completed the survey. In these samples, because survey responses were fully anonymous, we were not able to restrict participation based on our previous studies, so some participants who completed the Best Vaccine vignette may have earlier completed the Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes.

In all cases, participants completed an online survey hosted by Qualtrics. After opening the survey, participants were randomly assigned to one of the possible vignettes being studied.^{2,3} In the case of data collection batches 4 and 5, there was only one vignette being tested that all participants saw. At this point, we used the exact same procedure detailed in Heck et al. (2020) [4]. First, participants were instructed to read about several possible decisions made by different decision-makers⁴, and to try to treat each decision as separate from the others. All scenarios contained a brief "background" text at the top of the page that summarized a problem, followed by three "situations," each of which detailed the decision-maker's choice to adopt intervention A, intervention B, or to run an A/B test by randomly assigning people to one of two test conditions. These conditions were presented in fully counterbalanced order; each participant received one of six possible orders (i.e., Situation 1 = A, Situation 2 = B, and Situation 3 = A/B; Situation 1 = A/B, Situation 2 = B, and Situation 3 = A/B; Situation order, so we collapsed across this variable for all analyses.

³ The clinician version of the Best Vaccine vignette was combined with another study being conducted by a subset of researchers on this team. The materials for Best Vaccine were presented after the survey materials from the other study. Data from the other study are unrelated to the research questions tested here and will be reported separately.

 $^{^2}$ For the clinician study of the Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes, clinicians were randomly assigned to one of these three scenarios and then completed the remaining two scenarios in random order. For consistency with the rest of this project and with our previous survey experiment with clinicians regarding the A/B effect (3, Study 6), and in order to make the results from clinician samples comparable to those with lay samples (in which each participant only ever saw one scenario), we analyze data from this study as a between-subjects design where we only consider the first scenario that every participant completed. See the section "Order Effect in Clinician Study" elsewhere in this appendix for further analyses.

For our primary outcome measures, participants were asked to rate the appropriateness of the decisions made in Situation 1, Situation 2, and Situation 3 ("How appropriate is the director's decision in Situation 1/2/3?"), using a 1-5 scale (1 = "Very inappropriate", 2 = "Inappropriate", 3 = "Neither inappropriate nor appropriate", 4 = "Appropriate", 5 = "Very appropriate"). Participants then specified a ranked order of the three decisions ("Among these three decisions, which decision do you think the director should make? Please drag and drop the options below into your preferred order from best to worst. You must click on at least one option before you can proceed."), with 1 being the best decision and 3 being the worst. The last item on this page asked participants to explain why they chose these ratings and rankings in a couple of sentences ("In a couple of sentences, please tell us why you chose the ratings and rankings you chose.").

Following these primary measures, participants completed standard demographic items on the next page. For MTurk participants, these were measures of sex, race/ethnicity, age, educational attainment, household income, religious belief or affiliation, whether they have a degree in a STEM field or not, and four items identifying political orientation and affiliation. As part of an ongoing study in our laboratory (whose results will be reported elsewhere), these participants were randomized to one of six conditions for this demographic questionnaire where we varied the option to select "prefer not to answer" and whether the items were mandatory, optional, or requested (but not required). For clinician participants, demographic items were mandatory response and were limited to the following: sex, sources of training in research methods and statistics, self-reported comfort with research methods and statistics, past experience with activities related to research methods and statistics (e.g., publishing a scientific paper or analyzing data), current involvement in research, position (e.g., doctor, physician assistant, nurse, medical student, etc.), length of time working in the medical field, and field of specialty.

After completing the survey, MTurk participants were given a completion code to receive payment (\$0.40). Clinician participants were invited to enter into a lottery to win a \$50 Amazon gift card by following a link to an independent survey where they could enter their email address. All participants were thanked for their participation and offered the opportunity to comment on the survey.

⁴ In all vignettes, the protagonist (e.g., the hospital director or Dr. Jones) was male for ease of comparison to our previous work using these vignettes. Future work should examine the impact of the characteristics of the decision-maker on evaluations of their decisions regarding policy imposition and conducting RCTs.

We computed several variables to measure participants' sentiments about pRCTs.

Following Meyer et al. (2019) [3], we define an "A/B effect" as the difference between participants' mean policy rating and their rating of the A/B test—that is, the degree to which the policies are (on average) rated higher than the A/B test. We also report the percentage of participants whose mean policy rating is higher than their rating of the A/B test.

Following Heck et al. (2020 [4]; see also Mislavsky et al., 2019 [5]), we define "experiment aversion" as the difference between participants' rating of their own lowest-rated policy and their rating of the A/B test. We also report the percentage of participants who express experiment aversion.

"Experiment rejection" (first reported in Heck et al., 2020 [4], but without this name) occurs when a participant rates the A/B test as inappropriate (1 or 2 on the 5-point scale) while also rating each policy as neutral or appropriate (3–5 on the scale).

A "reverse A/B effect" is the difference between participants' rating of the A/B test and their mean policy rating that is, the degree to which the A/B test is rated higher than the policies (on average). We also report the percentage of participants whose rating of the A/B test is higher than their mean policy rating.

"Experiment appreciation" is the difference between participants' rating of the A/B test and their rating of their own highest-rated policy. We also report the percentage of participants who express experiment appreciation.

"Experiment endorsement" occurs when a participant rates the A/B as appropriate (4 or 5 on the 5-point scale) while also rating each intervention as neutral or inappropriate (1–3 on the scale).

In all cases where a *d*-value was calculated (i.e., A/B effect, experiment aversion, reverse A/B effect, experiment appreciation), we used Cohen's *d* recovered from the *t*-statistic, *n*, and correlation between the two measures being compared (Dunlop et al., 1996 [6], equation 3: $d = tc[2(1-r)/n]^{\frac{1}{2}}$; see also <u>http://jakewestfall.org/blog/index.php/category/effect-size/kewestfall.org</u> [7]. To calculate this *d*-value, we use the following R code: effsize::cohen.d(x,y, paired = TRUE).

In Figures 1B, 2B, and 3B, we transformed participants A, B, and A/B ratings on the continuous 5-point Likert scale into a binary objected/did not object variable (where objecting was defined as assigning a rating of 1 or 2—"very inappropriate" or "somewhat inappropriate"— on the 1–5 scale). We do this only for visualization and do not perform any statistical analyses on this transformed objected/did not object variable. Instead, as is standard in social and moral psychology, we treated appropriateness ratings elicited on the 5-point Likert scale as continuous. Therefore, we use t-tests to test the differences between the ratings of the A/B test and the interventions (lowest, average, and highest). Other methodologies and statistical analyses like a discrete choice approach, in which participants would see and evaluation two of the three possible decisions (e.g., intervention A vs. A/B test) at a time, or the Stuart-Maxwell test, which requires a kxk matrix of categorical variables, would not be appropriate.

Our vignettes were inspired by discussions about the ethics of real-world RCTs (see Table S3).

Table S3

Literature calling for or reporting an RCT similar to what is proposed in each vignette

Vignette name	Relevant literature
Catheterization Safety Checklist	Pronovost et al. [8], Urbach et al. [9], Arriaga et al. [10]
Best Anti-Hypertensive Drug	ROMP Ethics Study [11], Sinnott et al. [12]
Intubation Safety Checklist	Turner et al. [13]
Best Corticosteroid Drug	Wagner et al. [14]
Ventilator Proning	Elharrar et al. [15], Sartini et al. [16], Caputo et al. [17]
School Reopening	Fretheim et al. [18, 19], Helsingen et al. [20], Angrist et al. [21], Kolata [22]
Masking Rules	Abaluck et al. [23], Jefferson et al. [24], Bundgaard et al. [25]
Best Vaccine	Bach [26]

The following section shows the exact vignette text that participants read in these studies (with the exception of the bolded titles, which are never shown to participants).

Catheterization Safety Checklist

(Originally from Heck et al. (2020) [4], adapted from Meyer et al. (2019) [2])

Background: Some medical treatments require a doctor to insert a plastic tube into a large vein. These treatments can save lives, but they can also lead to deadly infections.

Situation 1

A hospital director wants to reduce these infections, so he decides to give each doctor who performs this procedure a new ID badge with a list of standard safety precautions for the procedure printed on the back. All patients having this procedure will then be treated by doctors with this list attached to their clothing.

Situation 2

A hospital director wants to reduce these infections, so he decides to hang a poster with a list of standard safety precautions for this procedure in all procedure rooms. All patients having this procedure will then be treated in rooms with this list posted on the wall.

Situation 3

A hospital director thinks of two different ways to reduce these infections, so he decides to run an experiment by randomly assigning patients to one of two test conditions. Half of patients will be treated by doctors who have received a new ID badge with a list of standard safety precautions for the procedure printed on the back. The other half will be treated in rooms with a poster listing the same precautions hanging on the wall. After a year, the director will have all patients treated in whichever way turns out to have the highest survival rate.

Best Anti-Hypertensive Drug

(Originally from Heck et al. (2020) [4], adapted from Meyer et al. (2019) [2])

Background: Several drugs have been approved by the US. Food and Drug Administration as safe and effective for treating high blood pressure. Doctor Jones works in a multi-doctor walk-in clinic where patients see whichever doctor is available. Some doctors in the clinic prescribe drug A for high blood pressure, while others prescribe drug B. Both drugs are affordable and patients can tolerate their side effects. Situation 1

Doctor Jones wants to provide good treatment to his patients, so he decides that his patients who need high blood pressure medication will be prescribed drug A.

Situation 2

Doctor Jones wants to provide good treatment to his patients, so he decides that his patients who need high blood pressure medication will be prescribed drug B.

Situation 3

Doctor Jones thinks of two different ways to provide good treatment to his patients, so he decides to run an experiment by randomly assigning his patients who need high blood pressure medication to one of two test conditions. Half of patients will be prescribed drug A, and the other half will be prescribed drug B. After a year, he will only prescribe to new patients whichever drug has had the best outcomes for his patients.

Intubation Safety Checklist

Background: Some treatments for coronavirus (Covid-19) patients require a doctor to insert a plastic breathing tube into the throat. These treatments can save lives, but they can also lead to deadly fluid buildup in the lungs.

Situation 1

A hospital director wants to reduce these cases of fluid buildup, so he decides to give each doctor who performs this procedure a new ID badge with a list of standard safety precautions for the procedure printed on the back. All coronavirus patients having this procedure will then be treated by doctors with this list attached to their clothing.

Situation 2

A hospital director wants to reduce these cases of fluid buildup, so he decides to hang a poster with a list of standard safety precautions for this procedure in all procedure rooms. All coronavirus patients having this procedure will then be treated in rooms with this list posted on the wall.

Situation 3

A hospital director thinks of two different ways to reduce these cases of fluid buildup, so he decides to run an experiment by randomly assigning coronavirus patients who need a breathing tube to one of two test conditions. Half of patients will be treated by doctors who have received a new ID badge with a list of standard safety precautions for the procedure printed on the back. The other half will be treated in rooms with a poster listing the same precautions hanging on the wall. After two months, the director will have all patients treated in whichever way turns out to have the highest survival rate.

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Best Corticosteroid Drug

Background: Several corticosteroids (a family of anti-inflammatory drugs) have been approved by the U.S. Food and Drug Administration as safe and effective for treating a variety of diseases. There is some evidence that corticosteroids can also help certain coronavirus (Covid-19) patients, and many doctors prescribe corticosteroids for these patients. Doctor Jones works in a multi-doctor emergency department where patients see whichever doctor is available. Some doctors in the emergency department prescribe corticosteroid A for coronavirus symptoms, while others prescribe corticosteroid B. Both corticosteroids are affordable and patients can tolerate their side effects.

Situation 1

Doctor Jones wants to provide good treatment to his patients, so he decides that his coronavirus patients who need medication will be prescribed corticosteroid A.

Situation 2

Doctor Jones wants to provide good treatment to his patients, so he decides that his coronavirus patients who need medication will be prescribed corticosteroid B.

Situation 3

Doctor Jones thinks of two different ways to provide good treatment to his coronavirus patients, so he decides to run an experiment by randomly assigning his patients who need medication to one of two test conditions. Half of coronavirus patients will be prescribed corticosteroid A, and the other half will be prescribed corticosteroid B. After two months, he will only prescribe to new coronavirus patients whichever corticosteroid has had the best outcomes for his patients.

Ventilator Proning

Background: Some coronavirus (Covid-19) patients have to be sedated and placed on a ventilator to help them breathe. Even with a ventilator, these patients can have dangerously low blood oxygenation levels, which can result in death. Current standards suggest that laying ventilated patients on their stomach for 12-16 hours per day can reduce pressure on the lungs and might increase blood oxygen levels and improve survival rates.

Situation 1

A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.

Situation 2

A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 15-16 hours per day.

Situation 3

A hospital director thinks of two different ways to save as many ventilated Covid-19 patients as possible, so he decides to run an experiment by randomly assigning ventilated Covid-19 patients to one of two test conditions. Half of these patients will be placed on their stomach for 12-13 hours per day. The other half of these patients will be placed on their stomach for 12-16 hours per day. After one month, the director will have all ventilated Covid-19 patients treated in whichever way turns out to have the highest survival rate.

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Best Vaccine (ambiguous version; results not reported in main analyses) Background: Imagine that several vaccines have been approved by the U.S. Food and Drug Administration as safe and effective for preventing Covid-19. Vaccine A uses mRNA molecules to provide the cells with a blueprint for how to destroy the virus. Vaccine B uses deactivated or weakened coronavirus to help the body create an immune resistance to the disease. Both vaccines are affordable, similarly priced, and people can tolerate their side effects. However, people can only receive one of these two vaccines. 10 Situation 1 11 12 The director of public health for a state wants to reduce Covid-19 cases. So he decides that all clinics in the state 13 will offer Vaccine A for free. People can get any other vaccine somewhere else, if they want. 14 15 Situation 2 16 17 The director of public health for a state wants to reduce Covid-19 cases. So he decides that all clinics in the state 18 will offer Vaccine B for free. People can get any other vaccine somewhere else, if they want. 19

Situation 3

The director of public health for a state thinks of two different ways to reduce Covid-19 cases, so he decides to run an experiment by randomly assigning clinics in the state to one of two test conditions. Half of the clinics will offer Vaccine A for free, and the other half will offer Vaccine B for free. People can get any other vaccine somewhere else, if they want.⁵ After six months, he will direct the state to offer whichever vaccine has resulted in the fewest cases of Covid-19.

Best Vaccine

Background: Imagine that several vaccines have been approved by the U.S. Food and Drug Administration as safe and effective for preventing Covid-19. Vaccine A uses mRNA molecules to provide the cells with a blueprint for how to destroy the virus. Vaccine B uses deactivated or weakened coronavirus to help the body create an immune resistance to the disease. Both vaccines are affordable, similarly priced, and people can tolerate their side effects.

Situation 1

The director of public health for a state wants to reduce Covid-19 cases. So he decides that all clinics in the state will offer Vaccine A for free.

Situation 2

The director of public health for a state wants to reduce Covid-19 cases. So he decides that all clinics in the state will offer Vaccine B for free.

Situation 3

The director of public health for a state thinks of two different ways to reduce Covid-19 cases, so he decides to run an experiment by randomly assigning clinics in the state to one of two test conditions. Half of the clinics will offer Vaccine A for free, and the other half will offer Vaccine B for free. After six months, he will direct the state to offer whichever vaccine has resulted in the fewest cases of Covid-19.

⁵ This wording unintentionally implied that residents could choose their vaccine (by going elsewhere) if they did not wish to be subject to the official's decision (including policy implementation or A/B test); we suspect this had the effect of making the experiment condition less aversive, since people could effectively opt-out of it, and our goal in this research is to study pragmatic, real-world situations in which avoiding randomization is not a realistic option.

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School Reopening

Background: This Fall, school districts must decide whether to reopen their doors to students, teachers, and staff despite the risks of spreading coronavirus (Covid-19). Many school and public health officials have decided to use a "hybrid model" of teaching that offers some of the benefits of face-to-face learning time while attempting to minimize the risks related to Covid-19.

Situation 1

A superintendent at a large school district wants to provide good education to his students while slowing the spread of Coronavirus. So, he decides that students will attend school according to an even-odd schedule. Students in even-numbered grades (e.g., 2nd grade, 4th grade, etc.) will attend school in the morning and learn remotely in the afternoons, while students in odd- numbered grades will attend school in the afternoon and learn remotely in the mornings.

Situation 2

A superintendent at a large school district wants to provide good education to his students while slowing the spread of Coronavirus. So, he decides that students will attend school according to an A-day/B-day schedule. Students in the A group will attend school in person on Monday, Tuesday, and Wednesday morning, and students in the B group will attend school in person on Wednesday afternoon, Thursday, and Friday. Students will learn remotely on the days they do not attend school.

Situation 3

A superintendent at a large school district thinks of two different ways to provide good education to his students while slowing the spread of Coronavirus. So, he decides to conduct an experiment by randomly assigning schools in the district to one of two test conditions. For half of schools, students will attend school according to an even-odd schedule. Students in even-numbered grades (e.g., 2nd grade, 4th grade, etc.) will attend school in the morning and learn remotely in the afternoons, while students in odd-numbered grades will attend school in the afternoon and learn remotely in the mornings. For the other half of schools, students will attend school according to an A-day/B-day schedule. Students in the A group will attend school in person on Monday, Tuesday, and Wednesday morning, and students in the B group will attend school in person on Wednesday afternoon, Thursday, and Friday. Students will learn remotely on the days they do not attend school. At the end of the semester, all schools will adopt, for future semesters when the pandemic threat level remains similar, whichever policy has resulted in the best combination of test scores on state aptitude tests and number of Covid-19 cases.

Masking Rules

Background: Public health officials have considered different rules about when and where people must wear masks or other face coverings to reduce the spread of coronavirus (Covid-19).

Increasing mask use can reduce the spread of the disease, but highly restrictive mask policies can substantially reduce compliance rates.

Situation 1

A state health department director wants to reduce coronavirus spread within his state, so he decides that all counties will require masks in all businesses and public buildings.

Situation 2

A state health department director wants to reduce coronavirus spread within his state, so he decides that all counties will require masks in all businesses, public buildings, and outdoor public spaces.

Situation 3

A state health department director thinks of two different ways to reduce coronavirus spread within his state, so he decides to run an experiment by randomly assigning counties within the state to one of two test conditions. Half of counties will require masks in all businesses and public buildings. The other half of counties will require masks in all businesses, public buildings, and outdoor public spaces. After one month, the director will require all counties to adopt whichever policy has led to the fewest cases of Covid-19 for as long as the pandemic threat level remains high.

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Results

Sample demographics

Lay participants

Across all vignettes reported in the main text (i.e., excluding the initial ambiguous version of the Best Vaccine vignette), there were a total of 2,909 lay participants. They ranged in age from 18 to 88 years old (mean = 38.4, SD = 12.8) and the majority were White (74.6%) and female (55.9%). 35.7% had a 4-year college degree, 29.7% had some college, and 20.5% had a graduate degree. 21.3% of participants had a degree in a STEM field. The most frequently selected income level was between \$20,000 and \$40,000 (20.7%). A majority of participants reported being moderate, leaning liberal, or being liberal both generally and specifically with regards to social and economic issues. Similarly, a majority of participants reported being independent, leaning Democrat, or being Democrat in their political party affiliations. 37.7% of participants reported being non-religious. Of those who reported being religious, the most reported religion was Protestant (24.2%). See Table S4 for demographic breakdowns by vignette and in the combined lay participant sample.



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Table	S4
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Table S4							cted by copyright, including	5/bm iopen-2024-084699		
Demographics of lay participants l	by vignette Catheterization	Best Anti-	Intubation	Best	Best	Deet		entilator	Maalaina	
		Hypertensive		Corticosteroid	Vaccine	Best Vaccine		Proning	Masking Rules	via
T . 1 . Y	Checklist	Drug	Checklist	Drug	(first attempt)	v accine	332 38.7 (13.8 5 39.2 1 39.2 1	o ^{rioning}	Kules	vig
Total N	343	357	346	357	350	450		5 357	360	20.4.4
Age [Mean (SD)]	37.9 (12.9)	38.6 (12.9)	37.9 (12.4)	38.0 (12.7)	36.7 (12.0)	37.7 (12.6)	38.7 (13. 6)	12 .7)	39.0 (12.8)	38.4 (
Sex (%)	51.20/	41.50/	40.10/	51 50/	26.60/	29.40/		40.9%	20.70/	
Male	51.3% 47.8%	41.5% 58.0%	48.1% 51.9%	51.5%	36.6% 63.1%	38.4% 60.9%	59.2 % (C	40.9%	39.7% 60.0%	4
Female Other	47.8%	58.0% 0.6%	0.0%	48.2% 0.0%	0.3%	0.4%		20 58.8% 0.3%	0.3%	2
Prefer not to answer	0.8%	0.0%	0.0%	0.0%	0.3%	0.4%	39.2 9 area 60.5 5 cc 4 0.3 8 co t	ber 40.9% 58.8% 0.3% 0.0%	0.3%	
Race - select all that apply (%)	0.376	0.070	0.070	0.370	0.070	0.270	0.05 T		0.070	
Black/African-American	11.1%	5.0%	8.4%	10.1%	10.9%	11.3%	9.7% Superieur (A 9.7% Gandy data 77.0 % data	6 .7%	8.9%	
Hispanic or Latino	8.2%	8.4%	7.2%	8.4%	8.3%	5.6%	5 9 9 0	9.5%	7.5%	
White	72.0%	78.7%	71.5%	72.0%	70.9%	72.7%	77 0 9 10	000 77.6%	75.8%	7
Asian	12.5%	8.7%	15.3%	12.6%	12.6%	13.3%	8.6 2 4	G 7.0%	7.8%	1
Other	1.2%	1.7%	1.2%	0.3%	3.4%	0.9%	1.8	1 .7%	2.2%	
Prefer not to answer	0.9%	0.6%	0.0%	0.6%	0.3%	0.9%	1.8 a BES	0 .3%	0.3%	
Education (%)							in S	3		
Less than high school	0.6%	0.8%	0.3%	0.3%	0.6%	0.2%		9.8%	0.8%	
High school degree	5.5%	7.8%	8.9%	9.2%	9.1%	10.2%	10.3%	29.4%	11.4%	
Some college	32.7%	32.2%	24.2%	28.0%	30.3%	32.0%	10.3 26.3 37.8	33.6%	31.9%	2
Four-year college degree	37.3%	35.6%	39.5%	35.9%	37.1%	35.8%	37.8	3.1%	30.6%	3
Some graduate school	4.4%	3.4%	4.6%		4.6%	5.1%	4.4 <u>9</u>.	2 3.8%	4.7%	
Graduate degree	19.2%	19.9%	22.5%	22.1%	18.3%	16.2%	20.9	9 0.3%	20.6%	2
Prefer not to answer	0.3%	0.3%	0.0%	0.3%	0.0%	0.4%	4.44 20.90 0.00 9.45 18.95 21.28	9.8% 29.4% 33.6% 3.1% 23.8% 0.3% 0.0% 11.2% 19.0%	0.0%	
Income (%)							nd	3		
< \$20,000	11.1%	8.4%	9.2%	7.6%	12.0%	9.3%	9.4%	11.2%	9.7%	
\$20,000-\$40,000	17.8%	22.1%	21.6%	25.8%	19.7%	20.2%	18.95	19.0%	19.7%	2
\$40,000-\$60,000	24.5%	18.8%	19.0%	20.2%	21.4%	20.4%	<u> </u>	n 17.770	20.8%	2
\$60,000-\$80,000	13.7%	17.4%	16.1%	17.9%	18.6%	17.8%	16.5%		19.2%	1
\$80,000-\$100,000 > \$100,000	11.4%	13.7%	11.0%	9.5%	10.6%	12.2%	13.3%	8.4% 19.6%	12.2%	1
> \$100,000 Prefer not to answer	20.7% 0.9%	18.5% 1.1%	21.3% 0.9%	17.4% 1.4%	17.1% 0.3%	18.7% 1.3%			16.9% 1.4%	1
No response	0.9%	0.0%	0.9%	0.3%	0.3%	0.0%			1.4% 0.0%	
Political Ideology (%)	0.070	0.070	0.7/0	0.570	0.570	0.070	ġ	ŏ	0.070	
Very liberal	12.2%	12.6%	13.0%	11.2%	10.6%	13.1%	12.7%	NS 12.0%	12.8%	1
Liberal	32.1%	30.3%	32.3%		29.4%	31.1%	30.4%	a 30.8%	28.6%	3
										2
Conservative							20.9%	21.3%	23.6%	2
	5.8%	10.6%	5.2%		6.3%		7.4%	9.8%	5.8%	_
Prefer not to answer	0.9%	0.6%	0.3%							
No response	0.0%	0.3%	0.3%		0.0%	0.0%	0.3%	b 0.3%		
Very conservative Prefer not to answer	29.2% 19.8% 5.8% 0.9%	25.5% 20.2% 10.6% 0.6%	28.2% 20.7% 5.2% 0.3%	26.1% 17.1% 9.5% 0.3%	31.1% 21.7% 6.3% 0.9%	27.3% 18.7% 8.9% 0.9%	27.7% 20.9% 7.4% 0.6% 0.3%	Agence B 24.9% 21.3% 9.8% 0.8%	28.3% 23.6% 5.8% 0.8%	

3 Table S4, continued

				BMJ Op	en			6/bmjopen-2024-084699 on ∰tor cted by copyright, including fo		1
Table S4, continued								24-084 ight, i		
Demographics of lay participants by vignette								ncl		
	Catheterization	Best Anti-	Intubation	Best	Best Vaccine			udi 9		
	Safety	Hypertensive	Safety	Corticosteroid	(first	Best	School	G Vent il ator	Masking	
	Checklist	Drug	Checklist	Drug	attempt)	Vaccine	Reopening	d Proping	Rules	All vignettes
Political ideology on social issues (%)	10 70/	16.00/	10 (0)	10 50/	1.5.50/	10.00/	1.5.50		17.50/	17 50/
Very liberal	18.7%	16.8%	19.6%	13.7%	17.7%	18.0%	17.7%	epte 2% Enseign 16.0%	17.5%	17.5%
0 Liberal Madamta	34.1%	33.3%	33.4%	40.3%	31.1%	30.4%	36.6%	S S 33.2%	31.7%	34.1%
Moderate 1 Conservative	21.6% 16.6%	23.8%	23.9% 17.3%	19.9% 17.1%	26.0% 18.0%	25.6%	19.8% 18.3%	related	23.3% 19.4%	22.6% 17.0%
2 Very conservative	8.2%	15.4% 10.4%	5.2%	8.4%	6.3%	16.0% 9.1%	6.8%		7.5%	8.2%
	0.9%	0.3%	0.6%	0.6%	0.9%	0.9%	0.6%	1emer 1emer	0.6%	0.6%
3 Prefer not to answer No response	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	σ Ξ <u>#</u> 0%	0.0%	0.0%
4 Political ideology on economic issues (%)	0.070	0.070	0.070	0.070	0.070	0.070	0.570	4Doverstop ant Superious to text and dat	0.070	0.070
5 Very liberal	9.9%	12.0%	13.5%	11.2%	8.0%	13.8%	11.8%		11.9%	11.9%
6 Liberal	28.3%	21.6%	27.1%	28.3%	24.9%	23.3%	27.7%		19.7%	24.8%
0 Moderate	28.0%	27.5%	25.1%	25.2%	27.7%	28.4%	24.2%	d e 29.5%	32.2%	27.3%
7 Conservative	23.0%	24.9%	24.8%	22.1%	30.9%	22.0%	24.2%	da 4 26.8%	26.4%	24.1%
8 Very conservative	9.3%	13.7%	8.6%	12.0%	7.4%	11.3%	11.2%	ā ͡⊋i <u>\$</u> .9%	9.2%	11.1%
9 Prefer not to answer	1.5%	0.3%	0.9%	1.1%	1.1%	0.9%	0.6%	ata (Al279% m BEB.6%	0.6%	0.8%
	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.3%	8ES)	0.0%	0.1%
0 Political party (%)										
1 Strong Democrat	14.9%	10.9%	12.4%	13.7%	12.0%	13.6%	13.0%	ing, .0%	12.8%	13.2%
2 Democrat	23.3%	22.7%	27.7%	28.9%	26.3%	24.4%	22.7%	A 250%	21.7%	24.1%
A Independent (but lean Democrat)	15.7%	16.2%	14.7%	12.9%	13.4%	14.9%	17.4%	5 1 <u>3</u> .3%	15.8%	15.2%
independent	15.7%	16.8%	17.6%	14.3%	16.9%	16.9%	13.6%	Al training,	18.1%	16.0%
4 Independent (but lean Republican)	7.0%	8.7%	7.8%	10.4%	9.4%	8.7%	10.6%	nin 🙀.9%	10.6%	9.3%
5 Republican	16.3%	14.6%	14.1%	12.0%	13.1%	15.3%	15.6%	ig 1 <mark>3</mark> .0%	13.9%	14.5%
6 Strong Republican	4.1%	8.4%	4.3%	7.3%	6.9%	4.9%	6.5%	and 2.0%	6.4%	6.3%
Prefer not to answer	2.9%	1.7%	1.4%	0.6%	2.0%	1.3%	0.3%	nd <u>1</u> ,7%	0.8%	1.3%
1 to response	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	similar 24:4%	0.0%	0.0%
8 Religion (%)	26.20/	24 (0/	22 (0/	21.00/	24 (0/	24.20/	25 40/	nilar t	22.00/	24.20
9 Christian - Protestant Christian - Catholic	26.2% 17.5%	24.6% 16.5%	23.6% 15.9%	21.0% 18.2%	24.6% 17.7%	24.2% 14.0%	25.4% 17.1%	ar 19 00/	23.9% 15.3%	24.2%
0 Christian - Catholic Christian - Other	11.1%	11.2%	8.1%	18.2%	11.7%	14.0%	17.1%		13.3%	16.6% 11.0%
1 Jewish	2.6%	1.7%	1.7%	1.7%	1.7%	1.3%	11.8%	echr.4%	2.5%	1.8%
	2.0%	0.8%	1.4%	0.6%	0.3%	0.9%	1.3%	Č P 1%	1.7%	1.07
Duddhist	2.3%	1.4%	2.0%	1.7%	1.1%	2.0%	2.4%	0 0 .6%	1.4%	1.7%
3 Hindu	1.2%	0.6%	2.6%	1.1%	1.7%	1.6%	0.3%	gie 26%	0.6%	1.1%
4 Non-religious	32.7%	38.1%	40.9%	40.3%	36.6%	40.0%	35.4%	S. 350%	36.4%	37.7%
5 Other	3.5%	3.6%	2.6%	3.4%	3.7%	3.8%	4.1%		4.2%	3.6%
	0.9%	1.4%	1.2%	0.6%	0.9%	1.1%	0.6%	a.4%	1.9%	1.2%
6 Prefer not to answer No response	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	6 .3%	0.0%	0.1%
7 STEM degree (%)								g .3%		
8 No	77.6%	77.0%	75.2%	76.8%	77.4%	80.7%	78.5%	78 .4%	78.6%	77.9%
a Yes	21.9%	22.1%	23.3%	22.4%	22.3%	18.7%	21.5%	2001.2%	21.1%	21.3%
Prefer not to answer	0.6%	0.8%	1.4%	0.8%	0.0%	0.0%	0.0%	ð .0%	0.0%	0.7%
1 to response	0.0%	0.0%	0.0%	0.0%	0.3%	0.7%	0.0%	8 :3%	0.3%	0.1%
1 2 3 4 5 6	I	For peer reviev	w only - http	://bmjopen.bn	nj.com/site/al	bout/guideli	nes.xhtml	bil <u>%</u> Bigraphique de l		

Clinicians

There were 2,149 clinician responses across all vignettes. In the clinician samples, survey responses were anonymous, so we could not restrict participation based on our previous studies so some participants who completed the Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes may have also completed the Best Vaccine vignette. For this reason, demographics are reported separately by vignette in Table S5. Across vignettes, a majority of clinicians were female. Over 50% of participants in the sample were registered nurses, followed by physicians and physician assistants. Over 50% of participants in the sample reported that they had been in the medical field for over 10 years. The clinicians reported that they had received training in research methods and statistics via an average of 1.5 of the sources we listed, and that they engaged in an average of 2.5 research methods and statistics.

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Table S5

Demographics of clinicians by vignette

	Intubation	Best		
	Safety	Corticosteroid	Masking	Bes
	Checklist	Drug	Rules	Vaccin
Total N	271	275	349	1254
Sex (%)				
Male	18.1%	22.5%	18.1%	18.7%
Female	81.9%	77.1%	81.4%	81.2%
Other	0.0%	0.4%	0.6%	0.2%
Source of research methods/statistics training - select all that apply (%)				
Undergraduate coursework	48.7%	49.5%	48.7%	47.4%
Professional school instruction	40.2%	31.3%	34.4%	34.4%
Postgraduate coursework	26.2%	20.7%	22.1%	21.1%
CME/CEU courses	27.7%	25.1%	24.1%	25.8%
Self-instruction via peer-reviewed literature	19.2%	15.6%	17.2%	21.3%
Other	7.0%	4.0%	3.2%	3.9%
Total number of research methods/statistics training [mean (SD)]	1.69 (1.22)		1.50 (1.13)	
Comfort with research methods/statistics (%)				
Not at all	8.9%	12.7%	10.9%	11.19
Somewhat	37.6%	44.4%	45.8%	46.6%
Moderately	39.5%	32.0%	32.7%	30.89
Very	11.8%	9.1%	8.9%	9.9
Extremely	2.2%	1.8%	1.7%	1.79
Research methods/statistics activities - select all that apply (%)	/0	1.070	1.770	
Read results of RCT in peer-reviewed journal article	81.2%	75.3%	71.9%	71.29
Changed typical prescription/recommendation after personally	01.270	10.070	/1.5/0	,
reading results of RCT in peer-reviewed journal article	41.0%	33.1%	33.0%	39.89
Published scientific paper in peer-reviewed journal	13.3%	12.4%	9.7%	12.0%
Conducted or worked on a team conducting an RCT	18.5%	20.0%	19.2%	17.1%
Took a course/class in statistics, biostatistics, research methods	73.1%	69.8%	69.1%	68.5%
Analyzed data for statistical significance outside of course require	23.6%	21.8%	19.2%	21.19
Used statistical software	12.2%	11.6%	11.5%	9.39
Total number of research methods/statistics activities [mean (SD)]	2.63 (1.69)		2.34 (1.66)	
Currently involved in research (%)	10.7%	9.1%	9.7%	2.39 (1.72 9.69
Position (%)	10.770	9.1/0	9.770	9.0
Doctor	14.8%	14.5%	12.6%	15.79
	14.8%	6.9%	9.5%	7.79
Physician Assistant				
Nurse Practitioner	6.3%	2.5%	4.3%	4.79
Nurse (RN)	51.3%	57.1%	55.6%	52.89
Nurse (LPN)	6.3%	9.5%	8.0%	15.69
Nurse (Other)	1.8%	1.1%	1.4%	0.69
Genetic Counselor	0.0%	0.0%	0.0%	0.00
Non-prescribing clinician or staff without clinical credential	0.0%	0.0%	0.0%	0.09
Medical student	5.2%	5.5%	4.6%	0.19
Faculty or Professor	0.4%	0.7%	0.3%	0.39
Other	1.5%	2.2%	3.7%	2.69
Years in medical field (%)				_
< 1 year	2.6%	2.9%	3.2%	2.89
1-2 years	6.3%	5.5%	6.0%	5.89
3-5 years	15.1%	11.3%	12.6%	13.6%
6-10 years	16.6%	14.2%	15.8%	15.8%
> 10 years	59.4%	66.2%	62.5%	62.0%

Note. Reported here are the demographics of the clinicians who saw the Intubation Safety Checklist, Best Corticosteroid Drug, or Masking Rules vignette first (responses to the Best Vaccine vignette were collected at a different time). All clinicians who participated in this study completed all vignettes but in randomized order. In the main text, we only analyze responses to the first vignette, so we report demographics similarly here.

Results presented in main text

In Figures S1-3, we show all individual appropriateness ratings (1 = very inappropriate, 5 = very appropriate) for intervention A, intervention B, and the A/B test across all vignettes.

Figure S1

Lay Sentiments About pRCTs

		eteriz Safety heckli	/	Anti-F	Best Anti-Hypertensive Drug						
⁵ CI)		Same a									
Appropriateness Rating (with 95% CI)		States and a second sec				S. W. S.					
ss Rating					ALVARA						
priatenes			S. Salation	11.42 E.	and a second second						
Appro							3				
l	Á	B	A/B Test	Á	B	A/B Test					

Figure S2

Lay Sentiments About Covid-19 pRCTs

9	Ventilator Proning								Masking Rules			Intubation Safety Checklist			Best Corticosteroid Drug			Best Vaccine		
95% CI)		本語の語	調査研究	1. 400 A.M.	経営調査	All South Stands	和影響家	弊風肥長	12.11.20		活動記載宣			時代の	Constants.	市場の高い	「「「「「「「」」」			
(with	THE REAL	の記事業	San		NOTE OF	A. Carlo Balanta	語言を読むが	語の主要	大学と記念	New Arriv		ないないの		の言語を		Solution and the second		いたの		
is Rating	1922 1929	Section.			11.60	Hark		New York	200 1	12100 W	10 8 M	S. Herend	and the second second	ないであり	1.		- ANALAS	A CAR		
Appropriateness		1.11.12	Section A.S.		81.81.2	たのない		「「「	議事務は	14000	4. 4.8 6			A STATE		2012-121-22	* 出版情况	東京の		
Approp	Sec. Sec.		新学校	14 A. S. A.	1.		ii N	1912-0100	20 C 100			器合置		the second	A Carlower	A. Argel	1990 - N. 1990 1990 - N. 1990 1990 - N. 1990	1000 A		
2	À	B	A/B Test	Á	B	A/B Test	Á	B	A/B Test	À	B	A/B Test	A	B	A/B Test	Á	B	A/B Test		

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Figure S3

Clinician Sentiments About Covid-19 pRCTs

Intubation Best Masking Best Safety Corticosteroid **Rules** Vaccine Checklist Drug Appropriateness Rating (with 95% CI) 「学校」は大学 「「「「「「「「」」」 Section Section 9.400 CAN Sec. Level なながらの 学校である のないので Track to NA TANK T が王上に のないなどのない N. 1999 14 のの読むす No. 学生の記録 のであると のの主要の 王の言語を * 200 A C 「二、二十二 新学行のの にの言葉の 沢かくから われたかないたの I Ì S. S. Start 100 Sec. 100 THE WAY 10. A. S. S. S. S. A Carto のないのないない のないである のないのである いなながあり 14 j, にたいない がなながる 学業務 Source of いたいであるか でいたのないな A: 17 7 Z, Á B A/B Á B A/B À B A/B À B A/B Test Test Test Test

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In Table S6A-C, we present the descriptive and inferential results for all vignettes discussed in the main text.

Table S6A

Descriptive and inferential results of ratings and	d rankings of interventions and experiment for all vignettes
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		Desc	riptive Resu	ılts	Infe	rential Results
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome
Lay Sentiments	s About pRO	CTs				
					A/B Effect	$t(342) = 9.74^{***}, d = 0.69 \pm .16$
					Mean(A,B) > AB	$58\% \pm 5\%$
	А	3.77 (1.12)	27%	32%	Reverse A/B effect	$t(342) = -9.74^{***}, d = -0.69 \pm .16$
Catheterization	В	4.03 (1.09)	42%	21%	AB > Mean(A,B)	27% ± 4%
Safety	AB	3.09 (1.40)	32%	48%	Experiment Aversion	$t(342) = 3.70^{***}, d = 0.25 \pm .14$
Checklist	Mean(A,B)	3.90 (0.84)	-	-	Min(A,B) > AB	41% ± 5%
(n = 343)	Min(A,B)	3.42 (1.16)	-	-	Experiment Appreciation	$t(342) = -14.61^{***}, d = -1.13 \pm .20$
laypeople)	Max(A,B)	4.39 (0.81)	-	-	AB > Max(A,B)	15% ± 3%
•••••					Experiment Rejection	28% ± 5%
					(A,B = 3,4,5; AB = 1,2)	
					Experiment Endorsement	3% ± 1%
					(AB = 4,5; A,B = 1,2,3)	
					A/B Effect	$t(356) = 6.68^{***}, d = 0.52 \pm .16$
					Mean(A,B) > AB	47% ± 5%
	А	3.87 (1.00)	25%	27%	Reverse A/B effect	$t(356) = -6.68^{***}, d = -0.52 \pm .16$
Best Anti-	В	3.89 (0.99)	25%	28%	AB > Mean(A,B)	$31\% \pm 5\%$
Hypertensive	AB	3.24 (1.47)	50%	45%	Experiment Aversion	$t(356) = 5.96^{***}, d = 0.46 \pm .16$
Drug	Mean(A,B)	3.88 (0.95)	-	-	Min(A,B) > AB	$44\% \pm 5\%$
(n = 357)	Min(A,B)	3.82 (1.03)	-	-	Experiment Appreciation	$t(356) = -7.26^{***}, d = -0.57 \pm .17$
laypeople)	Max(A,B)	3.94 (0.95)	-	-	AB > Max(A,B)	$29\% \pm 4\%$
					Experiment Rejection	34% ± 5%
					(A,B = 3,4,5; AB = 1,2)	
					Experiment Endorsement	$18\% \pm 4\%$
					(AB = 4,5; A,B = 1,2,3)	

Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. Experiment Appreciation refers to the difference between the rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of their highest-rated intervention. Experiment Rejection is the percentage of people who rated interventions A and B as "neither inappropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate. Experiment Endorsement is the percentage of people who rated the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate.

*p < .05

**p < .01

***p < .001

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Table S6B

		Desc	riptive Resu	lts	Inferential Results		
			%	%			
Vignette	Variable	Mean (SD)	Ranking Best	Ranking Worst	Test Description	Test Outcome	
Lay Sentime	its About (Covid-19 pRC		worst	<u> </u>		
		P			A/B Effect	$t(345) = 10.69^{***}, d = 0.75 \pm .1$	
					Mean(A,B) > AB	$58\% \pm 59$	
	А	3.81 (1.10)	29%	29%	Reverse A/B effect	$t(345) = -10.69^{***}, d = -0.75 \pm .1$	
T , T , T	В	3.99 (1.13)	43%	19%	AB > Mean(A,B)	$25\% \pm 4\%$	
Intubation	AB	2.98 (1.46)	29%	52%	Experiment Aversion	$t(345) = 5.28^{***}, d = 0.35 \pm .1$	
Safety	Mean(A,B)	3.90 (0.88)	_	_	Min(A,B) > AB	$45\% \pm 5\%$	
Checklist	Min(A,B)	3.46 (1.19)	-	-	Experiment Appreciation	$t(345) = -14.94^{***}, d = -1.14 \pm .1$	
(n = 346)	Max(A,B)		-	-	AB > Max(A,B)	$14\% \pm 3^{\circ}$	
laypeople)	~ ())				Experiment Rejection		
					(A,B = 3,4,5; AB = 1,2)	$31\% \pm 5\%$	
					Experiment Endorsement		
					(AB = 4,5; A,B = 1,2,3)	$4\% \pm 2\%$	
					(112 1,0, 11,2 1,2,0)		
					A/B Effect	$t(356) = 2.28^*, d = 0.17 \pm .1$	
					Mean(A,B) > AB	$(550)^{-2.20}, u^{-0.17} = 11$ $34\% \pm 5^{\circ}$	
	А	3.89 (1.03)	17%	32%	Reverse A/B effect	$t(356) = -2.28^*, d = -0.17 \pm .1$	
-	В	3.90 (1.00)	18%	37%	AB > Mean(A,B)	$2.20, u = 0.17 \pm 11$ $38\% \pm 5^{\circ}$	
Best	AB	3.69 (1.37)	65%	31%	Experiment Aversion	$t(356) = 1.55, p = .123, d = 0.12 \pm .1$	
Corticosteroid	Mean(A,B)	3.90 (0.99)	-	-	Min(A,B) > AB	$31\% \pm 5\%$	
Drug	Min(A,B)	3.83 (1.04)	-	-	Experiment Appreciation	$t(356) = -2.99^{**}, d = -0.23 \pm .1$	
(n = 357)	Max(A,B)	3.96 (0.98)	-	_	AB > Max(A,B)	$35\% \pm 5\%$	
laypeople)		()			Experiment Rejection		
					(A,B = 3,4,5; AB = 1,2)	$22\% \pm 4\%$	
					Experiment Endorsement		
					(AB = 4,5; A,B = 1,2,3)	$17\% \pm 4^{\circ}$	
					A/B Effect	$t(449) = 2.41^*, d = 0.15 \pm .1$	
					Mean(A,B) > AB	$i(44) = 2.41$, $u = 0.13 \pm .13$ $34\% \pm 49$	
	А	3.95 (1.09)	26%	27%	Reverse A/B effect	$t(449) = -2.41^*, d = -0.15 \pm .1$	
	В	3.84 (1.09)	19%	39%	AB > Mean(A,B)	$2.41, u = 0.15 \pm 11$ $36\% \pm 4\%$	
	AB	3.72 (1.34)	55%	34%	Experiment Aversion	$t(449) = 0.61, p = .546, d = 0.04 \pm .1$	
Best Vaccine	Mean(A,B)	3.90 (1.03)	-	-	Min(A,B) > AB	$29\% \pm 4\%$	
(n = 450)	Min(A.B)	3.77 (1.13)	-	-	Experiment Appreciation	$t(449) = -4.06^{***}, d = -0.25 \pm .1$	
laypeople)	Max(A,B)	4.03 (1.04)	-	-	AB > Max(A,B)	$1(449) = 4.00$, $u = -0.23 \pm .1$ $32\% \pm 49$	
	(,)				Experiment Rejection		
					(A,B = 3,4,5; AB = 1,2)	$17\% \pm 39$	
					Experiment Endorsement		
					(AB = 4,5; A,B = 1,2,3)	$13\% \pm 3\%$	

Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. Experiment Appreciation refers to the difference between the rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of the intervention. Experiment Rejection is the percentage of people who rated interventions A and B as "neither inappropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate. Experiment Endorsement is the percentage of people who rated the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate.

**p* < .05

***p* < .01

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Table S6B, continued

Descriptive and inferential results of r	ratings and rankings of interventions a	nd experiment for all vignettes
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		Desci	riptive Resu		Inferential Results		
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome	
Lay Sentin	nents Abo	ut Covid-19 p	RCTs				
					A/B Effect	$t(338) = 6.42^{***}, d = 0.39 \pm .12$	
					Mean(A,B) > AB	$46\% \pm 5\%$	
	А	3.45 (1.15)	17%	46%	Reverse A/B effect	$t(338) = -6.42^{***}, d = -0.39 \pm .12$	
	В	3.96 (1.03)	53%	14%	AB > Mean(A,B)	$28\% \pm 5\%$	
School	AB	3.24 (1.36)	30%	40%	Experiment Aversion	$t(338) = 0.47, p = .638, d = 0.03 \pm .12$	
Reopening	Mean(A,B)	3.70 (0.90)	-	-	Min(A,B) > AB	28% ± 5%	
(n = 339)	Min(A,B)	3.28 (1.15)	-	-	Experiment Appreciation	$t(338) = -11.25^{***}, d = -0.75 \pm .15^{***}$	
laypeople)	Max(A,B)	4.12 (0.91)	-	-	AB > Max(A,B)	15% ± 3%	
					Experiment Rejection		
					(A,B = 3,4,5; AB = 1,2)	$19\% \pm 4\%$	
					Experiment Endorsement		
					(AB = 4,5; A,B = 1,2,3)	$4\% \pm 2\%$	
					A/B Effect	$t(356) = 6.07^{***}, d = 0.42 \pm .14$	
					Mean(A,B) > AB	45% ± 5%	
	А	3.82 (1.09)	21%	33%	Reverse A/B effect	$t(356) = -6.07^{***}, d = -0.42 \pm .14$	
	В	3.96 (1.07)	36%	25%	AB > Mean(A,B)	$31\% \pm 5\%$	
Ventilator	AB	3.39 (1.38)	43%	42%	Experiment Aversion	$t(356) = 2.63^{**}, d = 0.17 \pm .13$	
Proning	Mean(A,B)	3.89 (0.96)	-	_	\bigwedge Min(A,B) > AB	$36\% \pm 5\%$	
-	Min(A,B)	3.61 (1.11)	-	-	Experiment Appreciation	$t(356) = -8.927^{***}, d = -0.64 \pm .10^{\circ}$	
laypeople)		4.17 (0.99)	-	-	AB > Max(A,B)	$22\% \pm 4\%$	
JI I /					Experiment Rejection		
					(A,B = 3,4,5; AB = 1,2)	$23\% \pm 4\%$	
					Experiment Endorsement		
					(AB = 4,5; A,B = 1,2,3)	$6\% \pm 2\%$	
					A/B Effect	$t(359) = 14.55^{***}, d = 1.07 \pm .18$	
					Mean(A,B) > AB	$68\% \pm 5\%$	
	А	4.19 (0.95)	44%	14%	Reverse A/B effect	$t(359) = -14.55^{***}, d = -1.07 \pm .18$	
	В	3.80 (1.34)	38%	27%	AB > Mean(A,B)	$21\% \pm 4\%$	
	AB	2.74 (1.38)	18%	59%	Experiment Aversion	$t(359) = 7.63^{***}, d = 0.56 \pm .13$	
e	Mean(A,B)	4.00 (0.91)	-	-	Min(A,B) > AB	$50\% \pm 5\%$	
	Min(A,B)	3.47 (1.22)	_	-	Experiment Appreciation	$t(359) = -20.85^{***}, d = -1.57 \pm .22$	
laypeople)		4.53 (0.84)	-	_	AB > Max(A,B)	$1(557) = 20.85$, $u = 1.57 \pm 1.22$ $8\% \pm 2\%$	
, people)		1.55 (0.04)			Experiment Rejection	370 ± 27	
					(A,B = 3,4,5; AB = 1,2)	38% ± 5%	
					Experiment Endorsement		
					(AB = 4,5; A,B = 1,2,3)	$3\% \pm 1\%$	

Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the

percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. Experiment Appreciation refers to the difference between the rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of their highest-rated intervention. Experiment Rejection is the percentage of people who rated interventions A and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate. Experiment Endorsement is the percentage of people who rated the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate. *p < .05

***p < .001

 $P \ge .00$

*		Desc	riptive Resu	ults	Inferential Results		
			%	%	5		
Vignette	Variable	Mean (SD)	Ranking Best	Ranking Worst	Test Description	Test Outcome	
Clinician Sei	ntiments A	bout Covid-19	P pRCTs				
					A/B Effect	$t(270) = 9.00^{***}, d = 0.71 \pm .17$	
					Mean(A,B) > AB	57% ± 6%	
	А	3.37 (1.26)	19%	32%	Reverse A/B effect	$t(270) = -9.00^{***}, d = -0.71 \pm .17$	
Intubation	В	3.90 (1.12)	53%	14%	AB > Mean(A,B)	23% ± 5%	
Safety	AB	2.74 (1.49)	28%	54%	Experiment Aversion	$t(270) = 3.98^{***}, d = 0.30 \pm .15$	
Checklist	Mean(A,B)	3.63 (0.96)	-	-	Min(A,B) > AB	43% ± 6%	
(n = 271)	Min(A.B)	3.14 (1.23)	-	-	Experiment Appreciation	$t(270) = -12.70^{***}, d = -1.08 \pm .21$	
clinicians)	Max(A,B)	4.12 (1.01)	-	-	AB > Max(A,B)	$16\% \pm 4\%$	
, ,					Experiment Rejection	$28\% \pm 5\%$	
					(A,B = 3,4,5; AB = 1,2)		
					Experiment Endorsement	$6\% \pm 2\%$	
					(AB = 4,5; A,B = 1,2,3)		
					A/B Effect	$t(274) = 6.59^{***}, d = 0.52 \pm .17$	
					Mean(A,B) > AB	$48\% \pm 6\%$	
	А	3.76 (1.10)	28%	28%	Reverse A/B effect	$t(274) = -6.59^{***}, d = -0.52 \pm .17$	
Best	В	3.74 (1.09)	23%	26%	AB > Mean(A,B)	$27\% \pm 5\%$	
Corticosteroid	AB	3.04 (1.56)	49%	46%	Experiment Aversion	$t(274) = 6.18^{***}, d = 0.49 \pm .17$	
Drug	Mean(A,B)	3.75 (1.08)	-	-	Min(A,B) > AB	$46\% \pm 6\%$	
(n = 275)	Min(A,B)	3.71 (1.11)	-	-	Experiment Appreciation	$t(274) = -6.93^{***}, d = -0.55 \pm .17$	
clinicians)	Max(A,B)	3.79 (1.08)	-	-	AB > Max(A,B)	26% ± 5%	
	/	. /			Experiment Rejection	$34\% \pm 5\%$	
					(A,B = 3,4,5; AB = 1,2)		
					Experiment Endorsement	15% ± 4%	
					(AB = 4,5; A,B = 1,2,3)		

Descriptive and inferential results of ratings and rankings of interventions and experiment for all vignettes

Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. Experiment Appreciation refers to the difference between the rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of their highest-rated intervention. Experiment Rejection is the percentage of people who rated interventions A and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate. Experiment Endorsement is the percentage of people who rated the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate.

*p < .05
**p < .01
***p < .001

Table S6C, continued

		Desc	riptive Resi	ults	1	Inferential Results
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcom
Clinician	Sentiment	s About Cov	id-19 pRC	Гs		
					A/B Effect	$t(348) = 16.50^{***}, d = 1.27 \pm .2$
					Mean(A,B) > AB	$72\% \pm 5$
	А	4.19 (1.05)	39%	15%	Reverse A/B effect	$t(348) = -16.50^{***}, d = -1.27 \pm .23$
	В	4.01 (1.24)	44%	22%	AB > Mean(A,B)	$16\% \pm 3$
Masking	AB	2.61 (1.41)	17%	62%	Experiment Aversion	$t(348) = 9.72^{***}, d = 0.74 \pm .12$
Rules	Mean(A,B)	4.10 (0.88)	-	-	Min(A,B) > AB	57% ± 5
(n = 349)	Min(A,B)	3.58 (1.20)	-	-	Experiment Appreciation	$t(348) = -22.58^{***}, d = -1.74 \pm .23$
clinicians)	Max(A,B)	4.62 (0.82)	-	-	AB > Max(A,B)	$6\% \pm 2$
					Experiment Rejection	43% ± 5
					(A,B = 3,4,5; AB = 1,2)	
					Experiment Endorsement	2% ± 1
					(AB = 4,5; A,B = 1,2,3)	
					A/B Effect	$t(1253) = 2.50^*, d = 0.10 \pm .000$
					Mean(A,B) > AB	$35\% \pm 3$
	А	3.56 (1.17)	27%	28%	Reverse A/B effect	$t(1253) = -2.50^*, d = -0.10 \pm .000$
	В	3.40 (1.18)	17%	39%	AB > Mean(A,B)	$34\% \pm 3$
Best	AB	3.36 (1.38)	56%	33%	Experiment Aversion	$t(1253) = -0.89, p = .375, d = -0.03 \pm .000$
Vaccine	Mean(A,B)	3.48 (1.09)	-	-	Min(A,B) > AB	29% ± 2
(n = 1254)	Min(A,B)	3.32 (1.18)	-	-	Experiment Appreciation	$t(1253) = -5.49^{***}, d = -0.22 \pm .000$
clinicians)	Max(A,B)	3.64 (1.16)	-	-	AB > Max(A,B)	$30\% \pm 2$
					Experiment Rejection	$20\% \pm 2$
					(A,B = 3,4,5; AB = 1,2)	
					Experiment Endorsement	$20\% \pm 2$
					(AB = 4,5; A,B = 1,2,3)	

Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of the A/B test. AB > Max(A,B) is the percentage of people who rated interventions A and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate.

*p <	.05
**p	< .01
***	< 0

****p* < .001

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Comparisons to previously published work

To compare these results to our previous findings reporting sentiments about experiments, as we do in the main text, please refer to Heck et al. (2020) [4]. For example, in the Results section "Lay Sentiments About pRCTs," we say, "these levels of experiment aversion near the height of the pandemic were slightly (but not significantly) higher than those we observed among similar laypeople in 2019 (41% ± 5% in 2020 vs. 37% ± 6% in 2019 for Catheterization Safety Checklist, p = .31; 44% ± 5% in 2020 vs. 40% ± 6% in 2019 for Best Anti-Hypertensive Drug, p = .32)." We extracted the percentage of participants who were experiment averse in 2019 from Heck et al. (2020) [4]. We then performed a two-sample z-test for proportions to compare the 2019 and 2020 proportions. As noted in the main text, we did not find a significant difference between the percentage of people who were experiment averse in 2019 and the percentage of people who were experiment averse in the current studies which took place in 2020 and 2021 (Catheterization Safety Checklist; $\chi^2(1) = 1.034$, p = .309, Anti- Hypertensive Drug; $\chi^2(1) = 0.998$, p = .318).

Results not presented in the main text

Results of Best Vaccine vignette (initial ambiguous version)

The only vignette which showed no A/B Effect was the initial ambiguous version of Best Vaccine (see Table S6D). The two versions of Best Vaccine both presented a public health official's decision to either distribute an mRNAbased vaccine to every county in their state, distribute an inactivated-virus vaccine to every county, or run an experiment in which counties are randomized to receive one of the two vaccine types. However, in version 1, the wording unintentionally implied that residents could choose their vaccine (by going elsewhere) if they did not wish to be subject to the official's decision (including intervention implementation or A/B test), while in version 2 we eliminated this possible interpretation; we suspect this had the effect of making the experiment condition in version 1 less aversive, since people could effectively opt- out of it, and our goal in this research is to study pragmatic, realworld situations in which avoiding randomization is typically not a realistic option.

Table S6D

		Desc	riptive Resi	ılts	Iı	nferential Results
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome
					A/B Effect	$t(349) = -0.72, p = .473, d = -0.05 \pm .15$
					Mean(A,B) > AB	$33\% \pm 5\%$
Best	А	3.58 (1.08)	21%	29%	Reverse A/B effect	$t(349) = 0.72, p = .473, d = 0.05 \pm .15$
Vaccine	В	3.47 (1.10)	21%	40%	AB > Mean(A,B)	$45\% \pm 5\%$
(initial	AB	3.59 (1.37)	58%	31%	Experiment Aversion	$t(349) = -2.28^*, d = -0.17 \pm .15$
ambiguous	Mean(A,B)	3.53 (1.02)	-	-	Min(A,B) > AB	$29\% \pm 5\%$
version;	Min(A,B)	3.38 (1.11)	-	-	Experiment Appreciation	$t(349) = -0.84, p = .399, d = -0.07 \pm .15$
n = 350	Max(A,B)	3.67 (1.05)	-	-	AB > Max(A,B)	$40\% \pm 5\%$
11-)					Experiment Rejection	$21\% \pm 4\%$
laypeople)					(A,B = 3,4,5; AB = 1,2)	$21\% \pm 4\%$
					Experiment Endorsement	$24\% \pm 4\%$
					(AB = 4,5; A,B = 1,2,3)	

Descriptive and inferential results of ratings and rankings of interventions and experiment for all vignettes

Order effect in clinician study

For the clinician study of the Catheterization Safety Checklist, Best Anti-Hypertensive Drug, and Masking Rules vignettes, participants were randomly assigned to one of these three vignettes and then completed the remaining two vignettes in random order. For consistency with the rest of this project and with our previous approach (Meyer et al., 2019) [3], we analyze data from this study as a between-subjects design where we only consider the first vignette that every participant completed.

While conducting an interim analysis on the data for this study, we observed an intriguing and unexpected order effect of presentation.

For the first 601 complete responses we received, we observed an effect of presentation order on participants' appropriateness ratings of the A/B test condition within the Best Anti-Hypertensive Drug vignette. Participants who received the Best Anti-Hypertensive Drug vignette first rated the A/B test an average of 2.95 (SD = 1.57), participants who received this vignette second rated the A/B test an average of 3.48 (SD = 1.39), and participants who received this vignette last rated the A/B test an average of 3.78 (SD = 1.41). This suggests that participants who read about other policies and A/B tests before considering the Best Anti-Hypertensive Drug vignette found the A/B test in the Best Anti-Hypertensive Drug vignette to be less objectionable than participants who received this vignette earlier in the survey. The relationship between presentation order (1, 2, or 3) and appropriateness rating of the A/B test was r = .23. This order effect did not emerge for the other two vignettes or for ratings of either intervention (A or B).

After observing this order effect but before examining any additional data, we preregistered this order effect with the goal of replicating it in an independent sample. 294 new participants completed the study after this interim analysis, and we analyzed the data from this sample independently from the sample that generated the order effect. Table S7 displays ratings of the A/B condition within each scenario grouped by the order in which participants received them.

The order effect observed with the Best Anti-Hypertensive Drug A/B test condition replicated (r = .15), as did the absence of any similar order effect for the other conditions.

Table S7

Ratings of A/B test in Clinician Sample

Exploratory Sample (N = 601)	Best Corticosteroid Drug A/B Rating (SD)	Intubation Safety Checklist A/B Rating (SD)	Masking Rules A/B Rating (SD)
Target Scenario First	2.95 (1.57)	2.79 (1.49)	2.63 (1.43)
Target Scenario Second	3.48 (1.39)	2.53 (1.35)	2.66 (1.44)
Target Scenario Last	3.78 (1.41)	2.78 (1.38)	2.57 (1.29)

Confirmatory Sample (N=294)	Best Corticosteroid Drug A/B Rating (SD)	Intubation Safety Checklist A/B Rating (SD)	Masking Rules A/B Rating (SD)
Target Scenario First	3.22 (1.54)	2.63 (1.50)	2.58 (1.38)
Target Scenario Second	3.49 (1.51)	2.76 (1.39)	2.38 (1.42)
Target Scenario Last	3.77 (1.33)	2.69 (1.15)	2.51 (1.38)

Heterogeneity in experiment aversion

In both the lay participant sample and the clinician sample, associations between demographic variables, including educational attainment, having a degree in a STEM field, years of experience in the medical field, and role in the healthcare system, and sentiment about pRCTs (e.g., A/B effect, experiment aversion, experiment appreciation) are consistently small (r < |.13|, therefore explaining less than 2% of the variance; Tables S8–11).

In the lay sample, women show larger AB and experiment aversion effects (e.g., larger difference between mean intervention rating/lowest-rated intervention rating and AB test rating; r = .067-.068, p < .001) and a smaller experiment appreciation effect (e.g., smaller difference between AB test and highest-rated intervention rating; r = .064, p < .001). Lay participants who are more conservative (in general and with respect to social and economic issues) or more likely to be strong Republicans show lower levels of an AB effect and experiment aversion (i.e., smaller difference between mean intervention rating/lowest-rated intervention rating; all rs < -.094, ps < .0001). These participants also show significantly more experiment appreciation, though the strength of the association is weaker (rs = .037-.046, p < .0001).

Finally, we find that people who are non-religious show a larger degree of experiment aversion (r = .061, p < .001; they also show a larger AB effect, r = .051, but p = .007 which is greater than p < .005, the standard proposed in Benjamin et al. (2018)¹⁷ for exploratory analyses without a priori hypotheses). For all other variables, we find no significant associations between the individual difference measures and experiment sentiments (all rs < |.051|, all ps > .005).

In the clinician sample, the strongest association was between self-reported comfort with research methods and statistics and experiment aversion—clinicians who report being more comfortable with research methods and statistics are more likely to appreciate the A/B test (r = .070, p = .001).

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Table S8

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Table S8											2024-0846: ɔyright, in			
Correlations between lay participant ch			timents ab	out exper								1		
	Size A/I effe	в	A/. effe		Size experii avers	nent	Experin avers		Experin reject		experiment appeciation	Experime appreciati		Experimen endorsemer
	r	$\frac{p}{p}$	r	р	r	p	r	р	r	р		r	p	r
Age	-0.008	0.662	-0.020	0.286	-0.020	0.270	-0.038	0.043	-0.046	0.012	-0.809	-0.016	0.389	-0.033 0.
Sex $(1 = male, 2 = female)$	0.068	<.001	0.048	0.010	0.067	<.001	0.039	0.035	0.059	0.002	-0.555 -0	-0.071	<.001	-0.036 0.
Race (0 = all other, 1 = Nonhispanic White)	-0.004	0.814	-0.017	0.360	-0.001	0.945	-0.016	0.388	0.003	0.867	0.5024	0.001		-0.012 0.
Education Income Political Ideology	0.047 0.020	0.011 0.293	0.033 0.005	0.075 0.787	0.049 0.020	0.008 0.273	0.051 0.011	0.006 0.571	0.029 0.005	0.114 0.777	-0.042 0.024 -0.01 20 00.353	-0.023 -0.025		-0.019 0. -0.026 0.
(1 = Very Liberal, 5 = Very Conservative) Political Ideology (Social)	-0.114	< .0001	-0.087	<.0001	-0.118	< .0001	-0.101	< .0001	-0.091	< .0001	-0.201 -0.201 -0.2024. Downloaded from ht -0.24. Downloaded from ht -0.24. Superieur (ABES) 0.24 control of the control o	0.043	0.022	0.045 0.
(1 = Very Liberal,5 = Very Conservative)Political Ideology (Economic)	-0.123	< .0001	-0.099	< .0001	-0.128	< .0001	-0.118	< .0001	-0.106	< .0001	0. Month 1 from h 1 applied from h	0.039	0.036	0.052 0.
(1 = Very Liberal, 5 = Very Conservative) Political Party	-0.094	< .0001	-0.065	<.001	-0.095	< .0001	-0.082	< .0001	-0.073	< .0001	0985 素 0001	0.046	0.013	0.040 0.
(1 = Strong Democrat,7 = Strong Republican)Conservatism	-0.096	< .0001	-0.073	< .0001	-0.098	< .0001	-0.075	< .0001	-0.075	< .0001	5://bmjopen.bm Al tratening, an	0.037	0.050	0.035 0.
(mean of z-scored Political Ideology, Political Ideology (Social), Political Ideology (Economic), and Political Party)	-0.117	<.0001	-0.089	< .0001	-0.121	< .0001	-0.103	< .0001	-0.095	< .0001	and 0.5 imilar	0.045	0.015	0.047 0.
Non-religious (0 = Religious (any religion), 1 = non-religious)	0.051	0.007	0.027	0.150	0.061	<.001	0.049	0.009	0.046	0.015		-0.013	0.496	-0.021 0.
STEM degree $(0 = no, 1 = yes)$	0.023	0.208	0.016	0.399	0.027	0.154	0.026	0.157	0.027	0.142	-0 0 19 6 -0 0 19 6 -0 0 19 20	0.016	0.403	0.024 0.

Note. Size of the A/B effect refers to the magnitude of the difference between the mean intervention rating and the A/B test rating. A/B effect refers to the presence or absence of an A/B effect -- people who have a positive difference between their mean intervention rating and their A/B test rating show the A/B effect, people who have no difference or a negative difference between their mean intervention rating and their A/B test rating do not show an A/B effect. Size of experiment aversion refers to the magnitude of the difference between the worst intervention rating and the A/B test rating. Experiment aversion refers to the presence or absence of experiment aversion -- people who have a postive difference between their rating of their least-preferred intervention and their A/B test rating are experiment averse, people who have no difference or a negative difference are not experiment averse. Experiment rejection refers to the presence or absence of experiment rejection -- people who rate interventions A and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate reject the experiment. Size of experiment appreciation refers to the magnitude of the difference between the A/B test rating and the best intervention. Experiment appreciation refers to the presence or absence of experiment appreciation -- people who have a positive difference betwoen their rating of the A/B test and their rating of their most-preferred intervention are experiment appreciative. Experiment endorsement refers to the presence or absence of experiment endorsement -- people who rate the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate endors the experiment.

Table S9

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Table S9 Means and percentages of sentime	ents abo	ut exne	rimen	ts by a	lemographic	c variable	e in lav partic	inants			ht, includir	084699 on	
means and percentages of semina	Size of				Size of exp		Experiment	Experiment	Size of exp	eriment	(0)	Experi	ment
	effe		A/B	effect	aversi		aversion	rejection	appreci		appreciation	Experi endorse	ement
	mean	SD		%	mean	SD	%	%	mean	SD	ses related of and an	n ter	%
Sex											s re	nb	
Male	0.479	1.620		45.6	0.183	1.650	35.7	23.2	-0.775	1.730	2	er	9.8
Female	0.703	1.630		50.4	0.408	1.680	39.5	28.4	-0.998	1.710	19 81	02	7.8
Other	0.571	1.880		28.6	0.429	1.810	28.6	28.6	-0.714	1.980	2866	4.	0.0
Prefer not to answer	0.900	1.880		60.0	0.800	1.920	40.0	20.0	-1.000	1.870	2 @ 0	2 O M	0.0
Race					6						lan	nlo	
Black/African-American	0.504			49.8	0.149	1.647	37.2	21.8	-0.858	1.681	2 25	ad	9.6
Hispanic or Latino		1.646		50.2	0.429	1.675	38.8	28.8	-0.954	1.726		ed	7.8
White	0.601			47.7	0.309	1.671	37.2	26.2	-0.893	1.724	2 57	a fo	8.4
Asian	0.594			47.1	0.296	1.645	39.2	26.1	-0.892	1.757	23 5 2	² 3	10.5
Other		1.730		48.7	0.256	1.831	38.5	23.1	-1.103	1.818	2 සු 6	ŧ	5.1
Prefer not to answer	1.200	1.623		60.0	0.933	1.624	40.0	33.3	-1.467	1.767	1328	Š,	6.7
Education											trai	<u>ă</u>	
Less than high school		1.440		75.0		1.610	58.3	41.7	-1.830	1.400	œ <u></u> 0	B	0.0
High school degree		1.550		42.2	0.093	1.650	30.6	22.0	-0.713	1.610	2 0 59	ň.t	9.0
Some college		1.690		47.5	0.216	1.720	36.3	25.2	-0.831	1.790	24 2 2	<u>ă</u>	10.2
Four-year college degree		1.620		48.7	0.361	1.650	38.4	26.7	-0.925	1.710	2 5 4	<u>.</u>	8.0
Some graduate school		1.600		50.0		1.640	37.9	28.2	-0.968	1.700	2002	ž.	6.5
Graduate degree		1.590		50.6	0.419	1.620	41.7	27.8	-1.010	1.690	1928	on	8.2
Prefer not to answer	0.750	1.720		50.0	0.667	1.750	33.3	16.7	-0.833	1.720		٦٦	0.0
ncome	0 (70	1 570		47.0	0.000	1 (50		200	0.044	1 (10	1 (67) 1 (10 (10 (10 (10 (10)) 1 (10) 1 (10))	ne	()
< \$20,000		1.570		47.8		1.650	37.7	26.8		1.640		ูด N	6.9
\$20,000-\$40,000		1.700		46.6		1.730	37.1	25.0		1.790		2025	10.8
\$40,000-\$60,000		1.630		49.4	0.220	1.670	36.9	25.4		1.750			8.9
\$60,000-\$80,000		1.620		49.5	0.376	1.640	38.0	27.4		1.710	20.9	at Agence Bibl <mark>i</mark> ographique de l	10.5
\$80,000-\$100,000		1.520 1.620		50.0		1.530	41.3	27.2 25.7		1.640	18.9	jen	6.0
> \$100,000				47.2	0.302	1.680	37.5			1.700	21.0	се	7.4
Prefer not to answer No response	-0.250	1.940		47.2	0.556	2.080 1.000	38.9	36.1 0.0	-1.170 0.000	1.930		Bib	2.8
INO TESDONSE	-0.230	0.800	1	25.0	-0.500	1.000	0.0	0.0	0.000	0.816	25.0	Ě.	0.0

Page	67	of	75
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Table S9, continued								3	846		
Means and percentages of sentiments ab	out experiments by	demograph	ic variable i	in lav pa	rticipants				609 o		
<i>III</i> _ <i>I</i>	Size of A/B				Experiment	Experiment	Size of exp	beriment	Experim	ent F	Exp
	effect	A/B effect	avers	ion	aversion	rejection	appreci	. 44		ion er	ndo
	mean SD	%	mean	SD	%	%	mean	SD	Sep	%	
Political Ideology									Enten		
Very liberal	0.888 1.740	54.3	0.590	1.780	44.1	31.1	-1.190	1.830	nbe sei(19.8	
Liberal	0.753 1.650	51.6	0.491	1.680	42.3	29.8	-1.010	1.740	gne	20.2	
Moderate	0.557 1.570	47.5	0.247	1.600	36.2	25.4	-0.867	ation SD 1.830 1.740 1.670 1.700 1.500 1.940 0.816		21.1	
Conservative	0.380 1.600	43.8	0.058	1.650		21.4	-0.703	1.700		25.0	
Very conservative	0.307 1.520	39.0		1.570		18.6	-0.589	1.500	Sul	24.2	
Prefer not to answer	0.684 1.680	57.9		1.560	31.6	21.1	-1.110	1.940	per	21.1	
No response	0.625 0.750	50.0	0.250	0.957	50.0	50.0	-1.000	0.816	ieu n	0.0	
Political Ideology (Social)											
Very liberal	0.927 1.720	55.7	0.628	1.760	46.3	33.3	-1.230	1.810 1.710	ĒĒ	19.1	
Liberal	0.714 1.610	51.2	0.445	1.640	41.1	28.5	-0.983	1.710		20.9	
Moderate	0.498 1.600	45.2	0.205	1.660	35.2	25.0	-0.791	1.680	3. <mark>ਵ</mark>	22.1	
Conservative	0.321 1.590	42.5	-0.016	1.630				1.710	₽ 🎽	25.1	
Very conservative	0.362 1.500	40.6	0.059	1.550	28.9	18.8	-0.665	1.590		22.6	
Prefer not to answer	0.528 1.540	55.6	0.222	1.560	33.3	11.1	-0.833	1.650		16.7	
No response	-1.000 NA	0.0	-2.000	NA	0.0	0.0	0.000	NA	5 <u>5</u>	0.0	
Political Ideology (Economic)								2			
Very liberal	0.795 1.760	49.4	0.514	1.770	40.5	28.6	-1.080	1.870		19.9	
Liberal	0.800 1.630	53.8	0.512	1.670	43.7	31.5	-1.090	1.730	<u>a</u> . ž	18.9	
Moderate	0.594 1.600	48.2	0.307	1.650	38.0	25.5	-0.882	1.670	on	21.4	
Conservative	0.401 1.580	44.2		1.620			-0.726	1.710	· -	25.5	
Very conservative	0.435 1.600	42.9		1.650		21.7	-0.705	1.660	Ine	22.7	
Prefer not to answer	0.783 1.540	65.2		1.530		21.7	-1.130			13.0	
No response	-1.000 0.000	0.0	-1.500	0.707	0.0	0.0	0.500	0.707		50.0	
Political Party								ſ	25 a		
Strong Democrat	0.869 1.710			1.720			-1.160	1.820	it A	19.6	
Democrat	0.701 1.630			1.690				1.700	gei	19.9	
Independent (but lean Democrat	·			1.640				1.730	nce	21.0	
Independent	0.468 1.590			1.630			-0.762	1.670	B	22.1	
Independent (but lean Republica	· ·			1.730			-0.731	1.830	<u> </u>	28.8	
Republican	0.387 1.550			1.610				1.640	ogr	22.5	
Strong Republican	0.432 1.500			1.570			-0.734	1.580	apl	21.7	
Prefer not to answer	0.615 1.580			1.490			-0.949	1.790	hiq	20.5	
No response	-1.000 NA For peer revi			NA				NA	ue de l	0.0	

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Table S9, continued

	Size of	A/B	A/D affaat	Size of exp	eriment	Experiment	Experiment	Size of exp	eriment	Experiment	Experi	iment
	effe	ct	A/B effect	aversi	on	aversion	rejection	apprecia	ation	appreciation	Bndors	ement
	mean	SD	%	mean	SD	%	%	mean	SD	%	iep	%
Religion											ten Ens Ses	
Christian - Protestant	0.515	1.620	45.9	0.212	1.680	34.9	24.3	-0.818	1.700	22.5	btembei Enseig Ises rel	10.0
Christian - Catholic	0.483	1.510	46.7	0.176	1.550	34.4	21.6	-0.790	1.610	20.7	at ne 7	6.4
Christian - Other	0.589	1.650	48.3	0.298	1.690	37.3	25.4	-0.881	1.740	22.9	024 ed t	9.7
Jewish	0.868	1.720	54.7	0.453	1.840	43.4	32.1	-1.280	1.770			7.6
Muslim	0.357	1.700	45.7	-0.057	1.800	28.6	20.0	-0.771	1.780	31.4	Sup	17.1
Buddhist	0.840	1.690	54.0	0.520	1.570	48.0	32.0	-1.160	1.940	24.0		14.0
Hindu	-0.129	1.550	38.7	-0.452	1.570	29.0	16.1	-0.194	1.620	35.5		19.4
Non-religious	0.704	1.650	49.9	0.435	1.680	40.7	28.5	-0.973	1.750		0 >	8.0
Other	0.673	1.780	49.0	0.337	1.810	40.4	31.7	-1.010	1.880	22.1	from htt \BES) . 1 mining	8.7
Prefer not to answer	1.090	1.570	58.8	0.794	1.650	41.2	38.2	-1.380	1.600	11.8		0.0
No response	1.250	1.770	50.0	1.000	1.410	50.0	50.0	-1.500	2.120	0.0	<u>ia</u> · <mark>t</mark> t	0.0
STEM degree											http://bmjopen.) . ng, Al training,	
No	0.587	1.620	47.9	0.289	1.650	37.2	25.6	-0.885	1.720	21.3	traj j	8.4
Yes	0.680	1.680	49.8	0.397	1.740	40.3	28.5	-0.963	1.750			10.0
Prefer not to answer	0.400	1.510	40.0	0.200	1.510	30.0	15.0	-0.600	1.570	25.0		0.0
No response	0.250	1.060	50.0	-0.500	0.707	0.0	0.0	-1.000	1.410	0.0	an	0.0

Note. If there is an NA in the SD column, that indicates that there was only 1 respondent in that group so there is no variability in response to g report.

Size of the A/B effect refers to the magnitude of the difference between the mean intervention rating and the A/B test rating. A/B effect refers to the presence or absence of an A/B effect -- people who have a positive difference between their mean intervention rating and their A/B test rating show the A/B effect, people who have no difference or a negative difference between their mean intervention rating and their A/B test rating do not show an A/B effect. Size of experiment aversion refers to the magnitude of the difference between the worst intervention rating and the A/B test rates. Experiment aversion refers to the presence or absence of experiment aversion -- people who have a positive difference between their rating of the least-preferred intervention and their A/B test rating are experiment averse, people who have no difference or a negative difference are not experiment averse. Experiment rejection refers to the presence or absence of experiment rejection -- people who rate interventions A and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate reject the experiment. Size of experiment appreciation refers to the magnitude of the difference between the A/B test rating and the best intervention. Experiment appreciation refers to the presence or absence of experiment appreciation -- people who have a positive difference between their rating of the A/B test and the rating of their most-preferred intervention are experiment appreciative. Experiment endorsement refers to the presence or absence of experiment endorsement -- people who rate the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate gor aphique de l appropriate" or less appropriate endorse the experiment.

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Table S10

Correlations between clinician characte	eristics and sentiments about experiments
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	Size A/I effe	В	A/ effe		Size experi avers	ment	Experi avers		Experi rejec		Size experir apprect	nent	Experi appreci		Experiendors	
	r	p	r	р	r	р	r	р	r	р	r	р	r	lign	r r	р
Sex $(1 = male, 2 = female)$	0.016	0.453	0.016	0.457	0.000	0.991	-0.011	0.619	-0.021	0.326	-0.030	0.165	-0.026	em@n led_to	8 -0.032	0.134
Number of research methods/statistics training units	-0.005	0.812	0.000	0.992	0.000	0.999	0.016	0.471	0.017	0.428	0.010	0.659	0.019	t Supe	0.010	0.643
Comfort with research methods/statistics	-0.036	0.100	-0.018	0.410	-0.039	0.071	-0.021	0.335	-0.016	0.446	0.030	0.165	0.070	erieur Ind ^C da	0.045	0.035
Number of research methods/statistics activities	-0.019	0.375	-0.022	0.301	-0.006	0.796	0.006	0.778	0.020	0.360	0.031	0.157	0.041	(ABE	0 .023	0.279
Currently involved in research	-0.002	0.912	-0.012	0.570	-0.009	0.691	-0.016	0.470	-0.022	0.309	-0.004	0.870	-0.024	n (6267	0.009	0.693
Position (0 = non-prescriber, 1 = prescriber)	0.033	0.121	0.029	0.176	0.040	0.061	0.042	0.050	0.052	0.016	-0.025	0.250	-0.020	9, 0 2 47 47	-0.021	0.338
Years in medicine	0.016	0.452	-0.004	0.865	0.011	0.599	-0.007	0.734	0.006	0.792	-0.020	0.362	0.029	0 2 185	-0.003	0.879
					-								-	ng,		

Note. Size of the A/B effect refers to the magnitude of the difference between the mean intervention rating and the A/B test rating. A/B effect refers to the presence or absence of an A/B effect -- people who have a positive difference between their mean intervention rating and their A/B test rating show the A/B effect, people who have no difference or a negative difference between their mean intervention rating and their A/B test rating do not show in AB effect. Size of experiment aversion refers to the magnitude of the difference between the worst intervention rating and the A/B test rating. Experiment aversion refers to the presence or absence of experiment aversion -- people who have a positive difference between their rating of their least-preferred intervention and their A/B test rating are experiment averse, people who have no difference or a negative difference are not experiment averse. Experiment averse, the experiment averse is a second to be a second to to the presence or absence of experiment rejection -- people who rate interventions A and B as "neither inappropriate nor appropriate" or nor appropriate while rating the A/B test as "very" or "somewhat" inappropriate reject the experiment. Size of experiment appreciation refers to the magnaged of the difference between the A/B test rating and the best intervention. Experiment appreciation refers to the presence or absence of experiment appreciation -people who have a positive difference between their rating of the A/B test and their rating of their most-preferred intervention are experiment appreciative. Experiment endorsement refers to the presence or absence of experiment endorsement -- people who rate the A/B test as "very" or "somewhat" ppropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate endorse the experiment. ence Bibliographique de l

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Undergraduate coursework		1.755	44.2	0.258		37.7	26.5	-0.757; 5870	25.0	
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Published scientific paper in peer-reviewed journal		1.745	42.9	0.114	1.725	35.1	20.9	-0.000 8 8000	2 25.8	1
5	0.371		1		1 770	37.8		-0.732 # 892		1
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Published scientific paper in peer-reviewed journal Conducted or worked on a team conducting an RCT Took a course/class in statistics, biostatistics, research methods Analyzed data for statistical significance outside of	0.505	1.775 1.781						-0.690 Agen 912	2 26.2	1
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Page 71 of 75 BMJ Open S/bm jopen-2024-084699 o 1 2 3 Table \$11, continued 3 Table \$11, continued 4 5 Means and percentages of sentiments about experiments by demographic variable in clinician sample 4	35
5 Means and percentages of sentiments about experiments by demographic variable in clinician sample	
6 Size of Size	
7 A/B A/B effect experiment Experiment experiment	
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21 Non-prescribing clinician or staff without clinical	
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34 or a negative difference between their mean intervention rating and their A/B test rating do not show an A/B effect. Size of experiment averagion before to the magnitude of the	

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Aversion to pragmatic randomized controlled trials: Three survey experiments with clinicians and laypeople

STROBE Statement-checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title	1
		or the abstract	
		(b) Provide in the abstract an informative and balanced summary of	2-4
		what was done and what was found	
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	6-8
Objectives	3	State specific objectives, including any prespecified hypotheses	9
	5	State specific objectives, including any prespectified hypotheses	9
Methods			0.14
Study design	4	Present key elements of study design early in the paper	9-14
Setting	5	Describe the setting, locations, and relevant dates, including periods	9, 13-14
		of recruitment, exposure, follow-up, and data collection	
Participants	6	(a) Cohort study—Give the eligibility criteria, and the sources and	9, 13-14
		methods of selection of participants. Describe methods of follow-up	
		Case-control study—Give the eligibility criteria, and the sources and	
		methods of case ascertainment and control selection. Give the	
		rationale for the choice of cases and controls	
		Cross-sectional study—Give the eligibility criteria, and the sources	
		and methods of selection of participants	
		(b) Cohort study—For matched studies, give matching criteria and	
		number of exposed and unexposed	
		Case-control study—For matched studies, give matching criteria and	
		the number of controls per case	
Variables	7	Clearly define all outcomes, exposures, predictors, potential	13
		confounders, and effect modifiers. Give diagnostic criteria, if	
		applicable	
Data sources/	8*	For each variable of interest, give sources of data and details of	9-14
measurement	-	methods of assessment (measurement). Describe comparability of	
		assessment methods if there is more than one group	
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	SM 3-4
Quantitative variables	11	Explain how due study size was arrived at Explain how quantitative variables were handled in the analyses. If	13
Qualititative variables	11	applicable, describe which groupings were chosen and why	15
Statistical mathada	12		SM 7
Statistical methods	12	(<i>a</i>) Describe all statistical methods, including those used to control for confounding	
		confounding (b) Describe any methods used to examine subgroups and interactions	NI/A
		(b) Describe any methods used to examine subgroups and interactions	N/A
		(c) Explain how missing data were addressed	N/A
		(<i>d</i>) <i>Cohort study</i> —If applicable, explain how loss to follow-up was	N/A
		addressed	
		Case-control study—If applicable, explain how matching of cases and	
		controls was addressed	

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		taking account of sampling strategy	
		(<u>e</u>) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers	9, 13-14
-		potentially eligible, examined for eligibility, confirmed eligible, included in	
		the study, completing follow-up, and analysed	
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social)	SM 14-1
-		and information on exposures and potential confounders	SM 28-3
		(b) Indicate number of participants with missing data for each variable of	N/A
		interest	
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	Cohort study—Report numbers of outcome events or summary measures over	N/A
		time	
		Case-control study—Report numbers in each exposure category, or summary	N/A
		measures of exposure	
		Cross-sectional study—Report numbers of outcome events or summary	N/A
		measures	
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted	14-18
		estimates and their precision (eg, 95% confidence interval). Make clear which	SM 21-2
		confounders were adjusted for and why they were included	
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk	N/A
		for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and	SM 26-3
		sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	14-18
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias	20-22
		or imprecision. Discuss both direction and magnitude of any potential bias	
Interpretation	20	Give a cautious overall interpretation of results considering objectives,	18-20
-		limitations, multiplicity of analyses, results from similar studies, and other	
		relevant evidence	
Generalisability	21	Discuss the generalisability (external validity) of the study results	20-22
Other information	n	· · · · · · · · · · · · · · · · · · ·	
Funding	22	Give the source of funding and the role of the funders for the present study	27
- 0	_	and, if applicable, for the original study on which the present article is based	

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at

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Aversion to pragmatic randomized controlled trials: Three survey experiments with clinicians and laypeople in the United States

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Aversion to pragmatic randomized controlled trials: Three survey experiments with clinicians and laypeople in the United States Randi L. Vogt (0000-0003-1709-0471)*, Patrick R. Heck (0000-0003-0819-3890)*, Rebecca M. Mestechkin (0009-0002-2976-0364), Pedram Heydari (0000-0002-9804-1091), Christopher F. Chabris (0000-0002-7379-7378)[†], Michelle N. Meyer (0000-0001-5497-8803)[†]§ Randi L. Vogt, postdoctoral fellow, Department of Bioethics & Decision Sciences, Geisinger, Danville, PA, USA Patrick R. Heck, postdoctoral fellow, Department of Bioethics & Decision Sciences, Geisinger, Danville, PA, USA Rebecca M. Mestechkin, predoctoral fellow, Department of Bioethics & Decision Sciences, Geisinger, Danville, PA, USA Pedram Heydari, assistant professor, Department of Economics, Northeastern University, Boston, MA, USA Christopher F. Chabris, professor, Department of Bioethics & Decision Sciences, Geisinger, Danville, PA, USA Michelle N. Meyer, associate professor and chair, Department of Bioethics & Decision Sciences, Geisinger, Danville, PA, USA *Contributed equally [†]Contributed equally §Correspondence to: michellenmeyer@gmail.com

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Abstract

Objectives: Pragmatic randomized controlled trials (pRCTs) are essential for determining the real-world safety and effectiveness of healthcare interventions. However, both laypeople and clinicians often demonstrate experiment aversion: preferring to implement either of two interventions for everyone rather than comparing them to determine which is best. We studied whether clinician and layperson views of pRCTs for Covid-19 or other interventions became more positive early in the pandemic, which increased both the urgency and public discussion of pRCTs.

Design: Randomized survey experiments

Setting: Geisinger, a network of hospitals and clinics in central and northeastern Pennsylvania, U.S.; Amazon Mechanical Turk, a research participant platform used to recruit online participants residing across the U.S.

Participants: 2,149 clinicians (the types of people who conduct or make decisions about conducting pRCTs) and 2,909 laypeople (the types of people who are included in pRCTs as patients) in 2020 and 2021. The layperson sample ranges in age from 18 to 88 years old (mean = 38.4, SD = 12.8) and the majority were White (74.6%) and female (55.9%). The clinician sample was primarily female (80.8%), comprised doctors (14.9%), physician assistants (8.5%), registered nurses (53.6%), and other medical professionals, including other nurses, genetic counselors, and medical students (23%), and the majority of clinicians had more than 10 years of experience (62.3%).

Main outcome measures: Participants read vignettes in which a hypothetical decision-maker who sought to improve health could choose to implement intervention A for all, implement

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intervention B for all, or experimentally compare A and B and implement the superior intervention. Participants rated and ranked the appropriateness of each decision. Experiment aversion was defined as the degree to which a participant rated the experiment below their lowest-rated intervention.

Results: In a mid-pandemic survey of laypeople, we found significant aversion to experiments involving catheterization checklists and hypertension drugs unrelated to the treatment of Covid-19 (Cohen's d = 0.25-0.46, p < .001). Similarly, among both laypeople and clinicians, we found significant aversion to most (comparing different checklist, proning, and mask protocols; Cohen's d = 0.17-0.56, p < .001) but not all non-pharmaceutical Covid-19 experiments (comparing school reopening protocols; Cohen's d = 0.03, p = .64). Interestingly, we found the lowest experiment aversion to pharmaceutical Covid-19 experiments (comparing new drugs and new vaccine protocols for treating the novel coronavirus; Cohen's d = 0.04-0.12, p = .12-.55). Across all vignettes and samples, 28% to 57% of participants expressed experiment aversion, whereas only 6% to 35% expressed experiment appreciation by rating the trial higher than the participant's highest-rated intervention.

Conclusions: Advancing evidence-based medicine through pRCTs will require anticipating and addressing experiment aversion among patients and healthcare professionals.

Registration: https://osf.io/u945y/?view_only=a901fde13ddb423899074eb79964c6cd

Strengths	and limitations of this study
Suchguis	
•	The decision-science approach used in this paper enables measurement of aversion
	towards pragmatic randomized controlled trials (pRCTs) in large and diverse samples
	of laypeople and clinicians.
•	The size of the experiment aversion effect is measured in eight pRCT vignettes (in the
	layperson sample) and four pRCT vignettes (in the clinician sample) that describe a
	range of pRCTs from pharmaceutical medical interventions to non-pharmaceutical
	medical interventions to public health interventions, and specific to the Covid-19
	pandemic as well as more general medical situations.
•	The large sample sizes ensured sufficient statistical power to detect experiment
	aversion in each vignette and sample.
•	The samples may not perfectly represent all healthcare professionals or members of
	the general public as they are convenience samples of clinicians at a specific teaching
	hospital system in the United States and laypeople on a specific online crowdworking
	platform.
•	Participants expressed attitudes and judgments about the appropriateness of carrying
	out pRCTs or implementing policies, but were not in a position to make a real
	decision to execute the pRCTs or policies.

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INTRODUCTION

Pragmatic randomized controlled trials (pRCTs) are crucial for understanding how to safely, effectively, and equitably prevent and treat disease and deliver healthcare. Randomized evaluation is the gold standard in medicine, largely because it permits one to infer that an intervention *caused* an outcome, such as reduction of symptoms or improvement in a biomarker. Randomized experiments have repeatedly upended conventional clinical wisdom and the results of observational studies [1,2] and are urgently needed to evaluate new technologies [3,4]. Compared to more explanatory trials, trials that are further towards the pragmatic end of the spectrum [5] evaluate effectiveness of the intervention in more real-world contexts. Such pragmatism is critical for ensuring that causal evidence from randomized evaluation speaks to the effects of interventions in the circumstances in which they would be implemented (or maintained).

Yet despite their importance to healthcare quality and safety, pRCTs often prove controversial-even when they compare interventions that are within the standard of care or are otherwise unobjectionable, and about which the relevant expert community is in equipoise. Several recently published pRCTs—including Surfactant, Positive Pressure, and Oxygenation Randomized Trial (SUPPORT) [6], Flexibility in Duty Hour Requirements for Surgical Trainees (FIRST) [7], and Individualized Comparative Effectiveness of Models Optimizing Patient Safety and Resident Education (iCOMPARE) [8]—have received considerable criticism from physician-scientists, ethicists, and regulators [9,10] and in the public square [11-14]. Although criticisms of pRCTs can be complex, nuanced, and sometimes valid, many appear to reflect a rejection of the very idea that a randomized experiment was conducted, as opposed to simply giving everyone one of the interventions that was trialed. Our research applies concepts and

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methods from the behavioral and decision sciences to systematically explore whether, when, and why people might genuinely object to running pRCTs in healthcare, public health, and other domains.

In prior studies—inspired by several "notorious pRCTs," including technology industry "A/B tests" [15–17]—we confirmed that substantial shares of both laypeople and clinicians can be averse to randomized evaluation of efforts to improve health [18,19]. People rated a pRCT designed to compare the effectiveness of two interventions as less appropriate than the average appropriateness of implementing either one, untested, for everyone. We called this phenomenon the "A/B effect" [18]. In some cases, the lower average rating of an experiment could be driven not by dislike of experiments, per se, but by many raters' belief that one of the experiment's arms is inferior to the other [18–21]. Importantly, such beliefs are often based on intuition rather than evidence and have the potential to undermine evidence-based medicine. Yet this form of experiment rejection is not illogical, given the individual's own beliefs. We also, however, documented a more peculiar (if no less dangerous) phenomenon of "experiment aversion," which occurred when people rated the pRCT as significantly less appropriate than implementing *their* own least-preferred intervention contained within the trial. In this pattern of decision-making, in other words, people who perceive that one intervention is good and the other is less good prefer that everyone receive the less good (or even bad) intervention rather than half the people receiving the better one, and without comparing the two to determine whether one is really better than the other [19]. Such judgments could reflect a more general skepticism about or opposition to pRCTs, at least within specific domains of inquiry. For instance, people may be averse to the inequality or disparate treatment that is necessarily (temporarily) imposed by any RCT (pRCT or otherwise), the uncertainty signaled by agents (often trusted experts) who decide they do not

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already know what works and need to conduct a pRCT, the process of assigning people to treatments "randomly" as opposed to using expert judgment, or something else viewed as undesirable. Both patterns of negative sentiments about experiments can impede efforts to assure and improve health outcomes.

The Covid-19 pandemic presented the potential for an inflection point in attitudes towards pRCTs. In April 2020, 72 Covid-19 drug trials were already underway [22] and more traditional, explanatory RCTs became daily, front-page news. Because explanatory and pragmatic RCTs share many key features that participants in our prior research often cited as partial explanations for their lower ratings of experiments—including random assignment to different conditions [18]—that sustained exposure to explanatory RCTs might have educated people about the value of healthcare pRCTs, too, and/or made them seem less exceptional and more normative. Our previous research also suggests that another cause of experiment aversion is an illusion of knowledge—a (mis)perception that experts already must know what works best and should simply implement those interventions without further study. But Covid-19 was a novel disease, and—at least in the case of pharmaceutical interventions—no sensible person thought the correct treatments were already obvious. People therefore may have been less averse to Covid-19 pRCTs (e.g., trials comparing Covid-19 proning protocols or masking rules) than to pRCTs that test interventions for familiar conditions or problems, such as hypertension or hospital-acquired infections. On the other hand, because of the urgency attached to Covid-19, people may have been more averse to Covid-19 RCTs, being even less inclined to risk giving someone a treatment that might turn out to "lose" in a comparison study [23,24]. Finally, even if the pandemic did not affect public attitudes towards explanatory or pragmatic RCTs, it could have affected the attitudes of clinicians, many of whom were involved in Covid-19 research.

Because clinicians strongly influence whether particular RCTs are conducted (both explanatory and pragmatic), their attitudes matter. Here, we investigated attitudes towards pRCTs in the first year of the pandemic by conducting a series of preregistered studies conducted between August 2020 and February 2021.

METHODS

Study setting

The study was conducted online using the Qualtrics platform [25]. For the layperson sample, we used the CloudResearch service [26,27] to recruit adult crowd workers on Amazon Mechanical Turk [28] living in the U.S. to participate in a brief online survey. These services provide samples that are broadly representative of the U.S. population and are well-accepted in social science research as providing as good or better-quality, diverse samples of research participants than common convenience samples such as student volunteers, with results that are similar to probability sampling methods [29–31]. Clinicians of various levels in healthcare were recruited by email (following a procedure successfully used in several previous studies including [18]) from Geisinger, a network of hospitals and clinics in central and northeastern Pennsylvania, U.S. with a medical school and a research institute. Geisinger's IRB determined that these surveys were exempt (IRB# 2017-0449).

Study design

Data was collected between August 2020 and January 2021 (Table S1). First, we used decision-making vignettes from our previous work to ask whether the extraordinary publicity around (primarily explanatory) Covid-19 RCTs reduced general healthcare experiment aversion

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by the public. Next, we adapted these vignettes to determine whether the public was averse to pRCTs on pharmaceutical and/or non-pharmaceutical interventions (NPIs) for Covid-19. Finally, we recruited a large clinician sample to investigate how their attitudes compared to those of laypeople.

Participants were evenly randomly assigned (using the Qualtrics survey software, such that aside from participants who dropped prior to completing the survey, the same number of participants are allocated to each vignette) to read one of the vignettes that described a problem that the decision-maker could address in one of three ways: by implementing intervention A for all patients or relevant members of the public (A); by implementing intervention B for all patients or relevant members of the public (B); or by conducting an experiment in which patients or relevant members of the public are randomly assigned to A or B and the superior intervention is then implemented for all (A/B). For example, in Best Anti-Hypertensive Drug, some doctors in a walk-in clinic prescribe "Drug A" while others prescribe "Drug B" (both of which are affordable, tolerable, and FDA approved), and "Dr. Jones" prescribes either A for all his hypertensive patients, B for all those patients, or runs a randomized experiment to compare the effectiveness of A and B. (See Table 1 for two additional examples, Table S2 for all vignette names, and pp. 8-13 in the Supplemental Materials [SM] for all vignette text.) To develop the vignettes, we consulted the literature and our knowledge, as experts in bioethics and psychological science, of pRCTs that have historically proved controversial (see Table S3 in the SM for motivations for all vignettes). All vignettes describe an RCT that is highly pragmatic in nature (i.e., high on PRECIS-2 eligibility, recruitment, setting, organization, follow-up, and primary outcome domains [5]). For instance, all patients with the relevant condition who attend the clinic/hospital for care become members of the trial and the trial is situated within the

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clinic/hospital where their care would typically take place. (Similarly, in the public health scenarios, all students in the school district and all residents of the state where these trials occur are included in the trial.) In addition, our vignettes are silent about whether consent will be obtained. Trials that include only those who opt into them are less pragmatic if they are testing the effectiveness of an intervention that would be imposed on people as a matter of policy or practice. IRBs customarily waive consent when it would make low-risk pRCTs impracticable, including by rendering the results uninformative about how an intervention would fare in practice [32]. In separate work, we found that substantial shares of people object to such experiments even when we specify that consent will be obtained [33].

Next, following a standard decision-science approach commonly used in social and moral psychology for evaluating decisions [34], participants rated each option on a scale of appropriateness from 1 ("very inappropriate") to 5 ("very appropriate"), with 3 as a neutral midpoint. Participants then rank-ordered the options from best to worst and provided demographic information.

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Table 1

Vignette text for Catheterization Safety Checklist and Ventilator Proning

Intervention A A dd n t t H t P at A B d P P w W A/B test A t	ome medical treatments require a doctor to insert a plastic the into a large vein. These treatments can save lives, but and the event of the event o	Some coronavirus (Covid-19) patients have to be sedated and placed on a ventilator to help them breathe. Even with a ventilator, these patients can have dangerously low blood oxygenation levels, which can result in death. Current standards suggest that laying ventilated patients on their stomach for 12-16 hours per day can reduce pressure on the lungs and might increase blood oxygen levels and improve survival rates. A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.
Intervention A A du The standard A A A A A A A A A A A A A A A A A A A	hospital director wants to reduce these infections, so he ecides to give each doctor who performs this procedure a ew ID badge with a list of standard safety precautions for the procedure printed on the back. All patients having this rocedure will then be treated by doctors with this list tached to their clothing.	Even with a ventilator, these patients can have dangerously low blood oxygenation levels, which can result in death. Current standards suggest that laying ventilated patients on their stomach for 12-16 hours per day can reduce pressure on the lungs and might increase blood oxygen levels and improve survival rates. A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.
Intervention A A da Intervention A B da P P W W A/B test A t	hospital director wants to reduce these infections, so he ecides to give each doctor who performs this procedure a ew ID badge with a list of standard safety precautions for the procedure printed on the back. All patients having this procedure will then be treated by doctors with this list tached to their clothing.	dangerously low blood oxygenation levels, which can result in death. Current standards suggest that laying ventilated patients on their stomach for 12-16 hours per day can reduce pressure on the lungs and might increase blood oxygen levels and improve survival rates. A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.
A du nu tr p at A B du p p w A/B test A tr	ecides to give each doctor who performs this procedure a ew ID badge with a list of standard safety precautions for a procedure printed on the back. All patients having this rocedure will then be treated by doctors with this list tached to their clothing.	result in death. Current standards suggest that laying ventilated patients on their stomach for 12-16 hours per day can reduce pressure on the lungs and might increase blood oxygen levels and improve survival rates. A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.
A du nu tr p at A/B test A tr	ecides to give each doctor who performs this procedure a ew ID badge with a list of standard safety precautions for a procedure printed on the back. All patients having this rocedure will then be treated by doctors with this list tached to their clothing.	ventilated patients on their stomach for 12-16 hours per day can reduce pressure on the lungs and might increas blood oxygen levels and improve survival rates. A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.
A du nu tr p at A/B test A tr	ecides to give each doctor who performs this procedure a ew ID badge with a list of standard safety precautions for a procedure printed on the back. All patients having this rocedure will then be treated by doctors with this list tached to their clothing.	day can reduce pressure on the lungs and might increas blood oxygen levels and improve survival rates. A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.
A du nu tr p at A B du p p w A/B test A tr	ecides to give each doctor who performs this procedure a ew ID badge with a list of standard safety precautions for a procedure printed on the back. All patients having this rocedure will then be treated by doctors with this list tached to their clothing.	blood oxygen levels and improve survival rates. A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.
A du nu tr p at A B du p p w X A/B test A tr	ecides to give each doctor who performs this procedure a ew ID badge with a list of standard safety precautions for a procedure printed on the back. All patients having this rocedure will then be treated by doctors with this list tached to their clothing.	A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.
A du nu tr p at A B du p p w X A/B test A tr	ecides to give each doctor who performs this procedure a ew ID badge with a list of standard safety precautions for a procedure printed on the back. All patients having this rocedure will then be treated by doctors with this list tached to their clothing.	Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.
A du nu tr p at A B du p p w A/B test A tr	ecides to give each doctor who performs this procedure a ew ID badge with a list of standard safety precautions for a procedure printed on the back. All patients having this rocedure will then be treated by doctors with this list tached to their clothing.	Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.
A du nu tr p at A/B test A tr	ecides to give each doctor who performs this procedure a ew ID badge with a list of standard safety precautions for a procedure printed on the back. All patients having this rocedure will then be treated by doctors with this list tached to their clothing.	Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.
A du nu tr p at A/B test A tr	ecides to give each doctor who performs this procedure a ew ID badge with a list of standard safety precautions for a procedure printed on the back. All patients having this rocedure will then be treated by doctors with this list tached to their clothing.	Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.
Intervention A B du pr b A/B test A t	ew ID badge with a list of standard safety precautions for the procedure printed on the back. All patients having this rocedure will then be treated by doctors with this list tached to their clothing.	these patients will be placed on their stomach for 12-13 hours per day.
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p at Intervention A B du p p w W A/B test A t	rocedure will then be treated by doctors with this list tached to their clothing.	
Intervention A B de p p w A/B test A th	tached to their clothing. hospital director wants to reduce these infections, so he	A hospital director wants to save as many ventilated
Intervention A B du p P W A/B test A th	hospital director wants to reduce these infections, so he	A hospital director wants to save as many ventilated
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B da pp pr w A/B test A th		A hospital director wants to save as many ventilated
B da pp pr w A/B test A th		A hospital director wants to save as many ventilated
A/B test A		i i nospital all'ettor mano to suve as many ventilated
A/B test A th	ecides to hang a poster with a list of standard safety	Covid-19 patients as possible, so he decides that all of
A/B test A th	recautions for this procedure in all procedure rooms. All	these patients will be placed on their stomach for 15-16
A/B test A th	atients having this procedure will then be treated in rooms	hours per day.
th	ith this list posted on the wall.	
th		
th		
th	hospital director thinks of two different ways to reduce	A hospital director thinks of two different ways to save
	uses infections, so he decides to run an experiment by	as many ventilated Covid-19 patients as possible, so he
10	indomly assigning patients to one of two test conditions.	decides to run an experiment by randomly assigning
	alf of patients will be treated by doctors who have	ventilated Covid-19 patients to one of two test
	eceived a new ID badge with a list of standard safety	conditions. Half of these patients will be placed on their
	recautions for the procedure printed on the back. The	stomach for 12-13 hours per day. The other half of thes
-	ther half will be treated in rooms with a poster listing the	patients will be placed on their stomach for 15-16 hour
	ame precautions hanging on the wall. After a year, the	per day. After one month, the director will have all
	irector will have all patients treated in whichever way	ventilated Covid-19 patients treated in whichever way
	rns out to have the highest survival rate.	turns out to have the highest survival rate.
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Participants

Based on a power analysis, we determined that recruiting ~350 participants (laypeople and clinicians) per vignette (Catheterization Safety Checklist, Best Anti-Hypertensive Drug, Intubation Safety Checklist, Best Corticosteroid Drug, Masking Rules, School Reopening, and Ventilator Proning) would yield 95% power to detect an effect as small as Cohen's d = 0.19 at $\alpha = .05$. These sample sizes are consistent with our previous work using the same methods (but different vignettes, [19]).

For Best Vaccine, based on a prior study (see SM for full details), we hypothesized a smaller effect size, which resulted in a power analysis that determined that recruiting ~450 lay participants would yield 80% power to detect an effect as small as Cohen's d = 0.13 and 95% power to detect as small as Cohen's d = 0.17 (sample size consistent with [19]). For the clinician sample, we based our power analysis for Best Vaccine on the number of responses we collected in the first clinician survey testing the Masking Rules, Intubation Safety Checklist, and Best Corticosteroid vignettes. We assumed ~900 responses which we determined would yield 95% power to detect an effect as small as d = 0.12.

Across all vignettes, there were a total of 2,909 lay participants. They ranged in age from 18 to 88 with a mean age of 38 years old (SD = 12.8). The majority of participants were White (75%), female (56%), and college educated (30% having completed some college, 36% having earned a four-year degree, and 21% having earned a graduate degree; 21% of participants had a STEM degree) with a median household income of \$40,000 to \$60,000. The sample is more liberal (44%) and Democrat (38%) than conservative (28%) and Republican (21%) and a plurality of participants identified as non-religious (38%).

The clinician sample (N = 2,149) was comprised of doctors (15%), physician assistants (9%), nurse practitioners (5%), nurses (67%; RN: 54%; LPN: 12%, other: 1%), and other medical professionals (including genetic counselors and medical students; 4%). We determined the ratio of different types of clinicians from their self-reported position in the survey. We did not estimate in advance the proportion of certain types of clinicians who would respond. The majority of the clinicians were female (81%) and had been working in health care for more than 10 years (62%). A majority of clinicians reported being somewhat or moderately comfortable with research methods and statistics (77%) and had two sources of formal or informal training or education in research methods and statistics (e.g., undergraduate, professional school, or postgraduate coursework; 58%). (In these clinician samples, because survey responses were made fully anonymous to encourage greater participation and honest responding, we were unable to restrict participation in later waves to clinicians who had not participated in earlier waves. Therefore, some clinicians who completed the Best Vaccine vignette may have earlier completed the Masking Rules, Intubation Safety Checklist, and Best Corticosteroid Drug vignettes.) See Table S4-5 for detailed demographics of lay participants and clinicians by vignette.

Data analysis

We define the "A/B Effect" as the degree to which participants' ratings of the A/B test were lower than the average of their ratings of implementing A and B [18]. "Experiment aversion" is the degree to which participants rated the A/B test lower than their own lowest-rated intervention (either A or B for each person) [19]. "Experiment appreciation" is the opposite: the degree to which the experiment is rated higher than each participant's highest-rated intervention. For all measures, we performed paired t-tests at $\alpha = .05$ and calculated Cohen's *d* recovered from the *t*statistic, *n*, and correlation between the two measures being compared [35,36]. We also

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calculated the percentage of participants who ranked the A/B test as the worst (or best) option the decision-maker could implement as well as the percentage of participants who showed an A/B Effect, were experiment averse, or were experiment appreciative. We analyzed data using R version 4.3.0. Participant response data, preregistrations, materials, and analysis code have been deposited in Open Science Framework [60].

Patient and public involvement

We included laypeople as participants in our studies because they are typically included in pRCTs as patients or (in the case of some public health pRCTs and pRCTs in other domains) as members of the public and are therefore important stakeholders. Decisions about whether to participate in or conduct pRCTs are made against the backdrop of individuals' personal views and/or anticipation of potential backlash or other public reactions; therefore, how patients and clinicians feel about experiments is relevant to if and how advancements in healthcare are made. All participant responses were anonymous and, thus, results cannot be disseminated back to our participants.

RESULTS

In the following results, we group the vignettes by theme: those eliciting lay participants sentiments about pRCTs unrelated to the treatment of Covid-19, those eliciting lay participants sentiments about pRCTs related to the treatment, prevention of, or public health response to Covid-19, and those eliciting clinician sentiments about pRCTs related to the treatment, prevention of, or public health response to Covid-19.

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Lay Sentiments About pRCTs

To elicit lay sentiments about pRCTs, participants responded to one of two vignettes: Catheterization Safety Checklist (which described two locations where a hospital director could display a safety checklist for clinicians; see Table 1; n = 343) or Best Anti-Hypertensive Drug (which described two drugs a doctor could prescribe for his hypertensive patients; n = 357).

We found substantial negative reactions to A/B testing in both vignettes (Table 2A), replicating our pre-pandemic findings [18,19]. Although in most cases the mean rating of the A/B test was near the neutral midpoint, implementing policies was substantially preferred to A/B testing (Figure 1A) and large proportions of participants objected to the A/B test (Figure 1B). In Catheterization Safety Checklist (Figure 1A), we found evidence of the A/B Effect: participants rated the A/B test significantly below the average ratings they gave to implementing interventions A and B (d = 0.69, 95% CI: (0.53, 0.85); Table S6A). Here, 41% ± 5% (95% CI) of participants expressed experiment aversion (rating the A/B test lower than their own lowest-rated intervention; d = 0.25, 95% CI: (0.11, 0.39); Table S6A). When ranking the three options from best to worst, only 32% placed the A/B test first, while 48% placed it last (Table S6A).

We also observed an A/B Effect in Best Anti-Hypertensive Drug (Figure 1B); d = 0.52, 95% CI: (0.36, 0.68); Table S6A), where 44% ± 5% also expressed experiment aversion (d = 0.46, 95% CI: (0.30, 0.52); Table S6A). Notably, participants were averse to this experiment even though there is no reason to prefer "Drug A" to "Drug B," and patients are effectively already randomized to A or B based on which clinician happens to see them—which occurs wherever unwarranted variation in practice determines treatments, such as walk-in clinics and

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emergency departments. Here, however, similar proportions of people ranked the A/B test best and worst (50% vs. 45%; p = 0.16; Table S6A). These levels of experiment aversion near the height of the pandemic were slightly (but

not significantly) higher than those we observed among similar laypeople in 2019 ($41\% \pm 5\%$ in 2020 vs. $37\% \pm 6\%$ in 2019 for Catheterization Safety Checklist, p = 0.31; $44\% \pm 5\%$ in 2020 vs. Best A... $40\% \pm 6\%$ in 2019 for Best Anti-Hypertensive Drug, p = 0.32) [19].

[Figure 1]

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Sentiments about experiments by vignette and popula	tion					l699 inclu		
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(A) Lay Sentiments About pRCTs						iber 2 relati		
Catheterization Safety Checklist	~	\checkmark	\checkmark	✓		per 2024. D signement related to t		
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Best Corticosteroid Drug		\checkmark		101	\checkmark	pen. ning,		
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(C) Clinician Sentiments About Covid-19 pRCTs								
Masking Rules	\checkmark	\checkmark	1	√				
Intubation Safety Checklist	√	~	1	1		ı June 6, 20 <i>î</i> technologie		
Best Corticosteroid Drug	√	~	1), 2025 ogies.		
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Notes. Experiment Aversion refers to the difference b								
and the rating of the A/B test. The Reverse A/B Effect between the rating of the A/B test and the rating of th								
Checkmarks (\checkmark) represent a statistically significant effects								
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Lay Sentiments About Covid-19 pRCTs

To elicit lay sentiments about Covid-19 pRCTs, we asked lay participants to read one of the following vignettes: Masking Rules (which described two masking policies, of varying scope; n = 360); School Reopening (two school schedules designed to increase social distancing; n = 339); Best Vaccine (two types of vaccine—mRNA versus inactivated virus; n = 450); Ventilator Proning (two protocols for positioning ventilated Covid-19 patients; see Table 1; n = 357); Intubation Safety Checklist (adapted from above to apply to Covid-19; n = 347); and Best Corticosteroid Drug (adapted from above to apply to Covid-19; n = 357).

In all six Covid-19 vignettes, we found evidence of the A/B Effect (Table 2B, Figure 2A). In three, however, we did not find experiment aversion: Best Vaccine¹, Best Corticosteroid Drug, and School Reopening. In the first two of these, participants rated the two interventions very similarly and the experiment only slightly lower (Figure 2B). These vignettes also elicited the largest proportion of participants (65% in Best Vaccine and 56% in Best Corticosteroid Drug; Table S6B) in any vignette who ranked the A/B test best among the three options, compared to 31–34% of participants who ranked it worst (Table S6B). In School Reopening, experiment aversion was not observed because participants on average clearly preferred intervention B to A and rated the experiment similar to intervention A [20,21]. 53% of participants ranked intervention B as the best of the three options (compared to 17% choosing intervention A and 30% choosing the A/B test; Table S6B).

¹ See Table S6D for results from a previous version of Best Vaccine which unintentionally implied that vignette participants could choose their vaccine.

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In the other three vignettes, participants rated the A/B test condition as significantly less appropriate than their lowest-rated intervention (Masking Rules: d = 0.56, 95% CI: (0.41, 0.71); Ventilator Proning: d = 0.17, 95% CI: (0.04, 0.30); Intubation Safety Checklist: d = 0.36, 95% CI: (0.21, 0.49)). These levels of aversion to Covid-19 RCTs are similar to the levels of aversion to non-Covid-19 RCTs both before [19] and during the pandemic (see above).

[Figure 2]

Clinician Sentiments About Covid-19 pRCTs

Clinicians responded to one² of four Covid-19-related vignettes: Masking Rules (n = 349), Intubation Safety Checklist (n = 271), Best Corticosteroid Drug (n = 275), or Best Vaccine (n = 1254). We observed an A/B effect in all four vignettes (Figures 3A-B). In two, clinicians, like laypeople, were also significantly experiment averse (Masking Rules: d = 0.74, 95% CI: (0.57, 0.91; Table S6C); Intubation Safety Checklist: d = 0.30, 95% CI: (0.15, 0.45); Table S6C). In Best Vaccine, clinicians, like laypeople, did not show any significant difference in their ratings of the A/B test and their lowest-rated intervention (d = -0.03, 95% CI: (-0.10, 0.04); Table S6C). Again, like laypeople, 58% of clinicians ranked the vaccine A/B test as the best of the three options, the highest proportion of any clinician-rated vignette.

Clinicians differed from laypeople in their response to Best Corticosteroid Drug. Laypeople did not show experiment aversion, but clinicians rated the A/B test as significantly less appropriate than their lowest-rated intervention (d = 0.49, 95% CI: (0.32, 0.66); Table S6C).

² Clinicians in the first survey were randomly assigned to one of the three vignettes (Masking Rules, Intubation Safety Checklist, and Best Corticosteroid Drug) and then completed the remaining vignettes in random order. For consistency with the rest of this project and with our previous approach [18], we analyzed data from this survey as a between-subjects design where we only consider the first vignette that every participant completed. See Table S7 and pp. 27-28 in SM for further discussion.

This difference may be due to clinicians' greater familiarity with the treatment of Covid-19. Clinicians may also have seen an urgent need for any drugs to treat Covid-19 [24] and thus rated adopting a clear treatment intervention as more appropriate than an RCT.

[Figure 3]

Heterogeneity in Experiment Aversion

Collapsed across studies, political ideology explained 1.5% of the variance (p < .001) in sentiments about experiments, with conservatives slightly less averse to experiments than liberals. Less or no variation was explained by all other demographics, including educational attainment (0.2%, p = .008), STEM degree (0.1%, p = .15), and prescribers versus other clinicians (0.2%, p = .061); see Tables S8-11 in SM for further discussion.

DISCUSSION

In three preregistered survey experiments, we observed considerable experiment aversion among laypeople during the first year of the Covid-19 pandemic, despite increased exposure to the nature and purpose of (largely explanatory) RCTs. Neither laypeople nor clinicians were overall less averse to Covid-19 pRCTs, despite the fact that confidence in anyone's knowledge of what works should have been even more circumscribed than in the everyday contexts of hypertension and catheter infections. To the contrary, most Covid-19 vignettes were met with experiment aversion. This is consistent with an emphasis during the pandemic that we must "do" instead of "learn," a false dichotomy that fails to recognize that implementing an untested intervention is itself a nonconsensual experiment from which, unlike an RCT, little or nothing can be learned [37–39]. Participants may have been averse to the uncertainty that the decision to conduct an experiment conveys. They may have perceived the experiment as more risky than implementing either of the policies it contains. Or they may have experienced hindsight bias, believing that the experiment was unfair to whomever received the least effective policy, neglecting the fact that the results were not known in advance. For whatever reason, across all vignettes and samples, between 28% and 57% of participants demonstrated experiment aversion, while only 6%–35% demonstrated experiment appreciation (by rating the pRCT higher than their highest-rated intervention).

Although in most cases the mean rating of the A/B test was near the neutral midpoint, in none of our 12 studies were more people appreciative of than averse to the pRCT, in none was the average pRCT rating higher than the average intervention rating, and in none was the pRCT rating higher than each participant's highest-rated intervention, on average. Notably, unlike trials with placebo or no-contact controls, the A/B tests in our vignettes compared two active, plausible interventions, neither of which was obviously known ex ante to be superior. Yet substantial shares of participants still preferred that one intervention simply be implemented without bothering to determine which (if either) worked best.

The most positive sentiment towards experiments was observed in both laypeople and clinicians in the vignettes involving Covid-19 drugs and vaccines. Here we observed the highest proportions of participants who demonstrated experiment appreciation (31%–46%) and who ranked the pRCT first (49%–65%). This result could be explained by differences in the pRCT length (ranging from one to twelve months) and perceived severity of the pRCT outcome ("best outcome" and "fewest cases of Covid-19" in Best Corticosteroid and Best Vaccine, respectively vs., e.g., "highest survival rate" in Ventilator Proning). But this result is also consistent with our

previous findings that the illusion of knowledge—here, the belief that either the participant herself or some expert already does or should know the right thing to do and should simply do it—biases people to prefer universal intervention implementation to pRCTs [18,19]. One possible solution is to teach patients that clinicians typically have many options for treating a condition, that often no one knows which option is best, and that a pRCT is the optimal way to figure that out. Similarly, highlighting unwarranted variation in practice during medical training may help reduce clinicians' negative sentiments towards experiments. Rightly or wrongly, both laypeople and clinicians might (a) appropriately recognize that near the start of a pandemic, no one knows which existing drugs, if any, are safe and effective in treating a novel disease, and that new vaccines need to be tested, yet (b) fail to sufficiently appreciate the level of uncertainty around NPIs like masking, proning, and social distancing, which can also benefit from rigorous evaluation. This is consistent with the dearth of RCTs (explanatory or pragmatic) of Covid-19 NPIs [40]: of the more than 4,000 Covid-19 trials registered worldwide as of August 2021, only 41 tested NPIs [41]. Explaining critical concepts like clinical equipoise or unwarranted variation in medical and NPI practice might diminish experiment aversion.

Limitations

While our lay participant samples were large, diverse, and demographically similar to the general U.S. population (see Table S4), they may not be perfectly representative of other populations. Similarly, Geisinger, the network of hospitals with which the clinicians were affiliated, may not be representative of all hospitals, specifically in their exposure to research and A/B tests such as those described in our vignettes. Geisinger is primarily comprised of teaching hospitals, and has a medical school, but is not associated with a university and, therefore, our results may not generalize either to clinicians who practice at large academic medical centers

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(e.g., Massachusetts General Hospital or Johns Hopkins Hospital) where RCTs are often conducted or, on the other hand, to clinicians who practice at small community hospitals that have little exposure to research. In addition, because the clinician sample was largely made up of individuals with only some research training and experience, these results may not generalize to clinicians who have extensive research training and experience and conduct RCTs (or pRCTs) themselves. Importantly, however, the support of non-investigator clinical and operational leaders is often needed to conduct a pRCT, and administrator-clinicians do not always have substantial research experience. Moreover, in both samples, our primary goal was not to estimate the percentage of people in the general population who hold negative views of pRCTs, but rather to ascertain experimentally whether laypeople and clinicians display the patterns of negative sentiments about pRCTs that we have found previously [18,19], when confronted with vignettes during, or about, a novel situation (the Covid-19 pandemic). Thus, though the sample may not perfectly represent all healthcare professionals or members of the general public, the results demonstrate the repeated presence of negative sentiments, and a lack of positive sentiments, towards experiments across eight distinct situations among segments of populations whose opinions matter.

Furthermore, because experiment aversion and appreciation are likely socio-cultural phenomena, we should expect that the presence or size of the effects we report may differ among societies and over time [42]. However, contrary to recent claims [43], the similarity in aversion to experiments between laypeople and clinicians suggests that these results generalize across populations that differ in their level of knowledge of RCTs. In addition, our findings here and elsewhere [18,19] show that experiment aversion occurs in health and non-health scenarios and,

within the health domain, in both clinical and public health scenarios, and regarding both pharmaceutical and non-pharmaceutical interventions.

Finally, as noted above, all vignettes discussed in this paper are silent about whether the consent of patients and/or clinicians would be obtained. Previous work that did not directly compare judgments about pRCTs versus treatment implementation suggests that when given the option, laypeople prefer to be asked for consent (e.g., for a study comparing the effectiveness of two marketed hypertension drugs, a scenario somewhat related to one of ours [44,45]). Additionally, other research has found neither experiment aversion nor appreciation (as we define it here and elsewhere [33]) after introducing a critical element of voluntariness by asking respondents how likely they would be to "choose to be treated" at a hospital that is conducting a pRCT [43]. In separate work, we found that when vignettes explicitly specify that prior consent is obtained, negative sentiment towards pRCTs is reduced—but not eliminated [33]. However, individual consent would undermine the external validity of pRCTs, and is anyhow rarely feasible in such settings [32,46,47], e.g., tests of policy interventions such as providing safety checklists and promulgating public health rules.

Conclusion

Critics rightly note that RCTs have limited external validity when they employ overly selective inclusion/exclusion criteria or are executed in ways that deviate from how interventions would be operationalized in diverse, real-world settings. However, the solution is not to abandon randomized evaluation, but to incorporate it into routine clinical care and healthcare delivery via pRCTs [1,47–49]. It has been many years since the U.S. Institute of Medicine urged research of many varieties to be embedded in care [50]. More recently, the UK Royal College of Physicians

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and National Institute for Health and Care Research issued a joint position statement similarly advocating the integration of research into care [51]. In addition, the U.S. Food and Drug Administration now promotes pRCTs to support post-marketing monitoring and other regulatory decision-making [52,53], a priority also highlighted in the UK Medicines and Healthcare products Regulatory Agency's 2021-2023 Delivery Plan [54] and guidance on RCTs [55]. Pragmatic RCTs have been fielded successfully and informed healthcare practice and policy [46,56,57], but they remain far from ubiquitous and they require buy-in to be successful, as shown by the case of a Norwegian school reopening trial during the pandemic that was abandoned due to lack of such support [58,59]. Broadening the use of pRCTs will require not only redoubling investment in interoperable electronic health records and recalibrating regulators' views of the comparative risks of research versus idiosyncratic practice variation [1], but also anticipating and addressing experiment aversion among patients and healthcare professionals. Better understanding experiment aversion and then discovering strategies to mitigate it will help grow the evidence base necessary for evidence-based decision-making and, ultimately, improved patient outcomes.

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ETHICS APPROVAL

Geisinger's IRB determined that the study surveys were exempt from ethical approval, including any requirement of informed consent, under 45 C.F.R. § 46.104(2)(i) (IRB# 2017-0449). Nevertheless, prospective participants were invited to take a survey and told the broad topic, the estimated time it would take, and the compensation offered. Those who proceeded were deemed

to have tacitly consented. Participants could quit the survey at any time.

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DATA AVAILABILITY STATEMENT

Participant response data, preregistrations, materials, and analysis code have been deposited in

Open Science Framework

(https://osf.io/6p5c7/?view_only=eaeb95cb754247028f1d1ed94414cbd2).

CONTRIBUTORS

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P.R.H., P.H., C.F.C, and M.N.M. designed the studies and collected the data. P.R.H. and R.L.V. analyzed the data. R.L.V., R.M.M., C.F.C., and M.N.M. wrote the first draft of the manuscript.P.R.H. and P.H. provided critical revisions. R.L.V. and P.R.H. contributed equally to this work.M.N.M. and C.F.C. contributed equally to this work.

COMPETING INTERESTS

None of the authors have competing interests to report.

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Figure Captions reliev

Figure 1

Lay Sentiments About pRCTs

[figure uploaded separately]

Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highestrated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness

ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2—"very inappropriate" or "somewhat inappropriate"— on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.

Figure 2

Lay Sentiments About Covid-19 pRCTs

[figure uploaded separately]

Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highest-rated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2—"very inappropriate" or "somewhat inappropriate"— on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.

Figure 3

Clinician Sentiments About Covid-19 pRCTs

[figure uploaded separately]

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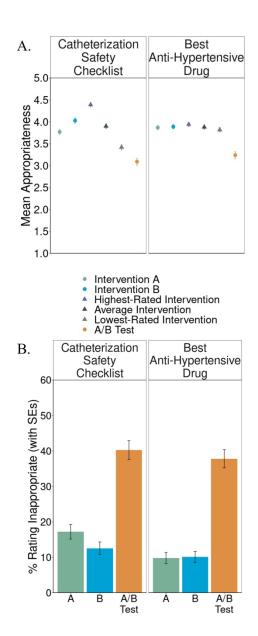
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Notes. (A) Mean appropriateness ratings, on a 1-5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highestrated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2—"very inappropriate" or "somewhat inappropriate"— on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.

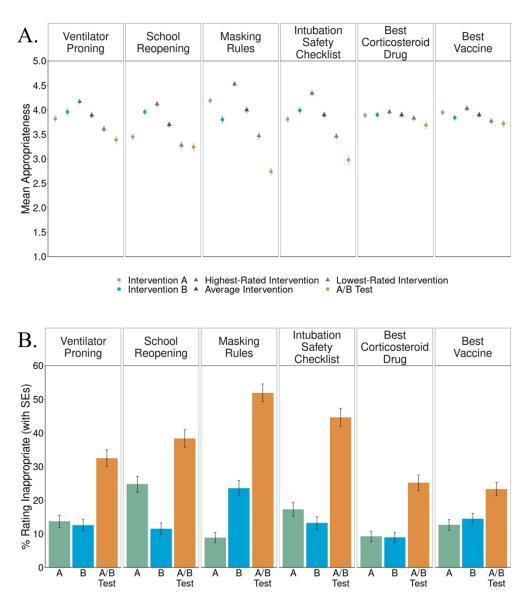
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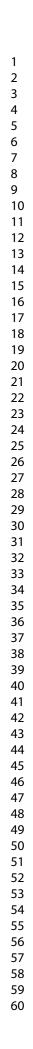


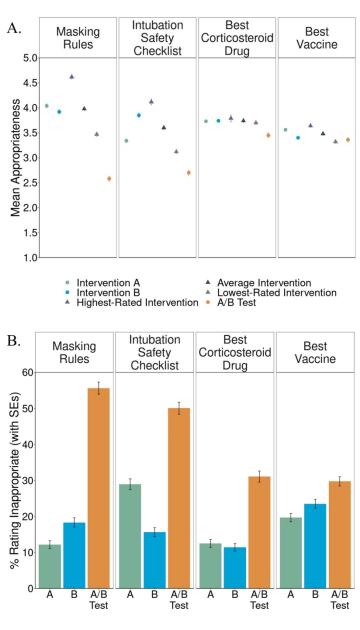
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Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highest-rated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2— "very inappropriate" or "somewhat inappropriate"—on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.

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Methods In the main text, we grouped the vignettes thematically into three sets: "Lay Sentiments About pRCTs," "Lay the clinician sample¹) in the number of participants in each vignette (see Table S1). Population, sample size, and dates of data collection for each vignette **Preregistration # Vignette** Sample size Dates of data collection **Population** Catheterization Safety Checklist MTurk workers 343 August 13, 2020 Intubation Safety Checklist MTurk workers 347 August 13, 2020 Best Anti-Hypertensive Drug MTurk workers 357 August 13, 2020 Best Corticosteroid Drug MTurk workers 357 August 13, 2020 2 Masking Rules MTurk workers 360 September 30-October 2, 2020 School Reopening MTurk workers 339 September 30-October 2, 2020 Best Vaccine (ambiguous version)* MTurk workers 350 September 30-October 2, 2020 Ventilator Proning MTurk workers 357 September 30-October 2, 2020 3 271 Intubation Safety Checklist Clinicians November 13-December 9, 2020 Best Corticosteroid Drug Clinicians 275 November 13-December 9, 2020 Masking Rules Clinicians 349 November 13-December 9, 2020

Sentiments About Covid-19 pRCTs," and "Clinician Sentiments About Covid-19 pRCTs." However, when we collected data, we grouped our vignettes differently such that we started with vignettes that we have used in previous published work and their respective Covid-19 derivatives, then we developed and tested novel Covid-19 specific vignettes separately, and then, again separately, we tested a Covid-19 vaccine vignette. We followed a similar pattern in our clinician sample: we first tested three Covid-19 specific vignettes (two which were derivatives of vignettes from our previous work, one which was new to this work) and then separately, we tested a Covid-19 vaccine vignette. These groupings are important for understanding how participants were randomly assigned to vignettes and why there are slight discrepancies (or large discrepancies in the case of the Best Vaccine vignette in

Table S1

4

5

Best Vaccine

Best Vaccine

Note. Within each data collection batch, participants were randomly assigned to one	of the vignettes. In the clinician
sample (preregistration #3), clinicians saw all three vignettes in randomized order. Th	ne sample size reported here is the
number of clinicians who saw that vignette first.	

MTurk workers

Clinicians

450

1254

January 8, 2021

January 25-February 9, 2021

*Our first attempt at the Best Vaccine vignette included wording that unintentionally made the experiment condition less aversive. For this reason, this vignette is not included in the main analyses.

¹ The Best Vaccine vignette was combined with another study that required a sample size much larger than the sample sizes in our previous vignette studies to have adequate statistical power.

For clarity, in the main text of this article we used different names for the vignettes than those used in the preregistrations and in previous publications (see Table S2).

Table S2

Original vignette names from preregistrations and previous work and corresponding name in main text

Original vignette name	Main text vignette name Hospital
Safety Checklist (also called Checklist)	Catheterization Safety Checklist Best
Drug: Walk-In Clinic (also called Best Drug)	Best Anti-Hypertensive Drug
Checklist (Covid-19)	Intubation Safety Checklist
Best Drug (Covid-19)	Best Corticosteroid Drug
Ventilator Proning	Ventilator Proning
School Reopening	School Reopening
Mask Requirements	Masking Rules
Modified Covid-19 Vaccines	Best Vaccine
Vaccine Distribution	(not reported in main text)

Note. Vignette names in this article were changed from those in previous work and in our preregistrations in order to clarify the content for readers.

Preregistrations, sample sizes, and power analyses

Our research questions, power analyses and sample sizes, and analysis plans were all preregistered at Open Science Framework (OSF) before data collection. These sample size precommitments are copied from each preregistration document which can be found on OSF at https://osf.io/u945y/?view_only=a901fde13ddb423899074eb79964c6cd.

Preregistration 1 (Catheterization Safety Checklist, Best Anti-Hypertensive Drug, Intubation Safety Checklist, Best Corticosteroid Drug vignettes):

"We predict that, using a two-tailed, paired t-test with $\alpha = .05$ within each scenario, participants will rate the A/B test condition as significantly less appropriate than their own average rating of the two policy conditions, mean(A,B). This is the test for the "A/B Effect." Recruiting 350 participants for each scenario provides 95% power to detect an effect as small as d = 0.19, which is substantially smaller than the effect sizes we have observed using the Hospital Safety Checklist and Best Drug: Walk-In Clinic vignettes in past research."

Preregistration 2 (Ventilator Proning, School Reopening, Masking Rules, and Best Vaccine (initial ambiguous version) vignettes):

"We predict that, using a two-tailed, paired t-test with $\alpha = .05$ within each scenario, participants will rate the A/B test condition as significantly less appropriate than their own average rating of the two policy conditions, mean(A,B). This is the test for the "A/B Effect." Recruiting 350 participants for each scenario provides 95% power to detect an effect as small as d = 0.19, which is substantially smaller than the effect sizes we have observed using the Hospital Safety Checklist and Best Drug: Walk-In Clinic vignettes in past research."

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Preregistration 3 (Clinicians; Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes):

Note that because of time constraints around the possible starting dates of our clinician surveys, we launched this study before preregistering it, and we did not report an explicit power analysis before collecting the data. Because this study follows a similar structure to the studies above, however, it was reasonable to apply the previous sample size and power analysis considerations. We did, however, preregister our approach and research plan twice during this study: once during data collection, before any analyses had been conducted, and again after all data had been collected (but before analyzing any of them).

Preregistration 3.1: "At the time of this preregistration, we have received 655 complete responses. No data have been explored or analyzed at this point. We will conduct an interim analysis on this dataset using the same analyses we have previously preregistered, and we may continue to collect more data from this population."

Preregistration 3.2: "Data collection is now complete and we have closed the survey. On 11/24/2020, we conducted an interim analysis on 601 complete responses. Since then, we have received an additional 295 complete responses, to which we remain blind."

Preregistration 4 (Best Vaccine):

"We recruited 350 participants for the original Covid-19 vaccines study. Because we are running this study to determine whether even a small effect emerges, we will increase the sample size to 450 participants. This provides 80% power to detect an effect as small as d = 0.13 in a repeated- measures, two-tailed t-test, and 95% power to detect an effect as small as d = 0.17."

Preregistration 5 (Clinicians; Best Vaccine):

"Our previous survey of healthcare providers resulted in approximately 900 complete responses; we expect a similar response rate for this survey. This sample size provides 95% power to detect an effect as small as d = 0.12 using a two-tailed, repeated measures t-test. Even if we only receive 600 complete responses, we will have 95% power to detect an effect as small as d = 0.15."

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Procedure and design

Several aspects of the procedure and experimental design were consistent across the studies reported here. Below, we describe these consistent features and note in specific studies where we deviated from them.

For the lay participant samples, we used the CloudResearch service to recruit crowd workers on Amazon Mechanical Turk (MTurk) to participate in a 3–5-minute survey experiment. These services provide samples that are broadly representative of the U.S. population and are well-accepted in social science research as providing as good or better-quality data than convenience samples such as student volunteers, with results that are similar to probability sampling methods [1,2]. Participants were excluded from recruitment in any of the studies reported here if they had participated in any of our previous studies on this topic. Across all laypeople vignettes, the completion rate of participants starting the survey was 91.5%. The Geisinger IRB determined that these anonymous surveys were exempt (IRB# 2017-0449).

For the clinician samples, we recruited healthcare providers (including physicians, physician assistants, nurse practitioners, and nurses) from a large health system in the Northeastern U.S via email. Each provider received either one or two emails about the study during the recruitment window. In the first clinician study (Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes), we first tested the email recruitment system by sending out the survey invitation email to just 200 clinicians. Clinicians who completed the survey based on this survey invitation were included in the final sample. Then, all clinicians were sent the recruitment email on November 19, 2020, followed by a reminder email on December 3, 2020. In the second clinician study (Best Vaccine), the initial recruitment email was sent January 25, 2021, with the follow-up email sent February 2, 2021. In the first clinician study, 5,925 clinicians were emailed and 895 completed the survey. In the second clinician study, 6,993 clinicians were emailed and 1,254 completed the survey. In these samples, because survey responses were fully anonymous, we were not able to restrict participation based on our previous studies, so some participants who completed the Best Vaccine vignette may have earlier completed the Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes.

In all cases, participants completed an online survey hosted by Qualtrics. After opening the survey, participants were randomly assigned to one of the possible vignettes being studied.^{2,3} In the case of data collection batches 4 and 5, there was only one vignette being tested that all participants saw. At this point, we used the exact same procedure detailed in Heck et al. (2020) [4]. First, participants were instructed to read about several possible decisions made by different decision-makers⁴, and to try to treat each decision as separate from the others. All scenarios contained a brief "background" text at the top of the page that summarized a problem, followed by three "situations," each of which detailed the decision-maker's choice to adopt intervention A, intervention B, or to run an A/B test by randomly assigning people to one of two test conditions. These conditions were presented in fully counterbalanced order; each participant received one of six possible orders (i.e., Situation 1 = A, Situation 2 = B, and Situation 3 = A/B; Situation 1 = A/B, Situation 2 = B, and Situation 3 = A; etc....). At no point did we observe a meaningful effect of presentation order, so we collapsed across this variable for all analyses.

³ The clinician version of the Best Vaccine vignette was combined with another study being conducted by a subset of researchers on this team. The materials for Best Vaccine were presented after the survey materials from the other study. Data from the other study are unrelated to the research questions tested here and will be reported separately.

 $^{^2}$ For the clinician study of the Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes, clinicians were randomly assigned to one of these three scenarios and then completed the remaining two scenarios in random order. For consistency with the rest of this project and with our previous survey experiment with clinicians regarding the A/B effect (3, Study 6), and in order to make the results from clinician samples comparable to those with lay samples (in which each participant only ever saw one scenario), we analyze data from this study as a between-subjects design where we only consider the first scenario that every participant completed. See the section "Order Effect in Clinician Study" elsewhere in this appendix for further analyses.

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For our primary outcome measures, participants were asked to rate the appropriateness of the decisions made in Situation 1, Situation 2, and Situation 3 ("How appropriate is the director's decision in Situation 1/2/3?"), using a 1-5 scale (1 = "Very inappropriate", 2 = "Inappropriate", 3 = "Neither inappropriate nor appropriate", 4 = "Appropriate", 5 = "Very appropriate"). Participants then specified a ranked order of the three decisions ("Among these three decisions, which decision do you think the director should make? Please drag and drop the options below into your preferred order from best to worst. You must click on at least one option before you can proceed."), with 1 being the best decision and 3 being the worst. The last item on this page asked participants to explain why they chose these ratings and rankings in a couple of sentences ("In a couple of sentences, please tell us why you chose the ratings and rankings you chose.").

Following these primary measures, participants completed standard demographic items on the next page. For MTurk participants, these were measures of sex, race/ethnicity, age, educational attainment, household income, religious belief or affiliation, whether they have a degree in a STEM field or not, and four items identifying political orientation and affiliation. As part of an ongoing study in our laboratory (whose results will be reported elsewhere), these participants were randomized to one of six conditions for this demographic questionnaire where we varied the option to select "prefer not to answer" and whether the items were mandatory, optional, or requested (but not required). For clinician participants, demographic items were mandatory response and were limited to the following: sex, sources of training in research methods and statistics, self-reported comfort with research methods and statistics, past experience with activities related to research methods and statistics (e.g., publishing a scientific paper or analyzing data), current involvement in research, position (e.g., doctor, physician assistant, nurse, medical student, etc.), length of time working in the medical field, and field of specialty.

After completing the survey, MTurk participants were given a completion code to receive payment (\$0.40). Clinician participants were invited to enter into a lottery to win a \$50 Amazon gift card by following a link to an independent survey where they could enter their email address. All participants were thanked for their participation and offered the opportunity to comment on the survey.

⁴ In all vignettes, the protagonist (e.g., the hospital director or Dr. Jones) was male for ease of comparison to our previous work using these vignettes. Future work should examine the impact of the characteristics of the decision-maker on evaluations of their decisions regarding policy imposition and conducting RCTs.

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We computed several variables to measure participants' sentiments about pRCTs.

Following Meyer et al. (2019) [3], we define an "A/B effect" as the difference between participants' mean policy rating and their rating of the A/B test—that is, the degree to which the policies are (on average) rated higher than the A/B test. We also report the percentage of participants whose mean policy rating is higher than their rating of the A/B test.

Following Heck et al. (2020 [4]; see also Mislavsky et al., 2019 [5]), we define "experiment aversion" as the difference between participants' rating of their own lowest-rated policy and their rating of the A/B test. We also report the percentage of participants who express experiment aversion.

"Experiment rejection" (first reported in Heck et al., 2020 [4], but without this name) occurs when a participant rates the A/B test as inappropriate (1 or 2 on the 5-point scale) while also rating each policy as neutral or appropriate (3–5 on the scale).

A "reverse A/B effect" is the difference between participants' rating of the A/B test and their mean policy rating that is, the degree to which the A/B test is rated higher than the policies (on average). We also report the percentage of participants whose rating of the A/B test is higher than their mean policy rating.

"Experiment appreciation" is the difference between participants' rating of the A/B test and their rating of their own highest-rated policy. We also report the percentage of participants who express experiment appreciation.

"Experiment endorsement" occurs when a participant rates the A/B as appropriate (4 or 5 on the 5-point scale) while also rating each intervention as neutral or inappropriate (1-3 on the scale).

In all cases where a *d*-value was calculated (i.e., A/B effect, experiment aversion, reverse A/B effect, experiment appreciation), we used Cohen's *d* recovered from the *t*-statistic, *n*, and correlation between the two measures being compared (Dunlap et al., 1996 [6], equation 3: $d = tc[2(1-r)/n]^{\frac{1}{2}}$; see also <u>http://jakewestfall.org/blog/index.php/category/effect-size/kewestfall.org</u> [7]. To calculate this *d*-value, we use the following R code: effsize::cohen.d(x,y, paired = TRUE).

In Figures 1B, 2B, and 3B, we transformed participants A, B, and A/B ratings on the continuous 5-point Likert scale into a binary objected/did not object variable (where objecting was defined as assigning a rating of 1 or 2—"very inappropriate" or "somewhat inappropriate"— on the 1–5 scale). We do this only for visualization and do not perform any statistical analyses on this transformed objected/did not object variable. Instead, as is standard in social and moral psychology, we treated appropriateness ratings elicited on the 5-point Likert scale as continuous. Therefore, we use t-tests to test the differences between the ratings of the A/B test and the interventions (lowest, average, and highest). Other methodologies and statistical analyses like a discrete choice approach, in which participants would see and evaluation two of the three possible decisions (e.g., intervention A vs. A/B test) at a time, or the Stuart-Maxwell test, which requires a kxk matrix of categorical variables, would not be appropriate.

Vignettes

Our vignettes were inspired by discussions about the ethics of real-world RCTs (see Table S3).

Table S3

Literature calling for or reporting an RCT similar to what is proposed in each vignette

Vignette name	Relevant literature
Catheterization Safety Checklist	Pronovost et al. [8], Urbach et al. [9], Arriaga et al. [10]
Best Anti-Hypertensive Drug	ROMP Ethics Study [11], Sinnott et al. [12]
Intubation Safety Checklist	Turner et al. [13]
Best Corticosteroid Drug	Wagner et al. [14]
Ventilator Proning	Elharrar et al. [15], Sartini et al. [16], Caputo et al. [17]
School Reopening	Fretheim et al. [18, 19], Helsingen et al. [20], Angrist et al. [21], Kolata [22]
Masking Rules	Abaluck et al. [23], Jefferson et al. [24], Bundgaard et al. [25]
Best Vaccine	Bach [26]

The following section shows the exact vignette text that participants read in these studies (with the exception of the bolded titles, which are never shown to participants).

Catheterization Safety Checklist

(Originally from Heck et al. (2020) [4], adapted from Meyer et al. (2019) [2])

Background: Some medical treatments require a doctor to insert a plastic tube into a large vein. These treatments can save lives, but they can also lead to deadly infections.

Situation 1

A hospital director wants to reduce these infections, so he decides to give each doctor who performs this procedure a new ID badge with a list of standard safety precautions for the procedure printed on the back. All patients having this procedure will then be treated by doctors with this list attached to their clothing.

Situation 2

A hospital director wants to reduce these infections, so he decides to hang a poster with a list of standard safety precautions for this procedure in all procedure rooms. All patients having this procedure will then be treated in rooms with this list posted on the wall.

Situation 3

A hospital director thinks of two different ways to reduce these infections, so he decides to run an experiment by randomly assigning patients to one of two test conditions. Half of patients will be treated by doctors who have received a new ID badge with a list of standard safety precautions for the procedure printed on the back. The other half will be treated in rooms with a poster listing the same precautions hanging on the wall. After a year, the director will have all patients treated in whichever way turns out to have the highest survival rate.

Best Anti-Hypertensive Drug

(Originally from Heck et al. (2020) [4], adapted from Meyer et al. (2019) [2])

Background: Several drugs have been approved by the US. Food and Drug Administration as safe and effective for treating high blood pressure. Doctor Jones works in a multi-doctor walk-in clinic where patients see whichever doctor is available. Some doctors in the clinic prescribe drug A for high blood pressure, while others prescribe drug B. Both drugs are affordable and patients can tolerate their side effects. Situation 1

Doctor Jones wants to provide good treatment to his patients, so he decides that his patients who need high blood pressure medication will be prescribed drug A.

Situation 2

Doctor Jones wants to provide good treatment to his patients, so he decides that his patients who need high blood pressure medication will be prescribed drug B.

Situation 3

Doctor Jones thinks of two different ways to provide good treatment to his patients, so he decides to run an experiment by randomly assigning his patients who need high blood pressure medication to one of two test conditions. Half of patients will be prescribed drug A, and the other half will be prescribed drug B. After a year, he will only prescribe to new patients whichever drug has had the best outcomes for his patients.

Intubation Safety Checklist

Background: Some treatments for coronavirus (Covid-19) patients require a doctor to insert a plastic breathing tube into the throat. These treatments can save lives, but they can also lead to deadly fluid buildup in the lungs.

Situation 1

A hospital director wants to reduce these cases of fluid buildup, so he decides to give each doctor who performs this procedure a new ID badge with a list of standard safety precautions for the procedure printed on the back. All coronavirus patients having this procedure will then be treated by doctors with this list attached to their clothing.

Situation 2

A hospital director wants to reduce these cases of fluid buildup, so he decides to hang a poster with a list of standard safety precautions for this procedure in all procedure rooms. All coronavirus patients having this procedure will then be treated in rooms with this list posted on the wall.

Situation 3

A hospital director thinks of two different ways to reduce these cases of fluid buildup, so he decides to run an experiment by randomly assigning coronavirus patients who need a breathing tube to one of two test conditions. Half of patients will be treated by doctors who have received a new ID badge with a list of standard safety precautions for the procedure printed on the back. The other half will be treated in rooms with a poster listing the same precautions hanging on the wall. After two months, the director will have all patients treated in whichever way turns out to have the highest survival rate.

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Best Corticosteroid Drug

Background: Several corticosteroids (a family of anti-inflammatory drugs) have been approved by the U.S. Food and Drug Administration as safe and effective for treating a variety of diseases. There is some evidence that corticosteroids can also help certain coronavirus (Covid-19) patients, and many doctors prescribe corticosteroids for these patients. Doctor Jones works in a multi-doctor emergency department where patients see whichever doctor is available. Some doctors in the emergency department prescribe corticosteroid A for coronavirus symptoms, while others prescribe corticosteroid B. Both corticosteroids are affordable and patients can tolerate their side effects.

Situation 1

Doctor Jones wants to provide good treatment to his patients, so he decides that his coronavirus patients who need medication will be prescribed corticosteroid A.

Situation 2

Doctor Jones wants to provide good treatment to his patients, so he decides that his coronavirus patients who need medication will be prescribed corticosteroid B.

Situation 3

Doctor Jones thinks of two different ways to provide good treatment to his coronavirus patients, so he decides to run an experiment by randomly assigning his patients who need medication to one of two test conditions. Half of coronavirus patients will be prescribed corticosteroid A, and the other half will be prescribed corticosteroid B. After two months, he will only prescribe to new coronavirus patients whichever corticosteroid has had the best outcomes for his patients.

Ventilator Proning

Background: Some coronavirus (Covid-19) patients have to be sedated and placed on a ventilator to help them breathe. Even with a ventilator, these patients can have dangerously low blood oxygenation levels, which can result in death. Current standards suggest that laying ventilated patients on their stomach for 12-16 hours per day can reduce pressure on the lungs and might increase blood oxygen levels and improve survival rates.

Situation 1

A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.

Situation 2

A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 15-16 hours per day.

Situation 3

A hospital director thinks of two different ways to save as many ventilated Covid-19 patients as possible, so he decides to run an experiment by randomly assigning ventilated Covid-19 patients to one of two test conditions. Half of these patients will be placed on their stomach for 12-13 hours per day. The other half of these patients will be placed on their stomach for 12-16 hours per day. After one month, the director will have all ventilated Covid-19 patients treated in whichever way turns out to have the highest survival rate.

Best Vaccine (ambiguous version; results not reported in main analyses)

Background: Imagine that several vaccines have been approved by the U.S. Food and Drug Administration as safe and effective for preventing Covid-19. Vaccine A uses mRNA molecules to provide the cells with a blueprint for how to destroy the virus. Vaccine B uses deactivated or weakened coronavirus to help the body create an immune resistance to the disease. Both vaccines are affordable, similarly priced, and people can tolerate their side effects. However, people can only receive one of these two vaccines.

Situation 1

The director of public health for a state wants to reduce Covid-19 cases. So he decides that all clinics in the state will offer Vaccine A for free. People can get any other vaccine somewhere else, if they want.

Situation 2

The director of public health for a state wants to reduce Covid-19 cases. So he decides that all clinics in the state will offer Vaccine B for free. People can get any other vaccine somewhere else, if they want.

Situation 3

The director of public health for a state thinks of two different ways to reduce Covid-19 cases, so he decides to run an experiment by randomly assigning clinics in the state to one of two test conditions. Half of the clinics will offer Vaccine A for free, and the other half will offer Vaccine B for free. People can get any other vaccine somewhere else, if they want.⁵ After six months, he will direct the state to offer whichever vaccine has resulted in the fewest cases of Covid-19.

Best Vaccine

Background: Imagine that several vaccines have been approved by the U.S. Food and Drug Administration as safe and effective for preventing Covid-19. Vaccine A uses mRNA molecules to provide the cells with a blueprint for how to destroy the virus. Vaccine B uses deactivated or weakened coronavirus to help the body create an immune resistance to the disease. Both vaccines are affordable, similarly priced, and people can tolerate their side effects.

Situation 1

The director of public health for a state wants to reduce Covid-19 cases. So he decides that all clinics in the state will offer Vaccine A for free.

Situation 2

The director of public health for a state wants to reduce Covid-19 cases. So he decides that all clinics in the state will offer Vaccine B for free.

Situation 3

The director of public health for a state thinks of two different ways to reduce Covid-19 cases, so he decides to run an experiment by randomly assigning clinics in the state to one of two test conditions. Half of the clinics will offer Vaccine A for free, and the other half will offer Vaccine B for free. After six months, he will direct the state to offer whichever vaccine has resulted in the fewest cases of Covid-19.

⁵ This wording unintentionally implied that residents could choose their vaccine (by going elsewhere) if they did not wish to be subject to the official's decision (including policy implementation or A/B test); we suspect this had the effect of making the experiment condition less aversive, since people could effectively opt-out of it, and our goal in this research is to study pragmatic, real-world situations in which avoiding randomization is not a realistic option.

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School Reopening

Background: This Fall, school districts must decide whether to reopen their doors to students, teachers, and staff despite the risks of spreading coronavirus (Covid-19). Many school and public health officials have decided to use a "hybrid model" of teaching that offers some of the benefits of face-to-face learning time while attempting to minimize the risks related to Covid-19.

Situation 1

A superintendent at a large school district wants to provide good education to his students while slowing the spread of Coronavirus. So, he decides that students will attend school according to an even-odd schedule. Students in even-numbered grades (e.g., 2nd grade, 4th grade, etc.) will attend school in the morning and learn remotely in the afternoons, while students in odd- numbered grades will attend school in the afternoon and learn remotely in the mornings.

Situation 2

A superintendent at a large school district wants to provide good education to his students while slowing the spread of Coronavirus. So, he decides that students will attend school according to an A-day/B-day schedule. Students in the A group will attend school in person on Monday, Tuesday, and Wednesday morning, and students in the B group will attend school in person on Wednesday afternoon, Thursday, and Friday. Students will learn remotely on the days they do not attend school.

Situation 3

A superintendent at a large school district thinks of two different ways to provide good education to his students while slowing the spread of Coronavirus. So, he decides to conduct an experiment by randomly assigning schools in the district to one of two test conditions. For half of schools, students will attend school according to an even-odd schedule. Students in even-numbered grades (e.g., 2nd grade, 4th grade, etc.) will attend school in the morning and learn remotely in the afternoons, while students in odd-numbered grades will attend school in the afternoon and learn remotely in the mornings. For the other half of schools, students will attend school according to an A-day/B-day schedule. Students in the A group will attend school in person on Monday, Tuesday, and Wednesday morning, and students in the B group will attend school in person on Wednesday afternoon, Thursday, and Friday. Students will learn remotely on the days they do not attend school. At the end of the semester, all schools will adopt, for future semesters when the pandemic threat level remains similar, whichever policy has resulted in the best combination of test scores on state aptitude tests and number of Covid-19 cases.

Masking Rules

Background: Public health officials have considered different rules about when and where people must wear masks or other face coverings to reduce the spread of coronavirus (Covid-19).

Increasing mask use can reduce the spread of the disease, but highly restrictive mask policies can substantially reduce compliance rates.

Situation 1

A state health department director wants to reduce coronavirus spread within his state, so he decides that all counties will require masks in all businesses and public buildings.

Situation 2

A state health department director wants to reduce coronavirus spread within his state, so he decides that all counties will require masks in all businesses, public buildings, and outdoor public spaces.

Situation 3

A state health department director thinks of two different ways to reduce coronavirus spread within his state, so he decides to run an experiment by randomly assigning counties within the state to one of two test conditions. Half of counties will require masks in all businesses and public buildings. The other half of counties will require masks in all businesses, public buildings, and outdoor public spaces. After one month, the director will require all counties to adopt whichever policy has led to the fewest cases of Covid-19 for as long as the pandemic threat level remains high.

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Results

Sample demographics

Lay participants

Across all vignettes reported in the main text (i.e., excluding the initial ambiguous version of the Best Vaccine vignette), there were a total of 2,909 lay participants. They ranged in age from 18 to 88 years old (mean = 38.4, SD = 12.8) and the majority were White (74.6%) and female (55.9%). 35.7% had a 4-year college degree, 29.7% had some college, and 20.5% had a graduate degree. 21.3% of participants had a degree in a STEM field. The most frequently selected income level was between \$20,000 and \$40,000 (20.7%). A majority of participants reported being moderate, leaning liberal, or being liberal both generally and specifically with regards to social and economic issues. Similarly, a majority of participants reported being independent, leaning Democrat, or being Democrat in their political party affiliations. 37.7% of participants reported being non-religious. Of those who reported being religious, the most reported religion was Protestant (24.2%). See Table S4 for demographic breakdowns by vignette and in the combined lay participant sample.

Page	55	of	79
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Table	S4
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Demographics of lay participants by vignette

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Best	Schog	Ventilator
Vaccine	Reopenin	ך מ ^{Proning}

	Catheterization	Best Anti-	Intubation	Best	Best	Best	Schog	9 Ventilator	Masking	А
	Safety	Hypertensive	Safety	Corticosteroid	Vaccine	Vaccine	Doononir	N Droning	Dulas	
	Checklist	Drug	Checklist	Drug	(first attempt)		Reopening 339 38.7 (13.65 5 39.29 60 39.29 60	v ^{Proning}	Kules	vignett
Total N	343		346	357	350	450	332	5 357	360	290
Age [Mean (SD)]	37.9 (12.9)	38.6 (12.9)	37.9 (12.4)	38.0 (12.7)	36.7 (12.0)	37.7 (12.6)	38.7 (13.6)	6 4 (12.7)	39.0 (12.8)	38.4 (12.
Sex (%)							s rei	пb		
Male	51.3%	41.5%	48.1%	51.5%	36.6%	38.4%	39.2 9.2	ě 40.9%		43.6
Female	47.8%	58.0%	51.9%	48.2%	63.1%	60.9%	60.5 team 0.3 team 0.3 team 0.0 team	N 58.8%	60.0%	55.9
Other	0.6%	0.6%	0.0%	0.0%	0.3%	0.4%	0.3	N 0.3%	0.3%	0.2
Prefer not to answer	0.3%	0.0%	0.0%	0.3%	0.0%	0.2%	0.0 6 ž	.0.0%	0.0%	0.2
Race - select all that apply (%)							9.7# Superieur (AE 9.7# and data 77.0% data 1.8#	ğ		
Black/African-American	11.1%	5.0%	8.4%	10.1%	10.9%	11.3%	9.7 % 5	₹ 6.7%	8.9%	9.0
Hispanic or Latino	8.2%	8.4%	7.2%	8.4%	8.3%	5.6%	5.9 83 q	6 9.5%	7.5%	7.5
White	72.0%	78.7%	71.5%	72.0%	70.9%	72.7%	77.0 % ፬	ã 77.6%	75.8%	74.69
Asian	12.5%	8.7%	15.3%	12.6%	12.6%	13.3%	8.68	6 7.0%	7.8%	10.89
Other	1.2%	1.7%	1.2%	0.3%	3.4%	0.9%	1.8 2 >	1 .7%	2.2%	1.39
Prefer not to answer	0.9%	0.6%	0.0%	0.6%	0.3%	0.9%	1.8%1 A BES	0 .3%	0.3%	0.59
Education (%)										
Less than high school	0.6%	0.8%	0.3%	0.3%	0.6%	0.2%	0.3	9.8%	0.8%	0.49
High school degree	5.5%	7.8%	8.9%	9.2%	9.1%	10.2%	10.3	29.4%	11.4%	9.29
Some college	32.7%	32.2%	24.2%	28.0%	30.3%	32.0%	26.3	33.6%	31.9%	29.79
Four-year college degree	37.3%	35.6%	39.5%	35.9%	37.1%	35.8%	37.8	3.1%	30.6%	35.7
Some graduate school	4.4%	3.4%	4.6%	4.2%	4.6%	5.1%	4.499	23.8%	4.7%	4.3
Graduate degree	19.2%	19.9%	22.5%	22.1%	18.3%	16.2%	20.9	0.3%	20.6%	20.59
Prefer not to answer	0.3%	0.3%	0.0%	0.3%	0.0%	0.4%	0.0%	9.8% 29.4% 33.6% 3.1% 23.8% 0.3% 0.0%	0.0%	0.29
Income (%)							n	ž		
< \$20,000	11.1%	8.4%	9.2%	7.6%	12.0%	9.3%	9.4 %	11.2% 19.0%	9.7%	9.59
\$20,000-\$40,000	17.8%	22.1%	21.6%	25.8%	19.7%	20.2%	18.9	9 19.0%	19.7%	20.79
\$40,000-\$60,000	24.5%	18.8%	19.0%	20.2%	21.4%	20.4%	21.2	19.9%	20.8%	20.69
\$60,000-\$80,000	13.7%	17.4%	16.1%	17.9%	18.6%	17.8%	16.5%	9 19.3%	19.2%	17.3
\$80,000-\$100,000	11.4%	13.7%	11.0%	9.5%	10.6%	12.2%	13.3	S 19.3%	12.2%	11.5
> \$100,000	20.7%	18.5%	21.3%	17.4%	17.1%	18.7%	20.4	June 8.4%	16.9%	19.1
Prefer not to answer	0.9%	1.1%	0.9%	1.4%	0.3%	1.3%	() 392	a 2.5%	1.4%	1.2
No response	0.0%	0.0%	0.9%	0.3%	0.3%	0.0%	0.0		0.0%	0.19
Political Ideology (%)	0.070	0.070	0.970	0.570	0.570	0.070	Gie	0.070	0.070	0.1
Very liberal	12.2%	12.6%	13.0%	11.2%	10.6%	13.1%	0.0 0 0.0 0 0000000000	2025 0.0%	12.8%	12.5
Liberal	32.1%	30.3%	32.3%	35.9%	29.4%	31.1%	30.4%	a 30.8%	28.6%	31.4
Moderate	29.2%	25.5%	28.2%	26.1%	31.1%	27.3%		A 24.9%	28.3%	27.19
Conservative	19.8%	20.2%	20.7%	17.1%	21.7%	18.7%	20.9%	Q 24.9%	23.6%	27.1
Very conservative	5.8%	10.6%	5.2%	9.5%	6.3%	8.9%	7.4%		5.8%	7.9
Prefer not to answer	0.9%	0.6%	0.3%	9.3% 0.3%	0.3%	0.9%	0.6%	0	0.8%	0.7
							0.8%	ω		
No response	0.0%	0.3%	0.3%	0.0%	0.0%	0.0%	0.3%	0.3% ibliographique de	0.0%	0.1

3 Table S4, continued

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2 3 ^{Tal}	ble S4, continued								1-08. ght,		
4 De	nographics of lay participants by vignette								469 inc		
5		~			_	Best			ud on gVentitator		
6		Catheterization Safety	Best Anti- Hypertensive	Intubation Safety	Best Corticosteroid	Vaccine (first	Best	School	N Nantilator	Masking	
7		Checklist	Drug	Checklist	Drug	attempt)	Vaccine	Reopening	5 Proving	Rules	All vignettes
8 Pol	itical ideology on social issues (%)				<u></u>						
9	Very liberal	18.7%	16.8%	19.6%	13.7%	17.7%	18.0%	17.7%	eptember 2% Enseignemen Enseignemen tuses related to	17.5%	17.5%
10	Liberal Moderate	34.1% 21.6%	33.3% 23.8%	33.4% 23.9%	40.3% 19.9%	31.1% 26.0%	30.4% 25.6%	36.6% 19.8%	S 0353.2% г Ф 1 8%	31.7% 23.3%	34.1% 22.6%
11	Conservative	16.6%	15.4%	17.3%	19.9%	18.0%	16.0%	19.8%	seignement - related to t	23.3% 19.4%	17.0%
12	Very conservative	8.2%	10.4%	5.2%	8.4%	6.3%	9.1%	6.8%		7.5%	8.2%
	Prefer not to answer	0.9%	0.3%	0.6%	0.6%	0.9%	0.9%	0.6%		0.6%	0.6%
13	No response	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	4.00% 4.00% A.Down/to add for text and dat	0.0%	0.0%
14 _{Pol}	itical ideology on economic issues (%)								tế s o		
15	Very liberal	9.9%	12.0%	13.5%	11.2%	8.0%	13.8%	11.8%	€ 5 §.4%	11.9%	11.9%
16	Liberal	28.3%	21.6%	27.1%	28.3%	24.9%	23.3%	27.7%		19.7%	24.8%
17	Moderate	28.0%	27.5%	25.1%	25.2%	27.7%	28.4%	24.2%		32.2%	27.3%
	Conservative	23.0%	24.9%	24.8%	22.1%	30.9%	22.0%	24.2%		26.4%	24.1%
18	Very conservative	9.3%	13.7%	8.6%	12.0%	7.4%	11.3%	11.2%	ata m BE 1 1 1 1 1 1 1 1 1 1	9.2%	11.1%
19	Prefer not to answer No response	1.5% 0.0%	0.3% 0.0%	0.9% 0.0%	1.1% 0.0%	1.1% 0.0%	0.9% 0.2%	0.6% 0.3%	mini.0%	0.6% 0.0%	0.8% 0.1%
$20_{Po^{1}}$	No response itical party (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.270	0.3%		0.0%	0.170
21	Strong Democrat	14.9%	10.9%	12.4%	13.7%	12.0%	13.6%	13.0%	ng,	12.8%	13.2%
22	Democrat	23.3%	22.7%	27.7%	28.9%	26.3%	24.4%	22.7%		21.7%	24.1%
23	Independent (but lean Democrat)	15.7%	16.2%	14.7%	12.9%	13.4%	14.9%	17.4%		15.8%	15.2%
	Independent	15.7%	16.8%	17.6%	14.3%	16.9%	16.9%	13.6%	training, 19,0%	18.1%	16.0%
24	Independent (but lean Republican)	7.0%	8.7%	7.8%	10.4%	9.4%	8.7%	10.6%	Ji 10 .9%	10.6%	9.3%
25	Republican	16.3%	14.6%	14.1%	12.0%	13.1%	15.3%	15.6%	ເດັ 🔒.0%	13.9%	14.5%
26	Strong Republican	4.1%	8.4%	4.3%	7.3%	6.9%	4.9%	6.5%	and .7%	6.4%	6.3%
27	Prefer not to answer	2.9%	1.7%	1.4%	0.6%	2.0%	1.3%	0.3%	nd <u>1</u> .7%	0.8%	1.3%
	No response igion (%)	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	similar 24.4%	0.0%	0.0%
	Christian - Protestant	26.2%	24.6%	23.6%	21.0%	24.6%	24.2%	25.4%	milar t	23.9%	24.2%
29	Christian - Catholic	17.5%	16.5%	15.9%	18.2%	17.7%	14.0%	17.1%		15.3%	16.6%
30	Christian - Other	11.1%	11.2%	8.1%	11.2%	11.7%	11.1%	11.8%	6 10-9%	12.2%	11.0%
31	Jewish	2.6%	1.7%	1.7%	1.7%	1.7%	1.3%	1.8%	19% 19% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1%	2.5%	1.8%
32	Muslim	2.0%	0.8%	1.4%	0.6%	0.3%	0.9%	1.2%	7 9 .1%	1.7%	1.2%
33	Buddhist	2.3%	1.4%	2.0%	1.7%	1.1%	2.0%	2.4%	nolog 0.6%	1.4%	1.7%
	Hindu	1.2%	0.6%	2.6%	1.1%	1.7%	1.6%	0.3%	gie 20,6%	0.6%	1.1%
34	Non-religious	32.7%	38.1%	40.9%	40.3%	36.6%	40.0%	35.4%		36.4%	37.7%
35	Other	3.5%	3.6%	2.6%	3.4%	3.7%	3.8%	4.1%	at.4% ▶7%	4.2%	3.6%
36	Prefer not to answer	0.9%	1.4%	1.2%	0.6%	0.9%	1.1%	0.6%	▶7%	1.9%	1.2%
37 cT	No response EM degree (%)	0.0%	0.0%	0.0%	0.3%	0.0%	0.0%	0.0%	Gen .3%	0.0%	0.1%
38	No	77.6%	77.0%	75.2%	76.8%	77.4%	80.7%	78.5%	n 7 8 .4%	78.6%	77.9%
	Yes	21.9%	22.1%	23.3%	22.4%	22.3%	18.7%	21.5%	200.2%	21.1%	21.3%
39	Prefer not to answer	0.6%	0.8%	1.4%	0.8%	0.0%	0.0%	0.0%	d .0%	0.0%	0.7%
40	No response	0.0%	0.0%	0.0%	0.0%	0.3%	0.7%	0.0%	ð :3%	0.3%	0.1%
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46									—		

Clinicians

There were 2,149 clinician responses across all vignettes. In the clinician samples, survey responses were anonymous, so we could not restrict participation based on our previous studies so some participants who completed the Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes may have also completed the Best Vaccine vignette. For this reason, demographics are reported separately by vignette in Table S5. Across vignettes, a majority of clinicians were female. Over 50% of participants in the sample were registered nurses, followed by physicians and physician assistants. Over 50% of participants in the sample reported that they had been in the medical field for over 10 years. The clinicians reported that they had received training in research methods and statistics via an average of 1.5 of the sources we listed, and that they engaged in an average of 2.5 research methods and statistics.

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Table S5

Demographics of clinicians by vignette

	Intubation	Best		
	Safety	Corticosteroid	Masking	Bes
	Checklist	Drug	Rules	Vaccin
Total N	271	275	349	125
Sex (%)				
Male	18.1%	22.5%	18.1%	18.79
Female	81.9%	77.1%	81.4%	81.29
Other	0.0%	0.4%	0.6%	0.29
Source of research methods/statistics training - select all that apply (%)				
Undergraduate coursework	48.7%	49.5%	48.7%	47.49
Professional school instruction	40.2%	31.3%	34.4%	34.49
Postgraduate coursework	26.2%	20.7%	22.1%	21.19
CME/CEU courses	27.7%	25.1%	24.1%	25.89
Self-instruction via peer-reviewed literature	19.2%	15.6%	17.2%	21.39
Other	7.0%	4.0%	3.2%	3.99
Total number of research methods/statistics training [mean (SD)]	1.69 (1.22)	1.46 (1.02)	1.50 (1.13)	1.54 (1.16
Comfort with research methods/statistics (%)		× /		,
Not at all	8.9%	12.7%	10.9%	11.19
Somewhat	37.6%	44.4%	45.8%	46.69
Moderately	39.5%	32.0%	32.7%	30.89
Very	11.8%	9.1%	8.9%	9.99
Extremely	2.2%	1.8%	1.7%	1.79
Research methods/statistics activities - select all that apply (%)				
Read results of RCT in peer-reviewed journal article	81.2%	75.3%	71.9%	71.29
Changed typical prescription/recommendation after personally				
reading results of RCT in peer-reviewed journal article	41.0%	33.1%	33.0%	39.89
Published scientific paper in peer-reviewed journal	13.3%	12.4%	9.7%	12.09
Conducted or worked on a team conducting an RCT	18.5%	20.0%	19.2%	17.19
Took a course/class in statistics, biostatistics, research methods	73.1%	69.8%	69.1%	68.59
Analyzed data for statistical significance outside of course require	23.6%	21.8%	19.2%	21.19
Used statistical software	12.2%	11.6%	11.5%	9.39
Total number of research methods/statistics activities [mean (SD)]	2.63 (1.69)		2.34 (1.66)	
Currently involved in research (%)	10.7%	2.44 (1.71) 9.1%	2.34 (1.00) 9.7%	2.39 (1.72
Position (%)	10.770	9.170	9.170	9.0
Doctor	14.8%	14.5%	12.6%	15.79
				7.79
Physician Assistant Nurse Practitioner	12.5%	6.9%	9.5%	
	6.3%	2.5%	4.3%	4.79
Nurse (RN)	51.3%	57.1%	55.6%	52.89
Nurse (LPN)	6.3%	9.5%	8.0%	15.69
Nurse (Other)	1.8%	1.1%	1.4%	0.69
Genetic Counselor	0.0%	0.0%	0.0%	0.09
Non-prescribing clinician or staff without clinical credential	0.0%	0.0%	0.0%	0.09
Medical student	5.2%	5.5%	4.6%	0.19
Faculty or Professor	0.4%	0.7%	0.3%	0.39
Other	1.5%	2.2%	3.7%	2.69
Years in medical field (%)	-			_
< 1 year	2.6%	2.9%	3.2%	2.89
1-2 years	6.3%	5.5%	6.0%	5.89
3-5 years	15.1%	11.3%	12.6%	13.69
6-10 years	16.6%	14.2%	15.8%	15.89
> 10 years	59.4%	66.2%	62.5%	62.09

Note. Reported here are the demographics of the clinicians who saw the Intubation Safety Checklist, Best Corticosteroid Drug, or Masking Rules vignette first (responses to the Best Vaccine vignette were collected at a different time). All clinicians who participated in this study completed all vignettes but in randomized order. In the main text, we only analyze responses to the first vignette, so we report demographics similarly here.

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Results presented in main text

In Figures S1-3, we show all individual appropriateness ratings (1 = very inappropriate, 5 = very appropriate) for intervention A, intervention B, and the A/B test across all vignettes.

Figure S1

Lay Sentiments About pRCTs

ſ		eteriz Safety heckli	/	Anti-F	Best Anti-Hypertensive Drug				
° CI)				Section Provides					
Appropriateness Rating (with 95% CI)									
ss Rating					120031				
priatenes									
Appro							2		
l	À	B	A/B Test	Å	B	A/B Test			

Lay Sentiments About Covid-19 pRCTs

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(with 95% CI)		は正常な	調査にな	1. 16. 19. 19. 19. 19. 19. 19. 19. 19. 19. 19	が設定する	A State and		費風完長	N9428.1		活動記載宣			のないで	代目的建設的	の影響ななない。	「新藤木市	
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s Rating		Section 2	「大学の学校						े इ.	1999 - A.	202 Story	S. Harrison					大学の行う	
Appropriateness					19. C. M. C. M.	ななない		「「「	調手続き		4. 1.4.			$\frac{1}{2} \leq 1 \leq \sqrt{2} \leq 1$	997.979.27		* 112第2	東京
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	À	B	A/B Test	Á	B	A/B Test	Á	B	A/B Test	Á	B	A/B Test	Á	B	A/B Test	Á	B	A/B Test
Figuro Clinic		ntime	ents Abo	out Co	vid-19	9 pRCT	S											

Figure S3

	Masking Rules			Intubation Safety Checklist			Best Corticosteroid Drug			Best Vaccine		
اک% CI)						1948 1984 1984 1984 1984 1984 1984 1984	要资料资料		$\mathcal{L}_{\mathcal{T}}}}}}}}}}$		学校の大学	
Appropriateness Rating (with 95% CI)		新田家										
s Ratine			• <mark>•</mark> €s k, sta	<mark>-}:</mark> ,⊘%%%	- 2012年1月			Prair South				
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	Á	B	A∕B Test	Á	B	A/B Test	Á	B	A/B Test	À	B	A/B Test

In Table S6A-C, we present the descriptive and inferential results for all vignettes discussed in the main text.

Table S6A

Descriptive and inferential results of ratings and rankings of interventions and experiment for all vignet	tes
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		Desc	riptive Resu	ults	Inferential Results				
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome			
Lay Sentiments	s About pRO	CTs							
					A/B Effect	$t(342) = 9.74^{***}, d = 0.69 \pm .10^{\circ}$			
					Mean(A,B) > AB	$58\% \pm 5\%$			
	А	3.77 (1.12)	27%	32%	Reverse A/B effect	$t(342) = -9.74^{***}, d = -0.69 \pm .1$			
Catheterization	В	4.03 (1.09)	42%	21%	AB > Mean(A,B)	$27\% \pm 49$			
Safety	AB	3.09 (1.40)	32%	48%	Experiment Aversion	$t(342) = 3.70^{***}, d = 0.25 \pm .1$			
Checklist	Mean(A,B)	3.90 (0.84)	-	-	Min(A,B) > AB	$41\% \pm 5\%$			
(n = 343)	Min(A,B)	3.42 (1.16)	-	-	Experiment Appreciation	$t(342) = -14.61^{***}, d = -1.13 \pm .2$			
laypeople)	Max(A,B)	4.39 (0.81)	-	-	AB > Max(A,B)	15% ± 3°			
••••					Experiment Rejection	$28\% \pm 5\%$			
					(A,B = 3,4,5; AB = 1,2)				
					Experiment Endorsement	$3\% \pm 1$			
					(AB = 4,5; A,B = 1,2,3)				
					A/B Effect	$t(356) = 6.68^{***}, d = 0.52 \pm .1$			
					Mean(A,B) > AB	47% ± 5			
	А	3.87 (1.00)	25%	27%	Reverse A/B effect	$t(356) = -6.68^{***}, d = -0.52 \pm .1$			
Best Anti-	В	3.89 (0.99)	25%	28%	AB > Mean(A,B)	31% ± 5			
Hypertensive	AB	3.24 (1.47)	50%	45%	Experiment Aversion	$t(356) = 5.96^{***}, d = 0.46 \pm .1$			
Drug	Mean(A,B)	3.88 (0.95)	-	-	Min(A,B) > AB	44% ± 5			
(n = 357)	Min(A,B)	3.82 (1.03)	-	-	Experiment Appreciation	$t(356) = -7.26^{***}, d = -0.57 \pm .1$			
laypeople)	Max(A,B)	3.94 (0.95)	-	-	AB > Max(A,B)	$29\% \pm 4$			
_					Experiment Rejection	$34\% \pm 5\%$			
					(A,B = 3,4,5; AB = 1,2)				
					Experiment Endorsement	$18\% \pm 4\%$			
					(AB = 4,5; A,B = 1,2,3)				

Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. Experiment Appreciation refers to the difference between the rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of the intervention. Experiment Rejection is the percentage of people who rated interventions A and B as "neither inappropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate. Experiment Endorsement is the percentage of people who rated the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate.

*p < .05

**p < .01

****p* < .001

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Table S6B

		Des	criptive Resu	lts	Inj	ferential Results
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome
Lay Sentime	nts About (Covid-19 pR		Worst		
·		•			A/B Effect	$t(345) = 10.69^{***}, d = 0.75 \pm .1$
					Mean(A,B) > AB	58% ± 5
	А	3.81 (1.10)	29%	29%	Reverse A/B effect	$t(345) = -10.69^{***}, d = -0.75 \pm .10^{\circ}$
Intubation	В	3.99 (1.13)	43%	19%	AB > Mean(A,B)	25% ± 4
Safety $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$ Checklist $\begin{bmatrix} 1 \\ 1 \end{bmatrix}$	AB	2.98 (1.46)	29%	52%	Experiment Aversion	$t(345) = 5.28^{***}, d = 0.35 \pm .100$
	Mean(A,B)	3.90 (0.88)	-	-	Min(A,B) > AB	45% ± 5
	Min(A,B)	3.46 (1.19)	-	-	Experiment Appreciation	$t(345) = -14.94^{***}, d = -1.14 \pm .13$
	Max(A,B)	4.34 (0.84)	-	-	AB > Max(A,B)	$14\% \pm 3$
laypeople)					Experiment Rejection	210/ + 5
					(A,B = 3,4,5; AB = 1,2)	$31\% \pm 5$
					Experiment Endorsement	40/
					(AB = 4,5; A,B = 1,2,3)	4% ± 2
					A/B Effect	$t(356) = 2.28^*, d = 0.17 \pm .$
					Mean(A,B) > AB	34% ± 5
	А	3.89 (1.03)	17%	32%	Reverse A/B effect	$t(356) = -2.28^*, d = -0.17 \pm .$
Deet	В	3.90 (1.00)	18%	37%	AB > Mean(A,B)	38% ± 5
Best	AB	3.69 (1.37)	65%	31%	Experiment Aversion	$t(356) = 1.55, p = .123, d = 0.12 \pm .$
Corticosteroid	Mean(A,B)	3.90 (0.99)	-	-	Min(A,B) > AB	31% ± 5
Drug	Min(A,B)	3.83 (1.04)	-	-	Experiment Appreciation	$t(356) = -2.99^{**}, d = -0.23 \pm .$
(n = 357)	Max(A,B)	3.96 (0.98)	-	-	AB > Max(A,B)	35% ± 5
laypeople)					Experiment Rejection	2201
					(A,B = 3,4,5; AB = 1,2)	$22\% \pm 4$
					Experiment Endorsement	
					(AB = 4,5; A,B = 1,2,3)	17% ± 4
					A/B Effect	$t(449) = 2.41^*, d = 0.15 \pm$
					Mean(A,B) > AB	
	А	3.95 (1.09)	26%	27%	Reverse A/B effect	
	В	3.84 (1.09)	19%	39%	AB > Mean(A,B)	36% ± 4
	AB	3.72 (1.34)	55%	34%	Experiment Aversion	$t(449) = 0.61, p = .546, d = 0.04 \pm .$
Best Vaccine	Mean(A,B)	3.90 (1.03)	-	-	Min(A,B) > AB	29% ± 4
(n = 450)	Min(A.B)	3.77 (1.13)	-	-	Experiment Appreciation	$t(449) = -4.06^{***}, d = -0.25 \pm .$
laypeople)	Max(A,B)	4.03 (1.04)	-	-	AB > Max(A,B)	32% ± 4
					Experiment Rejection	
					(A,B = 3,4,5; AB = 1,2)	17% ± 3
					Experiment Endorsement	
					(AB = 4,5; A,B = 1,2,3)	$13\% \pm 3$

Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. Experiment Appreciation refers to the difference between the rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of their highest-rated intervention. Experiment Rejection is the percentage of people who rated interventions A and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate. Experiment Endorsement is the percentage of people who rated the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate.

*p < .05

**p < .01

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Table S6B, continued

Descriptive and inferentia	l results of ratings and	rankings of interventions and	experiment for all vignettes
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		Desc	riptive Resu		Inferential Results				
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome			
Lay Senti	ments Abo	ut Covid-19 p	RCTs						
					A/B Effect	$t(338) = 6.42^{***}, d = 0.39 \pm .12$			
					Mean(A,B) > AB	46% ± 5%			
	А	3.45 (1.15)	17%	46%	Reverse A/B effect	$t(338) = -6.42^{***}, d = -0.39 \pm .12$			
	В	3.96 (1.03)	53%	14%	AB > Mean(A,B)	$28\% \pm 5\%$			
School	AB	3.24 (1.36)	30%	40%	Experiment Aversion	$t(338) = 0.47, p = .638, d = 0.03 \pm .1$			
Reopening	Mean(A,B)	3.70 (0.90)	-	-	Min(A,B) > AB	$28\% \pm 5\%$			
(n = 339)	Min(A,B)	3.28 (1.15)	-	-	Experiment Appreciation	$t(338) = -11.25^{***}, d = -0.75 \pm .1$			
laypeople)	Max(A,B)	4.12 (0.91)	-	-	AB > Max(A,B)	15% ± 3%			
					Experiment Rejection				
					(A,B = 3,4,5; AB = 1,2)	$19\% \pm 4\%$			
					Experiment Endorsement				
					(AB = 4,5; A,B = 1,2,3)	$4\% \pm 2\%$			
					A/B Effect	$t(356) = 6.07^{***}, d = 0.42 \pm .1$			
					Mean(A,B) > AB	$45\% \pm 5\%$			
	А	3.82 (1.09)	21%	33%	Reverse A/B effect	$t(356) = -6.07^{***}, d = -0.42 \pm .10^{-10}$			
	В	3.96 (1.07)	36%	25%	AB > Mean(A,B)	$31\% \pm 5\%$			
Ventilator	AB	3.39 (1.38)	43%	42%	Experiment Aversion	$t(356) = 2.63^{**}, d = 0.17 \pm .11$			
Proning	Mean(A,B)	3.89 (0.96)	_	_	Min(A,B) > AB	$36\% \pm 5\%$			
(n = 357)	Min(A,B)	3.61 (1.11)	-	-	Experiment Appreciation	$t(356) = -8.927^{***}, d = -0.64 \pm .1$			
laypeople)		4.17 (0.99)	-	_	AB > Max(A,B)	$22\% \pm 4\%$			
					Experiment Rejection				
					(A,B = 3,4,5; AB = 1,2)	$23\% \pm 4\%$			
					Experiment Endorsement				
					(AB = 4,5; A, B = 1,2,3)	$6\% \pm 2\%$			
					A/B Effect	$t(359) = 14.55^{***}, d = 1.07 \pm .1$			
					Mean(A,B) > AB	$(357) = 14.55$, $u = 1.07 \pm .11$ $68\% \pm 5\%$			
	А	4.19 (0.95)	44%	14%	Reverse A/B effect	$t(359) = -14.55^{***}, d = -1.07 \pm .1$			
	B	3.80 (1.34)	38%	27%	AB > Mean(A,B)	$r(339) = -14.35^{-10}, \ u = -1.07^{-1}$. 21% ± 49			
Masking	AB	2.74 (1.38)	18%	27% 59%	Experiment Aversion	$t (359) = 7.63^{***}, d = 0.56 \pm .1$			
Rules	Mean(A,B)	4.00 (0.91)	-	5770	Min(A,B) > AB	$1(339) = 7.03223, \ a^2 = 0.30 \pm .1$ $50\% \pm 59$			
(n = 360)	Min(A,B)	3.47 (1.22)	-	-	Experiment Appreciation	$t(359) = -20.85^{***}, d = -1.57 \pm .22$			
	,	. ,	-	-	AB > Max(A,B)	$l(539) = -20.85^{+++}, \ a = -1.37 \pm .2$ $8\% \pm 29$			
aypeople)	Max(A,B)	4.53 (0.84)	-	-	Experiment Rejection	8% ± 29			
					(A,B = 3,4,5; AB = 1,2)	38% ± 5%			
					Experiment Endorsement $(AP = 4.5; AP = 1.2.2)$	$3\% \pm 19$			
					(AB = 4,5; A,B = 1,2,3)				

Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the

percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. Experiment Appreciation refers to the difference between the rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of their highest-rated intervention. Experiment Rejection is the percentage of people who rated interventions A and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate. Experiment Endorsement is the percentage of people who rated the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate. *p < .05

**p < .01

***p < .001

p < .00

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Table S6C

		Desc	riptive Resi	ults	Infe	rential Results
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome
Clinician Se	ntiments A	bout Covid-19	9 pRCTs			
					A/B Effect	$t(270) = 9.00^{***}, d = 0.71 \pm .17$
					Mean(A,B) > AB	$57\% \pm 6\%$
	А	3.37 (1.26)	19%	32%	Reverse A/B effect	$t(270) = -9.00^{***}, d = -0.71 \pm .17$
Intubation	В	3.90 (1.12)	53%	14%	AB > Mean(A,B)	$23\%~\pm~5\%$
Safety	AB	2.74 (1.49)	28%	54%	Experiment Aversion	$t(270) = 3.98^{***}, d = 0.30 \pm .15$
Checklist	Mean(A,B)	3.63 (0.96)	-	-	Min(A,B) > AB	43% ± 6%
(n = 271)	Min(A.B)	3.14 (1.23)	-	-	Experiment Appreciation	$t(270) = -12.70^{***}, d = -1.08 \pm .21$
clinicians)	Max(A,B)	4.12 (1.01)	-	-	AB > Max(A,B)	$16\% \pm 4\%$
					Experiment Rejection	$28\%~\pm~5\%$
					(A,B = 3,4,5; AB = 1,2)	
					Experiment Endorsement	$6\% \pm 2\%$
					(AB = 4,5; A,B = 1,2,3)	
					A/B Effect	$t(274) = 6.59^{***}, d = 0.52 \pm .17$
					Mean(A,B) > AB	$48\%~\pm~6\%$
	А	3.76 (1.10)	28%	28%	Reverse A/B effect	$t(274) = -6.59^{***}, d = -0.52 \pm .17$
Best	В	3.74 (1.09)	23%	26%	AB > Mean(A,B)	27% ± 5%
Corticosteroid	AB	3.04 (1.56)	49%	46%	Experiment Aversion	$t(274) = 6.18^{***}, d = 0.49 \pm .17$
Drug	Mean(A,B)	3.75 (1.08)	-	-	Min(A,B) > AB	46% ± 6%
(n = 275)	Min(A,B)	3.71 (1.11)	-	-	Experiment Appreciation	$t(274) = -6.93^{***}, d = -0.55 \pm .17$
clinicians)	Max(A,B)	3.79 (1.08)	-	-	AB > Max(A,B)	$26\%~\pm~5\%$
					Experiment Rejection	$34\% \pm 5\%$
					(A,B = 3,4,5; AB = 1,2)	
					Experiment Endorsement	$15\% \pm 4\%$
					(AB = 4,5; A,B = 1,2,3)	

Descriptive and inferential results of ratings and rankings of interventions and experiment for all vignettes

Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. Experiment Appreciation refers to the difference between the rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of the in highest-rated intervention. Experiment Rejection is the percentage of people who rated interventions A and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate. Experiment Endorsement is the percentage of people who rated the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate.

p < .05p < .01p < .01p < .001

Table S6C, continued

		Desc	riptive Resi	ılts	Inferential Results				
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome			
Clinician	Sentiment	s About Covi	id-19 pRC	Гs					
					A/B Effect	$t(348) = 16.50^{***}, d = 1.27 \pm .20$			
					Mean(A,B) > AB	72% ± 5%			
	А	4.19 (1.05)	39%	15%	Reverse A/B effect	$t(348) = -16.50^{***}, d = -1.27 \pm .20$			
	В	4.01 (1.24)	44%	22%	AB > Mean(A,B)	16% ± 3%			
Masking	AB	2.61 (1.41)	17%	62%	Experiment Aversion	$t(348) = 9.72^{***}, d = 0.74 \pm .1$			
Rules	Mean(A,B)	4.10 (0.88)	-	-	Min(A,B) > AB	$57\% \pm 5\%$			
(n = 349)	Min(A,B)	3.58 (1.20)	-	-	Experiment Appreciation	$t(348) = -22.58^{***}, d = -1.74 \pm .2$			
clinicians)	Max(A,B)	4.62 (0.82)	-	-	AB > Max(A,B)	$6\% \pm 2\%$			
					Experiment Rejection	$43\% \pm 5\%$			
					(A,B = 3,4,5; AB = 1,2)				
					Experiment Endorsement	$2\% \pm 19$			
					(AB = 4,5; A,B = 1,2,3)				
					A/B Effect	$t(1253) = 2.50^*, d = 0.10 \pm .0$			
		0.56 (1.17)	070/	2004	Mean(A,B) > AB	$35\% \pm 3\%$			
	A	3.56 (1.17)	27%	28%	Reverse A/B effect	$t(1253) = -2.50^*, d = -0.10 \pm .0$			
D +	B	3.40 (1.18)	17%	39%	AB > Mean(A,B)	$34\% \pm 3\%$			
Best Vaccine	AB	3.36 (1.38)	56%	33%	Experiment Aversion	$t(1253) = -0.89, p = .375, d = -0.03 \pm .0$			
	Mean(A,B)	3.48 (1.09)	-	-	Min(A,B) > AB	$29\% \pm 2\%$			
(n = 1254	Min(A,B)	3.32 (1.18)	-	-	Experiment Appreciation	$t(1253) = -5.49^{***}, d = -0.22 \pm .0$			
clinicians)	Max(A,B)	3.64 (1.16)	-	-	AB > Max(A,B)	$30\% \pm 29$			
					Experiment Rejection $(A P = 2.45; AP = 1.2)$	$20\% \pm 2\%$			
					(A,B = 3,4,5; AB = 1,2)				
					Experiment Endorsement $(AP = 4.5; AP = 1.2.2)$	$20\% \pm 2\%$			
					(AB = 4,5; A,B = 1,2,3)				

Descriptive and inferential results of ratings and rankings of interventions and experiment for all vignettes	s
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Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. Experiment Appreciation refers to the difference between the rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of their highest-rated intervention. Experiment Rejection is the percentage of people who rated interventions A and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate. Experiment Endorsement is the percentage of people who rated the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate.

*p < .05 **p < .01

***p < .001

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Comparisons to previously published work

To compare these results to our previous findings reporting sentiments about experiments, as we do in the main text, please refer to Heck et al. (2020) [4]. For example, in the Results section "Lay Sentiments About pRCTs," we say, "these levels of experiment aversion near the height of the pandemic were slightly (but not significantly) higher than those we observed among similar laypeople in 2019 ($41\% \pm 5\%$ in 2020 vs. $37\% \pm 6\%$ in 2019 for Catheterization Safety Checklist, p = .31; $44\% \pm 5\%$ in 2020 vs. $40\% \pm 6\%$ in 2019 for Best Anti-Hypertensive Drug, p = .32)." We extracted the percentage of participants who were experiment averse in 2019 from Heck et al. (2020) [4]. We then performed a two-sample z-test for proportions to compare the 2019 and 2020 proportions. As noted in the main text, we did not find a significant difference between the percentage of people who were experiment averse in the current studies which took place in 2020 and 2021 (Catheterization Safety Checklist; $\chi^2(1) = 1.034$, p = .309, Anti- Hypertensive Drug; $\chi^2(1) = 0.998$, p = .318).

Results not presented in the main text

Results of Best Vaccine vignette (initial ambiguous version)

The only vignette which showed no A/B Effect was the initial ambiguous version of Best Vaccine (see Table S6D). The two versions of Best Vaccine both presented a public health official's decision to either distribute an mRNAbased vaccine to every county in their state, distribute an inactivated-virus vaccine to every county, or run an experiment in which counties are randomized to receive one of the two vaccine types. However, in version 1, the wording unintentionally implied that residents could choose their vaccine (by going elsewhere) if they did not wish to be subject to the official's decision (including intervention implementation or A/B test), while in version 2 we eliminated this possible interpretation; we suspect this had the effect of making the experiment condition in version 1 less aversive, since people could effectively opt- out of it, and our goal in this research is to study pragmatic, realworld situations in which avoiding randomization is typically not a realistic option.

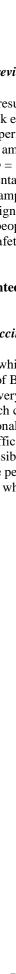


Table S6D

		Desc	riptive Resi	ılts	I	nferential Results
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome
					A/B Effect	$t(349) = -0.72, p = .473, d = -0.05 \pm .15$
					Mean(A,B) > AB	33% ± 5%
Best	А	3.58 (1.08)	21%	29%	Reverse A/B effect	$t(349) = 0.72, p = .473, d = 0.05 \pm .15$
Vaccine	В	3.47 (1.10)	21%	40%	AB > Mean(A,B)	$45\% \pm 5\%$
(initial	AB	3.59 (1.37)	58%	31%	Experiment Aversion	$t(349) = -2.28^*, d = -0.17 \pm .15^\circ$
ambiguous	Mean(A,B)	3.53 (1.02)	-	-	Min(A,B) > AB	$29\% \pm 5\%$
version;	Min(A,B)	3.38 (1.11)	-	-	Experiment Appreciation	$t(349) = -0.84, p = .399, d = -0.07 \pm .13$
n = 350	Max(A,B)	3.67 (1.05)	-	-	AB > Max(A,B)	$40\% \pm 5\%$
loursonle)					Experiment Rejection	21% ± 4%
laypeople)					(A,B = 3,4,5; AB = 1,2)	$21\% \pm 4\%$
					Experiment Endorsement	$24\% \pm 4\%$
					(AB = 4,5; A,B = 1,2,3)	

Order effect in clinician study

For the clinician study of the Catheterization Safety Checklist, Best Anti-Hypertensive Drug, and Masking Rules vignettes, participants were randomly assigned to one of these three vignettes and then completed the remaining two vignettes in random order. For consistency with the rest of this project and with our previous approach (Meyer et al., 2019) [3], we analyze data from this study as a between-subjects design where we only consider the first vignette that every participant completed.

While conducting an interim analysis on the data for this study, we observed an intriguing and unexpected order effect of presentation.

For the first 601 complete responses we received, we observed an effect of presentation order on participants' appropriateness ratings of the A/B test condition within the Best Anti-Hypertensive Drug vignette. Participants who received the Best Anti-Hypertensive Drug vignette first rated the A/B test an average of 2.95 (SD = 1.57), participants who received this vignette second rated the A/B test an average of 3.48 (SD = 1.39), and participants who received this vignette last rated the A/B test an average of 3.78 (SD = 1.41). This suggests that participants who read about other policies and A/B tests before considering the Best Anti-Hypertensive Drug vignette found the A/B test in the Best Anti-Hypertensive Drug vignette to be less objectionable than participants who received this vignette earlier in the survey. The relationship between presentation order (1, 2, or 3) and appropriateness rating of the A/B test was r = .23. This order effect did not emerge for the other two vignettes or for ratings of either intervention (A or B).

After observing this order effect but before examining any additional data, we preregistered this order effect with the goal of replicating it in an independent sample. 294 new participants completed the study after this interim analysis, and we analyzed the data from this sample independently from the sample that generated the order effect. Table S7 displays ratings of the A/B condition within each scenario grouped by the order in which participants received them.

The order effect observed with the Best Anti-Hypertensive Drug A/B test condition replicated (r = .15), as did the absence of any similar order effect for the other conditions.

Table S7

Ratings	of A/B	test i	in	Clinician	Sample	

Exploratory Sample (N = 601)	Best Corticosteroid Drug A/B Rating (SD)	Intubation Safety Checklist A/B Rating (SD)	Masking Rules A/B Rating (SD)
Target Scenario First	2.95 (1.57)	2.79 (1.49)	2.63 (1.43)
Target Scenario Second	3.48 (1.39)	2.53 (1.35)	2.66 (1.44)
Target Scenario Last	3.78 (1.41)	2.78 (1.38)	2.57 (1.29)

Confirmatory Sample (N=294)	Best Corticosteroid Drug A/B Rating (SD)	Intubation Safety Checklist A/B Rating (SD)	Masking Rules A/B Rating (SD)
Target Scenario First	3.22 (1.54)	2.63 (1.50)	2.58 (1.38)
Target Scenario Second	3.49 (1.51)	2.76 (1.39)	2.38 (1.42)
Target Scenario Last	3.77 (1.33)	2.69 (1.15)	2.51 (1.38)

Heterogeneity in experiment aversion

In both the lay participant sample and the clinician sample, associations between demographic variables, including educational attainment, having a degree in a STEM field, years of experience in the medical field, and role in the healthcare system, and sentiment about pRCTs (e.g., A/B effect, experiment aversion, experiment appreciation) are consistently small (r < |.13|, therefore explaining less than 2% of the variance; Tables S8–11).

In the lay sample, women show larger AB and experiment aversion effects (e.g., larger difference between mean intervention rating/lowest-rated intervention rating and AB test rating; r = .067-.068, p < .001) and a smaller experiment appreciation effect (e.g., smaller difference between AB test and highest-rated intervention rating; r = .064, p < .001). Lay participants who are more conservative (in general and with respect to social and economic issues) or more likely to be strong Republicans show lower levels of an AB effect and experiment aversion (i.e., smaller difference between mean intervention rating/lowest-rated intervention rating; n = .094, p < .0001). These participants also show significantly more experiment appreciation, though the strength of the association is weaker (rs = .037-.046, p < .0001).

Finally, we find that people who are non-religious show a larger degree of experiment aversion (r = .061, p < .001; they also show a larger AB effect, r = .051, but p = .007 which is greater than p < .005, the standard proposed in Benjamin et al. (2018)¹⁷ for exploratory analyses without a priori hypotheses). For all other variables, we find no significant associations between the individual difference measures and experiment sentiments (all rs < |.051|, all ps > .005).

In the clinician sample, the strongest association was between self-reported comfort with research methods and statistics and experiment aversion—clinicians who report being more comfortable with research methods and statistics are more likely to appreciate the A/B test (r = 0.070, n = 0.01)

.070, *p* = .001).

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Table S8

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	Size A/ effe	'B	A/l effe		Size experii avers	ment	Experin avers		Experii reject		experiment appeciation	Experin apprecia		Expe endor
	r	р	r	р	r	р	r	р	r	р	r e p	r	р	r
Age	-0.008	0.662	-0.020	0.286	-0.020	0.270	-0.038	0.043	-0.046	0.012	-0.80 F ten 0.809	-0.016	0.389	-0.0
Sex	0.068	<.001	0.048	0.010	0.067	<.001	0.039	0.035	0.059	0.002	seigne -0.elate	-0.071	< 001	-0.
(1 = male, 2 = female)	0.000	0.001	0.010	0.010	0.007		0.057	0.055	0.057	0.002		0.071	0.001	0.0
Race	-0.004	0.814	-0.017	0.360	-0.001	0.945	-0.016	0.388	0.003	0.867	0.00 m 20.706	0.001	0.937	-0.0
(0 = all other, 1 = Nonhispanic White)											0.61 n 20.700 t t 2	0.001		
Education	0.047	0.011	0.033	0.075	0.049	0.008	0.051	0.006	0.029	0.114	-0. 9 4 2 : 0.024	-0.023	0.216	-0.
Income	0.020	0.293	0.005	0.787	0.020	0.273	0.011	0.571	0.005	0.777	-0.024 -0.024 -0.024 -0.001 -0.001 -0.001 -0.001 -0.001	-0.025	0.184	-0.0
Political Ideology	0.114	0001	0.007	0001	0.110	0001	0 101	0001	0.001	0001	t ac	0.042	0.000	
(1 = Very Liberal,	-0.114	<.0001	-0.087	< .0001	-0.118	< .0001	-0.101	<.0001	-0.091	<.0001	0.H0F. 62.0001	0.043	0.022	0.
5 = Very Conservative) Political Ideology (Social)		4											ľ	
(1 = Very Liberal,	-0.123	< .0001	-0.099	<.0001	-0.128	< .0001	-0.118	<.0001	-0.106	< .0001	0.102 ₹.0001	0.039	0.036	0.0
5 = Very Conservative) Political Ideology (Economic)											ed fr.0001 r (ABES) lata=minin			
(1 = Very Liberal,	-0.094	< .0001	-0.065	<.001	-0.095	<.0001	-0.082	<.0001	-0.073	< .0001	0985 🛃.0001	0.046	0.013	0.
5 = Very Conservative)											Al trans 0.561		ľ	
Political Party											tr. bn		ľ	
(1 = Strong Democrat,	-0.096	< .0001	-0.073	< .0001	-0.098	< .0001	-0.075	<.0001	-0.075	< .0001	0.887 😴.0001	0.037	0.050	0.
7 = Strong Republican)											ing,		ł	
Conservatism											g, a		ľ	
(mean of z-scored Political Ideology,											ano		ľ	
Political Ideology (Social), Political	-0.117	<.0001	-0.089	< .0001	-0.121	< .0001	-0.103	< .0001	-0.095	< .0001	0.55 0.0001	0.045	0.015	0.
Ideology (Economic), and Political													ł	ĺ
Party)											om/ or imilar		ł	
Non-religious											± 7		ł	ĺ
(0 = Religious (any religion),	0.051	0.007	0.027	0.150	0.061	<.001	0.049	0.009	0.046	0.015	-0. 6 36 _ 0.053	-0.013	0.496	-0.
1 = non-religious)											ne		ł	ĺ
STEM degree	0.023	0.208	0.016	0.399	0.027	0.154	0.026	0.157	0.027	0.142	-0 8 19 ,0.318	0.016	0.403	0.
(0 = no, 1 = yes) Note. Size of the A/B effect refers to the														L

Note. Size of the A/B effect refers to the magnitude of the difference between the mean intervention rating and the A/B test rating. A/B effect approximation of the difference or a negative difference or a negative difference between their mean intervention rating and their A/B test rating show the A/B effect, people who have a positive difference or a negative difference between their mean intervention rating and their A/B test rating do not show an A/B effect. Size of experiment aversion refers to the magnitude of the difference between their rating of their least-preferred intervention and their A/B test rating are experiment averse, people who have no difference or a negative difference between their rating of their least-preferred intervention and their A/B test rating are experiment averse, people who have no difference or a negative difference are not experiment averse. Experiment rejection refers to the presence or absence of experiment averse, people who have no difference between the difference between their rating the A/B test as "very" or "somewhat" inappropriate reject the experiment. Size of experiment appreciation refers to the magnitude of the difference between their rating of the A/B test rating and the best intervention. Experiment appreciation refers to the presence or absence of experiment appreciation refers to the presence or absence of experiment appreciation -- people who have a positive difference between their rating of the A/B test rating and the best intervention. Experiment appreciation refers to the presence or absence of experiment appreciation -- people who have a positive difference between their rating of the A/B test rating and the best intervention. Experiment appreciation refers to the presence or absence of experiment appreciation -- people who have a positive difference between their rating of the A/B test rating and the best intervention. Experiment appreciation refers to the presence or absence of experiment appreciation --- people who rate the A/B test rating and the

Table S9

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Table S9											ht, includ	084699 o	
Means and percentages of sentir			rimen	ts by c					a: 6		in Berling	-	
	Size of effe		A/B	effect	Size of exp avers		Experiment aversion	Experiment rejection	Size of exp appreci		Experiment appreciation	Exp	periment prsement
	mean	SD		%	mean	SD	aversion %	%	mean	SD			%
Sex	mean	50		70	mean	30	70	70	mean	3D	0°:	ptember 2024. Ensoignomen	70
Male	0.479	1.620		45.6	0.183	1.650	35.7	23.2	-0.775	1.730		ber	9.8
Female		1.630		50.4		1.680	39.5	28.4		1.710	2.540 1.601	20	7.8
Other		1.880		28.6		1.810	28.6			1.980	2 8 6	24.	0.0
Prefer not to answer		1.880		60.0		1.920	40.0			1.870	2000		0.0
Race					6						kt a	N N N	
Black/African-American	0.504	1.597		49.8	0.149	1.647	37.2	21.8	-0.858	1.681	and 2 0 5	loa	9.6
Hispanic or Latino	0.692	1.646		50.2	0.429	1.675	38.8	28.8	-0.954	1.726	2021	lec	7.8
White	0.601	1.631		47.7	0.309	1.671	37.2	26.2	-0.893	1.724	0	∧ <mark>R</mark>	8.4
Asian	0.594	1.634		47.1	0.296	1.645	39.2	26.1	-0.892	1.757	2.52	<u>n</u>	10.5
Other	0.679	1.730		48.7	0.256	1.831	38.5	23.1	-1.103	1.818	266		5.1
Prefer not to answer	1.200	1.623		60.0	0.933	1.624	40.0	33.3	-1.467	1.767	1323		6.7
Education											tra	Ĕ	
Less than high school	1.580	1.440		75.0	1.330	1.610	58.3	41.7	-1.830	1.400	Ē	8	0.0
High school degree		1.550		42.2		1.650	30.6	22.0		1.610	2 ශූ 9	en.	9.0
Some college		1.690		47.5		1.720	36.3	25.2		1.790	24 2 2	, B	10.2
Four-year college degree		1.620		48.7	0.361	1.650	38.4	26.7	-0.925	1.710	2 5 4	i ci	8.0
Some graduate school		1.600		50.0		1.640	37.9	28.2		1.700	2 (B 2	Ĕ	6.5
Graduate degree		1.590		50.6		1.620	41.7	27.8		1.690	1928	P N	8.2
Prefer not to answer	0.750	1.720		50.0	0.667	1.750	33.3	16.7	-0.833	1.720		۲	0.0
Income	0.170					4 4 7 0			0.044		24hd4si8i 25i8i138 138 tor 1000 1008 208	ne	
< \$20,000		1.570		47.8		1.650	37.7	26.8		1.640		6, 2	6.9
\$20,000-\$40,000		1.700		46.6		1.730	37.1	25.0		1.790		2025	10.8
\$40,000-\$60,000		1.630		49.4		1.670	36.9	25.4		1.750			8.9
\$60,000-\$80,000		1.620		49.5		1.640	38.0			1.710		Å	10.5
\$80,000-\$100,000 > \$100,000		1.520 1.620		50.0 47.2		1.530 1.680	41.3 37.5	27.2 25.7		1.640 1.700		at Agence	6.0 7.4
> \$100,000 Prefer not to answer		1.940		47.2		2.080	37.3			1.930			2.8
No response	-0.250			25.0		1.000	0.0			0.816		Bib	0.0
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		effe		A/B effect	avers	-	aversion	rejection	apprecia			eciation	endorse
		mean	SD	%	mean	SD	%	%	mean	SD		Ser %	
Political Id	leology										En	1 1 1	
Ve	ry liberal	0.888	1.740	54.3	0.590	1.780	44.1	31.1	-1.190	1.830	sei	19.8	1
Lib	beral	0.753	1.650	51.6	0.491	1.680	42.3	29.8	-1.010	1.740 1.670	elat	20.2	
Mo	oderate	0.557	1.570	47.5	0.247	1.600	36.2	25.4	-0.867	1.670		21.1	
Co	nservative	0.380	1.600	43.8	0.058	1.650	33.1	21.4	-0.703	1.700	to ent	25.0	1
Ve	ry conservative	0.307	1.520	39.0	0.026	1.570	27.7	18.6	-0.589	1.500	le su	2 4.2	
Pre	efer not to answer	0.684	1.680	57.9	0.263	1.560	31.6	21.1	-1.110	1.940	tar	21.1	
No	response	0.625	0.750	50.0	0.250	0.957	50.0	50.0	-1.000	0.816	Superieu ext and d	0.0	1
Political Id	leology (Social)										at (b D	
Ve	ry liberal	0.927	1.720	55.7	0.628	1.760	46.3	33.3	-1.230	1.810	ABES a mini	5 19.1	
Lit	peral	0.714	1.610	51.2	0.445	1.640	41.1	28.5	-0.983	1.810 1.710	<u>ini</u>	B 20.9	
Mo	oderate	0.498	1.600	45.2	0.205	1.660	35.2	25.0	-0.791	1.680		22.1	
Co	nservative	0.321	1.590	42.5	-0.016	1.630	30.6	19.8	-0.658	1.710	A	22.1 25.1 22.6 16.7 0.0 19.9 18.9 21.4 25.5 22.7	
Ve	ry conservative	0.362	1.500	40.6	0.059	1.550	28.9	18.8	-0.665	1.590	tra	22.6	
Pre	efer not to answer	0.528	1.540	55.6	0.222	1.560	33.3	11.1	-0.833	1.650		9 16.7	
No	response	-1.000	NA	0.0	-2.000	NA	0.0	0.0	0.000	NA	<u>e</u>	B 0.0	1
Political Id	leology (Economic)										an	Å	
Ve	ry liberal	0.795	1.760	49.4	0.514	1.770	40.5	28.6	-1.080	1.870	ds	19.9	
Lib	peral	0.800	1.630	53.8	0.512	1.670	43.7	31.5	-1.090	1.730	<u>B</u>	18.9	
Mo	oderate	0.594	1.600	48.2	0.307	1.650	38.0	25.5	-0.882	1.670	ar	o 21.4	
Co	nservative	0.401	1.580	44.2	0.076	1.620	33.5	22.4	-0.726	1.710	tec	2 5.5	
Ve	ry conservative	0.435	1.600	42.9	0.165	1.650	30.7	21.7	-0.705	1.660		22.7	
Pre	efer not to answer	0.783	1.540	65.2	0.435	1.530	39.1	21.7	-1.130	1.660	р g	p 13.0	ł
No	response	-1.000	0.000	0.0	-1.500	0.707	0.0	0.0	0.500	0.707	gie	8 50.0	ł
Political Pa	arty											25	
Str	ong Democrat	0.869	1.710	54.6	0.582	1.720	43.9	28.7	-1.160	1.820		1 9.6	r
De	mocrat	0.701			0.411	1.690	39.7	29.9	-0.990	1.700		1 9.9	
In	dependent (but lean Democrat)	0.755	1.620	51.9	0.470	1.640	42.0	29.6	-1.040	1.730		21.0	J
Ind	lependent	0.468	1.590	43.7	0.173	1.630	34.0	23.3	-0.762	1.670		B 22.1	
In	dependent (but lean Republican)	0.437	1.720	42.4	0.144	1.730	33.9	24.7	-0.731	1.830		28.8	
Re	publican	0.387	1.550	44.8	0.076	1.610	33.4			1.640		22 .5	
Str	ong Republican	0.432	1.500	44.0	0.130	1.570	32.6	20.7	-0.734	1.580	- -	aj 21.7	
Pre	efer not to answer	0.615	1.580	56.4	0.282	1.490	41.0	23.1	-0.949	1.790		Bibliographic 22.1 28.8 22.5 21.7 20.5 0.0 0.0	
No	response	-1.000			-2.000	NA	0.0 nj.com/site			NA	. 6	ue 0.0 de	1

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cted by copyright, includ 5/bmjopen-2024-084699 Table S9, continued Means and percentages of sentiments about experiments by demographic variable in lay participants ο Experiment Size of A/B Size of experiment Experiment Experiment Size of experiment Experiment A/B effect appreciation Endorsement appreciation effect aversion aversion rejection ер SD % SD % % SD % mean mean mean Religion tember 2024. Downloaded Enseignement Superieur (/ 0.515 1.620 Christian - Protestant 45.9 0.212 1.680 34.9 24.3 -0.818 1.700 22.5 10.0 Christian - Catholic 0.483 1.510 46.7 0.176 1.550 34.4 21.6 -0.790 1.610 20. ed Christian - Other 0.589 1.650 48.3 0.298 1.690 37.3 25.4 -0.881 1.740 22.90 Jewish 0.868 1.720 54.7 0.453 1.840 43.4 32.1 -1.280 1.770 13 lex 0.357 1.700 31.4 Muslim 45.7 -0.057 1.800 28.6 20.0 -0.771 1.780 17.1 and Buddhist 0.840 1.690 54.0 0.520 1.570 48.0 32.0 -1.160 1.940 24.0 14.0Hindu -0.129 1.550 38.7 -0.452 1.570 29.0 16.1 -0.194 1.620 35.5 19.4 0.704 1.650 -0.973 21.1 Non-religious 49.9 0.435 1.680 40.7 28.5 1.750 € from http://bmjopen.bm ABES) 22.1 min. 0.673 1.780 Other 49.0 0.337 1.810 40.4 31.7 -1.0101.880 1.090 1.570 Prefer not to answer 58.8 0.794 1.650 41.2 38.2 -1.3801.600 ng 0.0 1.250 1.770 50.0 1.000 50.0 -1.500 No response 1.410 50.0 2.120 Þ STEM degree training, 1.650 No 0.587 1.620 47.9 0.289 37.2 25.6 -0.885 1.720 21. Yes 0.680 1.680 49.8 0.397 1.740 28.5 -0.963 1.750 22.9 10.0 40.3 Prefer not to answer 0.400 1.510 40.0 0.200 1.510 30.0 15.0 -0.600 1.570 25.0 0.0 an 0.250 1.060 50.0 0.707 0.0 0.0 No response -0.500 -1.000 1.410

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Size of the A/B effect refers to the magnitude of the difference between the mean intervention rating and the A/B test rating. A/B effect refers to the presence or absence of an A/B effect -- people who have a positive difference between their mean intervention rating and their A/B test raises show the second seco the A/B effect, people who have no difference or a negative difference between their mean intervention rating and their A/B test rating do not show an A/B effect. Size of experiment aversion refers to the magnitude of the difference between the worst intervention rating and the A/B test rating. Experiment aversion refers to the presence or absence of experiment aversion -- people who have a positive difference between their rating of their least-preferred intervention and their A/B test rating are experiment averse, people who have no difference or a negative difference are not experiment averse. Experiment rejection refers to the presence or absence of experiment rejection -- people who rate interventions A and B as "neither ъ inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate reject the experiment. Size experiment appreciation refers to the magnitude of the difference between the A/B test rating and the best intervention. Experiment appreciation refers to the presence or absence of experiment appreciation -- people who have a positive difference between their rating of the A/B test and the rating of their most-preferred intervention are experiment appreciative. Experiment endorsement refers to the presence or absence of experiment endorsement -- people who rate the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate Gor appropriate" or less appropriate endorse the experiment. phique

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Table S10

	Size A/I effe	В	A/ effe		Size experi avers	ment	Experi avers		Experi rejec		Size experir apprec	nent	~	_ 7	Experi	
	r	p	r	р	r	р	r	р	r	р	r	р	r	ign	r r	р
Sex (1 = male, 2 = female)	0.016	0.453	0.016	0.457	0.000	0.991	-0.011	0.619	-0.021	0.326	-0.030	0.165	-0.026	em@nt ledJo	8 -0.032	0.134
Number of research methods/statistics training units	-0.005	0.812	0.000	0.992	0.000	0.999	0.016	0.471	0.017	0.428	0.010	0.659	0.019	te <u>Xi</u> a	0.010	0.643
Comfort with research methods/statistics	-0.036	0.100	-0.018	0.410	-0.039	0.071	-0.021	0.335	-0.016	0.446	0.030	0.165	0.070	erieur Ind ^C da	0.045	0.035
Number of research methods/statistics activities	-0.019	0.375	-0.022	0.301	-0.006	0.796	0.006	0.778	0.020	0.360	0.031	0.157	0.041	(ABE	0.023	0.279
Currently involved in research	-0.002	0.912	-0.012	0.570	-0.009	0.691	-0.016	0.470	-0.022	0.309	-0.004	0.870	-0.024	16267 (6207	0.009	0.693
Position (0 = non-prescriber, 1 = prescriber)	0.033	0.121	0.029	0.176	0.040	0.061	0.042	0.050	0.052	0.016	-0.025	0.250	-0.020	, 0 2 47 ₽	-0.021	0.338
Years in medicine	0.016	0.452	-0.004	0.865	0.011	0.599	-0.007	0.734	0.006	0.792	-0.020	0.362	0.029	0 3 185	-0.003	0.879
														ng,	Nen n	

Note. Size of the A/B effect refers to the magnitude of the difference between the mean intervention rating and the A/B test rating. A/B effect refers to the presence or absence of an A/B effect -- people who have a positive difference between their mean intervention rating and their A/B test rating show the A/B effect, people who have no difference or a negative difference between their mean intervention rating and their A/B test rating do not show in AB effect. Size of experiment aversion refers to the magnitude of the difference between the worst intervention rating and the A/B test rating. Experiment aversion refers to the presence or absence of experiment aversion -- people who have a positive difference between their rating of their least-prefered prevention and their A/B test rating are experiment averse, people who have no difference or a negative difference are not experiment averse. Experiment refection refers to the presence or absence of experiment rejection -- people who rate interventions A and B as "neither inappropriate nor appropriate" or nor appropriate while rating the A/B test as "very" or "somewhat" inappropriate reject the experiment. Size of experiment appreciation refers to the magnified of the difference between the A/B test rating and the best intervention. Experiment appreciation refers to the presence or absence of experiment appreciation -people who have a positive difference between their rating of the A/B test and their rating of their most-preferred intervention are experiment appreciative. Experiment endorsement refers to the presence or absence of experiment endorsement -- people who rate the A/B test as "very" or "somewhat" popropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate endorse the experiment. ence Bibliographique de l

			BMJ Ope	'n				5/bmjopen-2024-084699 o cted by copyright, includ		3
Table S11								024-08469 yright, ind		
Means and percentages of sentiments about experiments by demog	graphic	variabl	le in clinicia	n sample				99 o clud		
	Size	e of ⁄B	A/B effect	Size experi		Experiment	Experiment	expQriment	Experiment	Experimen
	eff	ect		avers		aversion	rejection	apperiation	appreciation	endorsemen
	mean	SD	%	mean	SD	%	%	mean S	D %	
Sex								0 (5) Ŏ		
Male	0.456	1.800	43.9	0.270	1.800	38.5	28.2	-0.@	0 26.5	17
Female	0.529	1.750	45.9	0.271	1.750	37.2	25.8	-0. ed -0. 20 24. I	0 23.6	14
Other	0.000	1.870	40.0	0.000	1.870	40.0	20.0	0.000000000000	0 20.0	20
Source of research methods/statistics training								0.087 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.080 0.087 0.097 0.087 0.087 0.087 0.097 0.0000000000		
Undergraduate coursework	0.483	1.755	44.2	0.258	1.753	37.7	26.5	-0.7872.587	0 25.0	14
Professional school instruction	0.571	1.767	46.0	0.314	1.756	38.2	27.1	-0.828 6 91	6 22.8	14
Postgraduate coursework	0.624	1.818	49.4	0.402	1.809	41.5	29.4	-0.時た 192	0 24.5	14
CME/CEU courses	0.463	1.788	47.1	0.217		38.6	26.6	-0.7 59822 6 92	5 25.7	10
Self-instruction via peer-reviewed literature	0.333	1.820	41.2	0.097	1.798	32.9	23.2	-0.3499 1.94	9 27.3	10
Other	0.722	1.902	46.7	0.478	1.915	41.1	32.2	-0. 9	6 22.2	14
Comfort with research methods/statistics								A 🕌		
Not at all		1.760		0.432		37.7	26.3	<u> </u>		
Somewhat		1.710		0.282		37.8				
Moderately		1.770		0.237		38.3				
Very		1.910								
Extremely	0.105	2.020	31.6	-0.079	2.050	28.9	23.7	-0.2 -0.2 -0.2 -0.2 -0.2 -0.2 -0.2 -0.2	0 26.3	23
Research methods/statistics activities								in g		
Read results of RCT in peer-reviewed journal article	0.521	1.772	45.5	0.284	1.762	38.0	27.2	-0.7 8 5.89	8 24.7	1:
Changed typical prescription/recommendation after								.te		
personally reading results of RCT in peer-reviewed	0.430	1.813	43.3	0.217	1.814	36.8	26.3	2 3	1	10
journal article								e 6 Nol	26.6	
Published scientific paper in peer-reviewed journal		1.692				38.2	29.9	-0.220 1080	2 22.8	
Conducted or worked on a team conducting an RCT	0.371	1.745	42.9	0.114	1.725	35.1	20.9	-0.6% 8 2590	2 25.8	10
Took a course/class in statistics, biostatistics, research methods	0.505	1.775	45.0	0.277	1.770	37.8		-0.732 a		1:
Analyzed data for statistical significance outside of	0.470	1.781	43.7	0.251	1 766	36.7	<i>26.2</i>	-0.690 ge 91	2 26.2	1:
course requirement								i i i i i i i i i i i i i i i i i i i		
Used statistical software	0.588	1.803	49.3	0.389	1.795	42.5	31.7	-0.787 bbliographique de l	5 26.7	14

79 Table S11, continued			BMJ Ope	'n				5/bmjopen-2024-084699 o cted by copyright, includ		
Means and percentages of sentiments about expe	riments by demographic	variabi	le in clinicia	n sampl	е			Ja o		
		e of /B	A/B effect	Size	iment	Experiment aversion	Experiment rejection	Saze of 1 expariment	Experiment appreciation	Experimen endorsemer
	mean		%	aver mean	sion SD	%	%	appreciation megn E 6SD	%	
Currently involved in research	mean	50	70	mean	50	/0	70			
Yes	0.526	1.740	47.4	0.316	1.720	39.7	29.2	-0.7 a/ 51.860	27.3	1
No	0.512	1.760	45.3	0.265	1.760	37.2	25.9			1
Position								to en 4.		
Doctor	0.556	1.730	45.5	0.374	1.720	39.9	28.7	-0.7 8 801840	23.1	1
Physician Assistant	0.757	1.780	53.0	0.508	1.780	44.3	34.4	-1.0 ² 0513390	21.9	1
Nurse Practitioner	0.500	1.910	45.9	0.184	1.970	36.7	25.5	-0.8±6=2030	23.5	1
Nurse (RN)	0.436	1.720	43.8				23.9	-0.6 ස 0ຊື້1 ຊີ 50		
Nurse (LPN)	0.410	1.790	42.1	0.150	1.760	33.5	22.6	-0.6	24.8	
Nurse (Other)	1.180	1.910	65.0	0.800	1.910	55.0	35.0	-1.5	10.0	
Genetic Counselor			<u> </u>					₽,90 <mark>-</mark>		
Non-prescribing clinician or staff without	clinical							ittp: ig, /		
credential								-1.4 1 0 1330		
Medical student	1.170	1.770	65.2	0.935			45.7			
Faculty or Professor	1.120	2.050	62.5	0.875	2.030	50.0	37.5		25.0	
Other	0.727	2.000	45.5	0.618	1.980	41.8	32.7	-0.856 2.060	25.5	
Years in medical field								anc		
< 1 year		1.540		0.377			32.8	<u> </u>		
1-2 years		1.720					29.4	-0.7 8 6 1 8 40		
3-5 years		1.570		0.140			21.3	-0.643 1490		
6-10 years		1.730					24.6			
> 10 years	0.555	1.820	45.9	0.303	1.810	37.5	27.1	►-0.8 6 7 15950	23.7	

difference between the worst intervention rating and the A/B test rating. Experiment aversion refers to the presence or absence of experiment a problem who have a positive difference between their rating of their least-preferred intervention and their A/B test rating are experiment averse, people who have no afference or a negative difference are not experiment averse. Experiment rejection refers to the presence or absence of experiment rejection -- people who rate intervent and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate reject the experiment. Size of experiment appreciation refers to the magnitude of the difference between the A/B test rating and the best intervention. Experiment appreciation refers to the presence ogabsence of experiment appreciation -- people who have a positive difference between their rating of the A/B test and their rating of their most-preferred intervention are experiment appreciative. Experiment endorsement refers to the presence or absence of experiment endorsement -- people who rate the A/B test as "very" or "somewhat appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate endorse the experiment. phique

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Aversion to pragmatic randomized controlled trials: Three survey experiments with clinicians and laypeople

STROBE Statement-checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
Title and abstract	1	(<i>a</i>) Indicate the study's design with a commonly used term in the title or the abstract	1
		(<i>b</i>) Provide in the abstract an informative and balanced summary of what was done and what was found	2-4
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	6-8
Objectives	3	State specific objectives, including any prespecified hypotheses	9
Methods		×	
Study design	4	Present key elements of study design early in the paper	9-14
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	9, 13-14
Participants	6	 (a) Cohort study—Give the eligibility criteria, and the sources and methods of selection of participants. Describe methods of follow-up Case-control study—Give the eligibility criteria, and the sources and methods of case ascertainment and control selection. Give the rationale for the choice of cases and controls Cross-sectional study—Give the eligibility criteria, and the sources and methods of selection of participants (b) Cohort study—For matched studies, give matching criteria and number of exposed and unexposed Case-control study—For matched studies, give matching criteria and the number of controls per case 	9, 13-14
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	13
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	9-14
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	SM 3-4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	13
Statistical methods	12	(<i>a</i>) Describe all statistical methods, including those used to control for confounding	SM 7
		(b) Describe any methods used to examine subgroups and interactions	N/A
		(c) Explain how missing data were addressed	N/A
		(d) Cohort study—If applicable, explain how loss to follow-up was addressed Case-control study—If applicable, explain how matching of cases and controls was addressed	N/A

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		taking account of sampling strategy	
		(<u>e</u>) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers	9, 13-14
F	-	potentially eligible, examined for eligibility, confirmed eligible, included in	- , -
		the study, completing follow-up, and analysed	
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social)	SM 14-1
1		and information on exposures and potential confounders	SM 28-3
		(b) Indicate number of participants with missing data for each variable of	N/A
		interest	
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	Cohort study—Report numbers of outcome events or summary measures over	N/A
		time	
		Case-control study—Report numbers in each exposure category, or summary	N/A
		measures of exposure	
		Cross-sectional study—Report numbers of outcome events or summary	N/A
		measures	
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted	14-18
		estimates and their precision (eg, 95% confidence interval). Make clear which	SM 21-2
		confounders were adjusted for and why they were included	
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk	N/A
		for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and	SM 26-3
		sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	14-18
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias	20-22
		or imprecision. Discuss both direction and magnitude of any potential bias	
Interpretation	20	Give a cautious overall interpretation of results considering objectives,	18-20
-		limitations, multiplicity of analyses, results from similar studies, and other	
		relevant evidence	
Generalisability	21	Discuss the generalisability (external validity) of the study results	20-22
Other informatio	on		
Funding	22	Give the source of funding and the role of the funders for the present study	27
- 0	-	and, if applicable, for the original study on which the present article is based	

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at

http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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Aversion to pragmatic randomized controlled trials: three survey experiments with clinicians and laypeople in the United States

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Aversion to pragmatic randomized controlled trials: three survey experiments with clinicians and laypeople in the United States

Randi L. Vogt (0000-0003-1709-0471)*, Patrick R. Heck (0000-0003-0819-3890)*, Rebecca M. Mestechkin (0009-0002-2976-0364), Pedram Heydari (0000-0002-9804-1091), Christopher F. Chabris (0000-0002-7379-7378)[†], Michelle N. Meyer (0000-0001-5497-8803)[†]§

Randi L. Vogt, postdoctoral fellow, Department of Bioethics & Decision Sciences, Geisinger, Danville, PA, USA

Patrick R. Heck, staff scientist, Department of Bioethics & Decision Sciences, Geisinger, Danville, PA, USA

Rebecca M. Mestechkin, predoctoral fellow, Department of Bioethics & Decision Sciences, Geisinger, Danville, PA, USA

Pedram Heydari, assistant professor, Department of Economics, Northeastern University, Boston, MA, USA

Christopher F. Chabris, professor, Department of Bioethics & Decision Sciences, Geisinger, Danville, PA, USA

Michelle N. Meyer, associate professor and chair, Department of Bioethics & Decision Sciences, Geisinger, Danville, PA, USA

*Contributed equally

[†]Contributed equally

§Correspondence to:

Michelle N. Meyer

michellenmeyer@gmail.com

Abstract

Objectives: Pragmatic randomized controlled trials (pRCTs) are essential for determining the real-world safety and effectiveness of healthcare interventions. However, both laypeople and clinicians often demonstrate experiment aversion: preferring to implement either of two interventions for everyone rather than comparing them to determine which is best. We studied whether clinician and layperson views of pRCTs for Covid-19 or other interventions became more positive early in the pandemic, which increased both the urgency and public discussion of pRCTs.

Design: Randomized survey experiments.

Setting: Geisinger, a network of hospitals and clinics in central and northeastern Pennsylvania, U.S.; Amazon Mechanical Turk, a research participant platform used to recruit online participants residing across the U.S. Data was collected between August 2020 and January 2021.

Participants: 2,149 clinicians (the types of people who conduct or make decisions about conducting pRCTs) and 2,909 laypeople (the types of people who are included in pRCTs as patients) in 2020 and 2021. The layperson sample ranges in age from 18 to 88 years old (mean = 38.4, SD = 12.8) and the majority were White (74.6%) and female (55.9%). The clinician sample was primarily female (80.8%), comprised doctors (14.9%), physician assistants (8.5%), registered nurses (53.6%), and other medical professionals, including other nurses, genetic counselors, and medical students (23%), and the majority of clinicians had more than 10 years of experience (62.3%).

Outcome measures: Participants read vignettes in which a hypothetical decision-maker who sought to improve health could choose to implement intervention A for all, implement

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intervention B for all, or experimentally compare A and B and implement the superior intervention. Participants rated and ranked the appropriateness of each decision. Experiment aversion was defined as the degree to which a participant rated the experiment below their lowest-rated intervention.

Results: In a mid-pandemic survey of laypeople, we found significant aversion to experiments involving catheterization checklists and hypertension drugs unrelated to the treatment of Covid-19 (Cohen's d = 0.25-0.46, p < .001). Similarly, among both laypeople and clinicians, we found significant aversion to most (comparing different checklist, proning, and mask protocols; Cohen's d = 0.17-0.56, p < .001) but not all non-pharmaceutical Covid-19 experiments (comparing school reopening protocols; Cohen's d = 0.03, p = .64). Interestingly, we found the lowest experiment aversion to pharmaceutical Covid-19 experiments (comparing new drugs and new vaccine protocols for treating the novel coronavirus; Cohen's d = 0.04-0.12, p = .12-.55). Across all vignettes and samples, 28% to 57% of participants expressed experiment aversion, whereas only 6% to 35% expressed experiment appreciation by rating the trial higher than the participant's highest-rated intervention.

Conclusions: Advancing evidence-based medicine through pRCTs will require anticipating and addressing experiment aversion among patients and healthcare professionals.

Study registration: https://osf.io/u945y/?view_only=a901fde13ddb423899074eb79964c6cd

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Strengths and limitations of this study

- The decision-science approach used in this paper enables measurement of aversion towards pragmatic randomized controlled trials (pRCTs) in large and diverse samples of laypeople and clinicians.
- The size of the experiment aversion effect is measured in eight pRCT vignettes (in the layperson sample) and four pRCT vignettes (in the clinician sample) that describe a range of pRCTs from pharmaceutical medical interventions to non-pharmaceutical medical interventions to public health interventions, and specific to the Covid-19 pandemic as well as more general medical situations.
- The large sample sizes ensured sufficient statistical power to detect experiment aversion in each vignette and sample.
- The samples may not perfectly represent all healthcare professionals or members of the general public as they are convenience samples of clinicians at a specific teaching hospital system in the United States and laypeople on a specific online crowdworking platform.
- Participants expressed attitudes and judgments about the appropriateness of carrying out pRCTs or implementing policies, but were not in a position to make a real decision to execute the pRCTs or policies.

INTRODUCTION

 Pragmatic randomized controlled trials (pRCTs) are crucial for understanding how to safely, effectively, and equitably prevent and treat disease and deliver healthcare. Randomized evaluation is the gold standard in medicine, largely because it permits one to infer that an intervention *caused* an outcome, such as reduction of symptoms or improvement in a biomarker. Randomized experiments have repeatedly upended conventional clinical wisdom and the results of observational studies [1,2] and are urgently needed to evaluate new technologies [3,4]. Compared to more explanatory trials, trials that are further towards the pragmatic end of the spectrum [5] evaluate effectiveness of the intervention in more real-world contexts. Such pragmatism is critical for ensuring that causal evidence from randomized evaluation speaks to the effects of interventions in the circumstances in which they would be implemented (or maintained).

Yet despite their importance to healthcare quality and safety, pRCTs often prove controversial—even when they compare interventions that are within the standard of care or are otherwise unobjectionable, and about which the relevant expert community is in equipoise. Several recently published pRCTs—including Surfactant, Positive Pressure, and Oxygenation Randomized Trial (SUPPORT) [6], Flexibility in Duty Hour Requirements for Surgical Trainees (FIRST) [7], and Individualized Comparative Effectiveness of Models Optimizing Patient Safety and Resident Education (iCOMPARE) [8]—have received considerable criticism from physician-scientists, ethicists, and regulators [9,10] and in the public square [11–14]. Although criticisms of pRCTs can be complex, nuanced, and sometimes valid, many appear to reflect a rejection of the very idea that a randomized experiment was conducted, as opposed to simply giving everyone one of the interventions that was trialed. Our research applies concepts and

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methods from the behavioral and decision sciences to systematically explore whether, when, and why people might genuinely object to running pRCTs in healthcare, public health, and other domains.

In prior studies—inspired by several "notorious pRCTs," including technology industry "A/B tests" [15–17]—we confirmed that substantial shares of both laypeople and clinicians can be averse to randomized evaluation of efforts to improve health [18,19]. People rated a pRCT designed to compare the effectiveness of two interventions as less appropriate than the average appropriateness of implementing either one, untested, for everyone. We called this phenomenon the "A/B effect" [18]. In some cases, the lower average rating of an experiment could be driven not by dislike of experiments, per se, but by many raters' belief that one of the experiment's arms is inferior to the other [18–21]. Importantly, such beliefs are often based on intuition rather than evidence and have the potential to undermine evidence-based medicine. Yet this form of experiment rejection is not illogical, given the individual's own beliefs. We also, however, documented a more peculiar (if no less dangerous) phenomenon of "experiment aversion," which occurred when people rated the pRCT as significantly less appropriate than implementing *their* own least-preferred intervention contained within the trial. In this pattern of decision-making, in other words, people who perceive that one intervention is good and the other is less good prefer that everyone receive the less good (or even bad) intervention rather than half the people receiving the better one, and without comparing the two to determine whether one is really better than the other [19]. Such judgments could reflect a more general skepticism about or opposition to pRCTs, at least within specific domains of inquiry. For instance, people may be averse to the inequality or disparate treatment that is necessarily (temporarily) imposed by any RCT (pRCT or otherwise), the uncertainty signaled by agents (often trusted experts) who decide they do not

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already know what works and need to conduct a pRCT, the process of assigning people to treatments "randomly" as opposed to using expert judgment, or something else viewed as undesirable. Both patterns of negative sentiments about experiments can impede efforts to assure and improve health outcomes.

The Covid-19 pandemic presented the potential for an inflection point in attitudes towards pRCTs. In April 2020, 72 Covid-19 drug trials were already underway [22] and more traditional, explanatory RCTs became daily, front-page news. Because explanatory and pragmatic RCTs share many key features that participants in our prior research often cited as partial explanations for their lower ratings of experiments—including random assignment to different conditions [18]—that sustained exposure to explanatory RCTs might have educated people about the value of healthcare pRCTs, too, and/or made them seem less exceptional and more normative. Our previous research also suggests that another cause of experiment aversion is an illusion of knowledge—a (mis)perception that experts already must know what works best and should simply implement those interventions without further study. But Covid-19 was a novel disease, and—at least in the case of pharmaceutical interventions—no sensible person thought the correct treatments were already obvious. People therefore may have been less averse to Covid-19 pRCTs (e.g., trials comparing Covid-19 proning protocols or masking rules) than to pRCTs that test interventions for familiar conditions or problems, such as hypertension or hospital-acquired infections. On the other hand, because of the urgency attached to Covid-19, people may have been more averse to Covid-19 RCTs, being even less inclined to risk giving someone a treatment that might turn out to "lose" in a comparison study [23,24]. Finally, even if the pandemic did not affect public attitudes towards explanatory or pragmatic RCTs, it could have affected the attitudes of clinicians, many of whom were involved in Covid-19 research.

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Because clinicians strongly influence whether particular RCTs are conducted (both explanatory and pragmatic), their attitudes matter. Here, we investigated attitudes towards pRCTs in the first year of the pandemic by conducting a series of preregistered studies conducted between August 2020 and February 2021.

METHODS

Study setting

The study was conducted online using the Qualtrics platform [25]. For the layperson sample, we used the CloudResearch service [26,27] to recruit adult crowd workers on Amazon Mechanical Turk [28] living in the U.S. to participate in a brief online survey. These services provide samples that are broadly representative of the U.S. population and are well-accepted in social science research as providing as good or better-quality, diverse samples of research participants than common convenience samples such as student volunteers, with results that are similar to probability sampling methods [29–31]. Clinicians of various levels in healthcare were recruited by email (following a procedure successfully used in several previous studies including [18]) from Geisinger, a network of hospitals and clinics in central and northeastern Pennsylvania, U.S. with a medical school and a research institute. Geisinger's IRB determined that these surveys were exempt (IRB# 2017-0449).

Study design

Data was collected between August 2020 and January 2021 (Table S1). First, we used decisionmaking vignettes from our previous work to ask whether the extraordinary publicity around (primarily explanatory) Covid-19 RCTs reduced general healthcare experiment aversion by the

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public. Next, we adapted these vignettes to determine whether the public was averse to pRCTs on pharmaceutical and/or non-pharmaceutical interventions (NPIs) for Covid-19. Finally, we recruited a large clinician sample to investigate how their attitudes compared to those of laypeople.

Participants were evenly randomized to read one of the vignettes. Randomization was accomplished using a proprietary least filled quota algorithm built into the Qualtrics survey software, such that aside from participants who withdrew before completing the survey, the same number of participants are allocated to each vignette (see Supplemental Materials for additional details). Each vignette described a problem that the decision-maker could address in one of three ways: by implementing intervention A for all patients or relevant members of the public (A); by implementing intervention B for all patients or relevant members of the public (B); or by conducting an experiment in which patients or relevant members of the public are randomly assigned to A or B and the superior intervention is then implemented for all (A/B). For example, in Best Anti-Hypertensive Drug, some doctors in a walk-in clinic prescribe "Drug A" while others prescribe "Drug B" (both of which are affordable, tolerable, and FDA approved), and "Dr. Jones" prescribes either A for all his hypertensive patients, B for all those patients, or runs a randomized experiment to compare the effectiveness of A and B (See Table 1 for two additional examples, Table S2 [Supplemental Materials] for all vignette names, and pp. 8-13 in the Supplemental Materials for all vignette text.) To develop the vignettes, we consulted the literature and our knowledge, as experts in bioethics and psychological science, of pRCTs that have historically proved controversial (see Table S3 in the Supplemental Materials for motivations for all vignettes). All vignettes describe an RCT that is highly pragmatic in nature (i.e., high on PRECIS-2 eligibility, recruitment, setting, organization, follow-up, and primary

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outcome domains [5]). For instance, all patients with the relevant condition who attend the clinic/hospital for care become members of the trial and the trial is situated within the clinic/hospital where their care would typically take place. (Similarly, in the public health scenarios, all students in the school district and all residents of the state where these trials occur are included in the trial.) In addition, our vignettes are silent about whether consent will be obtained. Trials that include only those who opt into them are less pragmatic if they are testing the effectiveness of an intervention that would be imposed on people as a matter of policy or practice. IRBs customarily waive consent when it would make low-risk pRCTs impracticable, including by rendering the results uninformative about how an intervention would fare in practice [32]. In separate work, we found that substantial shares of people object to such experiments even when we specify that consent will be obtained [33].

Next, following a standard decision-science approach commonly used in social and moral psychology for evaluating decisions [34], participants rated each option on a scale of appropriateness from 1 ("very inappropriate") to 5 ("very appropriate"), with 3 as a neutral midpoint. Participants then rank-ordered the options from best to worst and provided demographic information.

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Table 1 Vignette text for Catheterization Safety Checklist and Ventilator Proning

	Catheterization Safety Checklist	Ventilator Proning
Background	Some medical treatments require a doctor to insert a plastic tube into a large vein. These treatments can save lives, but they can also lead to deadly infections.	Some coronavirus (Covid-19) patients have to be sedated and placed on a ventilator to help them breathe. Even with a ventilator, these patients can have dangerously low blood oxygenation levels, which can result in death. Current standards suggest that laying ventilated patients on their stomach for 12-16 hours per day can reduce pressure on the lungs and might increas blood oxygen levels and improve survival rates.
Intervention	A hospital director wants to reduce these infections, so he	A hospital director wants to save as many ventilated
A	decides to give each doctor who performs this procedure a new ID badge with a list of standard safety precautions for the procedure printed on the back. All patients having this procedure will then be treated by doctors with this list attached to their clothing.	Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.
Intervention B	A hospital director wants to reduce these infections, so he decides to hang a poster with a list of standard safety precautions for this procedure in all procedure rooms. All patients having this procedure will then be treated in rooms with this list posted on the wall.	A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 15-16 hours per day.
A/B test	A hospital director thinks of two different ways to reduce these infections, so he decides to run an experiment by randomly assigning patients to one of two test conditions. Half of patients will be treated by doctors who have received a new ID badge with a list of standard safety precautions for the procedure printed on the back. The other half will be treated in rooms with a poster listing the same precautions hanging on the wall. After a year, the director will have all patients treated in whichever way turns out to have the highest survival rate.	A hospital director thinks of two different ways to save as many ventilated Covid-19 patients as possible, so he decides to run an experiment by randomly assigning ventilated Covid-19 patients to one of two test conditions. Half of these patients will be placed on their stomach for 12-13 hours per day. The other half of these patients will be placed on their stomach for 15-16 hours per day. After one month, the director will have all ventilated Covid-19 patients treated in whichever way turns out to have the highest survival rate.

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Based on a power analysis, we determined that recruiting ~350 participants (laypeople and clinicians) per vignette (Catheterization Safety Checklist, Best Anti-Hypertensive Drug, Intubation Safety Checklist, Best Corticosteroid Drug, Masking Rules, School Reopening, and Ventilator Proning) would yield 95% power to detect an effect as small as Cohen's d = 0.19 at $\alpha = .05$. These sample sizes are consistent with our previous work using the same methods (but different vignettes, [19]).

For Best Vaccine, based on a prior study (see Supplemental Materials for full details), we hypothesized a smaller effect size, which resulted in a power analysis that determined that recruiting ~450 lay participants would yield 80% power to detect an effect as small as Cohen's d = 0.13 and 95% power to detect as small as Cohen's d = 0.17 (sample size consistent with [19]). For the clinician sample, we based our power analysis for Best Vaccine on the number of responses we collected in the first clinician survey testing the Masking Rules, Intubation Safety Checklist, and Best Corticosteroid vignettes. We assumed ~900 responses which we determined would yield 95% power to detect an effect as small as d = 0.12.

Across all vignettes, there were a total of 2,909 lay participants. They ranged in age from 18 to 88 with a mean age of 38 years old (SD = 12.8). The majority of participants were White (75%), female (56%), and college educated (30% having completed some college, 36% having earned a four-year degree, and 21% having earned a graduate degree; 21% of participants had a STEM degree) with a median household income of \$40,000 to \$60,000. The sample is more liberal (44%) and Democrat (38%) than conservative (28%) and Republican (21%) and a plurality of participants identified as non-religious (38%).

The clinician sample (N = 2,149) was comprised of doctors (15%), physician assistants (9%), nurse practitioners (5%), nurses (67%; RN: 54%; LPN: 12%, other: 1%), and other medical professionals (including genetic counselors and medical students; 4%). We determined the ratio of different types of clinicians from their self-reported position in the survey. We did not estimate in advance the proportion of certain types of clinicians who would respond. The majority of the clinicians were female (81%) and had been working in health care for more than 10 years (62%). A majority of clinicians reported being somewhat or moderately comfortable with research methods and statistics (77%) and had two sources of formal or informal training or education in research methods and statistics (e.g., undergraduate, professional school, or postgraduate coursework; 58%). (In these clinician samples, because survey responses were made fully anonymous to encourage greater participation and honest responding, we were unable to restrict participation in later waves to clinicians who had not participated in earlier waves. Therefore, some clinicians who completed the Best Vaccine vignette may have earlier completed the Masking Rules, Intubation Safety Checklist, and Best Corticosteroid Drug vignettes.) See Table S4-5 for detailed demographics of lay participants and clinicians by vignette.

Data analysis

We define the "A/B Effect" as the degree to which participants' ratings of the A/B test were lower than the average of their ratings of implementing A and B [18]. "Experiment aversion" is the degree to which participants rated the A/B test lower than their own lowest-rated intervention (either A or B for each person) [19]. "Experiment appreciation" is the opposite: the degree to which the experiment is rated higher than each participant's highest-rated intervention. For all measures, we performed paired t-tests at $\alpha = .05$ and calculated Cohen's d recovered from the tstatistic, n_{1} and correlation between the two measures being compared [35,36]. We also

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calculated the percentage of participants who ranked the A/B test as the worst (or best) option the decision-maker could implement as well as the percentage of participants who showed an A/B Effect, were experiment averse, or were experiment appreciative. We analyzed data using R version 4.3.0. Participant response data, preregistrations, materials, and analysis code have been deposited in Open Science Framework [37].

Patient and public involvement

We included laypeople as participants in our studies because they are typically included in pRCTs as patients or (in the case of some public health pRCTs and pRCTs in other domains) as members of the public and are therefore important stakeholders. Decisions about whether to participate in or conduct pRCTs are made against the backdrop of individuals' personal views and/or anticipation of potential backlash or other public reactions; therefore, how patients and clinicians feel about experiments is relevant to if and how advancements in healthcare are made. All participant responses were anonymous and, thus, results cannot be disseminated back to our participants.

RESULTS

In the following results, we group the vignettes by theme: those eliciting lay participants sentiments about pRCTs unrelated to the treatment of Covid-19, those eliciting lay participants sentiments about pRCTs related to the treatment, prevention of, or public health response to Covid-19, and those eliciting clinician sentiments about pRCTs related to the treatment, prevention of, or public health response to Covid-19.

Lay sentiments about pRCTs

To elicit lay sentiments about pRCTs, participants responded to one of two vignettes: Catheterization Safety Checklist (which described two locations where a hospital director could display a safety checklist for clinicians; see Table 1; n = 343) or Best Anti-Hypertensive Drug (which described two drugs a doctor could prescribe for his hypertensive patients; n = 357).

We found substantial negative reactions to A/B testing in both vignettes (Table 2A), replicating our pre-pandemic findings [18,19]. Although in most cases the mean rating of the A/B test was near the neutral midpoint, implementing policies was substantially preferred to A/B testing (Figure 1A) and large proportions of participants objected to the A/B test (Figure 1B). In Catheterization Safety Checklist (Figure 1A), we found evidence of the A/B Effect: participants rated the A/B test significantly below the average ratings they gave to implementing interventions A and B (d = 0.69, 95% CI: (0.53, 0.85); Table S6A). Here, 41% ± 5% (95% CI) of participants expressed experiment aversion (rating the A/B test lower than their own lowest-rated intervention; d = 0.25, 95% CI: (0.11, 0.39); Table S6A). When ranking the three options from best to worst, only 32% placed the A/B test first, while 48% placed it last (Table S6A).

We also observed an A/B Effect in Best Anti-Hypertensive Drug (Figure 1B); d = 0.52, 95% CI: (0.36, 0.68); Table S6A), where 44% ± 5% also expressed experiment aversion (d = 0.46, 95% CI: (0.30, 0.52); Table S6A). Notably, participants were averse to this experiment even though there is no reason to prefer "Drug A" to "Drug B," and patients are effectively already randomized to A or B based on which clinician happens to see them—which occurs wherever unwarranted variation in practice determines treatments, such as walk-in clinics and

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emergency departments. Here, however, similar proportions of people ranked the A/B test best and worst (50% vs. 45%; p = 0.16; Table S6A).

These levels of experiment aversion near the height of the pandemic were slightly (but not significantly) higher than those we observed among similar laypeople in 2019 ($41\% \pm 5\%$ in 2020 vs. $37\% \pm 6\%$ in 2019 for Catheterization Safety Checklist, p = 0.31; $44\% \pm 5\%$ in 2020 vs. or Best Ann. $40\% \pm 6\%$ in 2019 for Best Anti-Hypertensive Drug, p = 0.32) [19].

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Table 2. Sentiments about experiments by vignette a	nd population					124-0846 17ight, in		
		Neg	ative sentiment			Gud o	ntiment	
	Experiment Aversion	A/B Effect	More people averse than appreciative?	More people rank AB test worst than best?	More people rank AB test best than worst?	Hore Reople apprestative Anan Merse?	Reverse A/B Effect	Experiment Appreciation
(A) Lay Sentiments About pRCTs						otem Ens		
Catheterization Safety Checklist	~ <	√	√	✓		iber : eign relat		
Best Anti-Hypertensive Drug		\checkmark	\checkmark			2024. ement		
(B) Lay Sentiments About Covid-19 pRCTs						Dow t Sup text		
Ventilator Proning	1	1	√			nloa berie and		
School Reopening			~	\checkmark		ded fr ur (At data i		
Masking Rules	\checkmark	1	5	✓		om h BES)		
Intubation Safety Checklist	\checkmark	\checkmark	1	1				
Best Corticosteroid Drug		\checkmark			\checkmark	bmjo train		
Best Vaccine		\checkmark		191	\checkmark	pen.b ing, a		
(C) Clinician Sentiments About Covid-19 pRCTs						and s		
Masking Rules	√	√	1	√		om/		
Intubation Safety Checklist	\checkmark	\checkmark	\checkmark	1		on Ju ar tecl		
Best Corticosteroid Drug	\checkmark	\checkmark	\checkmark		J	ne 6, ınolo		
Best Vaccine		√*			✓	2025 a		

Notes. Experiment Aversion refers to the difference between the lowest-rated intervention and the rating of the A/B test. The A/B Effect refers to the difference between the average rating of the two interventions. Experiment Appreciation refers to the difference between the rating of the A/B test and the average rating of the A/B test and the rating of the highest-rated intervention. See Table S6A-C in the Supplemental Materials for detailed results (including Cohen's and 95% CIs) for all measures of sentiment about experiments.

Checkmarks (\checkmark) represent a statistically significant effect at p < .05. In one case, the checkmark is followed by an asterisk (*). This indicates that while the effect reaches statistical significance, the effect size is very small and might have only reached significance due to the large sample size (three times as large as that for other vignettes).

Variables to the right of the thick vertical line are the reverse of those on the left. If no checkmark appears in either of the corresponding columns to the left and right of the thick vertical line (e.g., "More people rank

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Lay sentiments about Covid-19 pRCTs

To elicit lay sentiments about Covid-19 pRCTs, we asked lay participants to read one of the following vignettes: Masking Rules (which described two masking policies, of varying scope; n = 360); School Reopening (two school schedules designed to increase social distancing; n = 339); Best Vaccine (two types of vaccine—mRNA versus inactivated virus; n = 450); Ventilator Proning (two protocols for positioning ventilated Covid-19 patients; see Table 1; n = 357); Intubation Safety Checklist (adapted from above to apply to Covid-19; n = 347); and Best Corticosteroid Drug (adapted from above to apply to Covid-19; n = 357).

In all six Covid-19 vignettes, we found evidence of the A/B Effect (Table 2B, Figure 2A). In three, however, we did not find experiment aversion: Best Vaccine¹, Best Corticosteroid Drug, and School Reopening. In the first two of these, participants rated the two interventions very similarly and the experiment only slightly lower (Figure 2B). These vignettes also elicited the largest proportion of participants (65% in Best Vaccine and 56% in Best Corticosteroid Drug; Table S6B) in any vignette who ranked the A/B test best among the three options, compared to 31–34% of participants who ranked it worst (Table S6B). In School Reopening, experiment aversion was not observed because participants on average clearly preferred intervention B to A and rated the experiment similar to intervention A [20,21]. 53% of participants ranked intervention B as the best of the three options (compared to 17% choosing intervention A and 30% choosing the A/B test; Table S6B).

¹ See Table S6D for results from a previous version of Best Vaccine which unintentionally implied that vignette participants could choose their vaccine.

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In the other three vignettes, participants rated the A/B test condition as significantly less appropriate than their lowest-rated intervention (Masking Rules: d = 0.56, 95% CI: (0.41, 0.71); Ventilator Proning: d = 0.17, 95% CI: (0.04, 0.30); Intubation Safety Checklist: d = 0.36, 95% CI: (0.21, 0.49)). These levels of aversion to Covid-19 RCTs are similar to the levels of aversion to non-Covid-19 RCTs both before [19] and during the pandemic (see above).

Clinician sentiments about Covid-19 pRCTs

Clinicians responded to one² of four Covid-19-related vignettes: Masking Rules (n = 349), Intubation Safety Checklist (n = 271), Best Corticosteroid Drug (n = 275), or Best Vaccine (n = 1254). We observed an A/B effect in all four vignettes (Figures 3A-B). In two, clinicians, like laypeople, were also significantly experiment averse (Masking Rules: d = 0.74, 95% CI: (0.57, 0.91; Table S6C); Intubation Safety Checklist: d = 0.30, 95% CI: (0.15, 0.45); Table S6C). In Best Vaccine, clinicians, like laypeople, did not show any significant difference in their ratings of the A/B test and their lowest-rated intervention (d = -0.03, 95% CI: (-0.10, 0.04); Table S6C). Again, like laypeople, 58% of clinicians ranked the vaccine A/B test as the best of the three options, the highest proportion of any clinician-rated vignette.

Clinicians differed from laypeople in their response to Best Corticosteroid Drug. Laypeople did not show experiment aversion, but clinicians rated the A/B test as significantly less appropriate than their lowest-rated intervention (d = 0.49, 95% CI: (0.32, 0.66); Table S6C). This difference may be due to clinicians' greater familiarity with the treatment of Covid-19.

² Clinicians in the first survey were randomly assigned to one of the three vignettes (Masking Rules, Intubation Safety Checklist, and Best Corticosteroid Drug) and then completed the remaining vignettes in random order. For consistency with the rest of this project and with our previous approach [18], we analyzed data from this survey as a between-subjects design where we only consider the first vignette that every participant completed. See Table S7 and pp. 27-28 in the Supplemental Materials for further discussion.

Clinicians may also have seen an urgent need for any drugs to treat Covid-19 [24] and thus rated

adopting a clear treatment intervention as more appropriate than an RCT.

Heterogeneity in experiment aversion

Collapsed across studies, political ideology explained 1.5% of the variance (p < .001) in sentiments about experiments, with conservatives slightly less averse to experiments than liberals. Less or no variation was explained by all other demographics, including educational attainment (0.2%, p = .008), STEM degree (0.1%, p = .15), and prescribers versus other clinicians (0.2%, p = .061); see Tables S8-11 in the Supplemental Materials for further discussion.

DISCUSSION

In three preregistered survey experiments, we observed considerable experiment aversion among laypeople during the first year of the Covid-19 pandemic, despite increased exposure to the nature and purpose of (largely explanatory) RCTs. Neither laypeople nor clinicians were overall less averse to Covid-19 pRCTs, despite the fact that confidence in anyone's knowledge of what works should have been even more circumscribed than in the everyday contexts of hypertension and catheter infections. To the contrary, most Covid-19 vignettes were met with experiment aversion. This is consistent with an emphasis during the pandemic that we must "do" instead of "learn," a false dichotomy that fails to recognize that implementing an untested intervention is itself a nonconsensual experiment from which, unlike an RCT, little or nothing can be learned [38–40]. Participants may have been averse to the uncertainty that the decision to conduct an

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experiment conveys. They may have perceived the experiment as more risky than implementing either of the policies it contains. Or they may have experienced hindsight bias, believing that the experiment was unfair to whomever received the least effective policy, neglecting the fact that the results were not known in advance. For whatever reason, across all vignettes and samples, between 28% and 57% of participants demonstrated experiment aversion, while only 6%–35% demonstrated experiment appreciation (by rating the pRCT higher than their highest-rated

intervention).

Although in most cases the mean rating of the A/B test was near the neutral midpoint, in none of our 12 studies were more people appreciative of than averse to the pRCT, in none was the average pRCT rating higher than the average intervention rating, and in none was the pRCT rating higher than each participant's highest-rated intervention, on average. Notably, unlike trials with placebo or no-contact controls, the A/B tests in our vignettes compared two active, plausible interventions, neither of which was obviously known ex ante to be superior. Yet substantial shares of participants still preferred that one intervention simply be implemented without bothering to determine which (if either) worked best.

The most positive sentiment towards experiments was observed in both laypeople and clinicians in the vignettes involving Covid-19 drugs and vaccines. Here we observed the highest proportions of participants who demonstrated experiment appreciation (31%–46%) and who ranked the pRCT first (49%–65%). This result could be explained by differences in the pRCT length (ranging from one to twelve months) and perceived severity of the pRCT outcome ("best outcome" and "fewest cases of Covid-19" in Best Corticosteroid and Best Vaccine, respectively vs., e.g., "highest survival rate" in Ventilator Proning). But this result is also consistent with our previous findings that the illusion of knowledge—here, the belief that either the participant

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herself or some expert already does or should know the right thing to do and should simply do it—biases people to prefer universal intervention implementation to pRCTs [18,19]. One possible solution is to teach patients that clinicians typically have many options for treating a condition, that often no one knows which option is best, and that a pRCT is the optimal way to figure that out. Similarly, highlighting unwarranted variation in practice during medical training may help reduce clinicians' negative sentiments towards experiments. Rightly or wrongly, both laypeople and clinicians might (a) appropriately recognize that near the start of a pandemic, no one knows which existing drugs, if any, are safe and effective in treating a novel disease, and that new vaccines need to be tested, yet (b) fail to sufficiently appreciate the level of uncertainty around NPIs like masking, proning, and social distancing, which can also benefit from rigorous evaluation. This is consistent with the dearth of RCTs (explanatory or pragmatic) of Covid-19 NPIs [41]: of the more than 4,000 Covid-19 trials registered worldwide as of August 2021, only 41 tested NPIs [42]. Explaining critical concepts like clinical equipoise or unwarranted variation in medical and NPI practice might diminish experiment aversion.

Limitations

While our lay participant samples were large, diverse, and demographically similar to the general U.S. population (see Table S4), they may not be perfectly representative of other populations. Similarly, Geisinger, the network of hospitals with which the clinicians were affiliated, may not be representative of all hospitals, specifically in their exposure to research and A/B tests such as those described in our vignettes. Geisinger is primarily comprised of teaching hospitals, and has a medical school, but is not associated with a university and, therefore, our results may not generalize either to clinicians who practice at large academic medical centers (e.g., Massachusetts General Hospital or Johns Hopkins Hospital) where RCTs are often conducted or,

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on the other hand, to clinicians who practice at small community hospitals that have little exposure to research. In addition, because the clinician sample was largely made up of individuals with only some research training and experience, these results may not generalize to clinicians who have extensive research training and experience and conduct RCTs (or pRCTs) themselves. Similarly, a large proportion of the clinician sample were nurses and thus the level of experiment aversion observed in these studies may not be representative of the views of physicians and advanced practitioners. Importantly, however, the support of nurses and noninvestigator clinical and operational leaders is often needed to conduct a pRCT, and these groups do not always have substantial research experience. Moreover, in both samples, our primary goal was not to estimate the percentage of people in the relevant population who hold negative views of pRCTs, but rather to ascertain experimentally whether laypeople and clinicians display the patterns of negative sentiments about pRCTs that we have found previously [18,19], when confronted with vignettes during, or about, a novel situation (the Covid-19 pandemic). Thus, though the sample may not perfectly represent all healthcare professionals or members of the general public, the results demonstrate the repeated presence of negative sentiments, and a lack of positive sentiments, towards experiments across eight distinct situations among segments of populations whose opinions matter.

Furthermore, because experiment aversion and appreciation are likely socio-cultural phenomena, we should expect that the presence or size of the effects we report may differ among societies and over time [43]. However, contrary to recent claims [44], the similarity in aversion to experiments between laypeople and clinicians suggests that these results generalize across populations that differ in their level of knowledge of RCTs. In addition, our findings here and elsewhere [18,19] show that experiment aversion occurs in health and non-health scenarios and,

within the health domain, in both clinical and public health scenarios, and regarding both pharmaceutical and non-pharmaceutical interventions.

Finally, as noted above, all vignettes discussed in this paper are silent about whether the consent of patients and/or clinicians would be obtained. Previous work that did not directly compare judgments about pRCTs versus treatment implementation suggests that when given the option, laypeople prefer to be asked for consent (e.g., for a study comparing the effectiveness of two marketed hypertension drugs, a scenario somewhat related to one of ours [45,46]). Additionally, other research has found neither experiment aversion nor appreciation (as we define it here and elsewhere [33]) after introducing a critical element of voluntariness by asking respondents how likely they would be to "choose to be treated" at a hospital that is conducting a pRCT [44]. In separate work, we found that when vignettes explicitly specify that prior consent is obtained, negative sentiment towards pRCTs is reduced—but not eliminated [33]. However, individual consent would undermine the external validity of pRCTs, and is anyhow rarely feasible in such settings [32,47,48], e.g., tests of policy interventions such as providing safety checklists and promulgating public health rules.

CONCLUSION

Critics rightly note that RCTs have limited external validity when they employ overly selective inclusion/exclusion criteria or are executed in ways that deviate from how interventions would be operationalized in diverse, real-world settings. However, the solution is not to abandon randomized evaluation, but to incorporate it into routine clinical care and healthcare delivery via pRCTs [1,48–50]. It has been many years since the U.S. Institute of Medicine urged research of many varieties to be embedded in care [51]. More recently, the UK Royal College of Physicians

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and National Institute for Health and Care Research issued a joint position statement similarly advocating the integration of research into care [52]. In addition, the U.S. Food and Drug Administration now promotes pRCTs to support post-marketing monitoring and other regulatory decision-making [53,54], a priority also highlighted in the UK Medicines and Healthcare products Regulatory Agency's 2021-2023 Delivery Plan [55] and guidance on RCTs [56]. Pragmatic RCTs have been fielded successfully and informed healthcare practice and policy [47,57,58], but they remain far from ubiquitous and they require buy-in to be successful, as shown by the case of a Norwegian school reopening trial during the pandemic that was abandoned due to lack of such support [59,60]. Broadening the use of pRCTs will require not only redoubling investment in interoperable electronic health records and recalibrating regulators' views of the comparative risks of research versus idiosyncratic practice variation [1], but also anticipating and addressing experiment aversion among patients and healthcare professionals. Better understanding experiment aversion and then discovering strategies to mitigate it will help grow the evidence base necessary for evidence-based decision-making and, ultimately, improved patient outcomes.

ETHICS APPROVAL

Geisinger's IRB determined that the study surveys were exempt from ethical approval, including any requirement of informed consent, under 45 C.F.R. § 46.104(2)(i) (IRB# 2017-0449). Nevertheless, prospective participants were invited to take a survey and told the broad topic, the estimated time it would take, and the compensation offered. Those who proceeded were deemed

to have tacitly consented. Participants could quit the survey at any time.

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DATA AVAILABILITY STATEMENT

Participant response data, preregistrations, materials, and analysis code have been deposited in Open Science Framework

(https://osf.io/6p5c7/?view_only=eaeb95cb754247028f1d1ed94414cbd2).

CONTRIBUTORS

P.R.H., P.H., C.F.C, and M.N.M. designed the studies and collected the data. P.R.H. and R.L.V. analyzed the data. R.L.V., R.M.M., C.F.C., and M.N.M. wrote the first draft of the manuscript.P.R.H. and P.H. provided critical revisions. R.L.V. and P.R.H. contributed equally to this work.M.N.M. and C.F.C. contributed equally to this work. M.N.M. and C.F.C. are responsible for the overall content as guarantors.

COMPETING INTERESTS

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The authors are or were, at the time the research was conducted, affiliated with the same nonprofit health system (Geisinger) from which the clinician sample was recruited.

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Figure captions

Figure 1. Lay sentiments about pRCTs

Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highest-rated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2—"very inappropriate" or "somewhat inappropriate"— on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.

Figure 2. Lay sentiments about Covid-19 pRCTs

Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean

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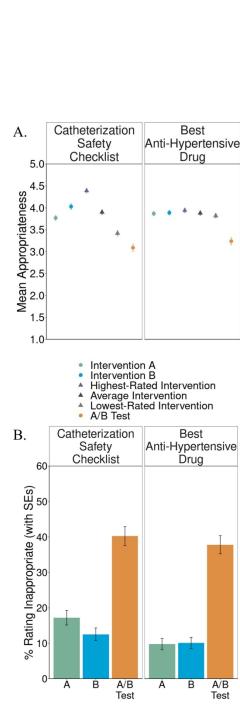
appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highest-rated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2—"very inappropriate" or "somewhat inappropriate"— on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.
Figure 3. Clinician sentiments about Covid-19 pRCTs
Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean

appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highestrated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2—"very inappropriate" or "somewhat inappropriate"— on a 1–5 scale) to

implementing intervention A, intervention B, and the A/B test.

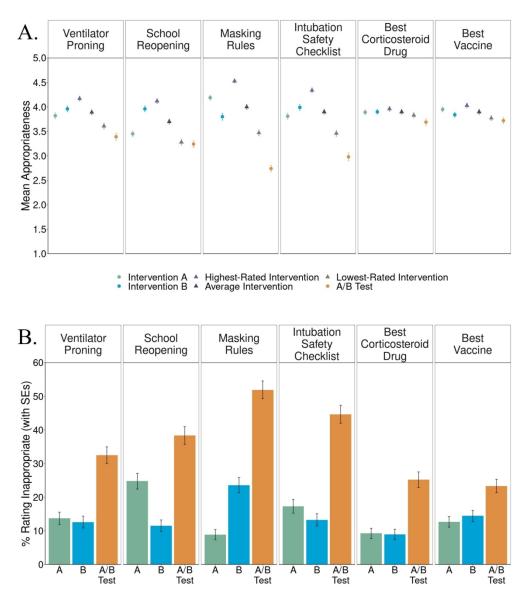


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Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highest-rated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2– "very inappropriate" or "somewhat inappropriate"— on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.

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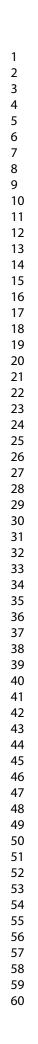


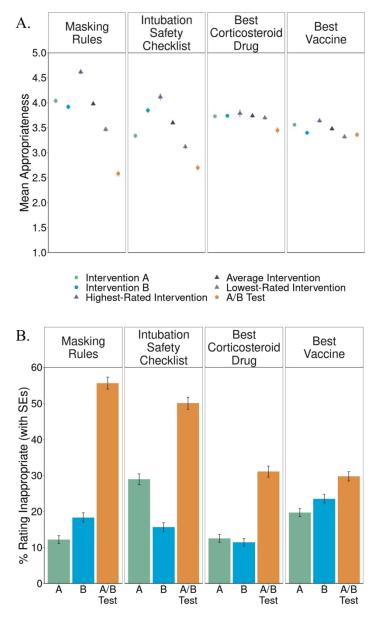
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Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highest-rated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2— "very inappropriate" or "somewhat inappropriate"—on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.

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Notes. (A) Mean appropriateness ratings, on a 1–5 scale, with SEs, for intervention A, intervention B, the highest-rated intervention, the average intervention, the lowest-rated intervention, and the A/B test. Circles represent measures directly collected from participants. Triangles represent averages derived from the direct measures. The distance of the mean appropriateness of the lowest-rated intervention (brown triangle) minus the mean appropriateness of the A/B test (orange circle) represents experiment aversion. The distance of the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the A/B test (orange circle) minus the mean appropriateness of the highest-rated intervention (purple triangle) represents experiment appreciation. (B) Appropriateness ratings transformed into percentages (and SEs) of participants objecting (defined as assigning a rating of 1 or 2– "very inappropriate" or "somewhat inappropriate"—on a 1–5 scale) to implementing intervention A, intervention B, and the A/B test.

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Methods

In the main text, we grouped the vignettes thematically into three sets: "Lay Sentiments About pRCTs," "Lay Sentiments About Covid-19 pRCTs," and "Clinician Sentiments About Covid-19 pRCTs." However, when we collected data, we grouped our vignettes differently such that we started with vignettes that we have used in previous published work and their respective Covid-19 derivatives, then we developed and tested novel Covid-19 specific vignettes separately, and then, again separately, we tested a Covid-19 vaccine vignette. We followed a similar pattern in our clinician sample: we first tested three Covid-19 specific vignettes (two which were derivatives of vignettes from our previous work, one which was new to this work) and then separately, we tested a Covid-19 vaccine vignette. These groupings are important for understanding how participants were randomly assigned to vignettes and why there are slight discrepancies (or large discrepancies in the case of the Best Vaccine vignette in the clinician sample¹) in the number of participants in each vignette (see Table S1).

Table S1

Population, sample size, and dates of data collection for each vignette

Preregistration #	Vignette	Population	Sample size	Dates of data collection
1	Catheterization Safety Checklist	MTurk workers	343	August 13, 2020
	Intubation Safety Checklist	MTurk workers	347	August 13, 2020
	Best Anti-Hypertensive Drug	MTurk workers	357	August 13, 2020
	Best Corticosteroid Drug	MTurk workers	357	August 13, 2020
2	Masking Rules	MTurk workers	360	September 30-October 2, 2020
	School Reopening	MTurk workers	339	September 30-October 2, 2020
	Best Vaccine (ambiguous version)*	MTurk workers	350	September 30-October 2, 2020
	Ventilator Proning	MTurk workers	357	September 30-October 2, 2020
3	Intubation Safety Checklist	Clinicians	271	November 13-December 9, 2020
	Best Corticosteroid Drug	Clinicians	275	November 13-December 9, 2020
	Masking Rules	Clinicians	349	November 13-December 9, 2020
4	Best Vaccine	MTurk workers	450	January 8, 2021
5	Best Vaccine	Clinicians	1254	January 25-February 9, 2021

Note. Within each data collection batch, participants were randomly assigned to one of the vignettes. In the clinician sample (preregistration #3), clinicians saw all three vignettes in randomized order. The sample size reported here is the number of clinicians who saw that vignette first.

*Our first attempt at the Best Vaccine vignette included wording that unintentionally made the experiment condition less aversive. For this reason, this vignette is not included in the main analyses.

As shown in Table 1, in the first round of survey experiments (preregistration #1), the first set of lay participants were randomly assigned to read and respond to either Catheterization Safety Checklist, Best Anti-Hypertensive Drug, Intubation Safety Checklist, or Best Corticosteroid Drug. Then, in a second round of survey experiments (preregistration #2), a second, separate, set of lay participants were randomly assigned to read and respond to either Masking Rules, School Reopening, Ventilator Proning, or an unintentionally ambiguous version of Best Vaccine (results of which are reported in the SM). A third set of lay participants (preregistration #4) were recruited to read and respond to a correct version of Best Vaccine (no other vignette was included and, thus, no randomization was necessary). In the clinician sample, one set of clinicians (preregistration #3) was recruited to read and respond to all three vignettes. However, only their responses to the first vignette they read are considered for the purpose of the analyses presented in the main text. A second set of clinicians (preregistration #5) was recruited to read and respond to Best Vaccine (no other vignette was included and, thus, no randomization was necessary). However, because the clinician survey was fully anonymous, it is possible that there is some overlap between participants in the first and second clinician samples.

¹ The Best Vaccine vignette was combined with another study that required a sample size much larger than the sample sizes in our forepions reignette studies to ///avejadequate/statisticate/subcert/guidelines.xhtml

For clarity, in the main text of this article we used different names for the vignettes than those used in the preregistrations and in previous publications (see Table S2).

Table S2

Original vignette names from preregistrations and previous work and corresponding name in main text

Original vignette name	Main text vignette name Hospital
Safety Checklist (also called Checklist)	Catheterization Safety Checklist Best
Drug: Walk-In Clinic (also called Best Drug)	Best Anti-Hypertensive Drug
Checklist (Covid-19)	Intubation Safety Checklist
Best Drug (Covid-19)	Best Corticosteroid Drug
Ventilator Proning	Ventilator Proning
School Reopening	School Reopening
Mask Requirements	Masking Rules
Modified Covid-19 Vaccines	Best Vaccine
Vaccine Distribution	(not reported in main text)

Note. Vignette names in this article were changed from those in previous work and in our preregistrations in order to clarify the content for readers.

Preregistrations, sample sizes, and power analyses

Our research questions, power analyses and sample sizes, and analysis plans were all preregistered at Open Science Framework (OSF) before data collection. These sample size precommitments are copied from each preregistration document which can be found on OSF at https://osf.io/u945y/?view_only=a901fde13ddb423899074eb79964c6cd.

Preregistration 1 (Catheterization Safety Checklist, Best Anti-Hypertensive Drug, Intubation Safety Checklist, Best Corticosteroid Drug vignettes):

"We predict that, using a two-tailed, paired t-test with $\alpha = .05$ within each scenario, participants will rate the A/B test condition as significantly less appropriate than their own average rating of the two policy conditions, mean(A,B). This is the test for the "A/B Effect." Recruiting 350 participants for each scenario provides 95% power to detect an effect as small as d = 0.19, which is substantially smaller than the effect sizes we have observed using the Hospital Safety Checklist and Best Drug: Walk-In Clinic vignettes in past research."

Preregistration 2 (Ventilator Proning, School Reopening, Masking Rules, and Best Vaccine (initial ambiguous version) vignettes):

"We predict that, using a two-tailed, paired t-test with $\alpha = .05$ within each scenario, participants will rate the A/B test condition as significantly less appropriate than their own average rating of the two policy conditions, mean(A,B). This is the test for the "A/B Effect." Recruiting 350 participants for each scenario provides 95% power to detect an effect as small as d = 0.19, which is substantially smaller than the effect sizes we have observed using the Hospital Safety Checklist and Best Drug: Walk-In Clinic vignettes in past research."

Preregistration 3 (Clinicians; Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes):

Note that because of time constraints around the possible starting dates of our clinician surveys, we launched this study before preregistering it, and we did not report an explicit power analysis before collecting the data. Because this study follows a similar structure to the studies above, however, it was reasonable to apply the previous sample size and power analysis considerations. We did, however, preregister our approach and research plan twice during this study: once during data collection, before any analyses had been conducted, and again after all data had been collected (but before analyzing any of them).

Preregistration 3.1: "At the time of this preregistration, we have received 655 complete responses. No data have been explored or analyzed at this point. We will conduct an interim analysis on this dataset using the same analyses we have previously preregistered, and we may continue to collect more data from this population."

Preregistration 3.2: "Data collection is now complete and we have closed the survey. On 11/24/2020, we conducted an interim analysis on 601 complete responses. Since then, we have received an additional 295 complete responses, to which we remain blind."

Preregistration 4 (Best Vaccine):

"We recruited 350 participants for the original Covid-19 vaccines study. Because we are running this study to determine whether even a small effect emerges, we will increase the sample size to 450 participants. This provides 80% power to detect an effect as small as d = 0.13 in a repeated- measures, two-tailed t-test, and 95% power to detect an effect as small as d = 0.17."

Preregistration 5 (Clinicians; Best Vaccine):

"Our previous survey of healthcare providers resulted in approximately 900 complete responses; we expect a similar response rate for this survey. This sample size provides 95% power to detect an effect as small as d = 0.12 using a two-tailed, repeated measures t-test. Even if we only receive 600 complete responses, we will have 95% power to detect an effect as small as d = 0.15."

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Several aspects of the procedure and experimental design were consistent across the studies reported here. Below, we describe these consistent features and note in specific studies where we deviated from them.

For the lay participant samples, we used the CloudResearch service to recruit crowd workers on Amazon Mechanical Turk (MTurk) to participate in a 3–5-minute survey experiment. These services provide samples that are broadly representative of the U.S. population and are well-accepted in social science research as providing as good or betterquality data than convenience samples such as student volunteers, with results that are similar to probability sampling methods [1,2]. Participants were excluded from recruitment in any of the studies reported here if they had participated in any of our previous studies on this topic. Across all laypeople vignettes, the completion rate of participants starting the survey was 91.5%. The Geisinger IRB determined that these anonymous surveys were exempt (IRB# 2017-0449).

For the clinician samples, we recruited healthcare providers (including physicians, physician assistants, nurse practitioners, and nurses) from a large health system in the Northeastern U.S via email. Each provider received either one or two emails about the study during the recruitment window. In the first clinician study (Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes), we first tested the email recruitment system by sending out the survey invitation email to just 200 clinicians. Clinicians who completed the survey based on this survey invitation were included in the final sample. Then, all clinicians were sent the recruitment email on November 19, 2020, followed by a reminder email on December 3, 2020. In the second clinician study (Best Vaccine), the initial recruitment email was sent January 25, 2021, with the follow-up email sent February 2, 2021. In the first clinicians were emailed and 1,254 completed the survey. In these samples, because survey responses were fully anonymous, we were not able to restrict participation based on our previous studies, so some participants who completed the Best Vaccine vignette may have earlier completed the Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes.

In all cases, participants completed an online survey hosted by Qualtrics. After opening the survey, participants were evenly randomized to one of the possible vignettes being studied using the "evenly present elements" function in the survey flow of Qualtrics.^{2.3} Qualtrics uses a least filled quota system which preferentially randomizes participants to the condition with the lowest count of responses at the time they enter the survey. The exact algorithm used by Qualtrics is proprietary. In the case of data collection batches 4 and 5, there was only one vignette being tested that all participants saw. At this point, we used the exact same procedure detailed in Heck et al. (2020) [4]. First, participants were instructed to read about several possible decisions made by different decision-makers⁴, and to try to treat each decision as separate from the others. All scenarios contained a brief "background" text at the top of the page that summarized a problem, followed by three "situations," each of which detailed the decision-maker's choice to adopt intervention A, intervention B, or to run an A/B test by randomly assigning people to one of six possible orders (i.e., Situation 1 = A, Situation 2 = B, and Situation 3 = A/B; Situation 1 = A/B, Situation 2 = B, and Situation 3 = A/; etc....). At no point did we observe a meaningful effect of presentation order, so we collapsed across this variable for all analyses.

³ The clinician version of the Best Vaccine vignette was combined with another study being conducted by a subset of researchers on this team. The materials for Best Vaccine were presented after the survey materials from the other study. Data from the other study are unrelated to the research questions tested here and will be reported separately.

 $^{^2}$ For the clinician study of the Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes, clinicians were randomly assigned to one of these three scenarios and then completed the remaining two scenarios in random order. For consistency with the rest of this project and with our previous survey experiment with clinicians regarding the A/B effect (3, Study 6), and in order to make the results from clinician samples comparable to those with lay samples (in which each participant only ever saw one scenario), we analyze data from this study as a between-subjects design where we only consider the first scenario that every participant completed. See the section "Order Effect in Clinician Study" elsewhere in this appendix for further analyses.

For our primary outcome measures, participants were asked to rate the appropriateness of the decisions made in Situation 1, Situation 2, and Situation 3 ("How appropriate is the director's decision in Situation 1/2/3?"), using a 1-5 scale (1 = "Very inappropriate", 2 = "Inappropriate", 3 = "Neither inappropriate nor appropriate", 4 = "Appropriate", 5 = "Very appropriate"). Participants then specified a ranked order of the three decisions ("Among these three decisions, which decision do you think the director should make? Please drag and drop the options below into your preferred order from best to worst. You must click on at least one option before you can proceed."), with 1 being the best decision and 3 being the worst. The last item on this page asked participants to explain why they chose these ratings and rankings in a couple of sentences ("In a couple of sentences, please tell us why you chose the ratings and rankings you chose.").

Following these primary measures, participants completed standard demographic items on the next page. For MTurk participants, these were measures of sex, race/ethnicity, age, educational attainment, household income, religious belief or affiliation, whether they have a degree in a STEM field or not, and four items identifying political orientation and affiliation. As part of an ongoing study in our laboratory (whose results will be reported elsewhere), these participants were randomized to one of six conditions for this demographic questionnaire where we varied the option to select "prefer not to answer" and whether the items were mandatory, optional, or requested (but not required). For clinician participants, demographic items were mandatory response and were limited to the following: sex, sources of training in research methods and statistics, self-reported comfort with research methods and statistics, past experience with activities related to research methods and statistics (e.g., publishing a scientific paper or analyzing data), current involvement in research, position (e.g., doctor, physician assistant, nurse, medical student, etc.), length of time working in the medical field, and field of specialty.

After completing the survey, MTurk participants were given a completion code to receive payment (\$0.40). Clinician participants were invited to enter into a lottery to win a \$50 Amazon gift card by following a link to an independent survey where they could enter their email address. All participants were thanked for their participation and offered the opportunity to comment on the survey.

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⁴ In all vignettes, the protagonist (e.g., the hospital director or Dr. Jones) was male for ease of comparison to our previous work using these vignettes. Future work should examine the impact of the characteristics of the decisionmaker on evaluations of their decisions regarding policy imposition and conducting RCTs.

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We computed several variables to measure participants' sentiments about pRCTs.

Following Meyer et al. (2019) [3], we define an "A/B effect" as the difference between participants' mean policy rating and their rating of the A/B test—that is, the degree to which the policies are (on average) rated higher than the A/B test. We also report the percentage of participants whose mean policy rating is higher than their rating of the A/B test.

Following Heck et al. (2020 [4]; see also Mislavsky et al., 2019 [5]), we define "experiment aversion" as the difference between participants' rating of their own lowest-rated policy and their rating of the A/B test. We also report the percentage of participants who express experiment aversion.

"Experiment rejection" (first reported in Heck et al., 2020 [4], but without this name) occurs when a participant rates the A/B test as inappropriate (1 or 2 on the 5-point scale) while also rating each policy as neutral or appropriate (3–5 on the scale).

A "reverse A/B effect" is the difference between participants' rating of the A/B test and their mean policy rating that is, the degree to which the A/B test is rated higher than the policies (on average). We also report the percentage of participants whose rating of the A/B test is higher than their mean policy rating.

"Experiment appreciation" is the difference between participants' rating of the A/B test and their rating of their own highest-rated policy. We also report the percentage of participants who express experiment appreciation.

"Experiment endorsement" occurs when a participant rates the A/B as appropriate (4 or 5 on the 5-point scale) while also rating each intervention as neutral or inappropriate (1-3 on the scale).

In all cases where a *d*-value was calculated (i.e., A/B effect, experiment aversion, reverse A/B effect, experiment appreciation), we used Cohen's *d* recovered from the *t*-statistic, *n*, and correlation between the two measures being compared (Dunlap et al., 1996 [6], equation 3: $d = tc[2(1-r)/n]^{\frac{1}{2}}$; see also <u>http://jakewestfall.org/blog/index.php/category/effect-size/kewestfall.org</u> [7]. To calculate this *d*-value, we use the following R code: effsize::cohen.d(x,y, paired = TRUE).

In Figures 1B, 2B, and 3B, we transformed participants A, B, and A/B ratings on the continuous 5-point Likert scale into a binary objected/did not object variable (where objecting was defined as assigning a rating of 1 or 2—"very inappropriate" or "somewhat inappropriate"— on the 1–5 scale). We do this only for visualization and do not perform any statistical analyses on this transformed objected/did not object variable. Instead, as is standard in social and moral psychology, we treated appropriateness ratings elicited on the 5-point Likert scale as continuous. Therefore, we use t-tests to test the differences between the ratings of the A/B test and the interventions (lowest, average, and highest). Other methodologies and statistical analyses like a discrete choice approach, in which participants would see and evaluation two of the three possible decisions (e.g., intervention A vs. A/B test) at a time, or the Stuart-Maxwell test, which requires a kxk matrix of categorical variables, would not be appropriate.

Vignettes

Our vignettes were inspired by discussions about the ethics of real-world RCTs (see Table S3).

Table S3

Literature calling for or reporting an RCT similar to what is proposed in each vignette

Vignette name	Relevant literature					
Catheterization Safety Checklist	Pronovost et al. [8], Urbach et al. [9], Arriaga et al. [10]					
Best Anti-Hypertensive Drug	ROMP Ethics Study [11], Sinnott et al. [12]					
Intubation Safety Checklist	Turner et al. [13]					
Best Corticosteroid Drug	Wagner et al. [14]					
Ventilator Proning	Elharrar et al. [15], Sartini et al. [16], Caputo et al. [17]					
School Reopening	Fretheim et al. [18, 19], Helsingen et al. [20], Angrist et al. [21], Kolata [22]					
Masking Rules	Abaluck et al. [23], Jefferson et al. [24], Bundgaard et al. [25]					
Best Vaccine	Bach [26]					

The following section shows the exact vignette text that participants read in these studies (with the exception of the bolded titles, which are never shown to participants).

Catheterization Safety Checklist

(Originally from Heck et al. (2020) [4], adapted from Meyer et al. (2019) [2])

Background: Some medical treatments require a doctor to insert a plastic tube into a large vein. These treatments can save lives, but they can also lead to deadly infections.

Situation 1

A hospital director wants to reduce these infections, so he decides to give each doctor who performs this procedure a new ID badge with a list of standard safety precautions for the procedure printed on the back. All patients having this procedure will then be treated by doctors with this list attached to their clothing.

Situation 2

A hospital director wants to reduce these infections, so he decides to hang a poster with a list of standard safety precautions for this procedure in all procedure rooms. All patients having this procedure will then be treated in rooms with this list posted on the wall.

Situation 3

A hospital director thinks of two different ways to reduce these infections, so he decides to run an experiment by randomly assigning patients to one of two test conditions. Half of patients will be treated by doctors who have received a new ID badge with a list of standard safety precautions for the procedure printed on the back. The other half will be treated in rooms with a poster listing the same precautions hanging on the wall. After a year, the director will have all patients treated in whichever way turns out to have the highest survival rate.

Best Anti-Hypertensive Drug

(Originally from Heck et al. (2020) [4], adapted from Meyer et al. (2019) [2])

Background: Several drugs have been approved by the US. Food and Drug Administration as safe and effective for treating high blood pressure. Doctor Jones works in a multi-doctor walk-in clinic where patients see whichever doctor is available. Some doctors in the clinic prescribe drug A for high blood pressure, while others prescribe drug B. Both drugs are affordable and patients can tolerate their side effects. Situation 1

Doctor Jones wants to provide good treatment to his patients, so he decides that his patients who need high blood pressure medication will be prescribed drug A.

Situation 2

Doctor Jones wants to provide good treatment to his patients, so he decides that his patients who need high blood pressure medication will be prescribed drug B.

Situation 3

Doctor Jones thinks of two different ways to provide good treatment to his patients, so he decides to run an experiment by randomly assigning his patients who need high blood pressure medication to one of two test conditions. Half of patients will be prescribed drug A, and the other half will be prescribed drug B. After a year, he will only prescribe to new patients whichever drug has had the best outcomes for his patients.

Intubation Safety Checklist

Background: Some treatments for coronavirus (Covid-19) patients require a doctor to insert a plastic breathing tube into the throat. These treatments can save lives, but they can also lead to deadly fluid buildup in the lungs.

Situation 1

A hospital director wants to reduce these cases of fluid buildup, so he decides to give each doctor who performs this procedure a new ID badge with a list of standard safety precautions for the procedure printed on the back. All coronavirus patients having this procedure will then be treated by doctors with this list attached to their clothing.

Situation 2

A hospital director wants to reduce these cases of fluid buildup, so he decides to hang a poster with a list of standard safety precautions for this procedure in all procedure rooms. All coronavirus patients having this procedure will then be treated in rooms with this list posted on the wall.

Situation 3

A hospital director thinks of two different ways to reduce these cases of fluid buildup, so he decides to run an experiment by randomly assigning coronavirus patients who need a breathing tube to one of two test conditions. Half of patients will be treated by doctors who have received a new ID badge with a list of standard safety precautions for the procedure printed on the back. The other half will be treated in rooms with a poster listing the same precautions hanging on the wall. After two months, the director will have all patients treated in whichever way turns out to have the highest survival rate.

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Best Corticosteroid Drug

Background: Several corticosteroids (a family of anti-inflammatory drugs) have been approved by the U.S. Food and Drug Administration as safe and effective for treating a variety of diseases. There is some evidence that corticosteroids can also help certain coronavirus (Covid-19) patients, and many doctors prescribe corticosteroids for these patients. Doctor Jones works in a multi-doctor emergency department where patients see whichever doctor is available. Some doctors in the emergency department prescribe corticosteroid A for coronavirus symptoms, while others prescribe corticosteroid B. Both corticosteroids are affordable and patients can tolerate their side effects.

Situation 1

Doctor Jones wants to provide good treatment to his patients, so he decides that his coronavirus patients who need medication will be prescribed corticosteroid A.

Situation 2

Doctor Jones wants to provide good treatment to his patients, so he decides that his coronavirus patients who need medication will be prescribed corticosteroid B.

Situation 3

Doctor Jones thinks of two different ways to provide good treatment to his coronavirus patients, so he decides to run an experiment by randomly assigning his patients who need medication to one of two test conditions. Half of coronavirus patients will be prescribed corticosteroid A, and the other half will be prescribed corticosteroid B. After two months, he will only prescribe to new coronavirus patients whichever corticosteroid has had the best outcomes for his patients.

Ventilator Proning

Background: Some coronavirus (Covid-19) patients have to be sedated and placed on a ventilator to help them breathe. Even with a ventilator, these patients can have dangerously low blood oxygenation levels, which can result in death. Current standards suggest that laying ventilated patients on their stomach for 12-16 hours per day can reduce pressure on the lungs and might increase blood oxygen levels and improve survival rates.

Situation 1

A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 12-13 hours per day.

Situation 2

A hospital director wants to save as many ventilated Covid-19 patients as possible, so he decides that all of these patients will be placed on their stomach for 15-16 hours per day.

Situation 3

A hospital director thinks of two different ways to save as many ventilated Covid-19 patients as possible, so he decides to run an experiment by randomly assigning ventilated Covid-19 patients to one of two test conditions. Half of these patients will be placed on their stomach for 12-13 hours per day. The other half of these patients will be placed on their stomach for 12-13 hours per day. The other half of these patients will be placed covid-19 patients treated in whichever way turns out to have the highest survival rate.

Best Vaccine (ambiguous version; results not reported in main analyses)

Background: Imagine that several vaccines have been approved by the U.S. Food and Drug Administration as safe and effective for preventing Covid-19. Vaccine A uses mRNA molecules to provide the cells with a blueprint for how to destroy the virus. Vaccine B uses deactivated or weakened coronavirus to help the body create an immune resistance to the disease. Both vaccines are affordable, similarly priced, and people can tolerate their side effects. However, people can only receive one of these two vaccines.

Situation 1

The director of public health for a state wants to reduce Covid-19 cases. So he decides that all clinics in the state will offer Vaccine A for free. People can get any other vaccine somewhere else, if they want.

Situation 2

The director of public health for a state wants to reduce Covid-19 cases. So he decides that all clinics in the state will offer Vaccine B for free. People can get any other vaccine somewhere else, if they want.

Situation 3

The director of public health for a state thinks of two different ways to reduce Covid-19 cases, so he decides to run an experiment by randomly assigning clinics in the state to one of two test conditions. Half of the clinics will offer Vaccine A for free, and the other half will offer Vaccine B for free. People can get any other vaccine somewhere else, if they want.⁵ After six months, he will direct the state to offer whichever vaccine has resulted in the fewest cases of Covid-19.

Best Vaccine

Background: Imagine that several vaccines have been approved by the U.S. Food and Drug Administration as safe and effective for preventing Covid-19. Vaccine A uses mRNA molecules to provide the cells with a blueprint for how to destroy the virus. Vaccine B uses deactivated or weakened coronavirus to help the body create an immune resistance to the disease. Both vaccines are affordable, similarly priced, and people can tolerate their side effects.

Situation 1

The director of public health for a state wants to reduce Covid-19 cases. So he decides that all clinics in the state will offer Vaccine A for free.

Situation 2

The director of public health for a state wants to reduce Covid-19 cases. So he decides that all clinics in the state will offer Vaccine B for free.

Situation 3

The director of public health for a state thinks of two different ways to reduce Covid-19 cases, so he decides to run an experiment by randomly assigning clinics in the state to one of two test conditions. Half of the clinics will offer Vaccine A for free, and the other half will offer Vaccine B for free. After six months, he will direct the state to offer whichever vaccine has resulted in the fewest cases of Covid-19.

⁵ This wording unintentionally implied that residents could choose their vaccine (by going elsewhere) if they did not wish to be subject to the official's decision (including policy implementation or A/B test); we suspect this had the effect of making the experiment condition less aversive, since people could effectively opt-out of it, and our goal in this research is to study pragmatic, real-world situations in which avoiding randomization is not a realistic option.

School Reopening

Background: This Fall, school districts must decide whether to reopen their doors to students, teachers, and staff despite the risks of spreading coronavirus (Covid-19). Many school and public health officials have decided to use a "hybrid model" of teaching that offers some of the benefits of face-to-face learning time while attempting to minimize the risks related to Covid-19.

Situation 1

A superintendent at a large school district wants to provide good education to his students while slowing the spread of Coronavirus. So, he decides that students will attend school according to an even-odd schedule. Students in even-numbered grades (e.g., 2nd grade, 4th grade, etc.) will attend school in the morning and learn remotely in the afternoons, while students in odd- numbered grades will attend school in the afternoon and learn remotely in the mornings.

Situation 2

A superintendent at a large school district wants to provide good education to his students while slowing the spread of Coronavirus. So, he decides that students will attend school according to an A-day/B-day schedule. Students in the A group will attend school in person on Monday, Tuesday, and Wednesday morning, and students in the B group will attend school in person on Wednesday afternoon, Thursday, and Friday. Students will learn remotely on the days they do not attend school.

Situation 3

A superintendent at a large school district thinks of two different ways to provide good education to his students while slowing the spread of Coronavirus. So, he decides to conduct an experiment by randomly assigning schools in the district to one of two test conditions. For half of schools, students will attend school according to an even-odd schedule. Students in even-numbered grades (e.g., 2nd grade, 4th grade, etc.) will attend school in the morning and learn remotely in the afternoons, while students in odd-numbered grades will attend school in the afternoon and learn remotely in the mornings. For the other half of schools, students will attend school according to an A-day/Bday schedule. Students in the A group will attend school in person on Monday, Tuesday, and Wednesday morning, and students in the B group will attend school in person on Wednesday afternoon, Thursday, and Friday. Students will learn remotely on the days they do not attend school. At the end of the semester, all schools will adopt, for future semesters when the pandemic threat level remains similar, whichever policy has resulted in the best combination of test scores on state aptitude tests and number of Covid-19 cases.

Masking Rules

Background: Public health officials have considered different rules about when and where people must wear masks or other face coverings to reduce the spread of coronavirus (Covid-19).

Increasing mask use can reduce the spread of the disease, but highly restrictive mask policies can substantially reduce compliance rates.

Situation 1

A state health department director wants to reduce coronavirus spread within his state, so he decides that all counties will require masks in all businesses and public buildings.

Situation 2

A state health department director wants to reduce coronavirus spread within his state, so he decides that all counties will require masks in all businesses, public buildings, and outdoor public spaces.

Situation 3

A state health department director thinks of two different ways to reduce coronavirus spread within his state, so he decides to run an experiment by randomly assigning counties within the state to one of two test conditions. Half of counties will require masks in all businesses and public buildings. The other half of counties will require masks in all businesses, public buildings, and outdoor public spaces. After one month, the director will require all counties to adopt whichever policy has led to the fewest cases of Covid-19 for as long as the pandemic threat level remains high.

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Results

Sample demographics

Lay participants

Across all vignettes reported in the main text (i.e., excluding the initial ambiguous version of the Best Vaccine vignette), there were a total of 2,909 lay participants. They ranged in age from 18 to 88 years old (mean = 38.4, SD = 12.8) and the majority were White (74.6%) and female (55.9%). 35.7% had a 4-year college degree, 29.7% had some college, and 20.5% had a graduate degree. 21.3% of participants had a degree in a STEM field. The most frequently selected income level was between \$20,000 and \$40,000 (20.7%). A majority of participants reported being moderate, leaning liberal, or being liberal both generally and specifically with regards to social and economic issues. Similarly, a majority of participants reported being independent, leaning Democrat, or being Democrat in their political party affiliations. 37.7% of participants reported being non-religious. Of those who reported being religious, the most reported religion was Protestant (24.2%). See Table S4 for demographic breakdowns by vignette and in the combined lay participant sample.



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Table S4

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Table S4							ıt, inc	08469		
Demographics of lay participants by	catheterization	Best Anti-	Intubation	Best	Best					
		Hypertensive		Corticosteroid	Vaccine	Best	Schog	9 Ventilator	Masking	
	Checklist	Drug	Checklist	Drug	(first attempt)	Vaccine	Peopenii	Proning	Rules	vign
Total N	343	357	346	357	350	450	330 38.7 (13.65 S reig 39.2 8 cig	357	360	
Age [Mean (SD)]	37.9 (12.9)		37.9 (12.4)	38.0 (12.7)	36.7 (12.0)	37.7 (12.6)	38.7 (13. 🛱 🖳	36.4 (12.7)	39.0 (12.8)	38.4 (
Sex (%)		,					St.	3		
Male	51.3%	41.5%	48.1%	51.5%	36.6%	38.4%	39.2 % g	<u><u>40.9%</u></u>	39.7%	4
Female	47.8%	58.0%	51.9%	48.2%	63.1%	60.9%	60.5 cm 0.3 cm 0.0 cm	N 58.8%	60.0%	5
Other	0.6%	0.6%	0.0%	0.0%	0.3%	0.4%	0.3 Å Ž	8 0.3%	0.3%	
Prefer not to answer	0.3%	0.0%	0.0%	0.3%	0.0%	0.2%	0.0 S S	4 . 0.0%	0.0%	
Race - select all that apply (%)							t f	D		
Black/African-American	11.1%	5.0%	8.4%	10.1%	10.9%	11.3%	9.7 Å 5	₹ 6.7%	8.9%	
Hispanic or Latino	8.2%	8.4%	7.2%	8.4%	8.3%	5.6%	5.9	n 9.5%	7.5%	
White	72.0%	78.7%	71.5%	72.0%	70.9%	72.7%	5.9 83 oerie 77.0%- ee	a 77.6%	75.8%	7
Asian	12.5%	8.7%	15.3%	12.6%	12.6%	13.3%	8.6	Downloaded 7.0%	7.8%	1
Other	1.2%	1.7%	1.2%	0.3%	3.4%	0.9%	1.8 🗟 🏹	1 .7%	2.2%	
Prefer not to answer	0.9%	0.6%	0.0%	0.6%	0.3%	0.9%	1.8%1 A BES 0.6%31 I D	o 0.3%	0.3%	
Education (%)										
Less than high school	0.6%	0.8%	0.3%	0.3%	0.6%	0.2%	0.3 2 .	9.8%	0.8%	
High school degree	5.5%	7.8%	8.9%	9.2%	9.1%	10.2%	10.3	29.4%	11.4%	
Some college	32.7%	32.2%	24.2%	28.0%	30.3%	32.0%	26.3 2	33.6%	31.9%	2
Four-year college degree	37.3%	35.6%	39.5%	35.9%	37.1%	35.8%	37.8	3.1%	30.6%	3
Some graduate school	4.4%	3.4%	4.6%	4.2%	4.6%	5.1%	4.4 9 20.9 2	2 3.8%	4.7%	
Graduate degree	19.2%	19.9%	22.5%	22.1%	18.3%	16.2%	20.9	0.3%	20.6%	2
Prefer not to answer	0.3%	0.3%	0.0%	0.3%	0.0%	0.4%	0.0	9.8% 29.4% 33.6% 3.1% 0.3% 0.3% 0.0% 11.2% 19.0%	0.0%	
Income (%)							no	3		
< \$20,000	11.1%	8.4%	9.2%	7.6%	12.0%	9.3%	9.4 %	o 11.2%	9.7%	
\$20,000-\$40,000	17.8%	22.1%	21.6%	25.8%	19.7%	20.2%	18.9	19.0%	19.7%	2
\$40,000-\$60,000	24.5%	18.8%	19.0%	20.2%	21.4%	20.4%	Z1.2 👸		20.8%	2
\$60,000-\$80,000	13.7%	17.4%	16.1%	17.9%	18.6%	17.8%	16.5 🔀	9 19.3%	19.2%	1
\$80,000-\$100,000	11.4%	13.7%	11.0%	9.5%	10.6%	12.2%	13.3	E 8.4%	12.2%	1
> \$100,000	20.7%	18.5%	21.3%	17.4%	17.1%	18.7%	20.4	June 8.4%	16.9%	1
Prefer not to answer	0.9%	1.1%	0.9%	1.4%	0.3%	1.3%	0.3	o 2.3%	1.4%	
No response	0.0%	0.0%	0.9%	0.3%	0.3%	0.0%		, 0.0%	0.0%	
Political Ideology (%)								Ñ		
Very liberal	12.2%	12.6%	13.0%	11.2%	10.6%	13.1%	12.7 /0		12.8%	1
Liberal	32.1%	30.3%	32.3%	35.9%	29.4%	31.1%	30.4%	at 30.8%	28.6%	3
Moderate	29.2%	25.5%	28.2%	26.1%	31.1%	27.3%	27.7%	A 24.9%	28.3%	2
Conservative	19.8%	20.2%	20.7%	17.1%	21.7%	18.7%	20.9%	g 21.3%	23.6%	2
Very conservative	5.8%	10.6%	5.2%	9.5%	6.3%	8.9%	7.4%	ence 21.3% 9.8%	5.8%	
Prefer not to answer	0.9%	0.6%	0.3%	0.3%	0.9%	0.9%	0.6%	D 0.8%	0.8%	
No response	0.0%	0.3%	0.3%	0.0%	0.0%	0.0%	0.3%	ibliographique de l	0.0%	

3 Table S4, continued

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4 De	mographics of lay participants by vignette								469 inc		
5				.	2	Best			ud on gVentitator		
6		Catheterization Safety	Best Anti- Hypertensive	Intubation Safety	Best Corticosteroid	Vaccine (first	Best	School	J. J.	Masking	
7		Checklist	Drug	Checklist	Drug	attempt)	Vaccine	Reopening	5 Proning	Rules	All vignettes
	litical ideology on social issues (%)										
9	Very liberal	18.7%	16.8%	19.6%	13.7%	17.7%	18.0%	17.7%	eptember 2% Enseignemen Enseignemen tuses related to	17.5%	17.5%
10	Liberal Moderate	34.1% 21.6%	33.3% 23.8%	33.4% 23.9%	40.3% 19.9%	31.1% 26.0%	30.4% 25.6%	36.6% 19.8%	S S 34.2%	31.7% 23.3%	34.1% 22.6%
11	Conservative	16.6%	15.4%	17.3%	17.1%	18.0%	16.0%	18.3%		19.4%	17.0%
12	Very conservative	8.2%	10.4%	5.2%	8.4%	6.3%	9.1%	6.8%	seignement - related to t	7.5%	8.2%
13	Prefer not to answer	0.9%	0.3%	0.6%	0.6%	0.9%	0.9%	0.6%	d ne 12.6%	0.6%	0.6%
	No response	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	4.00% 4.00% A.Down/to add for text and dat	0.0%	0.0%
14Po	litical ideology on economic issues (%)	0.00/	12.000	12.50/	11.20/	0.00/	12.00/	11.00/	ex So	11.00/	11.00/
15	Very liberal Liberal	9.9% 28.3%	12.0% 21.6%	13.5% 27.1%	11.2% 28.3%	8.0% 24.9%	13.8% 23.3%	11.8% 27.7%		11.9% 19.7%	11.9% 24.8%
16	Moderate	28.0%	27.5%	27.1%	25.2%	24.9%	28.4%	24.2%	n r:-20.0%	32.2%	24.8%
17	Conservative	23.0%	24.9%	24.8%	22.1%	30.9%	22.0%	24.2%	da ur 20.8%	26.4%	24.1%
18	Very conservative	9.3%	13.7%	8.6%	12.0%	7.4%	11.3%	11.2%	a >1Z.9%	9.2%	11.1%
19	Prefer not to answer	1.5%	0.3%	0.9%	1.1%	1.1%	0.9%	0.6%	Э В ð .6%	0.6%	0.8%
	No response	0.0%	0.0%	0.0%	0.0%	0.0%	0.2%	0.3%	mini.0%	0.0%	0.1%
20 Po	No response litical party (%)								ng,		
21	Strong Democrat	14.9%	10.9%	12.4%	13.7%	12.0%	13.6%	13.0%		12.8%	13.2%
22	Democrat	23.3%	22.7%	27.7%	28.9%	26.3%	24.4%	22.7%	A 25,0%	21.7%	24.1%
23	Independent (but lean Democrat) Independent	15.7% 15.7%	16.2% 16.8%	14.7% 17.6%	12.9% 14.3%	13.4% 16.9%	14.9% 16.9%	17.4% 13.6%	training, 19,0%	15.8% 18.1%	15.2% 16.0%
24	Independent (but lean Republican)	7.0%	8.7%	7.8%	10.4%	9.4%	8.7%	10.6%	nin 8.1%	10.6%	9.3%
25	Republican	16.3%	14.6%	14.1%	12.0%	13.1%	15.3%	15.6%	ng <u>3</u> .0%	13.9%	14.5%
26	Strong Republican	4.1%	8.4%	4.3%	7.3%	6.9%	4.9%	6.5%	0%. 💇 🕰	6.4%	6.3%
	Prefer not to answer	2.9%	1.7%	1.4%	0.6%	2.0%	1.3%	0.3%	and .7%	0.8%	1.3%
27	No response	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.3%	≌ . <mark>8</mark> .0%	0.0%	0.0%
	ligion (%)	26.20	24 604	22.50	21.00/	04 604	24.204	25.40		22.00/	24.2%
29	Christian - Protestant Christian - Catholic	26.2%	24.6% 16.5%	23.6% 15.9%	21.0% 18.2%	24.6% 17.7%	24.2% 14.0%	25.4% 17.1%	milar t	23.9% 15.3%	24.2% 16.6%
30	Christian - Other	17.5% 11.1%	11.2%	8.1%	18.2%	11.7%	14.0%	17.1%		13.3%	11.0%
31	Jewish	2.6%	1.7%	1.7%	1.7%	1.7%	1.3%	1.8%	100.9% hr.4%	2.5%	1.8%
32	Muslim	2.0%	0.8%	1.4%	0.6%	0.3%	0.9%	1.2%	19% 19% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1% 1%	1.7%	1.2%
	Buddhist	2.3%	1.4%	2.0%	1.7%	1.1%	2.0%	2.4%	nolog 0.6%	1.4%	1.7%
33	Hindu	1.2%	0.6%	2.6%	1.1%	1.7%	1.6%	0.3%	gie 20,6%	0.6%	1.1%
34	Non-religious	32.7%	38.1%	40.9%	40.3%	36.6%	40.0%	35.4%		36.4%	37.7%
35	Other	3.5%	3.6%	2.6%	3.4%	3.7%	3.8%	4.1%	at.4% ▶7%	4.2%	3.6%
36	Prefer not to answer	0.9% 0.0%	1.4% 0.0%	1.2% 0.0%	0.6% 0.3%	0.9%	1.1%	0.6% 0.0%	▶ ^{7%}	1.9% 0.0%	1.2%
37 st	No response EM degree (%)	0.0%	0.0%	0.0%	0.5%	0.0%	0.0%	0.0%	Gen .3%	0.0%	0.1%
38	No	77.6%	77.0%	75.2%	76.8%	77.4%	80.7%	78.5%	78 .4%	78.6%	77.9%
39	Yes	21.9%	22.1%	23.3%	22.4%	22.3%	18.7%	21.5%	200.2%	21.1%	21.3%
	Prefer not to answer	0.6%	0.8%	1.4%	0.8%	0.0%	0.0%	0.0%	ð :0%	0.0%	0.7%
40	No response	0.0%	0.0%	0.0%	0.0%	0.3%	0.7%	0.0%	ð .3%	0.3%	0.1%
41									gra		
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45			For peer reviev	w only - http	o://bmjopen.br	nj.com/site/a	bout/guideli	nes.xhtml	de		
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Clinicians

There were 2,149 clinician responses across all vignettes. In the clinician samples, survey responses were anonymous, so we could not restrict participation based on our previous studies so some participants who completed the Intubation Safety Checklist, Best Corticosteroid Drug, and Masking Rules vignettes may have also completed the Best Vaccine vignette. For this reason, demographics are reported separately by vignette in Table S5. Across vignettes, a majority of clinicians were female. Over 50% of participants in the sample were registered nurses, followed by physicians and physician assistants. Over 50% of participants in the sample reported that they had been in the medical field for over 10 years. The clinicians reported that they had received training in research methods and statistics via an average of 1.5 of the sources we listed, and that they engaged in an average of 2.5 research methods and statistics.

to beet terien only

Table S5

Demographics of clinicians by vignette

	Intubation	Best		
	Safety	Corticosteroid	Masking	Bes
	Checklist	Drug	Rules	Vaccin
Total N	271	275	349	125
Sex (%)				
Male	18.1%	22.5%	18.1%	18.79
Female	81.9%	77.1%	81.4%	81.29
Other	0.0%	0.4%	0.6%	0.29
Source of research methods/statistics training - select all that apply (%)				
Undergraduate coursework	48.7%	49.5%	48.7%	47.49
Professional school instruction	40.2%	31.3%	34.4%	34.49
Postgraduate coursework	26.2%	20.7%	22.1%	21.19
CME/CEU courses	27.7%	25.1%	24.1%	25.89
Self-instruction via peer-reviewed literature	19.2%	15.6%	17.2%	21.39
Other	7.0%	4.0%	3.2%	3.99
Total number of research methods/statistics training [mean (SD)]	1.69 (1.22)	1.46 (1.02)	1.50 (1.13)	1.54 (1.16
Comfort with research methods/statistics (%)		× /		,
Not at all	8.9%	12.7%	10.9%	11.19
Somewhat	37.6%	44.4%	45.8%	46.69
Moderately	39.5%	32.0%	32.7%	30.89
Very	11.8%	9.1%	8.9%	9.99
Extremely	2.2%	1.8%	1.7%	1.79
Research methods/statistics activities - select all that apply (%)	,.			
Read results of RCT in peer-reviewed journal article	81.2%	75.3%	71.9%	71.29
Changed typical prescription/recommendation after personally				
reading results of RCT in peer-reviewed journal article	41.0%	33.1%	33.0%	39.89
Published scientific paper in peer-reviewed journal	13.3%	12.4%	9.7%	12.09
Conducted or worked on a team conducting an RCT	18.5%	20.0%	19.2%	17.19
Took a course/class in statistics, biostatistics, research methods	73.1%	69.8%	69.1%	68.59
Analyzed data for statistical significance outside of course require	23.6%	21.8%	19.2%	21.19
Used statistical software	12.2%	11.6%	11.5%	9.39
Total number of research methods/statistics activities [mean (SD)]	2.63 (1.69)	2.44 (1.71)		
Currently involved in research (%)	10.7%	9.1%	9.7%	2.37 (1.72 9.69
Position (%)	10.770	9.170	2.170	2.0
Doctor	14.8%	14.5%	12.6%	15.79
Physician Assistant	14.8%	6.9%	9.5%	7.79
Nurse Practitioner	6.3%	2.5%	4.3%	4.79
Nurse (RN)	51.3%	57.1%	4.3% 55.6%	52.89
Nurse (LPN)	6.3%	9.5%	8.0%	15.69
Nurse (Other)	0.3%	9.3%	8.0% 1.4%	0.69
Genetic Counselor				
	0.0%	0.0%	0.0%	0.09
Non-prescribing clinician or staff without clinical credential	0.0%	0.0%	0.0%	0.09
Medical student	5.2%	5.5%	4.6%	0.19
Faculty or Professor	0.4%	0.7%	0.3%	0.39
Other	1.5%	2.2%	3.7%	2.69
Years in medical field (%)	0.00	0.004	2.004	0.0
< 1 year	2.6%	2.9%	3.2%	2.89
1-2 years	6.3%	5.5%	6.0%	5.89
3-5 years	15.1%	11.3%	12.6%	13.69
6-10 years	16.6%	14.2%	15.8%	15.89
> 10 years	59.4%	66.2%	62.5%	62.09

Note. Reported here are the demographics of the clinicians who saw the Intubation Safety Checklist, Best Corticosteroid Drug, or Masking Rules vignette first (responses to the Best Vaccine vignette were collected at a different time). All clinicians who participated in this study completed all vignettes but in randomized order. In the main text, we only analyze responses to the first vignette, so we report demographics similarly here.

Results presented in main text

In Figures S1-3, we show all individual appropriateness ratings (1 = very inappropriate, 5 = very appropriate) for intervention A, intervention B, and the A/B test across all vignettes.

Figure S1

Lay Sentiments About pRCTs

		neteriz Safety Sheckli	/	Anti-F	Best Anti-Hypertensive Drug					
°CI) %										
Appropriateness Rating (with 95% CI)										
s Rating					1. S.					
priatenes										
Approl							3			
L	Á	Ġ	A/B Test	Á	ġ	A/B Test				



Lay Sentiments About Covid-19 pRCTs

		entila ronii						asking Rules Checklist			Best Corticosteroid Drug			Best Vaccine				
(with 95% CI)	Strate Say	は語言を言う	調整にな	1. 16. 19. 19. 19. 19. 19. 19. 19. 19. 19. 19	が設定する		和和武物主	實施肥於	N9428.1		活動に進立			場合は現	《古田》的文	の影響なななが、	「新聞」を	
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Appropriateness			Sec. A.		19. C. M. C. M.	ななたの		「「「	議事務に		41. 2.4 2			1. 19 A.M.	987.878.8		* 112 第54	· · · · · · · · · · · · · · · · · · ·
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l	Á	B	A/B Test	Á	B	A/B Test	À	B	A/B Test	À	B	A/B Test	Á	B	A/B Test	À	B	A/B Test
Figur Clinic		ntime	ents Abo	out Cov	vid-19	9 pRCT	S											

Figure S3

	M	laski Rule	ng s	5	Intubation Safety Checklist			Best icost Drug	eroid	Best Vaccine			
اک% CI)						1948 1984 1984 1984 1984 1984 1984 1984	要资料资料		$\mathcal{L}_{\mathcal{T}}_{\mathcal{T}_{\mathcal{T}_{\mathcal{T}_{\mathcal{T}_{\mathcal{T}_{\mathcal{T}_{\mathcal{T}}}}}}}}}}$		学校の大学		
Appropriateness Rating (with 95% CI)	Arth State	教室が											
s Ratine			• <mark>•</mark> €s k, sta	<mark>-}:</mark> ,⊘%%%	- 2012年1月			Prair South					
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	Á	B	A∕B Test	Á	B	A/B Test	Á	B	A/B Test	À	B	A/B Test	

In Table S6A-C, we present the descriptive and inferential results for all vignettes discussed in the main text.

Table S6A

		Desc	riptive Resu	ults	Inferential Results				
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome			
Lay Sentiments	s About pRO	CTs							
					A/B Effect	$t(342) = 9.74^{***}, d = 0.69 \pm .10^{\circ}$			
					Mean(A,B) > AB	$58\% \pm 5\%$			
	А	3.77 (1.12)	27%	32%	Reverse A/B effect	$t(342) = -9.74^{***}, d = -0.69 \pm .1$			
Catheterization	В	4.03 (1.09)	42%	21%	AB > Mean(A,B)	$27\% \pm 49$			
Safety	AB	3.09 (1.40)	32%	48%	Experiment Aversion	$t(342) = 3.70^{***}, d = 0.25 \pm .1$			
Checklist	Mean(A,B)	3.90 (0.84)	-	-	Min(A,B) > AB	$41\% \pm 5\%$			
(n = 343)	Min(A,B)	3.42 (1.16)	-	-	Experiment Appreciation	$t(342) = -14.61^{***}, d = -1.13 \pm .2$			
laypeople)	Max(A,B)	4.39 (0.81)	-	-	AB > Max(A,B)	15% ± 3°			
••••					Experiment Rejection	$28\% \pm 5\%$			
					(A,B = 3,4,5; AB = 1,2)				
					Experiment Endorsement	$3\% \pm 1$			
					(AB = 4,5; A,B = 1,2,3)				
					A/B Effect	$t(356) = 6.68^{***}, d = 0.52 \pm .1$			
					Mean(A,B) > AB	47% ± 5			
	А	3.87 (1.00)	25%	27%	Reverse A/B effect	$t(356) = -6.68^{***}, d = -0.52 \pm .1$			
Best Anti-	В	3.89 (0.99)	25%	28%	AB > Mean(A,B)	31% ± 5			
Hypertensive	AB	3.24 (1.47)	50%	45%	Experiment Aversion	$t(356) = 5.96^{***}, d = 0.46 \pm .1$			
Drug	Mean(A,B)	3.88 (0.95)	-	-	Min(A,B) > AB	44% ± 5			
(n = 357)	Min(A,B)	3.82 (1.03)	-	-	Experiment Appreciation	$t(356) = -7.26^{***}, d = -0.57 \pm .1$			
laypeople)	Max(A,B)	3.94 (0.95)	-	-	AB > Max(A,B)	$29\% \pm 4$			
_					Experiment Rejection	$34\% \pm 5\%$			
					(A,B = 3,4,5; AB = 1,2)				
					Experiment Endorsement	$18\% \pm 4\%$			
					(AB = 4,5; A,B = 1,2,3)				

Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. Experiment Appreciation refers to the difference between the rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of the intervention. Experiment Rejection is the percentage of people who rated interventions A and B as "neither inappropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate. Experiment Endorsement is the percentage of people who rated the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate.

*p < .05

**p < .01

***p < .001

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Table S6B

	9	, i	riptive Resu	· ·	ventions and experiment for all vignettes Inferential Results				
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome			
Lay Sentime	nts About (Covid-19 pRC	Ts						
					A/B Effect Mean(A,B) > AB	$t (345) = 10.69^{***}, d = 0.75 \pm .155\% \pm 5\%$			
	А	3.81 (1.10)	29%	29%	Reverse A/B effect	$t(345) = -10.69^{***}, d = -0.75 \pm .10^{-10}$			
Intubation	В	3.99 (1.13)	43%	19%	AB > Mean(A,B)	$25\% \pm 4\%$			
Safety	AB	2.98 (1.46)	29%	52%	Experiment Aversion	$t(345) = 5.28^{***}, d = 0.35 \pm .14$			
Checklist	Mean(A,B)	3.90 (0.88)	-	-	Min(A,B) > AB	$45\% \pm 5\%$			
	Min(A,B)	3.46 (1.19)	-	-	Experiment Appreciation	$t(345) = -14.94^{***}, d = -1.14 \pm .1$			
(n = 346) laypeople)	Max(A,B)	4.34 (0.84)	-	-	AB > Max(A,B) Experiment Rejection	14% ± 3%			
					(A,B = 3,4,5; AB = 1,2)	$31\% \pm 5\%$			
					Experiment Endorsement	10/ - 20			
					(AB = 4,5; A,B = 1,2,3)	4% ± 2%			
					A/B Effect	$t(356) = 2.28^*, d = 0.17 \pm .1$			
					Mean(A,B) > AB	$34\% \pm 5\%$			
	А	3.89 (1.03)	17%	32%	Reverse A/B effect	$t(356) = -2.28^*, d = -0.17 \pm .1$			
Best	В	3.90 (1.00)	18%	37%	AB > Mean(A,B)	$38\% \pm 5\%$			
Corticosteroid	AB	3.69 (1.37)	65%	31%	Experiment Aversion	$t(356) = 1.55, p = .123, d = 0.12 \pm .1$			
Drug	Mean(A,B)	3.90 (0.99)	-	-	Min(A,B) > AB	$31\% \pm 5\%$			
(n = 357)	Min(A,B)	3.83 (1.04)	-	-	Experiment Appreciation	$t(356) = -2.99^{**}, d = -0.23 \pm .1$			
(n = 557) laypeople)	Max(A,B)	3.96 (0.98)	-	-	AB > Max(A,B)	$35\% \pm 5\%$			
laypeople)					Experiment Rejection	22% ± 49			
					(A,B = 3,4,5; AB = 1,2)				
					Experiment Endorsement	$17\% \pm 4^{\circ}$			
					(AB = 4,5; A,B = 1,2,3)				
					A/B Effect	$t(449) = 2.41^*, d = 0.15 \pm .1$			
					Mean(A,B) > AB	$34\% \pm 49$			
	А	3.95 (1.09)	26%	27%	Reverse A/B effect	$t(449) = -2.41^*, d = -0.15 \pm .1$			
	В	3.84 (1.09)	19%	39%	AB > Mean(A,B)	36% ± 44			
Best Vaccine	AB	3.72 (1.34)	55%	34%	Experiment Aversion	$t(449) = 0.61, p = .546, d = 0.04 \pm .1$			
(n = 450)	Mean(A,B)	3.90 (1.03)	-	-	Min(A,B) > AB	29% ± 49			
	Min(A.B)	3.77 (1.13)	-	-	Experiment Appreciation	$t(449) = -4.06^{***}, d = -0.25 \pm .1$			
laypeople)	Max(A,B)	4.03 (1.04)	-	-	AB > Max(A,B)	32% ± 49			
					Experiment Rejection	17% ± 3°			
					(A,B = 3,4,5; AB = 1,2)	17% ± 3			
					Experiment Endorsement	$13\% \pm 3\%$			
					(AB = 4,5; A,B = 1,2,3)	$15\% \pm 3\%$			

Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. Experiment Appreciation refers to the difference between the rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of their highest-rated intervention. Experiment Rejection is the percentage of people who rated interventions A and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate. Experiment Endorsement is the percentage of people who rated the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate.

*p < .05

**p < .01

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Table S6B, continued

Descriptive and inferentia	l results of ratings and	rankings of interventions	and experiment for all vignettes
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		Desc	riptive Resu		Inferential Results				
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome			
Lay Senti	ments Abo	ut Covid-19 p	RCTs						
					A/B Effect	$t(338) = 6.42^{***}, d = 0.39 \pm .12$			
					Mean(A,B) > AB	$46\% \pm 5\%$			
	А	3.45 (1.15)	17%	46%	Reverse A/B effect	$t(338) = -6.42^{***}, d = -0.39 \pm .12$			
	В	3.96 (1.03)	53%	14%	AB > Mean(A,B)	$28\% \pm 5\%$			
School	AB	3.24 (1.36)	30%	40%	Experiment Aversion	$t(338) = 0.47, p = .638, d = 0.03 \pm .12$			
Reopening	Mean(A,B)	3.70 (0.90)	-	-	Min(A,B) > AB	$28\% \pm 5\%$			
(n = 339)	Min(A,B)	3.28 (1.15)	-	-	Experiment Appreciation	$t(338) = -11.25^{***}, d = -0.75 \pm .13$			
laypeople)	Max(A,B)	4.12 (0.91)	-	-	AB > Max(A,B)	15% ± 3%			
					Experiment Rejection				
					(A,B = 3,4,5; AB = 1,2)	$19\% \pm 4\%$			
					Experiment Endorsement				
					(AB = 4,5; A,B = 1,2,3)	$4\% \pm 2\%$			
					A/B Effect	$t(356) = 6.07^{***}, d = 0.42 \pm .14$			
					Mean(A,B) > AB	45% ± 5%			
	А	3.82 (1.09)	21%	33%	Reverse A/B effect	$t(356) = -6.07^{***}, d = -0.42 \pm .14$			
	В	3.96 (1.07)	36%	25%	AB > Mean(A,B)	31% ± 5%			
Ventilator	AB	3.39 (1.38)	43%	42%	Experiment Aversion	$t(356) = 2.63^{**}, d = 0.17 \pm .12$			
Proning	Mean(A,B)	3.89 (0.96)	-	_	$\operatorname{Min}(A,B) > AB$	36% ± 5%			
(n = 357)	Min(A,B)	3.61 (1.11)	-	-	Experiment Appreciation	$t(356) = -8.927^{***}, d = -0.64 \pm .10^{\circ}$			
laypeople)	Max(A,B)	4.17 (0.99)	-	-	AB > Max(A,B)	22% ± 49			
JI I /		~ /			Experiment Rejection				
					(A,B = 3,4,5; AB = 1,2)	$23\% \pm 4\%$			
					Experiment Endorsement				
					(AB = 4,5; A, B = 1,2,3)	6% ± 29			
					A/B Effect	$t(359) = 14.55^{***}, d = 1.07 \pm .13$			
					Mean(A,B) > AB	$68\% \pm 5\%$			
	А	4.19 (0.95)	44%	14%	Reverse A/B effect	$t(359) = -14.55^{***}, d = -1.07 \pm .13$			
	В	3.80 (1.34)	38%	27%	AB > Mean(A,B)	$21\% \pm 4\%$			
Masking	AB	2.74 (1.38)	18%	59%	Experiment Aversion	$t (359) = 7.63^{***}, d = 0.56 \pm .13$			
Rules	Mean(A,B)	4.00 (0.91)	-	-	Min(A,B) > AB	$50\% \pm 5\%$			
(n = 360)	Min(A,B)	3.47 (1.22)	-	-	Experiment Appreciation	$t(359) = -20.85^{***}, d = -1.57 \pm .22$			
(n = 500)	Max(A,B)	4.53 (0.84)	_	_	AB > Max(A,B)	$(357) = -20.05$, $u = -1.57 \pm .2.5$ $8\% \pm 2\%$			
mypeople)		1.55 (0.04)			Experiment Rejection	670 ± 27			
					(A,B = 3,4,5; AB = 1,2)	$38\% \pm 5\%$			
					Experiment Endorsement				
					(AB = 4,5; A,B = 1,2,3)	$3\% \pm 1\%$			

Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the

percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. Experiment Appreciation refers to the difference between the rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of their highest-rated intervention. Experiment Rejection is the percentage of people who rated interventions A and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate. Experiment Endorsement is the percentage of people who rated the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate. *p < .05

***p* < .01

***p < .001

- *p* < .00

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		Desc	riptive Res	ults	Infe	rential Results
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome
Clinician Sei	ntiments A	bout Covid-19		110150		
					A/B Effect	$t(270) = 9.00^{***}, d = 0.71 \pm .17$
					Mean(A,B) > AB	57% ± 69
	А	3.37 (1.26)	19%	32%	Reverse A/B effect	$t(270) = -9.00^{***}, d = -0.71 \pm .1$
Intubation	В	3.90 (1.12)	53%	14%	AB > Mean(A,B)	23% ± 5%
Safety	AB	2.74 (1.49)	28%	54%	Experiment Aversion	$t(270) = 3.98^{***}, d = 0.30 \pm .1$
Checklist	Mean(A,B)	3.63 (0.96)	-	-	Min(A,B) > AB	43% ± 69
(n = 271)	Min(A.B)	3.14 (1.23)	-	-	Experiment Appreciation	$t(270) = -12.70^{***}, d = -1.08 \pm .2$
clinicians)	Max(A,B)	4.12 (1.01)	-	-	AB > Max(A,B)	$16\% \pm 49$
					Experiment Rejection	$28\% \pm 5\%$
					(A,B = 3,4,5; AB = 1,2)	
					Experiment Endorsement	$6\% \pm 2^{\circ}$
					(AB = 4,5; A,B = 1,2,3)	
					A/B Effect	$t(274) = 6.59^{***}, d = 0.52 \pm .1$
					Mean(A,B) > AB	$48\% \pm 6\%$
	А	3.76 (1.10)	28%	28%	Reverse A/B effect	$t(274) = -6.59^{***}, d = -0.52 \pm .1$
Best	В	3.74 (1.09)	23%	26%	AB > Mean(A,B)	$27\% \pm 5\%$
Corticosteroid	AB	3.04 (1.56)	49%	46%	Experiment Aversion	$t(274) = 6.18^{***}, d = 0.49 \pm .1$
Drug	Mean(A,B)	3.75 (1.08)	-	-	Min(A,B) > AB	$46\% \pm 6\%$
(n = 275)	Min(A,B)	3.71 (1.11)	-	-	Experiment Appreciation	$t(274) = -6.93^{***}, d = -0.55 \pm .1$
clinicians)	Max(A,B)	3.79 (1.08)	-	-	AB > Max(A,B)	$26\% \pm 5\%$
					Experiment Rejection	$34\% \pm 5\%$
					(A,B = 3,4,5; AB = 1,2)	
					Experiment Endorsement	$15\% \pm 49$
					(AB = 4,5; A,B = 1,2,3)	

Descriptive and inferential results of ratings and rankings of interventions and experiment for all vignettes

Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of the induction. Experiment Rejection is the percentage of people who rated interventions A and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate" or less appropriate.

p < .05p < .01p < .01

Table S6C, continued

		Desc	riptive Resi	ılts	Inferential Results				
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome			
Clinician	Sentiment	s About Covi	id-19 pRC	Гs					
					A/B Effect	$t(348) = 16.50^{***}, d = 1.27 \pm .20$			
					Mean(A,B) > AB	72% ± 5%			
	А	4.19 (1.05)	39%	15%	Reverse A/B effect	$t(348) = -16.50^{***}, d = -1.27 \pm .2$			
	В	4.01 (1.24)	44%	22%	AB > Mean(A,B)	$16\% \pm 3\%$			
Masking	AB	2.61 (1.41)	17%	62%	Experiment Aversion	$t(348) = 9.72^{***}, d = 0.74 \pm .1$			
Rules	Mean(A,B)	4.10 (0.88)	-	-	Min(A,B) > AB	$57\% \pm 5\%$			
(n = 349)	Min(A,B)	3.58 (1.20)	-	-	Experiment Appreciation	$t(348) = -22.58^{***}, d = -1.74 \pm .2$			
clinicians)	Max(A,B)	4.62 (0.82)	-	-	AB > Max(A,B)	$6\% \pm 2^{\circ}$			
					Experiment Rejection	$43\% \pm 5\%$			
					(A,B = 3,4,5; AB = 1,2)				
					Experiment Endorsement	2% ± 1			
					(AB = 4,5; A,B = 1,2,3)				
					A/B Effect	$t(1253) = 2.50^*, d = 0.10 \pm .0$			
					Mean(A,B) > AB	$35\% \pm 3\%$			
	А	3.56 (1.17)	27%	28%	Reverse A/B effect	$t(1253) = -2.50^*, d = -0.10 \pm .0$			
	В	3.40 (1.18)	17%	39%	AB > Mean(A,B)	$34\% \pm 3\%$			
Best	AB	3.36 (1.38)	56%	33%	Experiment Aversion	$t(1253) = -0.89, p = .375, d = -0.03 \pm .0$			
Vaccine	Mean(A,B)	3.48 (1.09)	-	-	Min(A,B) > AB	$29\% \pm 2\%$			
(n = 1254)	Min(A,B)	3.32 (1.18)	-	-	Experiment Appreciation	$t(1253) = -5.49^{***}, d = -0.22 \pm .0$			
clinicians)	Max(A,B)	3.64 (1.16)	-	-	AB > Max(A,B)	$30\% \pm 2\%$			
					Experiment Rejection	$20\% \pm 2\%$			
					(A,B = 3,4,5; AB = 1,2)				
					Experiment Endorsement	$20\% \pm 29\%$			
					(AB = 4,5; A,B = 1,2,3)				

Note. The A/B Effect refers to the difference between the average rating of the two interventions and the rating of the A/B test. Mean(A,B) > AB is the percentage of people whose average intervention rating was higher than their rating of the A/B test. The Reverse A/B Effect refers to difference between the rating of the A/B test and the average rating of the two interventions. AB > Mean(A,B) is the percentage of people who rating of the A/B test was higher than their average intervention rating. Experiment Aversion refers to the difference between the rating of the A/B test and the lowest-rated intervention. Min(A,B) > AB is the percentage of people whose lowest-rated intervention is rated higher than their rating of the A/B test. Experiment Appreciation refers to the difference between the rating of the highest-rated intervention and the rating of the A/B test. AB > Max(A,B) is the percentage of people whose rating of the A/B test is higher than the rating of their highest-rated intervention. Experiment Rejection is the percentage of people who rated interventions A and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate. Experiment Endorsement is the percentage of people who rated the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate.

*p < .05 **p < .01

***p < .001

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Comparisons to previously published work

To compare these results to our previous findings reporting sentiments about experiments, as we do in the main text, please refer to Heck et al. (2020) [4]. For example, in the Results section "Lay Sentiments About pRCTs," we say, "these levels of experiment aversion near the height of the pandemic were slightly (but not significantly) higher than those we observed among similar laypeople in 2019 (41% ± 5% in 2020 vs. 37% ± 6% in 2019 for Catheterization Safety Checklist, p = .31; 44% ± 5% in 2020 vs. 40% ± 6% in 2019 for Best Anti-Hypertensive Drug, p = .32)." We extracted the percentage of participants who were experiment averse in 2019 from Heck et al. (2020) [4]. We then performed a two-sample z-test for proportions to compare the 2019 and 2020 proportions. As noted in the main text, we did not find a significant difference between the percentage of people who were experiment averse in 2019 and the percentage of people who were experiment averse in the current studies which took place in 2020 and 2021 (Catheterization Safety Checklist; $\chi^2(1) = 1.034$, p = .309, Anti-Hypertensive Drug; $\chi^2(1) = 0.998$, p = .318).

Results not presented in the main text

Results of Best Vaccine vignette (initial ambiguous version)

The only vignette which showed no A/B Effect was the initial ambiguous version of Best Vaccine (see Table S6D). The two versions of Best Vaccine both presented a public health official's decision to either distribute an mRNAbased vaccine to every county in their state, distribute an inactivated-virus vaccine to every county, or run an experiment in which counties are randomized to receive one of the two vaccine types. However, in version 1, the wording unintentionally implied that residents could choose their vaccine (by going elsewhere) if they did not wish to be subject to the official's decision (including intervention implementation or A/B test), while in version 2 we eliminated this possible interpretation; we suspect this had the effect of making the experiment condition in version 1 less aversive, since people could effectively opt- out of it, and our goal in this research is to study pragmatic, real-world situations in which avoiding randomization is typically not a realistic option.

Table S6D

		Desc	riptive Resi	ılts	Inferential Results				
Vignette	Variable	Mean (SD)	% Ranking Best	% Ranking Worst	Test Description	Test Outcome			
					A/B Effect	$t(349) = -0.72, p = .473, d = -0.05 \pm .15$			
					Mean(A,B) > AB	33% ± 5%			
Best	А	3.58 (1.08)	21%	29%	Reverse A/B effect	$t(349) = 0.72, p = .473, d = 0.05 \pm .15$			
Vaccine	В	3.47 (1.10)	21%	40%	AB > Mean(A,B)	$45\% \pm 5\%$			
(initial	AB	3.59 (1.37)	58%	31%	Experiment Aversion	$t(349) = -2.28^*, d = -0.17 \pm .15^\circ$			
ambiguous	Mean(A,B)	3.53 (1.02)	-	-	Min(A,B) > AB	29% ± 5%			
version;	Min(A,B)	3.38 (1.11)	-	-	Experiment Appreciation	$t(349) = -0.84, p = .399, d = -0.07 \pm .15$			
n = 350	Max(A,B)	3.67 (1.05)	-	-	AB > Max(A,B)	$40\% \pm 5\%$			
larma anla)					Experiment Rejection	210/ + 40/			
laypeople)					(A,B = 3,4,5; AB = 1,2)	$21\% \pm 4\%$			
					Experiment Endorsement	$24\% \pm 4\%$			
					(AB = 4,5; A,B = 1,2,3)				

Order effect in clinician study

For the clinician study of the Catheterization Safety Checklist, Best Anti-Hypertensive Drug, and Masking Rules vignettes, participants were randomly assigned to one of these three vignettes and then completed the remaining two vignettes in random order. For consistency with the rest of this project and with our previous approach (Meyer et al., 2019) [3], we analyze data from this study as a between-subjects design where we only consider the first vignette that every participant completed.

While conducting an interim analysis on the data for this study, we observed an intriguing and unexpected order effect of presentation.

For the first 601 complete responses we received, we observed an effect of presentation order on participants' appropriateness ratings of the A/B test condition within the Best Anti-Hypertensive Drug vignette. Participants who received the Best Anti-Hypertensive Drug vignette first rated the A/B test an average of 2.95 (SD = 1.57), participants who received this vignette second rated the A/B test an average of 3.48 (SD = 1.39), and participants who received this vignette last rated the A/B test an average of 3.78 (SD = 1.41). This suggests that participants who read about other policies and A/B tests before considering the Best Anti-Hypertensive Drug vignette found the A/B test in the Best Anti-Hypertensive Drug vignette to be less objectionable than participants who received this vignette earlier in the survey. The relationship between presentation order (1, 2, or 3) and appropriateness rating of the A/B test was r = .23. This order effect did not emerge for the other two vignettes or for ratings of either intervention (A or B).

After observing this order effect but before examining any additional data, we preregistered this order effect with the goal of replicating it in an independent sample. 294 new participants completed the study after this interim analysis, and we analyzed the data from this sample independently from the sample that generated the order effect. Table S7 displays ratings of the A/B condition within each scenario grouped by the order in which participants received them.

The order effect observed with the Best Anti-Hypertensive Drug A/B test condition replicated (r= .15), as did the absence of any similar order effect for the other conditions.

Table S7

Ratings	of A/B	test	in	Clinician	Sample	

Exploratory Sample (N = 601)	Best Corticosteroid Drug A/B Rating (SD)	Intubation Safety Checklist A/B Rating (SD)	Masking Rules A/B Rating (SD)
Target Scenario First	2.95 (1.57)	2.79 (1.49)	2.63 (1.43)
Target Scenario Second	3.48 (1.39)	2.53 (1.35)	2.66 (1.44)
Target Scenario Last	3.78 (1.41)	2.78 (1.38)	2.57 (1.29)

Confirmatory Sample (N=294)	Best Corticosteroid Drug A/B Rating (SD)	Intubation Safety Checklist A/B Rating (SD)	Masking Rules A/B Rating (SD)
Target Scenario First	3.22 (1.54)	2.63 (1.50)	2.58 (1.38)
Target Scenario Second	3.49 (1.51)	2.76 (1.39)	2.38 (1.42)
Target Scenario Last	3.77 (1.33)	2.69 (1.15)	2.51 (1.38)

Heterogeneity in experiment aversion

In both the lay participant sample and the clinician sample, associations between demographic variables, including educational attainment, having a degree in a STEM field, years of experience in the medical field, and role in the healthcare system, and sentiment about pRCTs (e.g., A/B effect, experiment aversion, experiment appreciation) are consistently small (r < |.13|, therefore explaining less than 2% of the variance; Tables S8–11).

In the lay sample, women show larger AB and experiment aversion effects (e.g., larger difference between mean intervention rating/lowest-rated intervention rating and AB test rating; r = .067-.068, p < .001) and a smaller experiment appreciation effect (e.g., smaller difference between AB test and highest-rated intervention rating; r = -.064, p < .001). Lay participants who are more conservative (in general and with respect to social and economic issues) or more likely to be strong Republicans show lower levels of an AB effect and experiment aversion (i.e., smaller difference between mean intervention rating/lowest-rated intervention rating and AB test rating; all rs < -.094, ps < .0001). These participants also show significantly more experiment appreciation, though the strength of the association is weaker (rs = .037-.046, p < .0001).

Finally, we find that people who are non-religious show a larger degree of experiment aversion (r = .061, p < .001; they also show a larger AB effect, r = .051, but p = .007 which is greater than p < .005, the standard proposed in Benjamin et al. (2018)¹⁷ for exploratory analyses without a priori hypotheses). For all other variables, we find no significant associations between the individual difference measures and experiment sentiments (all rs < |.051|, all ps> .005).

In the clinician sample, the strongest association was between self-reported comfort with research methods and statistics and experiment aversion-clinicians who report being more comfortable with research methods and statistics are more likely to appreciate the A/B test (r =

.070, p = .001).

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Table S8

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	Size A/ effe	В	A/. effe		Size experin avers	ment	Experin avers		Experii reject		experiment appeciation	Experin apprecia		Experin endorse
	r	p	r	р	r	p	r	р	r	р		r	р	r
Age	-0.008	0.662	-0.020	0.286	-0.020	0.270	-0.038	0.043	-0.046	0.012		-0.016	0.389	-0.033
Sex	0.068	<.001	0.048	0.010	0.067	<.001	0.039	0.035	0.059	0.002	-0.001	-0.071	<.001	-0.036
(1 = male, 2 = female)	0.000	<.001	0.040	0.010	0.007	<.001	0.037	0.055	0.057	0.002			<.001	-0.050
Race	-0.004	0.814	-0.017	0.360	-0.001	0.945	-0.016	0.388	0.003	0.867		0.001	0.937	-0.012
(0 = all other, 1 = Nonhispanic White)												0.001		
Education	0.047	0.011	0.033	0.075	0.049	0.008	0.051	0.006	0.029	0.114	-0.042 0.024	-0.023	0.216	-0.019
Income	0.020	0.293	0.005	0.787	0.020	0.273	0.011	0.571	0.005	0.777	-0.04 -0.04 -0.024 -0.024 -0.024 -0.024	-0.025	0.184	-0.020
Political Ideology											0.4 0.4 0.4 0.4 0.0001		ľ	
(1 = Very Liberal,	-0.114	<.0001	-0.087	< .0001	-0.118	< .0001	-0.101	<.0001	-0.091	< .0001	0. HOH S .0001	0.043	0.022	0.04
5 = Very Conservative) Political Ideology (Social)		4		0										
(1 = Very Liberal,	-0.123	<.0001	-0.099	<.0001	-0.128	< .0001	-0.118	<.0001	-0.106	< .0001	0.ඪ0₽ ≍.0001	0.039	0.036	0.05
5 = Very Conservative) Political Ideology (Economic)											ed from h Ir (ABES) Jata minin			
(1 = Very Liberal,	-0.094	<.0001	-0.065	<.001	-0.095	<.0001	-0.082	<.0001	-0.073	< .0001	0985 暮.0001	0.046	0.013	0.04
5 = Very Conservative) Political Party						\sim								
(1 = Strong Democrat,	-0.096	<.0001	-0.073	< .0001	-0.098	< .0001	-0.075	<.0001	-0.075	< .0001	0.0001	0.037	0.050	0.03
7 = Strong Republican)													ľ	
Conservatism											g,		ľ	
(mean of z-scored Political Ideology,											pen.bm ing, an		ľ	
Political Ideology (Social), Political	-0.117	<.0001	-0.089	<.0001	-0.121	<.0001	-0.103	<.0001	-0.095	<.0001	and55 or 0.5imilar	0.045	0.015	0.04
Ideology (Economic), and Political											Sin Q			
Party)											simila		ł	
Non-religious											on		ľ	
(0 = Religious (any religion)),	0.051	0.007	0.027	0.150	0.061	<.001	0.049	0.009	0.046	0.015	-0.636 Lun0.053	-0.013	0.496	-0.02
1 = non-religious	0.001	0.007	0.027	0.100	0.001		0.017	0.007	0.010	0.015		0.010	5	0.02
STEM degree											ne 6 nol		ľ	1
(0 = no, 1 = yes)	0.023	0.208	0.016	0.399	0.027	0.154	0.026	0.157	0.027	0.142	-0 8 19 ,0.318	0.016	0.403	0.024

Note. Size of the A/B effect refers to the magnitude of the difference between the mean intervention rating and the A/B test rating. A/B effect are between the presence or absence of an A/B effect -- people who have a positive difference between their mean intervention rating and their A/B test rating show the A/B effect, people who have no difference or a negative difference between the worst intervention rating and their A/B test rating are experiment averse, people who have no difference or a negative difference between their rating the A/B test rating the A/B test rating the A/B test rating are experiment averse, people who have no difference or a negative difference between their rating the A/B test rating the A/B test rating the A/B test rating are experiment averse, people who have no difference or a negative difference between their rating the A/B test as "very" or "somewhat" inappropriate reject the experiment appreciative. Experiment appreciation -- people who have a positive difference between the presence or absence of experiment appreciation -- people who have a positive difference between the as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate" or absence of experiment evention are experiment appreciative. Experiment refers to the presence or absence of experiment appreciation -- people who have a positive difference between the best intervention. Experiment appreciation refers to the presence or absence of experiment appreciation -- people who have a positive difference between the best are "very" or "somewhat" appropriate magnitude of the difference between the experiment appreciation. Experiment appreciation are experiment appreciation are experiment appreciation -- people who have a positive difference between the best and their rating of their most-preferred intervention are experiment appreciative. Experiment endorsement refers to the presence or absence of experiment endorsement refers to the presence or absence of experiment endorsement -- peopl

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Table S9

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Table S9											nclu	669	
Means and percentages of sentim	ents abo	ut expe	erime	ents by a	demographic	c variable	e in lay partic	ipants			din	on .	
	Size of	f A/B	۸ /E	B effect	Size of exp	periment	Experiment	Experiment	Size of exp	eriment	Experiment	Expe	riment
	effe		A/L		aversi		aversion	rejection	appreci		appreciation	endor	sement
-	mean	SD		%	mean	SD	%	%	mean	SD	11 US 80 2 IS 1 IS 1 IS 2 IS 2 IS 2 IS 1 IS 2 IS 1 IS 2 IS 1 IS 2 IS 1 IS 2 IS 1 IS 2 IS 2 IS 2 IS 2 IS 2 IS 2 IS 2 IS 2		%
Sex	o 1 - 0				0.100	4 4 5 0					re	ibe	
Male		1.620		45.6		1.650	35.7	23.2		1.730	250	r 20	9.8
Female		1.630		50.4		1.680	39.5	28.4		1.710	1951)24	7.8
Other		1.880		28.6		1.810	28.6			1.980	2896		0.0
Prefer not to answer Race	0.900	1.880		60.0	0.800	1.920	40.0	20.0	-1.000	1.870	2 100 100 100 100 100 100 100 100 100 10	WI	0.0
Black/African-American	0.504	1 597		49.8	0.149	1.647	37.2	21.8	-0.858	1.681	2015	lloa	9.6
Hispanic or Latino	0.692			50.2		1.675	38.8	21.8	-0.954	1.726	21-5) Q 2(Q)1	ide	7.8
White	0.601			47.7		1.671	37.2	26.0	-0.893	1.724	2 a 2 L 7		8.4
Asian		1.634		47.1		1.645	39.2	26.2	-0.892	1.757	2.57		10.5
Other		1.730		48.7		1.831	38.5	23.1	-1.103	1.818	2006	Ē	5.1
Prefer not to answer		1.623		60.0		1.624	40.0	33.3		1.767	- 1 ≫ 8	tp:/	6.7
Education											ltra	/bn	
Less than high school	1.580	1.440		75.0	1.330	1.610	58.3	41.7	-1.830	1.400	eeo eeo	Jợ	0.0
High school degree		1.550		42.2		1.650	30.6	22.0	-0.713	1.610	2 .6 9	Den	9.0
Some college	0.524	1.690		47.5	0.216	1.720	36.3	25.2	-0.831	1.790	24 2 2	.bn	10.2
Four-year college degree	0.643	1.620		48.7	0.361	1.650	38.4	26.7	-0.925	1.710	2 6 4	j.c	8.0
Some graduate school	0.673	1.600		50.0	0.379	1.640	37.9	28.2	-0.968	1.700	2032	S S	6.5
Graduate degree	0.713	1.590		50.6	0.419	1.620	41.7	27.8	-1.010	1.690	1928	or	8.2
Prefer not to answer	0.750	1.720		50.0	0.667	1.750	33.3	16.7	-0.833	1.720	1 @7 1 @chnq4 2 0 2 0	ا ک	0.0
Income											hn	Ine	
< \$20,000	0.672	1.570		47.8	0.380	1.650	37.7	26.8	-0.964	1.640	1 6 4	, 6	6.9
\$20,000-\$40,000		1.700		46.6		1.730	37.1	25.0		1.790	2 5 8	202	10.8
\$40,000-\$60,000		1.630		49.4		1.670	36.9	25.4	-0.930	1.750		25 a	8.9
\$60,000-\$80,000		1.620		49.5		1.640	38.0	27.4	-0.883	1.710	20.9	at Agence Bibliographique de l	10.5
\$80,000-\$100,000		1.520		50.0		1.530	41.3	27.2	-0.994	1.640		ger	6.0
> \$100,000		1.620		47.2		1.680	37.5	25.7		1.700	21.0	lce	7.4
Prefer not to answer	0.861 -0.250	1.940		47.2		2.080	38.9		-1.170	1.930		Bil	2.8
No response	11/15/1	11 266		25.0	-0.500	1.000	0.0	0.0	0.000	0.816	25.0	0	0.0

Page	69	of	77
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Table S9, continued

Table S9, continued					ВМЈ Ор	pen				5/bmjopen-2024-084699 (cted by copyright, inclu		
										incl		
Means and percentages of sentiments about	experiment Size of A					<i>rticipants</i> Experiment	Experiment	Size of exp	periment	5 0		Exp
	effect	J	A/B effect	aversi		aversion	rejection	apprecia		appred		endo
	mean	SD	%	mean	SD	%	%	mean	SD		%	
Political Ideology										SED		
Very liberal	0.888 1.	740	54.3	0.590	1.780	44.1	31.1	-1.190	1.830	nsei	19.8	
Liberal	0.753 1.	650	51.6	0.491	1.680	42.3	29.8	-1.010	1.740	elan :	20.2	
Moderate	0.557 1.		47.5	0.247	1.600	36.2	25.4		1.830 1.740 1.670	tember 2024 Enseigneme <u>ses related t</u>	21.1	
Conservative	0.380 1.		43.8	0.058	1.650	33.1	21.4	-0.703	1.700	ent to t	25.0	
Very conservative	0.307 1.	520	39.0	0.026	1.570	27.7	18.6	-0.589	1.500		24.2	
Prefer not to answer	0.684 1.	680	57.9	0.263	1.560	31.6	21.1	-1.110	1.940	pe in	21.1	
No response	0.625 0.	750	50.0	0.250	0.957	50.0	50.0	-1.000	0.816	nieu	0.0	
Political Ideology (Social)										dat:		
Very liberal	0.927 1.	720	55.7	0.628	1.760	46.3	33.3	-1.230	1.810 1.710	ABES	19.1	
Liberal	0.714 1.	610	51.2	0.445	1.640	41.1	28.5	-0.983	1.710	<u>ini</u> ES)	20.9	
Moderate	0.498 1.	600	45.2	0.205	1.660	35.2	25.0	-0.791	1.680		22.1	
Conservative	0.321 1.	590	42.5	-0.016	1.630	30.6	19.8	-0.658	1.710		25.1	
Very conservative	0.362 1.	500	40.6	0.059	1.550	28.9	18.8	-0.665	1.590	tra	22.6	
Prefer not to answer	0.528 1.	540	55.6	0.222	1.560	33.3	11.1	-0.833	1.590 1.650 NA		16.7	
No response	-1.000	NA	0.0	-2.000	NA	0.0	0.0	0.000	NA	Ģ 🖁	0.0	
Political Ideology (Economic)										and		
Very liberal	0.795 1.	760	49.4	0.514	1.770	40.5	28.6	-1.080	1.870		19.9	
Liberal	0.800 1.	630	53.8	0.512	1.670	43.7	31.5	-1.090	1.730		18.9	
Moderate	0.594 1.	600	48.2	0.307	1.650	38.0	25.5	-0.882	1.670	ar or	21.4	
Conservative	0.401 1.	580	44.2	0.076	1.620	33.5	22.4	-0.726	1.710	יר בי	25.5	
Very conservative	0.435 1.	600	42.9	0.165	1.650	30.7	21.7	-0.705	1.660	http://bmjopen.bmj.com/ on June) ng. Al training, and similar techno	22.7	
Prefer not to answer	0.783 1.	540	65.2	0.435	1.530	39.1	21.7	-1.130	1.660 1.660	<u>ე</u> ნ ,	13.0	
No response	-1.000 0.	000	0.0	-1.500	0.707	0.0	0.0	0.500	0.707	20	50.0	
Political Party											l	
Strong Democrat	0.869 1.	710	54.6	0.582	1.720	43.9	28.7	-1.160	1.820	at Agence	19.6	
Democrat	0.701 1.	630	50.7	0.411	1.690	39.7	29.9	-0.990	1.700) ge	19.9	
Independent (but lean Democrat)	0.755 1.		51.9		1.640	42.0	29.6	-1.040	1.730) nce	21.0	
Independent	0.468 1.	590	43.7	0.173	1.630	34.0	23.3	-0.762	1.670		22.1	
Independent (but lean Republican)	0.437 1.	720	42.4	0.144	1.730	33.9	24.7	-0.731	1.830	Bibliographique de	28.8	
Republican	0.387 1.		44.8	0.076	1.610		20.9		1.640) ogr	22.5	
Strong Republican	0.432 1.	500	44.0	0.130	1.570	32.6	20.7	-0.734	1.580		21.7	
Prefer not to answer	0.615 1.		56.4		1.490			-0.949	1.790) hig	20.5	
No response		NA	0.0	-2.000	NA	0.0 nj.com/site		0.000	NA	ue	0.0	

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Means and percentages of sen	Size of		iperinents t					Size of com		Europinert	ight, includin	riment
	Size of		A/B effect	Size of exp aversi		Experiment aversion	rejection	Size of exp apprecia		Experiment appreciation	e Expe	ement
	mean	SD	%	mean	SD	aversion %	**************************************	mean	SD	% appreciation	or u_p	
Religion									~-	,.	Se Er G	
Christian - Protestant	0.515	1.620	45.9	0.212	1.680	34.9	24.3	-0.818	1.700	22.5	mbe Iseig Is rel	10.0
Christian - Catholic	0.483	1.510	46.7	0.176	1.550	34.4	21.6	-0.790	1.610	20.7	er z	5 6.4
Christian - Other	0.589	1.650	48.3	0.298	1.690	37.3	25.4	-0.881	1.740	22.9	nemen ated to	3 9.7
Jewish	0.868	1.720	54.7	0.453	1.840	43.4	32.1	-1.280	1.770		╧╤┍	
Muslim	0.357	1.700	45.7	-0.057	1.800	28.6	20.0	-0.771	1.780	31.4	Super Super	17.1
Buddhist	0.840	1.690	54.0	0.520	1.570	48.0	32.0	-1.160	1.940		ownioaded Superieur (ext and dat	5 14.0
Hindu	-0.129	1.550	38.7	-0.452	1.570	29.0	16.1	-0.194	1.620		dd	2 19.4
Non-religious	0.704	1.650	49.9	0.435	1.680	40.7	28.5	-0.973	1.750	21.1	eci r (A lata	8.0
Other	0.673	1.780	49.0	0.337	1.810	40.4	31.7	-1.010	1.880	22.1	rrom \BES) mini	8.7
Prefer not to answer	1.090	1.570	58.8	0.794	1.650	41.2	38.2	-1.380	1.600			
No response	1.250	1.770	50.0	1.000	1.410	50.0	50.0	-1.500	2.120		ig. i	0.0
STEM degree												
No	0.587	1.620	47.9	0.289	1.650	37.2	25.6	-0.885	1.720		trai	8.4
Yes	0.680	1.680	49.8	0.397	1.740	40.3	28.5	-0.963	1.750	22.9	nin <mark>P</mark>	10.0
Prefer not to answer	0.400	1.510	40.0	0.200	1.510	30.0	15.0	-0.600	1.570	25.0	<u>9</u>	0.0
No response	0.250	1.060	50.0	-0.500	0.707	0.0	0.0	-1.000	1.410	0.0	and	0.0

Note. If there is an NA in the SD column, that indicates that there was only 1 respondent in that group so there is no variability in responses to a second report. 0

Size of the A/B effect refers to the magnitude of the difference between the mean intervention rating and the A/B test rating. A/B effect refers to the presence or absence of an A/B effect -- people who have a positive difference between their mean intervention rating and their A/B test rating shows the A/B effect, people who have no difference or a negative difference between their mean intervention rating and their A/B test rating do not show an A/B effect. Size of experiment aversion refers to the magnitude of the difference between the worst intervention rating and the A/B test rates. Experiment aversion refers to the presence or absence of experiment aversion -- people who have a positive difference between their rating of the least-preferred intervention and their A/B test rating are experiment averse, people who have no difference or a negative difference are not experiment averse. Experiment rejection refers to the presence or absence of experiment rejection -- people who rate interventions A and B as "neither ≻ inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate reject the experiment. Sizeof experiment appreciation refers to the magnitude of the difference between the A/B test rating and the best intervention. Experiment appreciation refers to the presence or absence of experiment appreciation -- people who have a positive difference between their rating of the A/B test and the rating of their most-preferred intervention are experiment appreciative. Experiment endorsement refers to the presence or absence of experiment endorsement -- people who rate the A/B test as "very" or "somewhat" appropriate while rating interventions A and B as "neither inappropriate gor aphique de l appropriate" or less appropriate endorse the experiment.

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Table S10

	Size A/I effe	В	A/ effe		Size experi avers	ment	Experi avers		Experi rejec		Size experir appreci	nent	Experi appreci		Experi	
	r	p	r	р	r	р	r	р	r	р	r	р	r	relat	r	р
Sex (1 = male, 2 = female)	0.016	0.453	0.016	0.457	0.000	0.991	-0.011	0.619	-0.021	0.326	-0.030	0.165	-0.026	em@nt led_to	8 -0.032	0.134
Number of research methods/statistics training units	-0.005	0.812	0.000	0.992	0.000	0.999	0.016	0.471	0.017	0.428	0.010	0.659	0.019	te <u>Xi</u> a	0.010	0.643
Comfort with research methods/statistics	-0.036	0.100	-0.018	0.410	-0.039	0.071	-0.021	0.335	-0.016	0.446	0.030	0.165	0.070		0.045	0.035
Number of research methods/statistics activities	-0.019	0.375	-0.022	0.301	-0.006	0.796	0.006	0.778	0.020	0.360	0.031	0.157	0.041	(ABE	0.023	0.279
Currently involved in research	-0.002	0.912	-0.012	0.570	-0.009	0.691	-0.016	0.470	-0.022	0.309	-0.004	0.870	-0.024	n <u>B</u> 207	0.009	0.693
Position (0 = non-prescriber, 1 = prescriber)	0.033	0.121	0.029	0.176	0.040	0.061	0.042	0.050	0.052	0.016	-0.025	0.250	-0.020	ر 1847 ۲	-0.021	0.338
Years in medicine	0.016	0.452	-0.004	0.865	0.011	0.599	-0.007	0.734	0.006	0.792	-0.020	0.362	0.029	(j) 85	-0.003	0.879
														ng,		

Note. Size of the A/B effect refers to the magnitude of the difference between the mean intervention rating and the A/B test rating. A/B effect refers to the presence or absence of an A/B effect -- people who have a positive difference between their mean intervention rating and their A/B test rating show the A/B effect, people who have no difference or a negative difference between their mean intervention rating and their A/B test rating do not show in AB effect. Size of experiment aversion refers to the magnitude of the difference between the worst intervention rating and the A/B test rating. Experiment aversion refers to the presence or absence of experiment aversion -- people who have a positive difference between their rating of their least-prefered prevention and their A/B test rating are experiment averse, people who have no difference or a negative difference are not experiment averse. Experiment refection refers to the presence or absence of experiment rejection -- people who rate interventions A and B as "neither inappropriate nor appropriate" or nor appropriate while rating the A/B test as "very" or "somewhat" inappropriate reject the experiment. Size of experiment appreciation refers to the magnified of the difference between the A/B test rating and the best intervention. Experiment appreciation refers to the presence or absence of experiment appreciation -people who have a positive difference between their rating of the A/B test and their rating of their most-preferred intervention are experiment appreciative. Experiment endorsement refers to the presence or absence of experiment endorsement -- people who rate the A/B test as "very" or "somewhat" popropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate endorse the experiment. ence Bibliographique de l

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Γable S11								24-08469 right, inc		
Means and percentages of sentiments about experiments by demo	graphic	variabl	le in clinicia	n sample				99 o		
	Siz	e of		Size	of	F • (F	ingize off		л ·
	A	/B	A/B effect	experi	ment		Experiment	experiment	Experiment	Experimen
	eff	ect		avers	ion	aversion	rejection	appeciation	appreciation	endorsemen
	mean	SD	%	mean	SD	%	%	megar B B S		
Sex										
Male	0.456	1.800	43.9	0.270	1.800	38.5	28.2	-0.68 -0.68 -0.68 -0.70	26.5	1′
Female	0.529	1.750	45.9	0.271	1.750	37.2	25.8	-0.786	23.6	14
Other	0.000	1.870	40.0	0.000	1.870	40.0	20.0	0.00000000000	20.0	20
Source of research methods/statistics training								0.087 0.0800 0.0800 0.0800000000		
Undergraduate coursework	0.483	1.755	44.2	0.258	1.753	37.7	26.5	-0.7877.587	25.0	14
Professional school instruction		1.767	46.0			38.2	27.1	-0.8284 0 91	6 22.8	14
Postgraduate coursework		1.818				41.5	29.4	-0.8#72 #9.	24.5	
CME/CEU courses		1.788		0.217		38.6		-0.7 9)822 6 92	25.7	
Self-instruction via peer-reviewed literature		1.820				32.9		-0.3 46.5	9 27.3	
Other	0.722	1.902	46.7	0.478	1.915	41.1	32.2		36 22.2	. 14
Comfort with research methods/statistics										
Not at all		1.760		0.432		37.7	26.3	<u> </u>		
Somewhat		1.710		0.282		37.8	26.8			
Moderately		1.770				38.3	26.6			
Very		1.910								
Extremely	0.105	2.020	31.6	-0.079	2.050	28.9	23.7	-0.289 2:10	26.3	2.
Research methods/statistics activities	0.521	1 772	45.5	0.284	1 762	38.0	27.2		24.7	1
Read results of RCT in peer-reviewed journal article	0.321	1.//2	43.5	0.284	1.762	38.0	21.2	-0.758 5.89	/8 24.7	1.
Changed typical prescription/recommendation after personally reading results of RCT in peer-reviewed	0.430	1.813	43.3	0.217	1 814	36.8	26.3		01	10
journal article	0.430	1.015	43.5	0.217	1.014	50.8	20.3	-0.623 E92	26.6	
Published scientific paper in peer-reviewed journal	0.530	1.692	43.3	0.339	1 681	38.2	29.9	-0.2 2 0 1 80		
Conducted or worked on a team conducting an RCT		1.745				35.1	20.9	-0.6278 200 -0.6278 200 -0.6278 200	22.8 202 25.8	
Took a course/class in statistics, biostatistics, research										
methods	0.505	1.775	45.0	0.277	1.770	37.8	27.3	-0.732	25.4	. 1:
Analyzed data for statistical significance outside of	0.1-0	1 = 0 :		0.000		a - =		Age		
course requirement	0.470	1.781	43.7	0.251	1.766	36.7	26.2	-0.690	2 26.2	1.
Used statistical software	0.588	1.803	49.3	0.389	1.795	42.5	31.7	-0.787 egg	.5 26.7	14

Page 73 of 77				BMJ Ope	'n				6/bmjope cted by		
1 2 3 4 5	Table S11, continued Means and percentages of sentiments about experiments by demogrammets	graphic	variabl	le in clinicia	n sampl	2			5/bmjopen-2024-084699 o cted by copyright, includ		35
6 7 8		Size A/	e of B	A/B effect	Size	e of ment	Experiment aversion	Experiment rejection	Sze of <u>,</u> exp z riment	Experiment appreciation	Experiment endorsement
o 9		effe mean	ect SD	%	avers mean	sion SD	%	%	appreciaten mean <u>S</u> D	%	%
10	Currently involved in research	mean	3D	70	mean	3D	70	70		70	70
11	Yes	0.526	1.740	47.4	0.316	1.720	39.7	29.2	-0.7 ate -0.7 ate -0.7 ate -0.7 a	27.3	13.9
12	No	0.512	1.760	45.3	0.265	1.760	37.2	25.9	-0.7	23.8	14.9
13	Position								t <u>n</u> 4		
14	Doctor	0.556	1.730	45.5	0.374	1.720	39.9	28.7	-0.7 6 80012340	23.1	13.7
15	Physician Assistant	0.757	1.780	53.0				34.4	-1.0 ਜ਼ੑੑ 0ਙੵੑ1 ॾ ॖ90	21.9	13.1
16	Nurse Practitioner	0.500						25.5	-0.8 ∄6ឺ230 30	23.5	14.3
17	Nurse (RN)	0.436						23.9	-0.6 g 0 = 1 g 50	25.3	15.1
18	Nurse (LPN)	0.410			0.150			22.6	-0.6	24.8	17.3
19	Nurse (Other)	1.180	1.910	65.0	0.800	1.910	55.0	35.0	-1.5 10 00 00 00 00 00 00 00 00 00 00 00 00	10.0	10.0
20	Genetic Counselor			<u> </u>					s) - htt ing		
21	Non-prescribing clinician or staff without clinical								~ 73		
22	credential								Ali tr		
23	Medical student		1.770		0.935				-1.4	15.2	8.7
24	Faculty or Professor		2.050						-1.3	25.0	12.5
25	Other	0.727	2.000	45.5	0.618	1.980	41.8	32.7	-0.8% 200 a	25.5	16.4
26	Years in medical field										
27	< 1 year	0.582						32.8	-0.787 1.660	24.6	8.2
28	1-2 years	0.560								23.8	14.3
29	3-5 years	0.392								23.4	13.6
30	6-10 years	0.423						24.6	-0.651 1.830	26.4	15.1
31	> 10 years	0.555			0.303				▶-0.8 ਊ 7 1 ⊊ 50		15.3
32	<i>Note.</i> Size of the A/B effect refers to the magnitude of the differe										
33	of an A/B effect people who have a positive difference between										
34	or a negative difference between their mean intervention rating and	d their A	/B test	t rating do no	ot show	an A/I	3 effect. Size	of experimen	t avension befer	s to the magni	tude of the

difference between the worst intervention rating and the A/B test rating. Experiment aversion refers to the presence or absence of experiment a problem who have a positive difference between their rating of their least-preferred intervention and their A/B test rating are experiment averse, people who have no afference or a negative difference are not experiment averse. Experiment rejection refers to the presence or absence of experiment rejection -- people who rate intervent and B as "neither inappropriate nor appropriate" or more appropriate while rating the A/B test as "very" or "somewhat" inappropriate reject the experiment. Size of experiment appreciation refers to the magnitude of the difference between the A/B test rating and the best intervention. Experiment appreciation refers to the presence ogabsence of experiment appreciation -- people who have a positive difference between their rating of the A/B test and their rating of their most-preferred intervention are experiment appreciative. Experiment endorsement refers to the presence or absence of experiment endorsement -- people who rate the A/B test as "very" or "somewhat appropriate while rating interventions A and B as "neither inappropriate nor appropriate" or less appropriate endorse the experiment. phique

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Aversion to pragmatic randomized controlled trials: Three survey experiments with clinicians and laypeople

STROBE Statement-checklist of items that should be included in reports of observational studies

	Item No	Recommendation	Page No
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title	1
		or the abstract	
		(b) Provide in the abstract an informative and balanced summary of	2-4
		what was done and what was found	
Introduction			1
Background/rationale	2	Explain the scientific background and rationale for the investigation	6-8
		being reported	
Objectives	3	State specific objectives, including any prespecified hypotheses	9
Methods			1
Study design	4	Present key elements of study design early in the paper	9-14
Setting	5	Describe the setting, locations, and relevant dates, including periods	9, 13-14
		of recruitment, exposure, follow-up, and data collection	
Participants	6	(a) Cohort study—Give the eligibility criteria, and the sources and	9, 13-14
		methods of selection of participants. Describe methods of follow-up	
		Case-control study—Give the eligibility criteria, and the sources and	
		methods of case ascertainment and control selection. Give the	
		rationale for the choice of cases and controls	
		Cross-sectional study—Give the eligibility criteria, and the sources	
		and methods of selection of participants	
		(b) Cohort study—For matched studies, give matching criteria and	
		number of exposed and unexposed	
		Case-control study—For matched studies, give matching criteria and	
		the number of controls per case	
Variables	7	Clearly define all outcomes, exposures, predictors, potential	13
		confounders, and effect modifiers. Give diagnostic criteria, if	
		applicable	
Data sources/	8*	For each variable of interest, give sources of data and details of	9-14
measurement		methods of assessment (measurement). Describe comparability of	
		assessment methods if there is more than one group	
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	SM 3-4
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If	13
		applicable, describe which groupings were chosen and why	
Statistical methods	12	(a) Describe all statistical methods, including those used to control for	SM 7
		confounding	
		(b) Describe any methods used to examine subgroups and interactions	N/A
		(c) Explain how missing data were addressed	N/A
		(d) Cohort study—If applicable, explain how loss to follow-up was	N/A
		addressed	
		Case-control study—If applicable, explain how matching of cases and	
		controls was addressed	

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		taking account of sampling strategy	
		(<u>e</u>) Describe any sensitivity analyses	N/A
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers	9, 13-14
F	-	potentially eligible, examined for eligibility, confirmed eligible, included in	- , -
		the study, completing follow-up, and analysed	
		(b) Give reasons for non-participation at each stage	N/A
		(c) Consider use of a flow diagram	N/A
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social)	SM 14-1
I		and information on exposures and potential confounders	SM 28-3
		(b) Indicate number of participants with missing data for each variable of	N/A
		interest	
		(c) <i>Cohort study</i> —Summarise follow-up time (eg, average and total amount)	N/A
Outcome data	15*	<i>Cohort study</i> —Report numbers of outcome events or summary measures over	N/A
		time	
		Case-control study—Report numbers in each exposure category, or summary	N/A
		measures of exposure	
		Cross-sectional study—Report numbers of outcome events or summary	N/A
		measures	
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted	14-18
		estimates and their precision (eg, 95% confidence interval). Make clear which	SM 21-2
		confounders were adjusted for and why they were included	
		(b) Report category boundaries when continuous variables were categorized	N/A
		(c) If relevant, consider translating estimates of relative risk into absolute risk	N/A
		for a meaningful time period	
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and	SM 26-3
-		sensitivity analyses	
Discussion			
Key results	18	Summarise key results with reference to study objectives	14-18
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias	20-22
		or imprecision. Discuss both direction and magnitude of any potential bias	
Interpretation	20	Give a cautious overall interpretation of results considering objectives,	18-20
÷		limitations, multiplicity of analyses, results from similar studies, and other	
		relevant evidence	
Generalisability	21	Discuss the generalisability (external validity) of the study results	20-22
Other information	on		
Funding	22	Give the source of funding and the role of the funders for the present study	27
0		and, if applicable, for the original study on which the present article is based	

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at

http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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