

# Scenario planning: a framework for mitigating uncertainty in implementing strategic behavioral medicine initiatives during the COVID-19 pandemic

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Planning techniques, Strategic planning, COVID-19 pandemic, Uncertainty, Health priorities

## INTRODUCTION

Behavioral medicine investigators can adapt their research priorities, objectives, and methods to respond more effectively to the changing circumstances of the COVID-19 pandemic [1]. Despite progress in understanding COVID-19, nonpharmaceutical interventions, vaccines, and treatments [2], there remains “the unsettling realization that we have little confidence in predicting how the pandemic will unfold” [1].

Given that “uncertainty” is the elephant in the room in pandemic planning, we propose that behavioral medicine researchers consider using an adaptive strategy—Scenario Planning—to anticipate and adjust for changes in the trajectory of the COVID-19 pandemic. Scenario Planning was developed as an organizational framework, mainly used in the private sector, for adapting strategy during highly uncertain times (Table 1). The process begins with leadership brainstorming a list of key uncertainties that could affect a proposed initiative, such as a grant proposal. Then, they narrow down the list to a small number of critical uncertainties, typically two, that are both highly uncertain and likely to affect the proposed work. This winnowing process can be determined by internal knowledge within an organization, stakeholder input, or available literature. For example, in formulating a competitively funded research proposal, we relied on a poll of local stakeholders as well as epidemiologist ratings [3] to identify two near-term critical uncertainties of the pandemic most relevant to the project period: vaccination uptake (high vs. low) and the potential for variants that evade vaccines (problematic vs. trivial). We used these two critical uncertainties to make a 2 × 2 matrix of plausible scenarios. Within this matrix, we collaborated with community advocates who were members of our stakeholder population and local public health leaders to name, describe, and examine the potential implications of each scenario

## Implications

**Researchers:** Incorporate scenario planning to anticipate and explain how research objectives and procedures may be modified strategically under changing pandemic circumstances.

**Policymakers:** Request that investigators account for pandemic uncertainty in funding proposals to allocate funds effectively.

**Practitioners:** Work with stakeholders to identify critical uncertainties and develop contingency plans.

for the proposed project (Fig. 1). The funded project focuses on building capacity for stakeholder-engaged research with a key population affected by the pandemic—frontline essential service workers—and our work could be adapted to suit many populations and problems during the pandemic. The project will focus on concerns about vaccination decision making, mental health, and long COVID, while acknowledging that the relative prioritization of these three domains, and the focus within each domain, could shift considerably depending on the pandemic trajectory over the next two years. As an illustrative example, we describe herein how our focus within each of these domains could shift depending on the pandemic trajectory. Other investigators can use this illustrative example to develop adaptive plans for their own pandemic research or other future sources of uncertainty.

## VACCINE DECISION MAKING

As an initial example, we proposed conducting a project focused in part on helping people with vaccine decision making. Vaccine decision making places a tremendous burden on individuals and families [4], and the specific solutions for responding to these burdens will vary depending on the trajectory of the pandemic (Fig. 1). In the coming years, it is plausible that researchers will be interested in topics similar

to Scenario C that are focused on increasing vaccinations among remaining population subgroups like young children and hesitant adults, as well as topics focused on helping people navigate mixed vaccinated-unvaccinated social and work interactions. Under an optimistic scenario of better vaccination uptake (Scenario D), there might be more interest in research aimed at supporting people with the most complex vaccination decisions. Under worse scenarios where variants emerge that more often evade existing vaccines, researchers may wish

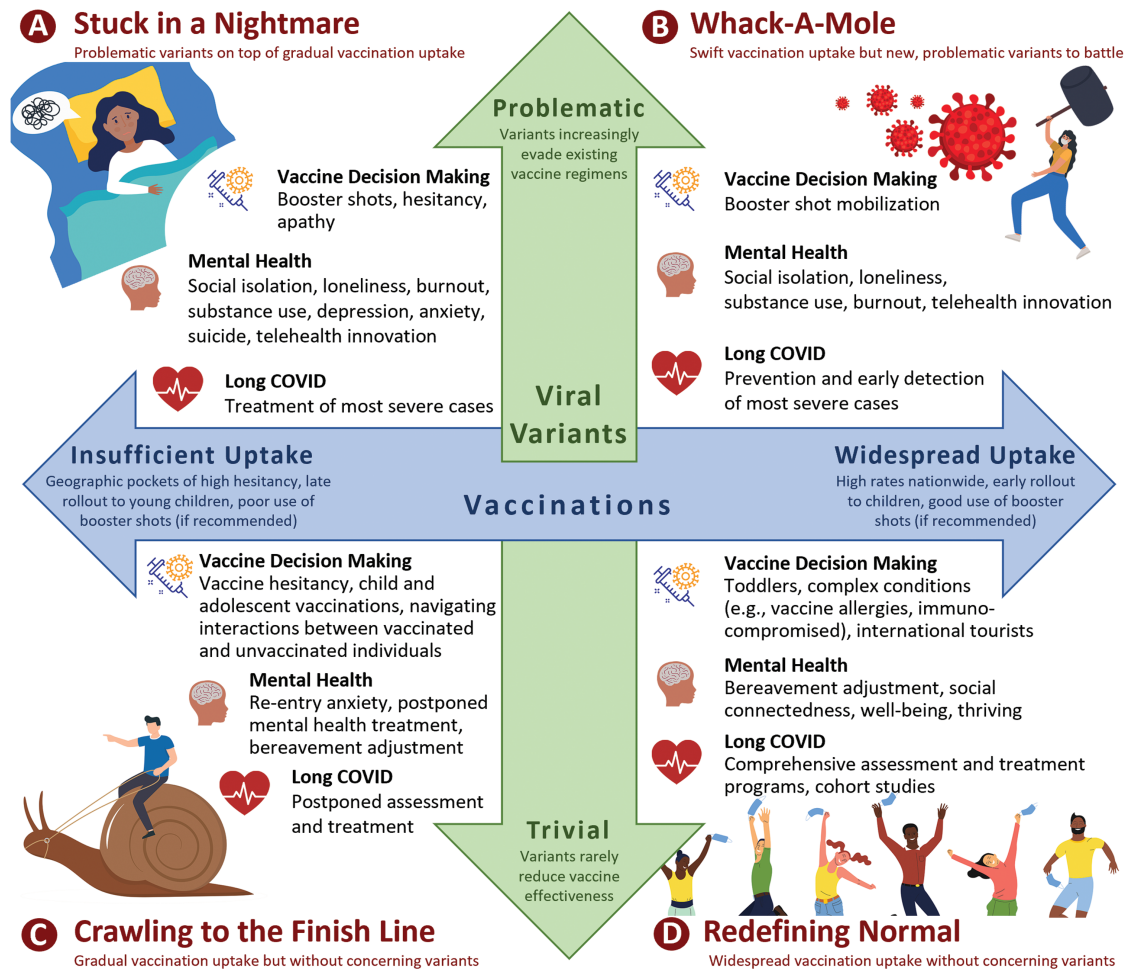
to focus on topics involving vaccine booster shot mobilization (Scenario B), or booster shot mobilization plus vaccine initiation among hesitant adults and newly eligible young children (Scenario A). Thus, we were able to argue that vaccine decision making research would remain relevant and have public health significance across key pandemic trajectories.

**MENTAL HEALTH**

As another example, consider how the potential pandemic trajectories could affect the type of mental health research prioritized as most significant. The pandemic has adversely affected the mental health and well-being of individuals and families [5], but the type of mental health concerns individuals and families will want to address will also vary by pandemic trajectory (Fig. 1). If the pandemic most resembles Scenario C throughout the next few years, researchers may be interested in prioritizing studies

**Table 1** | Scenario planning: key steps

1. Identify key uncertainties
2. Select two critical uncertainties
3. Characterize the four scenarios that could result if each critical uncertainty went well or poorly (2 × 2 matrix)
4. Develop plans for each scenario
5. Monitor likely scenarios



**Fig. 1** | An illustrative example of using scenario planning to shift the focus of a research study under four plausible pandemic scenarios. Stakeholders and epidemiologists identified vaccination uptake (blue arrow) and the potential for viral variants (green arrow) as critical uncertainties affecting the pandemic trajectory. These critical uncertainties yield a 2 × 2 matrix of four plausible scenarios (A–D). The investigators are conducting competitively funded research focusing on three core problems: vaccine decision making, mental health, and long COVID. Note that the three problem areas exist across each scenario, but the nature of each problem varies, which can affect the relative emphasis on each problem, the specific nature of each problem, and the type of solutions proposed. Accordingly, scenario planning can increase the public health significance of research proposed under uncertainty.

that help with “re-entry anxiety” (social anxiety about resuming more activities and with decreasing public health precautions), addressing mental health concerns put off by pandemic-related treatment barriers, or addressing bereavement needs related to loved ones lost during the pandemic. Under the rosier Scenario D, researchers may wish to address longer-standing mental health concerns and bereavement, but also more positive outcomes, such as how to improve wellness and thrive. If new variants emerge that evade existing vaccines (Scenarios A and B), researchers will likely want to focus on prioritizing more acute mental health concerns related to the pandemic worsening (social isolation, loneliness) or the enduring toll of a prolonged pandemic (burnout, substance use, depression, anxiety, and suicidality), and there would be opportunities to innovate with telehealth. The capacity to shift gears means that the research will be more responsive to mitigating emerging needs.

#### POST-ACUTE COVID-19 (LONG COVID)

Finally, in our illustrative example, we were focused on a population of frontline essential service workers that had above average risk of COVID-19, and thus also long COVID, or enduring burdensome symptoms (e.g., fatigue, difficulty breathing, and dyspnea) [6–10]. We reasoned that, among the three project domains, our attention toward long COVID would vary most across the pandemic trajectories (Fig. 1). Under Scenario C, it would help to prioritize supporting people who have long-term effects of COVID but have not yet received formal assessment or care. Under Scenario D, the other problem areas (vaccinations and mental health) would be less extreme, so there would be more opportunity to focus on long-term COVID survivors. In contrast, under Scenarios A and B, the acute vaccination and mental health needs would be so high, studies of post-acute COVID-19 would likely focus on identifying or treating the most severe cases only. Thus, the trajectory of the pandemic would affect the specific nature of each problem area as well as its relative prioritization, and a focus on post-acute COVID-19 would likely be of greater public health significance if the acute trauma of the pandemic wanes.

In closing, we believe that scenario planning can be used by behavioral medicine researchers to optimize the public health significance of their research proposals under varying plausible pandemic scenarios. Funders can increase the likelihood that funds will be spent wisely by encouraging such considerations by investigators and reviewers. This adaptive strategy can engage community stakeholders in research [11], allow researchers and policymakers to quickly adjust their actions as the

course of the pandemic shifts, and increase transparency during a time of public distrust [2] in the scientific community.

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#### COMPLIANCE WITH ETHICAL STANDARDS

**Conflict of Interest:** The authors have no conflicts of interest.

**Ethical Approval:** This article does not contain any studies with human participants performed by any of the authors. This article does not contain any studies with animals performed by any of the authors.

**Informed Consent:** This study does not involve human participants and informed consent was therefore not required.

#### TRANSPARENCY STATEMENTS

**Study Registration:** This study was not formally registered.

**Analytic Plan Pre-registration:** The analysis plan was not formally pre-registered.

**Data Availability:** De-identified data from this study are not available in a public archive.

**Analytic Code Availability:** There is no analytic code associated with this study.

**Materials Availability:** Materials used to conduct the study are not publicly available.

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