



# **Pandemic Recovery Metrics to Drive Equity (PanREMEDY): Guidelines for State and Local Leaders in Anticipation of Future Catastrophic Outbreaks**

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# Table of Contents

- Executive Summary .....iv
- Introduction .....1
- Methodology.....2
- Thematic Findings ..... 3
  - Asserting the Recovery Mission ..... 4
  - Setting the Context for Success ..... 6
  - Organizing and Managing Operations ..... 8
  - Monitoring and Evaluating Progress ..... 9
- Recommended Indicators .....11
- Implementation Assistance..... 18
- Conclusion.....21
- Appendix. Research Methodology ..... 22
  - Expert Advisory Panel ..... 22
  - Scoping Symposium ..... 22
  - Literature Review ..... 23
  - Listening Sessions ..... 24
  - Delphi Study..... 25
- References .....27

## Executive Summary

The **Pandemic Recovery Metrics to Drive Equity** – PanREMEDY project sought to give form to the least considered phase of a catastrophic outbreak of infectious disease, while applying an equity lens. The project inquired, “By what measures could local and state decision makers know that efforts at holistic recovery were working, especially for the socially vulnerable individuals and communities hit hardest by COVID-19?”

To answer this question, the project team gathered and analyzed a wide range of evidence. They consulted disaster recovery and resilience experts, convened a scoping symposium, reviewed academic and gray literature on epidemic/pandemic recovery, and elicited input from diverse participants via listening sessions. Based upon thematic analyses of these inputs, the team generated an initial set of 44 indicators and distilled ethical and practical considerations concerning their implementation.

The PanREMEDY indicators were ordered into 2 categories—recovery system organization and operations and system outcomes, the latter of which could be thought of as community status:

### Organization and Operations

- **Governance and Leadership:** political authority, collective action, financing structures, public face
- **Planning:** guiding framework, time horizons, technical expertise, aligned futures
- **Data Management:** actionable data, disaggregated data, extant data, community contextualization
- **Public Involvement:** representative bodies, feedback loops, community dashboards

### Outcomes

- **Human Health:** epidemiological curve, disrupted care, disease sequelae, healthcare infrastructure, health insurance
- **Human Development:** healthy housing, adequate nutrition, safety/security, educational attainment, connectivity/mobility
- **Economic Vitality:** earning power, entrepreneurship, work protections, neighborhood pulse, thriving grassroots
- **Political Integrity:** power-sharing, equity structures, safety net, public trust, inventive policy
- **Social Fabric:** connectedness, collective impact, stigma repair, caretaking
- **Emotional Wellbeing:** truth-telling, public memorialization, psychological supports, self-medication, relief/resolution

Subsequently, a panel of practitioners, community advocates, subject matter experts, and local government leaders rated the indicators according to importance (ie, salience to holistic recovery) and feasibility (ie, ease of application).

Developed in the COVID-19 context, the PanREMEDY project's findings can prompt further learning and actions specific to that pandemic. At the same time, the findings offer a more general framework with which to prepare communities for future pandemics. End-users are encouraged to tailor the indicators to their context, including local values, programmatic priorities, and political environments.

With the PanREMEDY indicators in hand, state and local leaders and other community members can better assess how well their jurisdictions are:

- Rebounding from the worst effects of the COVID-19 pandemic
- Targeting support to COVID-19 survivors who still need help
- Engaging in pre-event planning for future post-pandemic recovery
- Strengthening resilience to the increasing likelihood of future pandemics
- Motivating non-traditional partners to join in pandemic preparedness efforts.



## Introduction

The life-and-death nature of COVID-19 easily sharpens a collective vision of a successful pandemic response: quickly curtailing infections, illnesses, and deaths, while reducing the burden on healthcare professionals. By contrast, the process of recovering from the pandemic is less clear. Unlike the immediate response, there are no concrete indicators that signal when communities, or the country, have gotten through a pandemic and fully recovered. Additionally, numerous, disparate factors make it difficult to form a broadly shared vision of post-pandemic recovery.

Among the factors fracturing such an ideal are the COVID-19 pandemic's encompassing nature, with each sector of society experiencing idiosyncratic disruptions and losses<sup>1-2</sup>; vastly uneven pandemic experiences, with low-income, minoritized, and marginalized communities disproportionately bearing—and without further remedy, continuing to bear—adverse social, emotional, behavioral, physical, mental, and economic effects<sup>3</sup>; and a mismatch between traditional recovery models designed for sudden and often short-term disasters like earthquakes and the ongoing lived experiences of a pandemic of unknown duration and intensity.<sup>4</sup>

Recognizing the lack of clarity about the meanings of, and means for, post-pandemic recovery in a pluralistic nation, the Johns Hopkins Center for Health Security launched the **Pandemic Recovery Metrics to Drive Equity – PanREMEDY** project, with support from the Open Philanthropy Project. The purpose of PanREMEDY was to engage cross-sector participants from diverse disciplines in developing a set of indicators for comprehensive pandemic recovery. The project's core research question was, “By what measures could local and state decision makers know that efforts at recovery are working, especially for the socially vulnerable individuals and communities hit hardest by COVID-19?”

This report summarizes the recommended indicators for holistic pandemic recovery as well as the collective conversations around their use. Developed in the COVID-19 context, the PanREMEDY project's findings can prompt further learning and actions specific to that pandemic. At the same time, they also offer a more general framework to enhance readiness for future pandemics. The risk of such pandemics has increased threefold, based on historic trends and the projected increase in zoonotic diseases, which are the source of most new pandemics.<sup>5</sup>

With this resource in hand, state and local leaders and other community members can better assess how well their jurisdictions are:

- Rebounding from the worst effects of the COVID-19 pandemic
- Targeting support to COVID-19 survivors who still need help
- Engaging in pre-event planning for future post-pandemic recovery
- Strengthening resilience to the increasing likelihood of future pandemics
- Motivating non-traditional partners to join in pandemic preparedness efforts.

## Methodology

To develop indicators for holistic post-pandemic recovery, the project team conducted a multiphase, mixed methods study, gathering and analyzing a wide range of evidence (Table 1). We consulted disaster recovery and resilience experts, convened a virtual scoping conference, reviewed academic and gray literature on post-epidemic/-pandemic recovery, and elicited input from cross-sector practitioners and community advocates. Based upon these diverse streams of inputs, we generated a preliminary set of indicators, which practitioners, social activists, subject matter experts, and local government leaders then rated according to importance (ie, salience to holistic recovery) and feasibility (ie, ease of application). Across the study’s various phases, participants shared their operating assumptions about post-pandemic restoration and transformation, identified myriad challenges associated with recovering from the COVID-19 pandemic, recommended and prioritized post-pandemic recovery indicators, and considered hurdles to the promotion and adoption of the proposed indicators.

**Table 1. Study Phases and Activities**

APPROACH	TIMEFRAME
Consulted 4 expert advisors in disaster recovery/resilience for support in scoping the project, who assisted in identifying relevant resources from the hazards and disasters literature, ensuring that the outputs incorporated the best available science, and confirming the findings met the needs of end users	April 2022 to March 2023
Reviewed academic and gray literature (n=147 documents) on post-epidemic/pandemic recovery, including the COVID-19 case, to inform development of a conceptual model and candidate indicators and identify systems design for monitoring, evaluating, and communicating progress	April 2022 to July 2022
Convened a 2-day scoping symposium to establish the project’s conceptual boundaries (ie, what constitutes holistic recovery?), review cross-sector COVID-19 recovery needs, and learn what is happening in the field concerning recovery-related planning, evaluation, and communication	October 4 and 6, 2022
Conducted 6 regionally diverse listening sessions with a total of 39 cross-sector participants, including advocates from Latino/Hispanic and Black/African American communities, to discuss COVID-19 experiences, indicator use, and recovery tracking and communicating strategies	January 2024 to February 2024
Held a 1-day workshop of the study team to review and deliberate the symposium findings, literature review, and listening sessions, aiming to identify candidate indicators and domains; indicators were sorted into recovery system operations and outputs	March 1, 2024
Undertook a 3-round modified Delphi process with a panel of 25 cross-sector practitioners and community advocates to evaluate a total of 44 initial candidate indicators according to importance and feasibility, winnowing the set down to 31 priority indicators	March 2024 to May 2024

Further details on study methods can be found in the [Appendix](#).

## Thematic Findings

Recurrent themes emerged across the project inputs. Summarized in [Table 2](#) and detailed further below, the themes reflect the observations, ethical concerns, and recommendations of individuals from diverse sectors, including arts and culture, community advocacy, community health, education, healthcare, politics/government, public health and safety, emergency management, housing, food, labor, business and finance, mental health, philanthropy, social and human services, media, planning, disaster recovery/resilience, and religion/spirituality. At the conclusion of this section is brief guidance ([Box 1](#)) on implementing PanREMEDY indicators distilled from the thematic findings.

**Table 2. Thematic Findings with Illustrative Quotes**

THEME	QUOTE
<b>Asserting the Recovery Mission</b>	
Today’s vocabulary for disaster recovery does not match a pandemic’s complexities	<i>“We are not trying to get back to anything. We are continuing to try to strive for the world we want to live in, but I don’t see that on the horizon, but we still strive for it.”</i>
Pandemic “response” and “recovery” are intertwined, but not interchangeable aims	<i>“What concerned me with the ARPA [American Rescue Plan Act] funding...it didn’t move the needle to improving – it just kind of, accelerated what we were going to do anyway in certain cases. So, it didn’t necessarily reframe it to build those resiliencies.”</i>
Holistic post-pandemic recovery involves change of different sorts, speeds, and scales	<i>“I was in a flood-impacted community last week in rural Vermont and they said, ‘Everyone’s coming to talk to us about the flood and recovery, but the flood is just one thing. There’s a flood, there’s COVID, there’s the normal challenges that our rural youth are facing, and we really are not thinking so much about the flood.’ And I think that’s also the case with COVID. The pandemic was not one experience but many.”</i>
<b>Setting the Context for Success</b>	
The adoption of holistic recovery indicators hinges on political will	<i>“Without political will, we are spinning our wheels.”</i>
A compelling, truthful, and forward-looking narrative brings the community together for recovery	<i>“...[T]he community-based values surrounding recovery are the most critical elements of a holistic recovery. In other words, whatever moves the public mindset in the direction of taking the pandemic seriously and wanting to institutionalize more permanent solutions in terms of resources and public goals is best.”</i>



THEME	QUOTE
Holistic recovery interventions address people’s immediate and ongoing care needs	<i>“One of the challenges...is to take advantage of that ‘We’re out of the status quo, we need to transform to something better,’ while at the same time, taking care of people, and acknowledging that trauma, and acknowledging that fear of change and the resistance to change, and the hurt, and having both things be true at once, and that’s really difficult.”</i>
<b>Organizing and Managing Operations</b>	
A strong collaborative body is necessary to advance holistic post-pandemic recovery	<i>“If we are going to recover and be more resilient, stronger, we need to look at how we can tear down some of these bureaucratic barriers that we have that are going to prevent us from coming up with the necessary solutions to address the disparity in health, the disparity in housing, and employment, [and] education that will get in the way of the next pandemic.”</i>
A post-pandemic recovery enterprise with sufficient capacity sustains momentum	<i>“[Feasible] indicators often rely on existing data sources or established methodologies, reducing the burden of data collection and analysis. By prioritizing these feasible indicators, stakeholders can efficiently track progress, identify interventions, and make informed decisions to support comprehensive recovery efforts.”</i>
Community involvement up, down, and sideways keeps holistic recovery intact	<i>“However we move forward, it needs to not just be with community engagement in mind, but with community empowerment in mind. And community empowerment looks like community leadership.... People generally know what they need to be well and to be whole.”</i>
<b>Monitoring and Evaluating Progress</b>	
Upstream indicators of resilience to pandemic effects are key to holistic recovery planning	<i>“The best test of pandemic recovery is whether we addressed the structural vulnerabilities that shaped poor outcomes and sharp disparities during the pandemic.”</i>
Data relevant to holistic recovery monitoring and evaluation takes many forms	<i>“Information and data is useful to researchers and occasionally to policymakers, but more often, it is the emotive stories we tell ourselves about ourselves that are the most important.”</i>
Post-pandemic recovery indicators prove their value by mobilizing collective action	<i>“We really need to be disparity-driven in our thinking in terms of recovery and monitoring.... What are the specific mechanisms that generated the disparities...and then what are the very specific actions that we need to take both to address that and then also prepare for the next thing.”</i>

### Asserting the Recovery Mission

Based upon project participant observations and pandemic recovery writings, the term “recovery” evokes different associations depending upon the context, purpose, and speaker.

### *Today's vocabulary for disaster recovery does not match a pandemic's complexities*

People attach a wide range of meanings to the word “recovery,” so jurisdictions must first coalesce around common objectives. COVID-19 recovery plans and reports, for instance, convey a variety of ideas, including “returning to normal,” “achieving a new normal,” and “building back better.” The terms people use to speak about COVID-19 recovery are very context-dependent. They vary according to where individuals are in the process of controlling contagion (eg, just coming out of shutdowns, learning to live safely with COVID-19), which adaptations they want to retain (eg, working from home, relying more on telehealth), and what they see as the root cause of their suffering (eg, an unfeeling virus, an overreaching government, unequal social structures). Some participants objected to the very concept of recovery because of the extreme impacts upon lower-income communities and communities of color: “That word even is offensive to me. ...We have the highest rates in the world dying,” and “[T]he ability to think about recovery...is in some ways a privilege.” Others offered alternate words to account for the sand-shifting nature of the post-pandemic period, such as “discovery” and “changing, adapting, and resurfacing.”

### *Pandemic “response” and “recovery,” while intertwined, are not interchangeable*

The scale and scope of the pandemic recovery process are largely dictated by whether the response swiftly and sustainably interrupted disease transmission and the subsequent cascading health, social, and economic effects. However, even if urgent efforts are made to contain the disease, authorities should not mistake that response with the follow-on work of healing from loss and strengthening resilience to the next pandemic. Panelists commented upon COVID-19's far-reaching and long-term effects, some of which remain to be seen and still need mending: “I'm not sure we fully understand the long-term effects of what we have experienced, and just how long these lasting effects will reverberate throughout our healthcare system, our economy, our political landscape.” Grand yet short-term interventions such as the American Rescue Plan Act (ARPA), posited one commenter, have “artificially inflated” recovery for now, and once the monies have “completely gone through the system,” then the truth of whether communities have recovered from COVID-19 will be revealed. Project participant comments reproduced a taxonomy of short-, intermediate-, and long-term recovery considerations following a major public health emergency, as proposed by both the Institute of Medicine and during the scoping symposium. This taxonomy includes addressing immediate health and safety needs in parallel to the response (short term); returning individuals, families, infrastructure, and essential services and systems to functionality (intermediate term); and fully revitalizing the affected area over months or years post-crisis, including building wealth in communities historically disadvantaged (long term).

*“[W]hen you're going through a crisis [like COVID-19], all that you want to do is get back to what things used to be, but then you get on the end of it, and you realize that will never be again. ... We latch on to the way things used to be. And the fact of the matter is, it's not going to be like that. And so, I think, again, it's a mindset of how do you move forward? And how do you redefine what the path forward looks like?”* Local Business Leader, Midwest

### *Holistic post-pandemic recovery involves change of different sorts, speeds, and scales*

Where individuals and communities want to be after the extreme distress of a pandemic is not a single place or state, nor the timing of arrival all the same. Age, rural/urban location, class, race/ethnicity, and diverse sectors of society create a multiplicity of recovery trajectories. As one commenter said, “We have to understand the plurality of experiences during [the pandemic] to even think about what it looks like moving forward.” Some participants spoke to the multilayering of harm that communities of color experienced, auguring a complicated recovery. “We have trauma on top of trauma on top of trauma that a lot of folks in the community are just trying to deal with and then you add COVID,” one stated. Different generations, too, face distinct challenges: senior citizens recouping from social isolation, middle-aged adults navigating polarized politics, and children—the future workforce—falling behind in reading and math. Some participants questioned the implied meaning of recovery as getting back to a good place, with one noting, “It’s adjusting to a new normal of being under resourced and cascading issues. I don’t think that’s recovery. I think that’s just like limping along with an ankle that you haven’t gotten the proper care for.” While health issues are central the pandemic, participants also emphasized the cross-sector nature of recovery: “We understood that you could not just look at this like we need to infuse more dollars in public health programs or hospital programs or nursing homes; we also need to infuse dollars into communities to kind of make it so that their economic recovery didn’t turn into another challenge.”

## **Setting the Context for Success**

When considering issues of feasibility and practicality, project participants highlighted certain social conditions in which the adoption of holistic post-pandemic recovery indicators would be more likely.

### *The adoption of holistic recovery indicators hinges on political will*

Any set of pandemic recovery metrics, especially ones that signal the need for major social change, will be successful when they have political backing—that is, when political leaders commit to their use and allocate sufficient resources to support their adoption. Political patronage of holistic pandemic recovery, however, is a difficult prospect in the US because of current ideological divides and perceptions of government officials as untrustworthy. “[W]e have the...mechanics of measurement, but what we don’t have is the political will to change,” argued one commenter. They and others noted that genuine power-sharing between top authorities and severely affected communities is a prerequisite for implementing the PanREMEDY indicators. Others also saw fraught politics and the tensions between “rugged individualism” and “collective well-being” as standing in the way. Suggestions for advancing the use of PanREMEDY indicators included soliciting bipartisan support, using broadly appealing language, and phrasing the metrics in ways that resonate with the deeply held values of the specific communities implementing them. Political will, too, implies material support both for the application of the holistic indicators *and* implementation of interventions to improve the conditions being monitored.

### *A compelling, truthful, and forward-looking narrative brings the community together for recovery*

Top officials will be on firmer ground when applying holistic pandemic recovery indicators if they deliver an overarching narrative that acknowledges people’s diverse pandemic realities. Individuals and whole neighborhoods can be in very different places during recovery, depending upon the nature of their human and/or economic losses, prior social and economic standing, and the levels of risk and/or protection afforded by that standing. Leaders face the challenge of discussing recovery when some people are still suffering and others are ready to move on. An important intervention, argued one participant, is to “take care of people emotionally.” Authorities can help people understand the emotional life cycle of a disaster, normalizing the mixed emotions around recovery that can arise when people are at different places in that cycle. How authorities publicly frame the collective pandemic experience affects constituents’ sense of safety, security, and well-being, and whether decision makers consider their needs. Communal narratives regarding recovery should memorialize disproportionate impacts on underserved, vulnerable populations while still conveying hope, agency, and dignity, and looking forward. When greater resilience to future pandemics requires major change, then share the message, “We can do hard things.”

*“I believe that there is a range of feasibility across regions and states with respect to recovery measures. Improvements in resilience and recovery are dependent on a highly functional and responsive Congress, as well as assertive, engaged state[s], regions, and communities. If the right combination of resilience accelerators are in place, many of the measures cited could be achieved.”* Local Government Official, West Coast

### *Holistic recovery interventions address people’s immediate and ongoing needs*

Holistic recovery requires skill at navigating different goals, timeframes, and constituencies and thoughtfully applying community resources. As Meyer writes, “Recovery is the process of negotiating short-term needs with long-term goals and of balancing the desire to return to normal with the goal of decreasing future vulnerability.”<sup>6</sup> People in immediate distress include sufferers of pandemic fatigue who simply want to move on as well as individuals and families who face lingering insecurity in income, food, and housing—even more so when emergency safety nets are removed. Reparative work over the intermediate- and long-term includes improving the social determinants of health that put people at greater risk of a pandemic disease and its complications as well as working to dismantle hierarchies (race, class, gender, dis-/ability) that underpin unequal distribution of wealth and health in the US. To engender support for the differently paced workstreams, one participant recommended framing post-pandemic recovery as a process of “ongoing community building” rather than coming to a specific endpoint. Another spoke to the need to accept the complexity of holistic post-pandemic recovery: “When we get deeper into the recovery side, it’s so community-based and it’s messy and it’s iterative.”

## Organizing and Managing Operations

Speaking to their individual experiences and what they envision as ideal, participants sketched out features of an organizing entity to steer community recovery post-pandemic, uplift success, and identify gaps.

### *A strong collaborative body is necessary to propel holistic post-pandemic recovery*

Holistic post-pandemic recovery is a collective action problem, where the desired outcomes only become possible when disparate individuals, institutions, and sectors pull together toward a common objective. An entity to help make that possible requires political backing and support, performs a coordinating function, and represents the genuine interests of affected communities. Manifesting an inclusive and distributed form of leadership, holistic post-pandemic recovery amounts to, as one panelist put it, practicing “a new way of relating to one another,” namely coming together, communicating respectfully, and learning collectively. Community planning processes and a recovery framework that outlines planning assumptions, roles and responsibilities, key decisions, and coordinating mechanisms can mobilize the insights and resources of local government, philanthropy, nonprofit organizations, the private sector, and communities around a common agenda. One project participant underscored the importance of cross-sector collaboration to holistic recovery: “The partnerships that you continue to kind of cultivate with non-traditional partners is really important to any kind of future thinking or at pandemic recovery. As we’ve seen, the pandemic affected all parts of society, regardless of whether you wanted [it] to or not, and it just wasn’t just the healthcare issue.”

### *A post-pandemic recovery enterprise with sufficient capacity sustains momentum*

If a collective action recovery coalition is to apply holistic post-pandemic recovery indicators, then it needs adequate resources, skilled personnel, and overall bandwidth. In reviewing the PanREMEDY indicators, one participant noted that some were “extremely feasible to measure and would be good for understanding recovery, but they would require resources far in excess of what is typically available.” In the interest of economy and ease, participants called for the routinization of post-pandemic recovery monitoring, such as applying indicators that are not specific to COVID-19 but part of routine planning (like Community Health Needs Assessments) and for which data are collected on a regular basis. The workforce to support post-pandemic recovery monitoring and evaluation is a strong consideration: Are there sufficient personnel to gather and analyze data? Partnerships, such as working with local academic institutions to secure additional analytic capabilities or to feed recovery evaluation metrics with previously collected health outcome data, are one recommended way to surmount public health and emergency management agencies having limited capacity to collect relevant data.

### *Community involvement up, down, and sideways keeps holistic recovery progressing*

Holistic recovery is more likely if communities—especially those that have suffered greatly while also demonstrating courage during the pandemic—are fully integrated into decision making. “The voices of disproportionately affected people should be taken into account when making decisions,” argued one participant, “[because] they see

firsthand what is happening and can provide great insight into what needs to be done in the best interest of everyone.” Some observed that two-way communication is essential in this process. For example, eliciting community input via listening sessions, townhalls, trusted intermediaries, and/or written responses and communicating regularly to the community about any progress and setbacks in the recovery efforts are critical activities but insufficient on their own. One way to further this process is to ensure that at least a portion of recovery entity leadership has roots in those communities that have experienced disproportionate impacts. As one listening session participant explained, “While we work with the community and on behalf of the community, we often don’t really reflect the communities that we’re showing up in the rooms for, and so, I think however it is that we move forward, we do so with community leadership in mind.”

*“It needs to be not just the responsibility of local government to be working and trying to make us ready for the next pandemic. It needs to be a communitywide approach that also includes our NGOs, or other community partners, our school districts, our universities, our medical communities... [I]t also needs to include the private sector...if we’re really going to take a comprehensive approach on this because everybody has areas where they can improve...”* Local Emergency Manager, Southwest

## Monitoring and Evaluating Progress

During PanREMEDY indicator development, panelists weighed priorities for recovery measurement, including which aspects to measure, what kind of data to collect, and how to turn data into action.

### *Upstream indicators of resilience to pandemic effects are key to holistic recovery planning*

Applying a social determinants lens to COVID-19 disparities reveals an array of factors shaping adverse outcomes and complex recoveries for lower-income communities and communities of color, for example, employment in jobs without access to paid sick leave, denser housing arrangements inhibiting social distancing, and unequal access to healthcare due to bias and financial barriers. One participant implored that identifying such upstream indicators must “get beneath the surface of the pandemic” to “highlight systemic root causes” of disproportionate impacts and resilience. Others argued strongly about the importance of disaggregating recovery data according to place and socioeconomic groups; some proposed focusing on sentinel vulnerable populations such as children, incarcerated individuals, and caregivers. Participants identified priority indicators as those that encompass economic revival, social cohesion, and public health strength: “By focusing on measures like employment rates, healthcare accessibility, and community support systems, policymakers can effectively assess the effectiveness of recovery efforts in fostering long-term stability and well-being.” One person suggested that the PanREMEDY indicators can serve as a “general measure of equity and/or community resiliency in any community at any time” and provide pre-pandemic baselines with which to gauge recovery from future pandemics.

### *Data relevant to holistic recovery monitoring and evaluation takes many forms*

Quantitative and qualitative data are both useful in tracking post-pandemic recovery, including community feedback and personal stories that contextualize more objective data. Gathering hard numbers (eg, number of community members in need) aids recovery decision making, including that for allocating budgets, planning programs, targeting interventions, and coordinating services. At the same time, subjective measures get at the more intangible elements of post-pandemic recovery, such as feelings of grief, isolation, hope, and aspiration. As one commenter put it, some PanREMEDY indicators “were most important for monitoring” while others were “important for healing.” To discern the overall gestalt of a community or subgroup, one participant advocated asking periodically (to establish a baseline) and during recovery such broad questions as, “How do you rate [your wellbeing] right now on the ladder, and where do you see yourself in 5 years?” Involving communities in the work of collecting, analyzing, and acting upon recovery data facilitates holistic post-pandemic recovery; in part, it does this by accessing important data points and incorporating community perspectives that would otherwise be difficult for authorities to obtain on their own due to trust issues. One participant encouraged making recovery monitoring and evaluating data a community concern: “[T]here is an opportunity with all this great data, to think about how to operationalize it...how we use the data to foster community conversations.... There’s some work to be done there in terms of making this data really tangible and allow communities to speak to [it].”

### *Post-pandemic recovery indicators prove their value by mobilizing collective action*

Informing decision making, ensuring accountability, and spurring ownership for change are principal roles for post-pandemic recovery indicators. Measurement, in the eyes of project participants, is not an academic exercise; it is a force for action. As one explained, “It’s so much about what the purpose of it is.... Not measuring things just because you can measure it. But really, how is it going to be used?” Participants saw actionable indicators in two lights. First, they are easy to collect, backed by resources, and aligned with existing monitoring systems. Second, they point to something that can then be changed because community support, political will, resources, and clarity about responsible organization(s) are all in hand. Among the purposes for indicators identified in writings about post-pandemic recovery are finding out what is working and replicating/scaling it, pinpointing where resources and interventions are needed most, identifying what is not working and moving resources to more effective programs, and communicating progress. In the case of essential yet complex and slow-moving objectives, such as realizing health equity, some participants remarked that intermediate indicators such as representative political leadership, inclusive recovery planning, and truth-telling and memorialization might be easier to achieve, nearly as impactful, and important for building community trust—a prerequisite for other, more distal objectives.

### Box 1. Guidance to Leaders on Implementing PanREMEDY Indicators

- Expend political capital in support of a pandemic recovery agenda
- Set shared expectations about post-pandemic recovery
  - ✓ There is not one recovery but many
  - ✓ Some people already have a head start
  - ✓ Recovery is an iterative and messy process
  - ✓ Mixed emotions about recovery are normal
- Authorize and adequately resource a pandemic recovery entity adept at planning, coordination, data management, and community involvement
  - ✓ Promote recovery goals that align with local values
  - ✓ Command a recovery framework that outlines planning assumptions, roles and responsibilities, and key decisions
- Support a robust monitoring and evaluation system
  - ✓ Blend quantitative and qualitative data
  - ✓ Make data publicly available in accessible and visual forms
- Involve communities up, down, and sideways in recovery decisions
  - ✓ Create community feedback loops
  - ✓ Enlist individuals with roots in the most affected/vulnerable communities in recovery leadership

## Recommended Indicators

By developing recovery indicators, the PanREMEDY project sought to give form to the least considered phase of a catastrophic disease outbreak while applying an equity lens, which the COVID-19 pandemic revealed as essential. Indicators are a form of measurement that aim to describe as much about a system in as few details as possible.<sup>7</sup> Their purpose is threefold: to promote understanding about how a system works; to monitor and manage system performance; and to ensure accountability.<sup>7</sup> Indicators demonstrate their value by converting data into relevant information for decision makers and the public.<sup>8</sup>





The project team fashioned the indicators for post-pandemic recovery below ([Table 3](#) and [Table 4](#)), based upon a thematic analysis of study inputs. The PanREMEDY indicators fit into 2 categories: those for the recovery enterprise, that is, system organization and operations, and those for the outcomes of that system, that is, community status. A cross-sector Delphi panel (see [Appendix](#) for more process details) then rated the individual indicators in terms of their importance to holistic recovery and their ease of implementation; the panelists also suggested several more indicators ([Table 5](#)).









Of the originally identified 44 PanREMEDY indicators, the Delphi panelists prioritized 31 indicators both as important measures of holistic pandemic recovery as well as feasible to measure in practice. End users are encouraged to review the indicators in their entirety as an initial framework for post-pandemic recovery planning, preparedness, and assessment, while weighing the need to tailor indicator use to local and state contexts. In addition, Delphi panelists suggested a handful of additional indicators for consideration ([Table 5](#)).

*“These are honestly the highest-value indicators in the best of all socially just worlds. I will never argue with these indicators; they are literally the most telling signals of recovery efficacy. Given the situation of communities in the long-term process of pandemic recovery, aiming...for the best measures makes the most sense. Though these high-standard indicators are idealistic, they are guides for attaining improved health and well-being if there is support for authentically implementing better outcomes.”* Local Government Official, West Coast

**Table 3. PanREMEDY Indicators for the Pandemic Recovery Enterprise**

GOVERNANCE AND LEADERSHIP	RATING	
	Important	Feasible
<b>Political Authority:</b> Political leadership backs post-pandemic recovery aims, confers institutional legitimacy on the recovery process, and empowers a recovery taskforce to orchestrate planning and operations.		
<b>Collective Action:</b> Systems are in place to enable coordination and collaboration among public, private, and nonprofit sectors; engage entities responsible for diverse community functions (eg, healthcare, education); and include community-led groups rooted in the most severely affected populations.		
<b>Financing Structures:</b> Systems are in place to allocate, administer, direct and/or transfer recovery funds to agencies, organizations, and programs best equipped to support the communities most in need of recovery assistance.		
<b>Public Face:</b> A designated “recovery champion,” or “champions,” is responsible for elevating the work of recovery, providing updates on remaining gaps and remediating measures, and communicating a sense of agency and hopefulness.		

PLANNING	RATING	
	Important	Feasible
<p><b>Guiding Framework:</b> The overall recovery plan/scheme to which responsible parties adhere includes a guiding vision, key objectives, roles and responsibilities, agreed upon metrics, expected outcomes, and a continuous monitoring and improvement process.</p>		
<p><b>Time Horizons:</b> Recovery planning accounts for differently paced workstreams and outcomes (ie, meeting urgent human needs, making community systems more equitable, breaking down social hierarchies, and sustaining opportunities for economic betterment and political empowerment).</p>		
<p><b>Technical Expertise:</b> Planning taskforce is composed of people who have the relevant skills and knowledge to envision, enable, and execute a holistic and equitable recovery process; key areas of expertise include planning, data management, sector-specific knowledge, social justice and civil rights, and communication.</p>		
<p><b>Aligned Futures:</b> Recovery objectives and monitoring processes are aligned with other long-term and communitywide planning activities (eg, community development, smart growth, sustainability) so that tracking progress is a sustainable endeavor.</p>		

DATA MANAGEMENT	RATING	
	Important	Feasible
<p><b>Actionable Data:</b> Priority is given to obtaining and analyzing data that can inform decision-making and recursive actions that enable improvements in the health and wellbeing of the groups most severely affected by the pandemic.</p>		
<p><b>Disaggregated Data:</b> Information gathered, analyzed, and communicated about the status of community wellbeing is broken down according to different demographic groups (eg, age, gender, race, ethnicity, class, dis/ability) and by various geo-scales (eg, city/town, quadrant, neighborhood, ZIP code).</p>		
<p><b>Extant Data:</b> To the extent possible, recovery monitoring relies upon routinely collected and updated data so that progress and/or backsliding regarding recovery goals can be readily, promptly, and sustainably traced.</p>		
<p><b>Community Contextualization:</b> Experientially based community knowledge (eg, in the form of qualitative statements, anecdotes, narratives, and/or storytelling) is collected alongside routine quantitative measures to enable holistic monitoring of pandemic recovery sensitive to context.</p>		















PUBLIC INVOLVEMENT	RATING	
	Important	Feasible
<b>Representative Bodies:</b> The composition of decision-making and advisory bodies within the pandemic recovery enterprise reflects the demographics of the locality, with emphasis on the inclusion of the most severely affected communities.		
<b>Feedback Loops:</b> Mechanisms (including virtual, in-person, and trusted intermediary modalities) are in place that allow for ongoing, two-way communication about recovery aims and strategies, operational accomplishments, outcomes, remaining gaps, and remediating actions.		
<b>Community Dashboards:</b> Systems are in place to deliver recovery data in a publicly accessible and meaningful format, allowing for transparency and public accountability in recovery operations and outcomes.		

Table 4. PanREMEDY Indicators for Pandemic Recovery Outcomes

HUMAN HEALTH	RATING	
	Important	Feasible
<b>Epidemiological Curve:</b> The pathogen of concern is producing fewer clinical effects, including new cases of infections, hospitalizations, and deaths, among the most vulnerable populations.		
<b>Disrupted Care:</b> Access to care has been re-/established for chronic health conditions that were exacerbated by postponed, interrupted, and/or inadequate attention during the pandemic, and which disproportionately affect underserved populations.		
<b>Disease Sequelae:</b> Monitoring and treatment for the pathogen’s long-term health effects are available and affordable for the most severely affected communities.		
<b>Healthcare Infrastructure:</b> Healthcare facilities that serve under-resourced populations have re-established functionality in terms of adequate financial, physical and human capital, and have resumed the timely provision of care.		
<b>Health Insurance:</b> Health insurance coverage rates have increased steadily, enabling larger numbers of community members to seek and utilize preventive and therapeutic care without delay.		

## HUMAN DEVELOPMENT

### RATING

Important

Feasible

**Healthy Housing:** Affordable housing—whether rent- or mortgaged-based—is available to support stability, safety, a sense of place, and healthy behaviors, including compliance with personal protective measures in future pandemics.



**Adequate Nutrition:** Low-income households have sufficient and reliable access to affordable and nutritious food, maintaining quality of life and lowering their vulnerability to health threats.



**Safety/Security:** Communities hit hard by the pandemic report declining rates of interpersonal, domestic, and communal violence, and a rising sense of personal inviolability and protection.



**Educational Attainment:** A robust system of K-12 education, programs for personal enrichment across the entire lifespan, and/or professional training for career advancement are accessible to historically underserved community members.



**Connectivity/Mobility:** Low-income households have access to reliable transportation and broadband networks that enable the movement of people and information across the physical and virtual spaces of home, work, school, recreation, commerce, and community.



## ECONOMIC VITALITY, continued on page 16

### RATING

Important

Feasible

**Earning Power:** Members of lower-income households have access to meaningful, dignified employment opportunities that allow for a living wage, greater financial ability to access a high quality of life, an economic cushion for future emergencies, self-confidence, and personal fulfillment.



**Entrepreneurship:** Minority-owned small businesses are growing, contributing to a diversified, innovative, and resilient economy, and revitalizing neighborhoods through the provision of jobs, goods and services, and places for social connection.



**Worker Protections:** Employers and workers adopt measures to improve the health and safety of workplaces, including preventing the spread of contagion, such as by providing adequate paid sick leave, implementing personal protective protocols, and/or creating hybrid working arrangements.



**Neighborhood Pulse:** Strategic guidance, technical assistance, and capital investment are available for distressed communities to launch and lead initiatives that build community wealth and strengthen community resilience to future emergencies.



## ECONOMIC VITALITY

### RATING

Important

Feasible

**Thriving Grassroots:** Sustained funding, technical assistance, and sociopolitical capital are available for the faith-based organizations, community-based organizations, and mutual aid organizations that strengthen the health and wellbeing of historically underserved and socially marginalized communities.



## POLITICAL INTEGRITY

### RATING

Important

Feasible

**Power-Sharing:** Centers of power within the community have shifted to enable previously marginalized, neglected, or otherwise unheard groups to wield influence over resource allocation, decision making, and/or prioritization within pandemic recovery systems and processes.



**Equity Structures:** Health equity objectives are codified in pandemic recovery plans and protocols and incorporated into legacy programs and leadership structures.



**Safety Net:** The government has restored or increased public enrollment in social safety net programs (eg, Medicaid, SNAP, public housing) to improve provision of critical support to community members experiencing lingering economic hardship and instability.



**Public Trust:** Communities that experienced disproportionate human losses during the pandemic report increasing levels of trust that governmental and public health institutions are acting in the communities' best interest, including preparing for future emergencies.



**Inventive Policy:** Protocols are in place to capture critical lessons learned during the pandemic concerning the health and wellbeing of hard-hit communities, and to translate this knowledge into practices that improve health, economic, social, and/or political outcomes in measurable ways.



## SOCIAL FABRIC

### RATING

Important

Feasible

**Connectedness:** Low-income communities of color and other disproportionately affected communities report a renewed sense of belonging, influence, met needs, respect, and shared emotional connection in the larger place-based community of which they are a part.



**Collective Impact:** Effective partnerships, networks, coalitions, and other mechanisms for collaboration that were developed during the pandemic remain active, serving as the basis for legacy programming and planning.



**Stigma Repair:** Measures to redress the discrimination and abuse experienced by communities erroneously singled out as causing or spreading the pandemic (eg, Chinese or Asian Americans, southern border migrants) are underway, as are mitigation programs for future emergencies.



**Caretaking:** Parents, guardians, and caregivers within marginalized populations have greater access to affordable and reliable care services for children, elders, and other dependents.



## EMOTIONAL WELLBEING

### RATING

Important

Feasible

**Truth-Telling:** Hard-hit communities report that authority figures have genuinely acknowledged the disproportionate burdens that they experienced and demonstrate that this knowledge is informing transformative pandemic recovery policies.



**Public Memorialization:** Public spaces and collective rituals (virtual and in-person) are available for both grieving and commemorating pandemic losses and suffering, with special attention to communities that were disproportionately harmed.



**Psychological Supports:** Culturally competent, readily accessible mental health programming is sufficient to meet the needs of individuals from disproportionately affected communities who are experiencing lingering distress from the pandemic.









**Self-Medication:** There is a decline in the prevalence of substance abuse among communities disproportionately affected by the pandemic.



**Relief/Resolution:** Hard-hit community members report feeling less stress, fear, and despair in the aftermath of the pandemic, and a sense of resolution that the worst effects have ended and forwarding-looking protective measures are being put into place.



**Table 5. Additional Indicators Proposed by Delphi Panelists**

	RATING	
	Important	Feasible
<b>Judicious Interventions:</b> What it would look like for governmental emergency orders to be used appropriately, and how these orders may disrupt city, county, and state agencies (measured pre-pandemic).		
<b>Children/Youth:</b> Children and youth wellbeing as gauged by mental health and student performance.		
<b>Government Revenue:</b> Health of state cash reserves and changes in property taxes.		
<b>Science Support:</b> The level of public trust in models and forecasting.		
<b>Retrospection:</b> Whether people’s memories of a pandemic are distorted by trauma or replaced by more accurate memories of a moment that they collectively survived and learned from.		

## Implementation Assistance

Panelists encouraged the project team to craft implementation aids, such as a crosswalk with existing indicators and assessment tools. To this end, the team conducted a second purposive review of gray and peer-reviewed resources to identify potentially relevant indicators and indices applicable to one or more PanREMEDY indicator domains. Below are findings from a discrete review of sector-specific metrics. Planners and their partners may find the resources below helpful in operationalizing and implementing the PanREMEDY indicators in their own communities.

**Table 6. Examples of Indicators or Other Assessments Applicable to the PanREMEDY Framework**

PanREMEDY Domain	Publication Name	Summary of Indicators or Indices
Public Involvement	<a href="#">Using OpenGovB Transparency Indicator to Evaluate National Open Government Data<sup>9</sup></a>	The OpenGovB Transparency Indicator is a composite evaluation metric measuring government transparency, data accuracy and integrity, data quality, data sources’ credibility, data clarity, and reusability. While geared toward national data, the indicator could be repurposed for the local government level.

PanREMEDY Domain	Publication Name	Summary of Indicators or Indices
	<a href="#">Measuring Local Government Transparency</a> <sup>10</sup>	<p>The Municipal Transparency Index herein is based on a participatory-centered method to create a transparency and accountability metric for local government.</p>
	<a href="#">The Representativeness of State-Level Bureaucratic Leaders: A Missing Piece of the Representative Bureaucracy Puzzle</a> <sup>11</sup>	<p>Three representative bureaucracy ratios describe how well the government workforce—as well as upper-level appointments—represent the public they serve. Representation of specific demographics may also be measured.</p>
Data Management	<a href="#">OMH Data Collection Standards for Race, Ethnicity, Sex, Primary Language, and Disability Status</a> <sup>12</sup>	<p>This document from the US Department of Health and Human Services Office on Minority Health describes the federal bare minimum standards for demographic data collection.</p>
	<a href="#">More Comprehensive and Inclusive Approaches to Demographic Data Collection</a> <sup>13</sup>	<p>This evidence-based practice paper summarizes several proposed improved approaches for demographic data collection.</p>
Governance and Leadership	<a href="#">Assessing political will for anti-corruption efforts: an analytic framework</a> <sup>14</sup>	<p>While geared toward corruption, this publication presents a ranking system for systematically measuring political will that could be applied to other topics based on the perception of the issue, the degree of analysis of the issue, mobilization of support, openness to action, continuity of effort, and environmental factors.</p>
	<a href="#">Assessing countries' commitment to accelerate nutrition action demonstrated in PRSPs, UNDAFs and through nutrition governance</a> <sup>15</sup>	<p>While intended to evaluate political will for nutrition security, this document describes indicators for political will including policy, financing, legislation, citation in national strategy, prioritization compared to other sectors, and continuous reporting.</p>
Planning	<a href="#">Financial Indicators for Local Government</a> <sup>16</sup>	<p>The Financial Trend Monitoring System provides a financial indicator analysis for city governments to monitor their financial conditions, identify emerging and existing issues, develop an action plan, project future needs, and retain situational awareness.</p>



PanREMEDY Domain	Publication Name	Summary of Indicators or Indices
	<a href="#">Factors Influencing Local Government Sustainability Efforts</a> <sup>17</sup>	This publication presents a scorecard for sustainable local government development that could be adapted to assess harmony of recovery goals with city sustainability.
Human Health	<a href="#">The Human Resources for Health Effort Index: a tool to assess and inform Strategic Health Workforce Investments</a> <sup>18</sup>	This index may be used to evaluate professional health workforce status across 7 recognized human resources for health dimensions, including Leadership and Advocacy; Policy and Governance; Finance; Education and Training; Recruitment, Distribution, and Retention; Human Resources Management; and Monitoring, Evaluation, and Information Systems.
	<a href="#">Describing Epidemiologic Data. The CDC Field Epidemiology Manual</a> <sup>19</sup>	This CDC manual outlines standards for common epidemiological descriptive statistics.
	<a href="#">Health Insurance in Tax and Survey Data</a> <sup>20</sup>	This article outlines common indicators used to assess health insurance coverage in the United States, including potential data biases.
Human Development	<a href="#">A systematic literature review of indicators measuring food security</a> <sup>21</sup>	This article discusses food security indicators collected through a systematic review.
	<a href="#">Housing Affordability: Local and National Perspectives</a> <sup>22</sup>	The housing affordability for renters index provides a local measurement of affordable home ownership.
Economic Vitality	<a href="#">Human Development Index (HDI)</a> <sup>23</sup>	The Human Development Index is a composite measurement of longevity/ quality of life, educational attainment, and standard of living.
	<a href="#">The Kauffman Index of Main Street Entrepreneurship: National Trends 2016</a> <sup>24</sup>	This index evolved into the Kauffman Indicators of Entrepreneurship <sup>25</sup> in 2018. Both provide a wealth of indicators and accompanying data to assess small business ownership and employment.

PanREMEDY Domain	Publication Name	Summary of Indicators or Indices
Political Integrity	<a href="#">Securing the Safety Net: Concurrent Participation in Income Eligible Assistance Programs</a> <sup>26</sup>	This publication provides an example for how to measure concurrent participation in social safety net programs.
	<a href="#">Partisan strength, political trust and generalized trust in the United States: An analysis of the General Social Survey, 1972–2014</a> <sup>27</sup>	<a href="#">The General Social Survey</a> <sup>28</sup> is a long-running, nationally representative survey describing US demographic, behavioral, and attitudinal questions. This publication analyzes survey trends related to trust.
Social Fabric	<a href="#">Belonging: a review of conceptual issues, an integrative framework, and directions for future research</a> <sup>29</sup>	This article provides a review of existing definitions and measures for social belonging.
	<a href="#">The Intersectional Discrimination Index: Development and validation of measures of self-reported enacted and anticipated discrimination for intercategory analysis</a> <sup>30</sup>	This index measures multiple kinds of discrimination across multiple dimensions: day-to-day discrimination, anticipated discrimination, and major discrimination.
Emotional Wellbeing	<a href="#">The community substance use environment: The development and predictive ability of a multi-method and multiple-reporter measure</a> <sup>31</sup>	This article describes a method to assess the overall substance use picture across multiple categories of substance at the local level.
	<a href="#">Using Geospatial Research Methods to Examine Resource Accessibility and Availability as it Relates to Community Participation of Individuals with Serious Mental Illnesses</a> <sup>32</sup>	This publication describes the results of a geospatial analysis to assess environmental factors associated with accessibility and availability of and participation in mental health services.

## Conclusion

The **Pandemic Recovery Metrics to Drive Equity** – PanREMEDY project sought to give form to the least considered phase of a catastrophic infectious disease outbreak, while applying an equity lens. The result is a set of holistic pandemic recovery indicators with which decision makers, planners, and communities can approach a non-linear, unpredictable process with a clearer ethos, sense of direction, and set of priorities. The indicators developed through this project, with cross-sector practitioner and diverse community input, provide an important resource for local and state leaders to establish and support systems that further accelerate community healing from the COVID-19 pandemic, motivate non-traditional partners to join in pandemic readiness efforts, and conduct pre-event planning for post-crisis recovery in an era of an increasing probability of public health emergencies and pandemics.

## Appendix. Research Methodology

The PanREMEDY project implemented several modes of data collection and analysis to characterize COVID-19 recovery challenges facing hard-hit jurisdictions across the United States, identify actionable metrics for monitoring and evaluating restoration and transformation efforts, and articulate policy considerations and recommendations for decision makers. Below are further details on the methodological approach for each arm of data collection and analysis.

### Expert Advisory Panel

At the outset of the project, the PanREMEDY team engaged a panel of experts in disaster recovery and resilience for guidance and support in scoping the project, identifying relevant resources from disaster scholars and practitioners, and ensuring that the outputs incorporated the best available science and met the needs of end users. Meetings with the expert advisory panel occurred May 2022, October 2022, and February 2023, supplemented by ongoing email correspondence.

The expert advisory panel included:

- Arrietta Chakos, MPA, Principal, Urban Resilience Strategies; former Assistant City Manager for Berkeley (CA)
- Jennifer Horney, PhD, Professor of Epidemiology, College of Health Sciences; Core Faculty, Disaster Research Center, University of Delaware
- Steve Moddemeyer, Principal, CollinsWoerman
- James C. Schwab, MA, Chair, Hazard Mitigation and Disaster Recovery Planning Division, American Planning Association

### Scoping Symposium

In October 2022, the study team hosted a 2-day virtual symposium titled “Post-Pandemic Recovery: From What, for Whom, and How?” This event featured remarks by and discussions among a diverse group of leaders and practitioners spanning the public health, community development, healthcare, nutrition, faith, education, political, art, and emergency management sectors, among others.

Participants, discussion moderators, and keynote speakers were purposively selected to enable holistic, community-centered analyses of pandemic recovery challenges. Keynotes and roundtables addressed the following questions:

- What are urgent and enduring harms of the pandemic? Which remedies, repairs, and reforms are essential for recovery?
- What is necessary to heal the collective wounds from the COVID-19 pandemic?
- How are we framing the pandemic experience now and when it draws to a close?
- What pandemic recovery planning is underway now and how might we strengthen it, including through better metrics?
- How can mayors advance a transformative pandemic recovery process?

Members of the study team took detailed notes on each discussion, collaboratively synthesized thematic findings, and articulated a vision for the future of the PanREMEDY project. Findings were later disseminated via a [public-facing report](#).<sup>33</sup>

Symposium [recordings](#) and [meeting materials](#) are [available here](#).

### Literature Review

The study team performed an in-depth review of peer-reviewed and gray literature to identify existing and/or validated metrics of holistic pandemic recovery. Details of the search strategy, which we implemented between April 2022 and July 2022, are provided in the table below.

Table. Holistic Pandemic Recovery: Literature Search Strategy	
Peer-Reviewed Literature Databases	Search Terms
PubMed	“epidemic” OR “outbreak” OR “pandemic” AND “recovery” AND “community” -“opioid”
Scopus	“epidemic” OR “outbreak” OR “pandemic” AND “recovery” AND “community” AND NOT “opioid”
Web of Science	“outbreak” AND “recovery” AND “community”
Global Index Medicus	outbreak AND recovery AND community
Gray Literature Databases	Search Terms
OAIster	“outbreak” AND “recovery” AND “community”
Think Tank Search	“epidemic” OR “outbreak” OR “pandemic” AND “recovery” AND “community” -“opioid”
Government Agency document libraries: Administration for Strategic Preparedness & Response, Centers for Disease Control & Prevention, Congressional Research Service, Federal Emergency Management Agency	“epidemic” OR “outbreak” OR “pandemic” AND “recovery” AND “community” -“opioid”
Think tanks/professional organizations: American Enterprise Institute, Association of State and Territorial Health Officials, Big Cities Health Coalition, National Association of County and City Health Officials, National Association of Counties, International Association of Emergency Managers, National Emergency Management Association, National Governors Association, American Planning Association, National League of Cities, United States Conference of Mayors	“epidemic” OR “outbreak” OR “pandemic” AND “recovery” AND “community” -“opioid”

Table. Holistic Pandemic Recovery: Literature Search Strategy	
News media: The Atlantic, Bloomberg News, Los Angeles Times, New York Times, STAT, Wall Street Journal, Washington Post, WIRED	“epidemic” OR “outbreak” OR “pandemic” AND “recovery” AND “community” -“opioid”
US state health department document libraries	“epidemic” OR “outbreak” OR “pandemic” AND “recovery” AND “community” -“opioid”

Documents were excluded if they were not published in English and/or if they did not 1) include measurable and/or actionable considerations for US decision makers to account for while navigating societal recovery from COVID-19; 2) address considerations for monitoring and evaluating progress toward a new post-pandemic normal; or 3) define or conceptualize post-pandemic recovery processes and the specific harms they are intended to address.

Our search strategy yielded an initial set of 697 documents. 458 documents were deemed irrelevant following the study team’s review of titles and abstracts. From this, another 100 documents were discarded upon full-text review. However, 8 new documents were added via backward citation searching. Ultimately, the study team performed in-depth review and qualitative coding on 147 documents.

The documents were analyzed using NVivo software. The study team developed a coding framework based on learnings from the symposium and *a priori* knowledge derived from earlier scholarship on epidemic and pandemic recovery.<sup>34-35</sup> To ensure that coding processes were aligned across the study team, each member used the framework to independently code a subset of 10 documents and then presented their findings to the rest of the team. After synchronizing our coding processes, each team member coded a portion of the remaining documents, meeting routinely to discuss emergent themes and preliminary findings and foster reflexivity. Upon completion of coding, the study team collaboratively synthesized topline findings to inform subsequent phases of data collection and analysis.

### Listening Sessions

In addition to the symposium and literature review, the study team moderated 6 listening sessions spanning several US regions: East, Midwest, Southeast, Southwest, and West, as well as a “multiregional” group. Each listening session was scheduled for 90 minutes, moderated by either the principal or co-principal investigator of the study, and attended by at least one other study team member, who took detailed notes.

A total of 39 participants representing the following sectors took part in the listening sessions: arts and culture, community advocacy, community health, education, politics, public health and safety, health care, emergency management, housing, food, labor, business and finance, mental health, philanthropy, social and human services, media, recovery/resilience, planning, and religion and spirituality.

Topics of discussion included:

- How do you define pandemic recovery—bouncing back, bouncing forward, or something else? How do equity issues figure into your concept?
- How has community recovery from COVID-19 been reflected in your jurisdiction and/or sector? What concrete signs can you point to? Are the signs the same over the short- and long-terms?
- Does your city/county have a formal method for tracking and communicating progress in COVID-19 recovery? If so, what does it look like? Should any recovery aspects receive more priority than they do now?
- If you were building an effective system around which to plan and monitor post-pandemic recovery in your city/county, then what indicators would you use? To whom would you communicate them, how and why?

Participants were invited to join the study in December 2023, and the listening sessions took place between January 2024 and February 2024. During this period, the study team met routinely to discuss emergent findings and implications for monitoring trajectories of holistic pandemic recovery.

## Delphi Study

The final arm of data collection consisted of a 3-round, modified Delphi study that aimed to develop an actionable set of indicators for measuring and monitoring holistic pandemic recovery in the United States. Delphi studies are a technique for building expert consensus on a given topic through iterative rounds of questioning and have been adopted widely in public health and clinical research to develop indicators, set priorities, and formulate technical guidance.<sup>36-37</sup>

In a one-day workshop in March 2024, the study team collaboratively reviewed the findings from each of the prior arms of data collection, synthesized learnings from across the project, and developed an initial set of 44 candidate indicators that planners, practitioners, and decision makers could utilize to track pandemic recovery in their jurisdictions. Additionally, the team purposively assembled a geographically diverse, multidisciplinary panel of 25 subject matter experts and advocates from Hispanic/Latino and Black/African American communities to weigh the merits of each indicator.

In the first 2 rounds of the Delphi study, panelists were asked to rate each indicator on measures of importance and feasibility using a 5-point Likert scale, share the thinking behind their ratings, and suggest additional indicators not proposed by the study team. The third round consisted of a virtual webinar, wherein panelists discussed the rationales behind their ratings, as well as practical considerations for operationalizing the indicators. They were then asked to re-rate indicators that had not achieved consensus across the panel in the prior 2 rounds. Between rounds, the study team prepared and distributed descriptive summaries of indicator ratings to the panelists to inform rating decisions in the subsequent round.

Upon completion of Round 3, the study team estimated mean and median Likert ratings for the importance and feasibility of each indicator, as well as the interquartile range of responses to assess the panel’s level of consensus. We also performed Wilcoxon matched-pairs signed-rank testing to assess the stability of responses (ie, the degree to which Likert scores changed between rounds). Among the original 44 indicators, a final set of 31 indicators represented the measures that the panelists agreed were important measures of holistic pandemic recovery, feasible to measure in practice, and showed high stability across each round of the Delphi study.

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