



OFFICE OF THE SECRETARY  
PATIENT-CENTERED OUTCOMES  
RESEARCH TRUST FUND

## PROJECT REPORT

### FINAL REPORT

# Assessing the Feasibility of Creating a National Behavioral Health Workforce Database

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Prepared for  
The Office of the Assistant Secretary for Planning and Evaluation  
at the U.S. Department of Health and Human Services

by  
NORC at the University of Chicago

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## Executive Summary

**Background.** The U.S. behavioral health (BH) workforce is experiencing significant shortages and distribution challenges that impact people’s access to care, quality of care, and health outcomes. A comprehensive database that enumerates and characterizes BH providers is essential for advancing patient-centered outcomes research (PCOR), comparative effectiveness research (CER), and policy development to effectively allocate resources and improve BH care delivery.

**Objectives.** The objective of this project is to assess the feasibility of developing a database of BH providers and practices that provides up-to-date information to support research, policymaking, and public access. Key goals of the database include improved understanding of provider distribution, better informed patient healthcare decisions, and enhanced researcher and policymaker ability to address BH workforce challenges and reduce health disparities. The database would initially be a pilot, covering, for example, a census of providers in a small set of states, but ultimately would be scaled up to comprise a national-level provider census.

**Methods.** We first conducted an environmental scan to assess available federal and nonfederal data sources for the database and examined relevant database design considerations. We then engaged a 12-member technical expert panel (TEP) representing federal, state, and local agencies; professional organizations; and academia. Through virtual meetings held in July-August 2024, the TEP provided feedback on the environmental scan findings, shared lessons from existing BH databases, and discussed considerations for the pilot database's design, development, and scaling. Their input also helped identify key database users and research questions mapped to each user category, including those relevant for PCOR and CER.

**Results.** Critical data elements necessary for the BH provider database include provider demographics, licensure status, education, occupation, and practice characteristics. TEP members emphasized the value of creating a centralized, national database with BH workforce information for researcher, policymaker, provider, and patient use; however, there are several considerations for database design and implementation. Standardization to account for the variety of BH provider types, definitions, and credential classifications is critical. Data quality issues, such as missing or duplicate IDs and providers operating across state lines, add to the complexity, necessitating use of supplementary data sources and robust linkages. If multiple disparate data sources are used to create the database, then harmonization and standardization of data from these sources is required to create a comprehensive database and enable linkages with PCOR data sources on patient outcomes. Key considerations for database sustainability and maintenance include securing funding, ensuring data accessibility, and addressing technical and logistical challenges associated with data collection, updates, and integration.

**Conclusion.** This feasibility project underscores the need for, but also, complexity in, developing a national BH provider database to enhance workforce planning and improve BH care delivery and outcomes. It presents two viable development pathways: a federal approach leveraging existing data systems or a state-based approach building incrementally from states with robust data infrastructure. Both pathways require addressing substantial challenges related to data integration, maintenance, and cost. This project provides a foundation for future collaboration among federal, state, professional, and research stakeholders to develop and sustain a comprehensive BH workforce database, ultimately supporting better workforce planning, PCOR, policymaking, and care delivery.

## 1. Introduction

Under the U.S. Department of Health and Human Services (HHS) Office of the Secretary's Patient-Centered Outcomes Research Trust Fund (OS-PCORTF), the Office of the Assistant Secretary for Planning and Evaluation (ASPE) coordinates intradepartmental efforts that build capacity for the collection, linkage, and analysis of high-quality data to conduct rigorous patient-centered outcomes research (PCOR). Among many goals, HHS aims to address key issues contributing to shortages of accessible, high-quality behavioral health (BH) care, including workforce supply.<sup>1,2</sup> The OS-PCORTF seeks to build on these efforts by strengthening data capacity for PCOR on national health priorities, such as BH,<sup>3</sup> including addressing high rates of suicide and drug overdoses.<sup>4</sup>

While there is wide recognition that critical BH workforce shortages and distributional challenges contribute to the ongoing population-level mental health crisis, data on the BH workforce have long been fragmented and difficult to analyze. Existing analyses draw from different data sources and use different methodologies to identify BH providers, resulting in few national, comprehensive datasets for the BH workforce and varying estimates of the available supply of BH providers.<sup>5,6,7,8</sup> Research to improve BH outcomes requires a rich understanding of provider types (occupation, training, demographics, etc.), and practice characteristics by geographic location over time to analyze the dynamic factors that impact patients' access to BH care. Prior efforts to create resources for analyzing BH workforce trends include development of a [minimum data set](#) (MDS) for survey research<sup>5</sup> and databases that track the number of BH providers using a combination of health care claims and state licensure data. However, these efforts may not represent the full universe of providers delivering BH services to patients. Enhanced data, which are both longitudinal and national level in scope, are needed to enable more rigorous analyses of BH provider access and care delivery to better understand outcomes meaningful to people with BH conditions.

Although effective treatments exist for various BH conditions, patients encounter significant challenges in accessing care and face considerable difficulty finding providers for treatment.<sup>9</sup> A primary barrier is the availability of providers; many patients face long wait times—often weeks or months—before they can receive care, regardless of their specific needs or insurance coverage. Additionally, even when providers are available, patients may struggle to find ones who accept their insurance and are accepting new patients. In addition, the overlapping scopes of practice among providers can create confusion for patients trying to identify the right type of specialist for their condition. This patient-provider alignment is a key factor in achieving favorable treatment outcomes, including improved mental health, reduced risk of substance use disorder, and fewer suicides and drug overdoses.<sup>10,11,12</sup> Patients often face an even more fundamental barrier to accessible, high-quality care; for many, no provider is available at all regardless of specialization or therapeutic match.<sup>13</sup>

ASPE and NORC at the University of Chicago (NORC) worked together to assess the feasibility of developing a database that captures the broad range of providers delivering BH services, including physicians (e.g., psychiatrists, primary care physicians, pediatricians, and gerontologists), psychologists, social workers, mental health counselors, physician associates/assistants, advanced practice nurses (including nurse practitioners), and non-licensed professionals such as peer supports. Such a database can help inform policy interventions to address the most pressing BH treatment supply and distribution problems. Additionally, linking this database with BH utilization and patient outcomes data can enable

PCOR that studies the relationship between BH workforce supply and patient outcomes. **While the database would start as a pilot version representing some type of a census—for example, a census of all provider types for a few selected states—the goal is to eventually scale the database to represent the national census of BH clinicians in the U.S. over time.**

### ***1.1 Objectives and Structure of the Report***

This report describes findings from efforts to assess the feasibility of developing a comprehensive, longitudinal database of U.S.-based BH providers and their characteristics. The database would support and inform understanding of how provider supply and characteristics influence patients' BH-related outcomes. The feasibility project explored the following research objectives:

1. What are the conceptual considerations for defining the universe of BH providers for this database?
2. What are the key data elements that are important to capture in the (pilot) database?
3. What sources of federal and nonfederal data would be relevant for developing the (pilot) database?
4. What are main design considerations that would inform the pilot and future versions of this database?

This report is intended for an HHS audience, specifically the BH Coordinating Council (BHCC) Performance Measures, Data, and Evaluation (PMDE) subcommittee, as well as external researchers interested in assessing the impacts of BH workforce characteristics on mental health and substance use disorder treatment and clinical outcomes.

## **2. Methods**

Our approach to assessing the feasibility of developing the pilot database of BH providers comprised two key activities. First, we identified available federal and nonfederal data sources that could be leveraged for the database as well as database design and development considerations through an environmental scan of peer-reviewed and gray literature. Then, we sought feedback on the environmental scan findings and overall pilot database feasibility from subject matter experts through engagement with a technical expert panel (TEP). Each of these activities is detailed below.

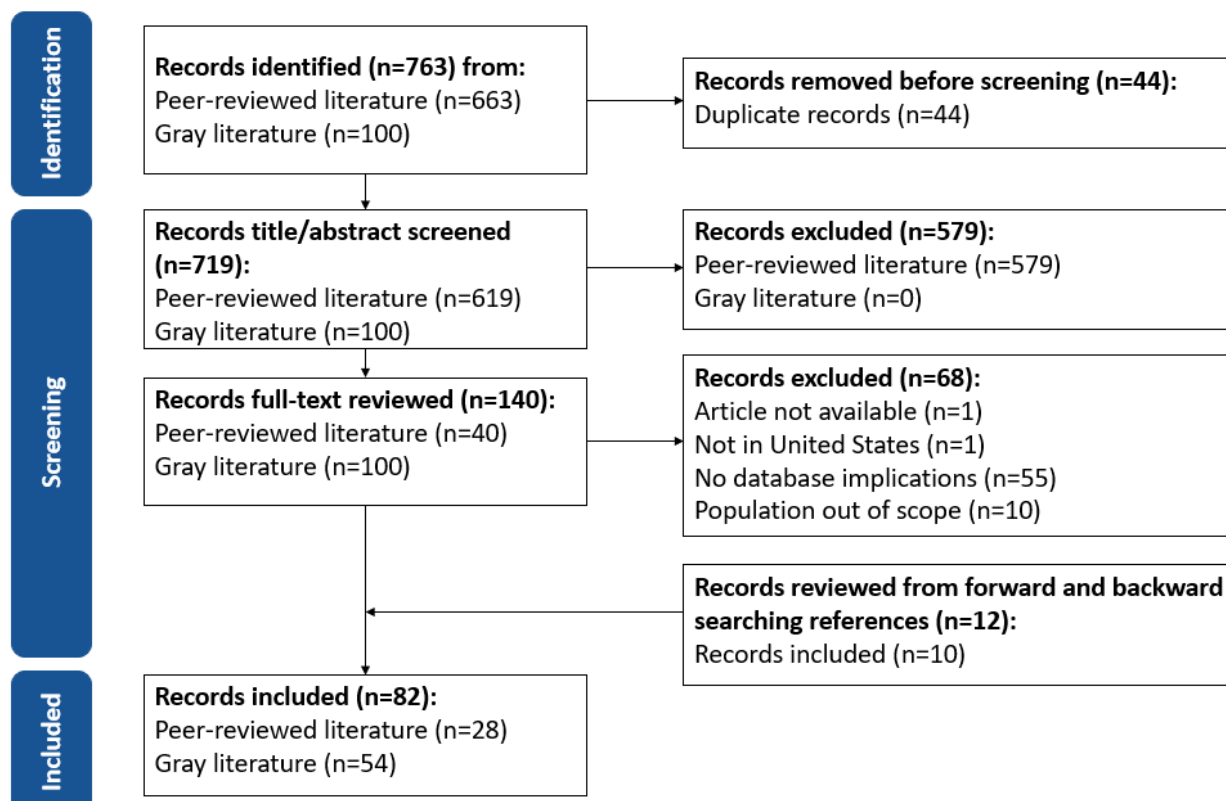
### ***2.1 Environmental Scan***

We conducted a targeted, web-based review of the literature to identify and assess available data sources that could be leveraged for the pilot database, considerations for accessing those data, gaps in available data sources, and promising examples of similar, pilot database development efforts. We performed a stepwise review of relevant peer-reviewed and gray literature (**Exhibit 1**).

First, we searched PubMed and Google Scholar to identify peer-reviewed research and systematic reviews published in English using established search terms described in **Appendix A, Exhibit A1**. We used Boolean operators to combine these terms. Next, we performed searches of the gray literature, prioritizing websites of HHS agencies involved in BH and/or workforce tracking, BH Workforce Research Centers, and BH professional organizations. See **Appendix A, Exhibit A2** for a full list of websites reviewed for relevant gray literature resources.



### Exhibit 1. Article Selection Process



Using our inclusion and exclusion criteria (**Appendix A, Exhibit A3**), we performed a two-step screening process to identify relevant resources, including a title/abstract review followed by a full text review of those articles included at the stage of title/abstract review. Next, we screened any relevant articles identified through backward reference searching of the included resources. Information from included data sources were abstracted into a data abstraction spreadsheet, **Exhibit 2**, which served as the basis for the inventory of potential data sources that is available on <https://aspe.hhs.gov/>. Finally, we reviewed known, existing databases on health care providers (both BH and others) to understand included data elements and data sources, as well as database development insights (**Appendix B**).

### Exhibit 2. Fields in the Potential Data Sources Inventory

Field Category	Specific Fields
<b>Resource Metadata</b>	<ul style="list-style-type: none"> <li>■ Data source steward/funder</li> <li>■ Data source name</li> <li>■ Date source purpose</li> </ul>
<b>Size and Scope</b>	<ul style="list-style-type: none"> <li>■ Years covered by the data</li> <li>■ Coverage level (e.g., national, statewide, multi-state)</li> <li>■ Data collection source (e.g., administrative)</li> <li>■ Unit of observation (e.g., individual, practice)</li> <li>■ Population(s) captured</li> </ul>
<b>Data Access</b>	<ul style="list-style-type: none"> <li>■ Public versus restricted data access</li> </ul>

Field Category	Specific Fields
<b>Data Types</b>	<ul style="list-style-type: none"> <li>■ Identifiers available for linkage</li> <li>■ Provider and practice variables organized by key domains</li> </ul>

## **2.2 Technical Expert Panel**

We convened a 12-member TEP to solicit insights on (a) the findings of the environmental scan, (b) lessons learned from their involvement with existing BH provider databases or potential data sources for developing a pilot database, (c) considerations for designing, developing, and scaling the pilot database, and (d) relevant PCOR questions that the database should be designed to answer. TEP members represented diverse perspectives relevant to the field of BH workforce research, including federal, state, and county agencies, BH professional organizations, and academics/researchers focused on BH workforce issues. The TEP met virtually over two sessions hosted July-August 2024.

## **3. Findings**

Below, we first outline the considerations for selecting BH providers for the database (Section 3.1), followed by a discussion of core data elements for the database (Section 3.2). Next, we describe potential data sources for the database (Section 3.3), followed by considerations for database design and development (Section 3.4). We conclude the findings section by describing database considerations and PCOR questions for key end user groups (Section 3.5).

### **3.1 Selecting BH Provider Types for the Database**

One of the first steps in developing the BH database is to operationalize the selection of relevant BH providers to include in the database. TEP members unanimously agreed that provider types for the database should include primary care providers, physician assistants, and allied health professionals (e.g., peer support workers and community health workers [CHWs]) in addition to those that are traditionally considered BH providers (e.g., psychologists, psychiatrists, clinical social workers).

While there is widespread recognition that multiple provider types are important in BH, current data limitations pose barriers to their inclusion in the database. Providers with specific occupational training in mental health and substance use services such as psychologists, psychiatrists, and licensed clinical social workers, referred to as specialty providers, are more easily identifiable in data and can clearly be included. While there is a large set of occupational categories collected by federal statistical agencies or on claims, the challenge for non-specialty providers - like primary care physicians and nurse practitioners - is that it may not be clear from looking at occupation categories in data whether the provider delivers BH services. In addition, there is a lack of standardized occupational categories in federal data or professional classifications for peer or CHWs, who may also provide BH services.

Further work is needed to narrow down in the data non-specialty professionals delivering BH services to retain the focus for the database. In some instances, researchers identify providers by their education, training, and occupation or area of practice using taxonomies developed for claims, or for national statistical purposes (e.g., the National Uniform Claim Committee or Standard Occupational Categories). They may also go directly to a national professional society for particular occupations and training. Claims data can also be used to distinguish non-specialty providers delivering BH services and

treatments, in addition to relying on provider training and profession information. Researchers have sometimes used prescribing practices to identify individual providers that are linked to the delivery of BH treatments.<sup>14</sup>

While this claims-based approach can identify non-specialty BH providers who may otherwise be missed in a profession- or licensure-based approach, there are several limitations in the data for capturing the universe of providers. Claims data will not capture those providers who do not directly bill insurance, such as those operating on a cash basis and out of network providers where a claim is not submitted.<sup>15</sup> Additionally, many BH programs that provide access to allied health professions, such as peer support specialists and CHWs, are funded through grants and are not covered through insurance.<sup>10</sup> Furthermore, some licensed BH providers, like social workers, may bill under a supervising provider or a facility, meaning that the individual providing BH care would not be captured in the claims data. For these reasons, relying solely on a claims-based approach will be insufficient for the pilot database.

Finally, some data sources identify providers at the individual level (e.g., psychiatrist, psychologist) while others identify the provider at the facility level, such as a treatment center. This distinction between individual-level and facility-level identification further complicates the process of identifying and categorizing providers for the database.

**Exhibit 3** presents a crosswalk of BH provider types included in different classification systems and standards. The lack of consistency in terminology and included professions emphasizes the challenges of maintaining consistency while linking information across data sources. Additionally, there are limitations in relying on the existing schemas to determine who to include and exclude in the database based on profession alone, given the lack of representation of some professions, like peer supports, in some standards.

**Exhibit 3. BH Provider Type Classification Examples**

BH Provider Category	University of Michigan Minimum Data Set (MDS)	Standard Occupational Classification (SOC)	National Uniform Claims Company (NUCC)
<b>Specialty Healthcare Providers</b>	<ul style="list-style-type: none"> <li>■ Psychiatrist</li> <li>■ Psychologist</li> <li>■ Clinical Social Worker</li> <li>■ Marriage and Family Therapist</li> <li>■ Mental Health Counselor</li> </ul>	<ul style="list-style-type: none"> <li>■ Psychiatric Nurse Practitioner</li> <li>■ Psychiatrist</li> <li>■ Clinical and Counseling Psychologist</li> <li>■ Social Worker</li> <li>■ Mental Health and Substance Abuse Social Worker</li> <li>■ Marriage and Family Therapist</li> <li>■ Licensed Professional Counselor</li> <li>■ Mental Health Counselor</li> </ul>	<ul style="list-style-type: none"> <li>■ Psychiatrist</li> <li>■ Psychologist</li> <li>■ Psychoanalyst</li> <li>■ Social Worker</li> <li>■ Therapist</li> <li>■ Family Medicine/Internal Medicine Physician: Addiction Medicine</li> </ul>

BH Provider Category	University of Michigan Minimum Data Set (MDS)	Standard Occupational Classification (SOC)	National Uniform Claims Company (NUCC)
<b>Non-Specialty Healthcare Providers</b>	<ul style="list-style-type: none"> <li>■ Advanced Practice Registered Nurse (APRN)</li> <li>■ Physician Assistant</li> <li>■ Physician</li> </ul>	<ul style="list-style-type: none"> <li>■ APRN</li> <li>■ Registered Nurse</li> <li>■ Licensed Practical Nurse</li> <li>■ Physician Assistant</li> <li>■ Physician</li> </ul>	<ul style="list-style-type: none"> <li>■ Nurse Practitioner</li> <li>■ Physician Assistant</li> </ul>
<b>Allied Professionals</b>	<ul style="list-style-type: none"> <li>■ Community Health Worker</li> <li>■ Addiction Counselor</li> <li>■ Prevention Specialist</li> <li>■ Peer Recovery Support Specialist</li> <li>■ Psychiatric Aide</li> </ul>	<ul style="list-style-type: none"> <li>■ Community Health Worker</li> <li>■ Counselor</li> <li>■ Psychiatric Technician</li> </ul>	<ul style="list-style-type: none"> <li>■ Counselor</li> <li>■ Behavioral Health &amp; Social Service Provider</li> </ul>

**TEP members recommended convening a workgroup to develop a conceptual model to guide BH provider identification and prioritization.** The conceptual model should balance the desire to include as many BH provider types as possible with the challenges database developers will encounter when attempting to include providers from many professions: those who may or may not provide BH services (e.g., primary care physicians, CHWs), those that are unlicensed, and those that are not billable providers for all insurance types. In addition to considering a provider’s profession or occupation, the conceptual model could also factor in an individual’s training and licensure to provide BH services, and where and how often are they providing services.

**3.2 BH Workforce Core Data Elements**

The feasibility of including all or a limited number of BH provider types in the pilot BH database is contingent on a determination of what its core data elements should be. Core data elements are the minimum data elements that will be reported on for each provider in the database. Fewer core data elements included in the database will increase the likelihood that the database can capture a broader set of BH provider types. If the BH database requires a significant number of core data elements to be deemed useful, then the completeness of the database may be compromised, as available data sources that reliably contribute data elements of interest for each BH provider type may be limited.

We reviewed three resources to understand their key data elements and standards for inventorying the BH workforce: Health Resources and Services Administration’s (HRSA’s) Health Workforce MDS,<sup>16</sup> the Cross-Profession MDS,<sup>17</sup> and the University of Michigan Behavioral Health MDS.<sup>5</sup> Of note, the University of Michigan MDS was developed by assessing 27 national data sources and expert review and consultation.<sup>5</sup> They encouraged data collection in five domains to address BH workforce distribution issues: demographics, licensure and certification, education and training, occupation and area of practice, and practice characteristics and settings. **Using the University of Michigan Behavioral Health MDS along with TEP member recommendations, we identified core data elements within each domain and potential data sources for the database (Exhibit 4).** The data sources include both primary sources

with individual provider and practice identifiers as well as supplementary sources for characteristic information, such as federally administered national surveys or professional organization data.

**Exhibit 4. Core Data Elements and their Potential Data Sources**

Domain Category	Data Element	Potential Data Source
<b>Provider Identifiers</b>	NPI, SSN, MPN, license number	<ul style="list-style-type: none"> <li>■ Billing-related provider registries (NPPES, Medicare Provider Enrollment Chain, and Ownership System [PECOS])</li> <li>■ Professional organization surveys/registries</li> <li>■ State licensure data</li> <li>■ Claims data</li> </ul>
<b>Practice Identifiers</b>	NPI, EIN, FIPS code, facility name and address	<ul style="list-style-type: none"> <li>■ Billing-related provider registries</li> <li>■ Federal facility surveys</li> </ul>
<b>Demographics</b>	Date of birth, sex, gender, race, ethnicity, place of birth, languages spoken	<ul style="list-style-type: none"> <li>■ Billing-related provider registries</li> <li>■ Professional organization surveys/registries</li> </ul>
<b>Licensure and Certification</b>	Licenses obtained, year obtained, state jurisdiction of license, job-related certifications held, licensure capacity	<ul style="list-style-type: none"> <li>■ Billing-related provider registries</li> <li>■ Professional organization surveys/registries</li> <li>■ State licensure data</li> </ul>
<b>Education and Training</b>	Highest degree obtained, year degree obtained, job-related trainings completed	<ul style="list-style-type: none"> <li>■ Professional organization surveys/registries</li> <li>■ Claims data</li> </ul>
<b>Occupation and Area of Practice</b>	Employment status, primary occupation, area of practice, active or inactive status	<ul style="list-style-type: none"> <li>■ Professional organization surveys/registries</li> <li>■ Claims data</li> </ul>
<b>Practice Characteristics and Settings</b>	Hours per week, time spent in direct patient care, practice location, setting type	<ul style="list-style-type: none"> <li>■ Federal facility surveys</li> <li>■ Professional organization surveys/registries</li> </ul>
<b>Care Delivery</b>	BH treatments and services provided (type and frequency), populations served	<ul style="list-style-type: none"> <li>■ Claims data</li> </ul>

At a minimum, the pilot database will need to capture unique identifiers for individual-level providers to build the census of BH providers and be linkable to PCOR-relevant data sources with patient outcomes. **TEP members recommended using data sources that provide as many unique identifiers as possible to ensure the database is linkable to other PCOR datasets that researchers may require to answer their given research question.** Our review of the literature identified several possible unique identifiers in existing data sources, including the National Provider Identifier (NPI), Social Security Number (SSN), Medicare or Medicaid Provider Number (MPN), Taxpayer Identification Number (TIN), license number, and date of birth and full name for individual providers. For BH practices, available identifiers include

NPI, Employer Identification Number (EIN), and facility name and address. In particular, TEP members noted the utility of the NPI for linking individual provider and practice records across data sources, including claims and state licensure data. However, the TEP and prior literature have described several drawbacks of the NPI and the system used to issue and record NPIs, the National Plan and Provider Enumeration System (NPPES). Currently, the NPPES alone is insufficient for tracking the BH workforce as provider registration is voluntary, providers are not required to update their practicing location or verify their status as an active provider, and specialty taxonomy codes are often incorrect.<sup>7,18</sup>

Depending on the approach for selecting BH provider types for the database, additional data elements may be required to build the census of BH providers. These data elements may include BH training and certifications obtained, active/inactive practicing status, BH treatments and services provided, practicing location, and information on the population providers serve. One TEP member emphasized the need to gather utilization data elements to examine the services BH providers deliver, in addition to knowing their occupation. Both Centers for Medicare & Medicaid Services (CMS) and HRSA have been exploring this with real-time Medicaid claims, which can be used to determine 1) active practicing status, 2) provided BH services, and 3) how to categorize the provided services.

**TEP members recommended including demographic data elements that will not change or may change slowly over time (e.g., race, gender, languages spoken, specialty), from a database scalability and maintenance standpoint.** TEP members highlighted race/ethnicity data as particularly important to include, given the need to understand racial and ethnic diversity within the BH workforce and their impact on patient outcomes. They also advocated for including data elements to understand licensure capacity (i.e., whether workers are working up to their licensed potential) to ascertain whether and how resources are being utilized.

### ***3.3 Sources of BH Workforce Data***

Existing BH workforce data sources may include general federal workforce data, state licensure data, claims data (private, public, proprietary), workforce surveys (e.g., state or professional organization issued), and professional association and accreditation body provider registries. The findings from the environmental scan and TEP convenings revealed that available data sources have relative strengths and limitations that should be considered, shown in **Exhibit 5** below. TEP members did not reach consensus on the best source of data for serving as the basis of the database, but they generally emphasized as important considerations for candidate data sources: 1) the information available in the data source (i.e., available data elements), 2) data format that enables linkage to other data sources, and 3) accuracy and completeness of data elements.

**Several data sources can be considered for building a census of BH providers. Provider registries**, including the NPPES, PECOS, and professional association registries, have the most potential for the database. In addition to representing a universe of providers, they also capture basic demographic, education and licensure information. **State licensure data**, within a certain scope, also capture the universe of providers as well as several other data elements of interest for the pilot database, although collected data varies by state. Commonly collected data elements include those related to provider demographics (e.g., sex, country of birth, address), licensure and certification information, education and training, and occupation and area of practice. While **claims data** (including CMS claims, private/commercial insurance claims, and all-payer claims databases [APCDs]) does not capture a

universe of providers since it is limited to providers who bill for services, it could be used to supplement these other sources of data that are foundational to building the database. They are a rich source of longitudinal data on services provided and prescribed prescriptions, as well as contain information on the type of provider (e.g., profession) and information about the facility where BH services were provided (e.g., facility name, number of beds). The TEP also highlighted using BH provider **education and training program graduation data** to inform the census population.

**Once the database of providers is built, it can be supplemented with information on provider characteristics by linking to survey data sources.** A few examples include **professional association surveys** (e.g., American Psychological Association, American Psychiatric Nurses Association), which often have rich data on their member providers, including self-reported information on their employment status, work hours, wages, certifications, characteristics of their practice such as facility settings, services provided, prescribing practices, populations served, and accepted insurances. **Other workforce surveys** fielded by states or at a national level also provide more detailed insight into the BH workforce, including data on provider demographics (e.g., gender, age, race/ethnicity, marital status), licensure, education and training, certificates obtained, services provided, prescribing practices, patient volume, wages, rurality, and practice setting characteristics.

The various federal and nonfederal data sources identified from our environmental scan are available in a data sources inventory on <https://aspe.hhs.gov/>. The inventory shows, for each data source, its purpose, years covered, data collection method, identifiers that could be used for BH providers or practices, and other data they provide. **Among the data sources that are useful for building the census,** some include individual-level identifiers for BH providers across the country, such as the NPI, SSN, MPN, provider name, and provider date of birth. Two of the identified data sources—HRSA’s Uniform Data System and SAMHSA’s National Substance Use and Mental Health Services Survey—provide facility-level or aggregate provider and practice data which could be linked with the database to enumerate the supply of providers at a facility or geographic level. They include identifiers for the EIN, permanent random number, FIPS code, and facility name or address.

**Among the survey data that provide additional characteristics information,** we identified surveys for nurse practitioners, registered nurses, psychiatric mental nurses, and psychologists. These data sources could be used in conjunction with other datasets to provide more information for broader BH workforce planning.

The challenges associated with existing data sources prompted some TEP members to recommend pursuing new data collection activities to develop a national census of all BH providers. Enhancing existing state-level data collection efforts brings its own challenges to ensuring consistent data collection, aggregation, and analysis across states<sup>19</sup> as implementation will vary by state without federal support to develop a standard infrastructure for such data collection. Therefore, the TEP saw a federally

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#### Data Sources with Individual BH Provider-Level Data for Building the Census

- Transformed Medicaid Statistical Information System (T-MSIS) Analytic Files
- Medicare Fee-for-Service PECOS
- Medicare Claims Data
- NPPES
- IQVIA Healthcare Solutions Claims Data
- SK&A Physician List
- AMA Physician Master File
- State Licensure Data
- APCDs

administered survey of BH providers as a more promising approach. The TEP suggested that new data collection efforts could focus on augmenting and improving the NPPES to track the full BH workforce by requiring providers to more frequently update their information and by requiring other certified providers, such as allied health professionals, to obtain an NPI, which is currently optional.



**Exhibit 5. Strengths and Limitations of Data Sources for the BH Workforce Database**

Data Source	Strengths	Limitations
<b>National Plan and Provider Enumeration System</b>	<ul style="list-style-type: none"> <li>■ Provides a unique identifier linkable across many data sources (NPI)</li> <li>■ Includes practice address and location</li> <li>■ Monthly data files are publicly accessible</li> </ul>	<ul style="list-style-type: none"> <li>■ Many providers (e.g., psychologists, LCSWs) do not register for an NPI</li> <li>■ Limited information on provider characteristics</li> <li>■ Point-in-time data collection, so data may be outdated</li> </ul>
<b>State Licensure Data</b>	<ul style="list-style-type: none"> <li>■ Required for licensed professionals, including peer support specialists in some states</li> <li>■ Can identify active versus inactive providers</li> <li>■ Contains accurate information on license status</li> </ul>	<ul style="list-style-type: none"> <li>■ Does not include unlicensed providers (e.g., community health workers)</li> <li>■ Does not include information to ascertain capacity issues (e.g., working up to full license level)</li> <li>■ Information captured and quality varies by state</li> <li>■ May be outdated or incomplete for practice location if they are licensed to serve across state lines</li> <li>■ Costly to procure</li> <li>■ Resource intensive to process and clean</li> <li>■ Some states have data sharing restrictions</li> </ul>
<b>Centers for Medicare &amp; Medicaid Services (CMS) Claims Data</b>	<ul style="list-style-type: none"> <li>■ Real-time claims data provides the most accurate information on patients and service delivery</li> <li>■ Can identify active versus inactive providers via new patient billing codes</li> <li>■ Can examine BH services performed by provider type</li> <li>■ Includes information on the population served and the facility providing the service</li> </ul>	<ul style="list-style-type: none"> <li>■ Only captures licensed providers who bill to CMS, excluding certain provider types (e.g., allied professionals) and those that operate on a cash payment model</li> <li>■ Some providers (e.g., social workers) bill under a supervising provider or a group/organization NPI and are not directly captured</li> <li>■ There are lag times between when a service occurs and when it is reported</li> <li>■ In T-MSIS, data quality and collection vary by state</li> <li>■ Limited information on provider characteristics (e.g., education, certification and licensure, demographics)</li> </ul>

Data Source	Strengths	Limitations
<b>Commercial/Private Claims Data</b>	<ul style="list-style-type: none"> <li>■ Prescription claims data can capture providers who take cash payments</li> <li>■ Can identify active versus inactive providers via new patient billing codes</li> <li>■ Can examine BH services performed by provider type</li> <li>■ Includes information on the population served and the health system providing the service</li> </ul>	<ul style="list-style-type: none"> <li>■ Only captures licensed providers who bill to private insurers, excluding certain provider types and those that operate on a cash payment model</li> <li>■ Not all providers bill for their own services (e.g., providers billing under another provider or facility code)</li> <li>■ Can be costly to procure, compared to state licensure data</li> <li>■ Limited information on provider characteristics</li> </ul>
<b>Professional Association Surveys/Registries</b>	<ul style="list-style-type: none"> <li>■ May provide rich characteristics information (e.g., burnout, attrition)</li> <li>■ Includes many BH provider types</li> </ul>	<ul style="list-style-type: none"> <li>■ Voluntary membership</li> <li>■ Only captures a sample of providers and may be outdated</li> <li>■ Some associations have data sharing restrictions for identifiable data</li> <li>■ Can be costly to obtain</li> </ul>
<b>State Workforce Surveys</b>	<ul style="list-style-type: none"> <li>■ Required in some states for licensure renewal</li> <li>■ Provides rich characteristic information</li> </ul>	<ul style="list-style-type: none"> <li>■ Not all states conduct surveys, and it is often voluntary</li> <li>■ Only captures a sample of providers and may be outdated</li> <li>■ Sampling frames may over or underestimate coverage</li> </ul>
<b>Facility Data (e.g., HRSA Uniform Data System [UDS], SAMHSA National Substance Use and Mental Health Services Survey [N-SUMHSS])</b>	<ul style="list-style-type: none"> <li>■ Can identify individual practices/facilities</li> <li>■ Includes information on patient characteristics/outcomes, services, and staffing</li> </ul>	<ul style="list-style-type: none"> <li>■ Cannot identify individual providers</li> <li>■ HRSA’s UDS excludes facilities that are not Health Center Program awardees or look-alikes</li> <li>■ SAMHSA’s N-SUMHSS is voluntary</li> </ul>

### 3.4 Pilot Database Design and Development Considerations

The TEP members highlighted important nuances that may impact feasibility of the pilot database, which align with challenges articulated in the literature. Implementation challenges include the lack of a common data model to support data linkages and high variability in data collection methods (e.g., surveys, claims, licensure data), which complicate data integration and require sophisticated harmonization techniques.<sup>20</sup>

National- and state-level BH workforce databases serve the purpose of maintaining inventories of providers for surveillance and trend analyses, with some state-level databases requiring mandatory survey participation at the time of licensure applications or renewal to support legislative reporting (e.g., New Mexico, Virginia, Wisconsin). Data quality issues, such as missing or duplicate unique IDs, necessitate using supplementary data sources and establishing meaningful data linkages for comprehensive coverage.<sup>7</sup> If relying on a state-based data collection approach, providers operating across state lines introduce complexity in using state licensure data as a proxy for practice locations. In addition, building the necessary infrastructure and developing state capacity for standardized data collection are critical for ensuring data quality. Overall, while addressing information gaps with new data sources is essential, it is equally important to leverage achievements in identifying and tracking millions of providers over time.

Below we summarize the desired functionalities and features of the pilot database expressed by the TEP and the requisite design, development, and implementation considerations for developing the pilot database.

**Defining the census of BH providers.** TEP members acknowledged that developing a national census of all individual BH providers in the U.S. may not be feasible initially for the pilot phase of the database. Given the challenges associated with the available data (described in Sections 3.1 and 3.3), the TEP identified the two possible paths to piloting and then scaling up a workforce database. One option is to develop a comprehensive database that captures a complete census of individual BH providers and practices within a sub-national geographical area, for example, focusing on specific states. This database could be used as the basis for federal investment to add additional states aligned with the established specifications, eventually expanding to a national database. The second option would start with a national database with more limited providers and data elements, which could be progressively built through additional investments to improve existing federal data collection infrastructure to eventually capture the national census of individual BH providers.

**Linking multiple data sources to reach a census.** TEP members recognized that either a federal data system will need to be enhanced and/or multiple data sources may have to be linked to create a comprehensive census of BH providers and their characteristics (see the Discussion section for more details on database development pathways). While some TEP members suggested using patient-centric

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#### Key Database Implementation Challenges

- High variability in data sources may require data harmonization to integrate data sources
- No clear roadmap or common data models for linking multiple data sources
- Systematic tracking of longitudinal data may be challenging, especially if database is developed from multiple data sources
- Variation in state-level data resources

data sources (e.g., care utilization within claims data) rather than sources for provider supply as the foundation of the database, other TEP members recommended not using claims as the foundation of the database as many BH providers operate on a cash basis. Despite the issues with using NPIs to identify BH providers, many TEP members believed that using NPI as the primary identifier for linkage would be the best starting point for the database. One study comparing the validity of data on psychiatrists, psychologists, and psychiatric nurse practitioners in the NPPES, American Medical Association (AMA) Master File, and state licensure data found that the NPPES provided the most complete representation of providers.<sup>21</sup> Furthermore, accuracy and completeness of the NPPES could be improved by linking NPPES data to routinely updated CMS datasets (e.g., PECOS, Medicare/Medicaid claims) and provider registries to potentially improve the validity of the information in NPPES.<sup>22</sup> **As each type of data source comes with its own strengths and limitations as discussed above, TEP members suggested that ASPE prioritize linking free or low-cost data sources as a first step, then assess population gaps in the database and progressively supplement with additional data sources to address gaps and scale the database over time.**

To combine disparate data sources into one database, we have identified three key steps for developers:

1. Identify individual providers using unique identifiers.
2. Determine whether the provider meets the established definition of a BH provider in the conceptual model for the database (referenced earlier in Section 3.1).
3. Supplement with additional data sources that can provide detailed provider characteristics and services provided (e.g., survey, claims data).

Step 2 might require different approaches depending on the data source type. For example, registries and surveys will use classifications or taxonomies for providers based on their profession; after using the NPI taxonomy categories to identify BH-specific providers, other data might be required to identify non-BH specialty providers (e.g., primary care providers and nurses). For example, the NPI could be linked to claims data to investigate BH prescribing practices or services delivered. Additional steps may be needed to further identify BH providers who meet the database's conceptual definition, such as whether they are actively treating patients, if included in the BH provider conceptual model.

The TEP discussed how the ultimate purpose of the database for research or policymaking needs will influence the data source linkage approach, as the census of providers needed can differ. **To meet the needs of various potential end users, TEP members suggested that the pilot database be grounded in the core infrastructure necessary (i.e., sources that include an NPI to identify BH providers) and then build upon or leverage other data sources with the data elements necessary to meet the needs of specific research questions or other purposes.** If the database's primary purpose is to link to data to answer PCOR questions, the approach may entail linking existing databases to answer specific pre-identified research questions. However, if the aim is to create a national database of all BH providers for policy purposes, such as workforce projections and trends tracking, new approaches to collecting data at the state and federal level are needed. Ultimately, the TEP recommended prioritizing creating a database at the level of the individual provider. This would enable the broadest range of uses as individual-level data can be aggregated to assess BH workforce supply-level questions.

**Standardizing disparate data elements.** With the lack of standard methodologies (e.g., common data models) and implementation roadmaps that could support linking across the variety of data source types and format, standardization of disparate data elements is needed. A framework for data linkages across and between federal and non-federal resources may facilitate meaningful data exchange and establish a pathway for scaling up the database in the future. While the pilot database will be a novel initiative, prior efforts to track health care and BH workforce trends, such as the AHRQ 3P-RD,<sup>23</sup> the George Washington University (GWU) Behavioral Health Workforce Tracker,<sup>24</sup> and several state-level databases,<sup>25,26,27,28,29</sup> offer valuable insights for the development of the pilot database. Lessons learned from these databases emphasize the importance of standardized data formats and comprehensive variable sets for effective linkage among different data sources. While the pilot database may approach data standardization differently, resources and lessons learned from prior, related databases can serve as a reference. **Appendix B** provides information on the data sources used in these prior databases.

**Ensuring the capture of longitudinal data.** While performing longitudinal analyses is a goal of the pilot database, creating a database that can longitudinally track providers may be difficult as the field lacks comprehensive longitudinal data sources. Disparate data sources have differing data lifecycles for updating and releasing data, for instance, CMS' T-MSIS lags by several years. State licensure boards have their own data collection and storage processes and requirements for updating provider data, if data are even updated after initial licensure.<sup>30</sup>

Currently, Veterans Administration and insurance claims and enrollment data provide robust longitudinal data on treatment services,<sup>31</sup> and these could be linked to the database to support longitudinal analyses of service utilization. The TEP also recommended state unemployment insurance or individual wage records as possible sources of longitudinal data, although it would likely be available at the aggregate or employer level and by nature excludes self-employed individuals.

**Establishing processes for data access.** Recommendations from TEP members affiliated with professional organizations that provide certifications and maintain records about the BH workforce included clear communication with data vendors about data usage, especially deidentification to protect privacy and ensure appropriate use of secondary data. The TEP suggested that secure data centers, maintained federally, and the sharing of aggregated data could help balance privacy concerns with the need for detailed workforce insights. TEP members also emphasized the importance of ensuring that all intended users have affordable access to the database, given that some users may be early career researchers or student researchers. Some proprietary or state-based data sources have significant recurring costs associated with them, limiting access to detailed practice patterns and patient-level data. Therefore, the project will need to identify federal funds that will enable the database to continually pay for data sources without offloading costs to users.

**Accounting early for database maintenance and scalability.** During database development, there should also be discussions of database maintenance and long-term sustainability. Key considerations include identifying where the database will be permanently housed in the federal government, who will staff the project, what technical capacity is needed, and how it will be scaled to other states/professions. Regarding the hosting agency, some TEP members recommended an agency that is well-known for providing BH resources, such as SAMHSA. To facilitate database maintenance and updates, TEP members recommended identifying data elements that require routine updates (e.g., practice location, services provided) versus those that can be updated every few years (e.g., name, demographics).

### 3.5 Database Considerations and PCOR Questions for End Users

As TEP members emphasized, it is important to establish an understanding of end user needs early in database development to facilitate effective design. In general, they agreed that the database has relevance to a wide variety of users and **should be designed such that it has value for PCOR and CER investigators, policymakers involved in understanding workforce supply trends, and patients and providers interested in understanding the availability BH providers and resources in their area.** See **Exhibit 6** for sample research questions that the database could support, mapped to research domain and end user category.

**Exhibit 6. Sample Research Questions for Target End User Groups**

Potential End Users	Sample Research Questions
<b>Domain: Workforce Supply</b>	
<b>PCOR Investigators</b>	<ul style="list-style-type: none"> <li>■ How are geographic disparities in workforce supply related to disparities in patient BH outcomes?</li> <li>■ How adequate is the supply of specialty providers for patient needs?</li> <li>■ How well do workforce characteristics align with patient preferences and satisfaction measures?</li> </ul>
<b>Policymakers</b>	<ul style="list-style-type: none"> <li>■ How does the BH workforce supply compare across states or regions? Where is the fastest growth projected?</li> <li>■ What is the minimum workforce supply to ensure that patient health outcomes improve or at least do not worsen?</li> <li>■ Which provider types (e.g., primary care, specialty provider) can effectively manage which BH conditions? Is there a need to change policies around which providers can bill for services?</li> </ul>
<b>Patients and Providers</b>	<ul style="list-style-type: none"> <li>■ Where are BH providers located in my area for my treatment and conditions (e.g., suicide ideation, substance use)?</li> <li>■ What BH services and treatment options are available?</li> <li>■ Where are BH providers available for patient referrals?</li> </ul>
<b>Domain: Workforce Characteristics</b>	
<b>PCOR Investigators</b>	<ul style="list-style-type: none"> <li>■ In what ways do BH workforce characteristics (e.g., demographics, credentials, experience) impact patient BH outcomes?</li> <li>■ In what ways do BH workforce characteristics (e.g., occupation, training, certification) affect providers' availability and accessibility to patients (e.g., accepting new patients, wait times)?</li> </ul>
<b>Domain: Care Delivery</b>	
<b>PCOR Investigators</b>	<ul style="list-style-type: none"> <li>■ What types of BH treatments and population groups can be effectively managed by primary care practitioners, and which have better outcomes when managed by BH specialty providers?</li> <li>■ How do practice settings and characteristics associated with clinician burnout influence care delivery?</li> </ul>

Regardless of an end-user's individual purpose for using the database, TEP members emphasized that the pilot database should capture a census of BH providers aligned with an established conceptual model for BH providers. **But there may be some variations to design considerations, depending on database user type, as described below.**

**Variation in included data elements.** TEP members noted that building a BH database that supports PCOR compared to one that supports workforce projections or enables patient and provider understanding of available providers will require different additional data elements. Providers' demographics and practice characteristics and settings (e.g., demographics, languages spoken, credentials, experience, services and treatments delivered) may be more important to users seeking to utilize the database to answer PCOR questions, as well as the inclusion of as many individual-level identifiers as available that can be used to link records across PCOR data sources.

For some policy-oriented uses, the TEP noted that counts and characteristics aggregated by geographic area may be sufficient to answer some policy questions, rather than relying on individual-level data; geographic-level data could still permit projections to be made, if granular geographies are observable. Policymakers may also require fewer provider and practice characteristics than those required for PCOR and CER research questions, although data on (aggregate) provider race/ethnicity, education and training, licensure and certification, care delivery practices, and active/inactive practicing status would be needed to assess the diversity of available providers in a given area. Additionally, information on state policies and statutes could be included to understand practice characteristics. It would also be important to allow policymakers to be able to distinguish the number of in-state and out-of-state licenses, as some providers have multiple licenses and serve patients across states.

To provide an accurate, current list of providers for patients and providers, provider names and locations would need to be made publicly available in a public-facing data format. For this end user group, there is more flexibility for the database to start with a set of basic provider and practice information (e.g., contact information, services provided, occupation) that would be informative for patient and provider decision making and build out the database over time. Data elements that capture care accessibility including new patient acceptance (e.g., new patient visit codes in claims) and whether there is a waitlist for new patients may also be important dimensions to include. One TEP member suggested making the database linkable to sources of provider quality or performance measure data to provide additional information that can support patient decision-making related to choosing providers. Notably, these data elements are subject to frequently change, and routine updates to the data will be necessary.

**Variation in data access restrictions.** To enable PCOR and CER investigators to examine the relationship between BH provider supply or characteristics and patient health outcomes, researchers will not need personal identifying information of providers but will need access to some provider identifiers (e.g. NPI) to be able to link the database to other sources of PCOR data. They will also need access to provider and practice characteristics that can support PCOR research questions of interest (e.g., demographics, languages spoken, credentials, experience, services and treatments delivered). However, patient information derived from claims data would be protected and de-identified to protect patient privacy. The data should be linkable by the provider identifier to other data sources with information on patient outcomes. For policymakers, user access could be limited to deidentified data to protect individual

information. On the other hand, providers and patients seeking information on care in their area would need to be able to access a registry of provider names and contact information.

**Variation in data timeliness.** Depending on end user needs, the database might need to represent one point in time, multiple points in time, or be updated continuously. For policymakers, a time series of providers and practices (that is updated at some predetermined frequency) will be critical for research questions related to workforce supply trends over time. For providers and patients seeking information on the supply of BH care in their geographic area, provider and practice information and characteristics must be current and updated regularly to reflect changing provider availability. In this scenario, database designers could prioritize stable provider elements (e.g., demographics) and include processes to keep less-stable elements (e.g., practice location) up to date. PCOR researchers may need less timely data, but the database should be updated on a somewhat regular basis.

## 4. Discussion

TEP members discussed how developing a comprehensive national BH workforce database presents an opportunity to improve PCOR, CER, and policy decisions that address workforce challenges and patient outcomes. However, they recognized the challenges of developing such a comprehensive database and offered a few pragmatic suggestions for starting an ideal pilot database.

The key contribution of the database will come from it comprising a national census of BH providers that captures the universe of providers that offer BH services (including primary care providers) and not just specialty providers. Given the scale of this endeavor, some TEP members saw the utility of creating a pilot database to collect a census of all BH providers for one or a small set of states and gradually expanding the scope over time. The database should also establish a minimum set of core data elements for individual providers and practices. TEP members agreed that the University of Michigan's MDS offered a starting point for identifying these data elements, and they advocated for including elements related to care delivery, such as insurances accepted and populations served, to provide patient-centric information. Finally, TEP members identified two distinct pathways for building a census of BH providers over time but did not arrive at a recommendation or preference for one approach over the other: **1) augmenting an existing federal data source such as the NPPES, or 2) linking disparate state-based data sources such as state licensure data.** Both pathways, described below, would require combining multiple data sources that will balance the best information available with the cost, accessibility, and long-term viability for use.

### ***4.1 Augmenting Existing Federal Data to Build the Database***

TEP members frequently reiterated the importance of having a federally sponsored and maintained registry of the national BH workforce. **In this top-down approach, database developers would partner with CMS to strengthen ongoing efforts to maintain the NPPES and inform the pending National Directory of Healthcare Providers and Services (NDH) under development by CMS. This approach could still begin with a subset of states to identify gaps in federal data and supplemental data sources needed at a smaller scale before expanding to the national database.**

The NPPES supplies every registered provider with a unique identifier (NPI) that could be used across data systems. All health care providers covered under Health Insurance Portability and Accountability Act (HIPAA) are required to obtain an NPI.<sup>32</sup> BH provider types include both individuals (e.g.,



psychiatrists, clinical psychologists, clinical social workers) and practices (e.g., community mental health centers, psychiatric hospitals or units). The NPPES currently captures point-in-time information on providers' identification, contact information, provider taxonomy codes, state licensure information, and optional demographics (e.g., race, ethnicity, languages spoken).<sup>32</sup>

In addition, CMS has been developing the NDH to serve as a publicly accessible "centralized data hub" of accurate, up-to-date information on all health care providers in the United States.<sup>33</sup> The NDH would leverage interoperable technology and application programming interfaces to streamline and compile provider and payer updates through their own directories. CMS released a request for information in 2022 for stakeholder input on the NDH and is working to execute the directory to meet users' needs.<sup>34</sup> Therefore, the timing of this federal partnership would align well with CMS' mission to work with stakeholders to provide information on the health care workforce.

Due to the standardized data structure, creation of a unique identifier, and public accessibility, the NPPES and future NDH could serve as a foundation to build upon for a more comprehensive BH database. Other databases such as the GWU Behavioral Health Workforce Tracker found that 80% of providers had an NPI to match against other data sources.<sup>18</sup> However, TEP members stated that in its current form, the NPPES would be insufficient for tracking purposes since a) not all BH providers bill for their own services, and b) many providers do not update their records in the system. It is also missing key data elements such as incomplete demographics and whether the provider serves patients in other states.

To further augment the accuracy and comprehensives of this data source, TEP members recommended adding requirements for all providers to update their information every two years and requiring all certified BH provider types to register, including peer support specialists and CHWs. TEP members recognized that this approach may require legislative action that has unforeseen challenges, but database developers could collaborate with CMS to discuss how to overcome barriers to further modifying the NPPES and establishing requirements. Prior databases that have leveraged cross-agency federal partnerships, such as AHRQ-CMS for the 3P-RD database, demonstrated efficiencies in the time, resources, budget, and data support needed to develop the database.<sup>35</sup> In the long term, this approach would not only benefit the proposed database, but all other existing health care databases.

#### ***4.2 Collecting Data from States to Build the Database***

Recognizing the unknown legislative barriers in the federal approach, some TEP members recommended building the database via data collection with states. **In this bottom-up pathway, database developers would begin with state licensure data and supplement with other state or national sources that address data gaps to eventually build a national census. Like the first approach, this approach would begin with a pilot phase with a few select states and expand incrementally over time until the database has comprehensive, national coverage.**

States often collect their own data on the BH workforce. In addition to state-level licensure and certifications, several states maintain some form of BH workforce databases or initiatives to monitor, analyze, and enhance workforce data within the state. These sources often include data elements for provider demographics, licensure details, education and training, specialties and certificates, and practice information; however specific data elements collected can vary by state. Following this feasibility determination, database developers would need to examine individual state data sources to

assess the array of providers included, what data elements exist, and what would need to be supplemented with additional data sources. For instance, TEP members discussed data sources that could potentially resolve limitations with state data, such as state unemployment insurance or individual wage records that could provide longitudinal data on actively practicing providers at the practice level or individual level.

This approach offers a key benefit in that state data could potentially identify more BH provider types than the NPPES as it currently stands, such as certified peer support specialists and licensed professional counselors. However, there are several interoperability and data quality challenges with linking different types of data sources across states. The data captured in state licensing boards would not be standardized across states and could be stored in different ways. Additionally, some states have restrictions on sharing their data, and interjurisdictional compacts make it difficult to know where the provider is practicing if they have a cross-state license. Due to these limitations, this pathway would require federal underpinning to encourage transforming, harmonizing, and standardizing data definitions and elements across states. To enable researchers to analyze the data accurately for cross-state comparisons, transparency of state data sources, including limitations, would be needed.

Furthermore, this pathway would require HHS investment to support data collection for elements of interest to the BH workforce database and developing systems for data sharing. States face significant challenges in maintaining and scaling their health workforce data systems.<sup>20</sup> Resource allocation for data collection is often constrained, with financial and personnel limitations impeding efforts to update licensing paperwork, online systems, and data entry processes, especially when survey participation is voluntary.<sup>36</sup> For licensing agencies in particular, there may be concerns about the value of adding questions for workforce planning, data ownership and confidentiality, and whether the agency has statutory authority to modify licensure forms.<sup>37</sup>

### ***4.3 Considerations for Selection of Pilot States***

As noted, both data development pathways described above will require starting with a subset of states to test on a smaller scale before scaling to a national level. TEP feedback highlighted preliminary considerations for selecting pilot states for participating in the database. First, states with established systems for managing BH data, including dedicated offices, staff, and budgets, are important for the pilot. These organizations' stability and longevity can provide insight into their ability to contribute effectively. Second, database developers should review states' legislative frameworks for data sharing as these may influence their ability to participate and the data they share. For instance, TEP members noted that California collects comprehensive, high-quality data on the BH workforce, yet the state has strict privacy protections for sharing identifiable data. Database developers and state agencies could discuss how to create a plan that describes data ownership, data sharing, and privacy and security protections. Third, during these discussions with state agencies, database developers should inquire about data release policies

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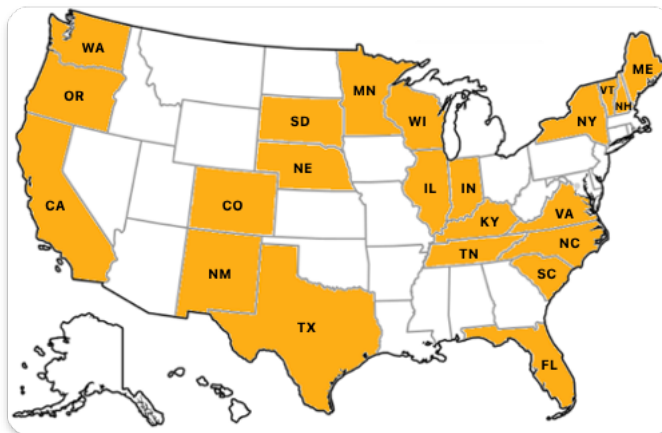
#### **Potential Selection Criteria for Pilot States**

- States with strong BH data infrastructure and systems for collecting and managing BH data.
- State data-sharing agreements on providing access to data and the cost of the data.
- State data release policies for certain data elements to provide researchers with access to the database.
- States that represent geographic variation.

and which data elements they are willing to provide researchers access to for their studies. As an indirect indication of states' willingness to share data, database developers could explore states' websites for what data is already publicly available, such as Tennessee that makes all data publicly available. Finally, database developers should consider including states in the pilot that represent geographic variation, such as urban and rural states, or frontier states. TEP members highlighted South Dakota as a frontier state that does a quarterly survey of BH providers (the Quarterly Access to Services Survey<sup>38</sup>) that focuses on staffing needs and shortages.

**Exhibit 7** shows states that were identified in the environmental scan or recommended by TEP members as meeting one or more of these key considerations. After the pilot phase, database developers can review the state statutes and common data definitions to identify effective practices and potential areas for enhancement. For instance, they can share language for data release policies with other states that express concerns. Once the project can demonstrate success with a few states, they could grow the database to neighboring states until they reach a national census.

**Exhibit 7. Map of Potential Pilot Database States**



#### **4.4 Project Limitations**

The environmental scan excluded peer support workers as BH providers, limiting considerations for this provider type in the database development. Further, we did not explore all potential data sources that could be used to conduct research on the BH workforce and patient outcomes, such as individual state licensure data, EHR data, and graduation data. Additionally, the data sources and databases that we did review varied in the type and level of documentation publicly available. Finally, while TEP members provided invaluable insights as experts in BH and health care workforce, they represent individual perspectives and may not be representative of all experiences that are important for database development and PCOR.

### **5. Conclusion**

The U.S. BH workforce is in a critical state of shortages and distributional challenges. Access to affordable and high-quality care can improve a wide range of BH outcomes, including mental health and substance use disorders. A database dedicated to enumerating and characterizing the supply of BH providers that is linkable to other databases to support PCOR and CER would significantly inform national and state efforts to improve BH workforce planning and access to BH services.

Our environmental scan and TEP discussions revealed a great need and enthusiasm for a comprehensive database on BH providers to conduct PCOR and CER. However, there are several considerations in database planning and development. First, the database design should be informed by its purpose,

targeted group of end users, and research questions it can help to answer. To provide a census on the universe of providers, the database should capture as many provider types as possible that offer BH services, including non-licensed and allied health providers, among others. The TEP identified two potential pathways for developing a pilot BH workforce database: 1) working with CMS to enhance the NPPES to create a federal census of providers, or 2) using a state-based model to incrementally build a national database of BH providers through data collection with individual states. This feasibility project revealed several considerations related to database maintenance and scalability, including data acquisition processes and costs, database hosting and security, and staffing and technical capacity. As interest in the database continues to grow, this feasibility project provides a basis for future federal, state, professional association, and research stakeholders to collaborate on strengthening the BH workforce data infrastructure.

## Appendix A. Environmental Scan Methods

### Exhibit A1. Literature Search Terms

Behavioral Health	Workforce	Data	Gray Literature Searches
"behavioral health" OR "mental health" OR "mental health services/organization and administration"[MeSH] OR "Psychiatry/statistics and numerical data"[MeSH] OR "substance-related disorders"[MeSH]	workforce[MeSH] OR "Health Workforce/statistics and numerical data"[MeSH] OR "Health Services Accessibility"[MeSH] OR ("Health Services Needs and Demand"[MeSH] OR "Health Planning"[MeSH])	database OR dataset OR "data source" OR "Data Collection/methods"[MeSH] OR "Database Management Systems"[MeSH] OR "data infrastructure" OR inventory OR "Databases as Topic"[MeSH] OR "minimum data set" OR registries[MeSH]	<ul style="list-style-type: none"> <li>■ "behavioral health" AND provider state licensure data</li> <li>■ "behavioral health" AND workforce AND "data challenges"</li> </ul>

### Exhibit A2. Gray Literature Sources

Organization Type	Organization Website
<b>Federal Agencies</b>	<ul style="list-style-type: none"> <li>■ Agency for Healthcare Research and Quality (AHRQ)</li> <li>■ U.S. Census</li> <li>■ Centers for Medicare and Medicaid (CMS)</li> <li>■ Department of Labor</li> <li>■ Health Resources and Services Administration (HRSA)</li> <li>■ National Institute for Drug Abuse (NIDA), National Institutes for Health (NIH)</li> <li>■ National Institute for Mental Health (NIMH), NIH</li> <li>■ Substance Abuse and Mental Health Services Administration (SAMHSA)</li> </ul>
<b>State Workforce Agencies</b>	<ul style="list-style-type: none"> <li>■ California Health Care Foundation</li> <li>■ California's Health Workforce Research Data Center</li> <li>■ Illinois Behavioral Health Workforce Center</li> <li>■ Montana Healthcare Workforce Data System</li> <li>■ Nebraska Health Professions Tracking Service</li> <li>■ Virginia Behavioral Health Workforce Data Center</li> </ul>
<b>BH Workforce Research Centers</b>	<ul style="list-style-type: none"> <li>■ Fitzhugh Mullan Institute for Health Workforce Equity at George Washington University</li> <li>■ Health Workforce Technical Assistance Center</li> <li>■ Rural Behavioral Health Workforce Center</li> <li>■ National Academy for State Health Policy</li> <li>■ University of Michigan</li> <li>■ University of North Carolina</li> <li>■ University of North Dakota Center for Rural Health</li> </ul>
<b>Professional Associations</b>	<ul style="list-style-type: none"> <li>■ American Medical Association (AMA)</li> <li>■ American Psychological Association (APA)</li> <li>■ National Association of Social Workers (NASW)</li> </ul>

**Exhibit A3. Literature Search Inclusion and Exclusion Criteria**

Category	Inclusion Criteria	Exclusion Criteria
<b>Publication Year</b>	2019-present*	Before 2019*
<b>Document Type</b>	<p><b>Peer-reviewed journal articles:</b> Theoretical articles, primary and secondary data analyses, scoping review, meta-analyses/systematic reviews</p> <p><b>Gray literature:</b> Reports, working papers, evaluation studies, white papers, conference proceedings, presentations, case studies, fact sheets, issue briefs, and government documents</p>	<b>Gray literature:</b> Opinion pieces
<b>Language</b>	English	Non-English
<b>Source</b>	Academic, expert, evaluator	News outlet
<b>Population</b>	U.S.-based BH providers, including physicians (e.g., psychiatrists, primary care physicians, pediatricians, and gerontologists), psychologists, social workers, mental health counselors, physician associates/assistants, and advanced practice registered nurses	BH providers not based in the U.S.; peer support specialists
<b>Focus</b>	Development of databases capturing BH provider and practice characteristics	No discussion of database examples, development or considerations

## Appendix B. Prior Health Workforce Databases

### Exhibit B1. Existing Databases Capturing the BH Workforce

Agency/Organization	Database Name	Purpose	Data Sources
<b>National-Level BH Provider Databases</b>			
The George Washington University	Behavioral Health Workforce Tracker	This is a customizable interactive map that allows you to visualize the geographic distribution of the BH workforce by provider type and by Medicaid acceptance status.	State licensure data; proprietary claims data using novel algorithms to identify providers who prescribe BH medications
University of Michigan	UM Behavioral Health Workforce Center: Scopes of Practice for Behavioral Health Professionals	This data visualization tool is for exploring the state-by-state characteristics of the BH workforce, focusing on scopes of practice. The interactive tool enables exploration of requirements by state to earn credentials and which services a provider is authorized to perform.	Online statutes and administrative codes about credentialing requirements
<b>State-Level BH Provider Databases</b>			
University of Nebraska Medical Center	Nebraska Health Professions Tracking Service (HPTS)	Survey conducted annually among actively practicing health professionals.	State licensure data used to identify sample
Illinois Behavioral Health Workforce Center	Illinois BH Workforce Dashboard	Dashboard with BH workforce data for each county in Illinois.	Includes: Professional Licensing from Illinois Department of Financial and Professional Regulation; Area Health Resource files - 2021-2022 County Level Data (Health Resources & Services Administration); Illinois Population Data. Illinois Department of Public Health, Vital Statistics; Illinois Department of Children and Family Services Illinois; Illinois Alcohol and Other Drug Abuse Professional Certification Association, Inc.
State of California	California Department of Health Care Access and Information (HCAI)	The Research Data Center provides data and analysis regarding issues of workforce shortage, equity, and distribution in order to inform state policy.	All health professional licensing boards in California are required to collect core data about the health workforce they oversee and provide this data to HCAI for analysis.

Agency/Organization	Database Name	Purpose	Data Sources
Bowen Center for Health Workforce Research & Policy, Indiana University School of Medicine	Indiana Behavioral Health and Human Services Workforce Dashboards	Indiana BHHS Professionals renew their BHHS license every two years under the Indiana Behavioral Health Board. At that time, they provide information on their professional characteristics. This information informs the interactive Tableau dashboards.	Indiana Professional Licensing Agency
MCD Global Health	Rural Behavioral Health Workforce Center: Maine, New Hampshire, and Vermont	Monitoring and surveilling BH workforce to increase and sustain Maine's BH workforce through partnerships across the health care spectrum, via mentorship and evidence-based training programs, and by addressing barriers to Maine's rural workforce.	Surveys
<b>General Provider Federal Databases</b>			
Agency for Healthcare Research and Quality (AHRQ)	Physician and Physician Practice Research Database (3P-RD)	Captures characteristics of physicians and physician practices in 13 states. The database describes the supply of physician services available across selected states for data year 2019-2020. AHRQ created 3P-RD as a resource to address existing data gaps in physician health services information at the state and market levels.	Core data files include the state medical board (SMB) licensure data, National Plan & Provider Enumeration System (NPPES) and the Medicare Provider Enrollment Chain, and Ownership System (PECOS). CMS claims data and state all-payer claims database supplement the core files.
Agency for Healthcare Research and Quality (AHRQ)	Healthcare Cost and Utilization Project (HCUP) databases	A family of health care databases and related software tools developed through a federal-state-industry partnership to build a multistate health data system for health care research and decision making. The National (Nationwide) Inpatient Sample (NIS), a component of HCUP, is the largest all-payer inpatient care database that is publicly available in the U.S.	Contains administrative data from approximately 8 million hospital stays from roughly 4,500 hospitals.



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