# Bed Tracking Systems: Do They Help Address Challenges in Finding Available Inpatient Beds?

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**Objective:** Locating open beds in hospital and residential mental health and substance use disorder treatment settings has been an ongoing challenge in the United States. The inability to find open beds has contributed to long emergency department wait times and missed opportunities to engage patients in treatment. Increasingly, states are creating online bed tracking systems to improve access to timely information about bed availability. This study aimed to document how states are implementing bed tracking systems, their successes and challenges, and lessons learned.

**Methods:** A review was conducted of the published and gray literature available between 2008 and 2018, and 13 interviews were conducted with 18 stakeholders in five states (Connecticut, Iowa, Kansas, Massachusetts, and Virginia).

**Results:** The authors identified 17 states with bed tracking systems, of which five make information available to consumers. Most interviewees reported that the bed tracking systems were improving the ability of providers and consumers to more readily locate openings. Challenges identified included that some hospitals will not participate in bed registries, data on bed availability is sometimes not timely enough, bed registries do not provide enough detail on whether the facility is capable of meeting a particular patient's needs, providers have not been coached to use the bed registry system and continue existing practices, and states that provide information to the public have not publicized the registry's existence.

**Conclusions:** Bed tracking systems offer promise, but more needs to be done to understand how to realize their potential and to more widely implement lessons learned.

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In the United States, inpatient hospital and residential settings for the treatment of mental and substance use disorders are considered an essential component of the behavioral health services care continuum (1, 2). Patients may require an inpatient stay when they experience a psychiatric or substance use disorder emergency, pose a threat to themselves or others, need 24-hour medical monitoring and treatment, or need a 24-hour controlled environment to assist with addiction treatment (3). Because the psychiatric hospital bed supply has declined over the years, finding an available bed has become more difficult, leading to longer wait times in emergency departments (4–7).

When a patient with a mental or substance use disorder presents at an emergency room and needs to be admitted, hospital emergency department staff will typically call inpatient providers until an appropriate opening is found. To improve clinicians' ability to identify inpatient openings more efficiently, some states are collecting and publishing online information on bed availability, creating "bed registries," "service registries," "bed tracking systems," "bed boards," and "open-beds systems." In addition to helping providers, these systems may also help consumers and their families find available and appropriate treatment more readily. Although bed tracking tools are intended to improve access to treatment, there is little research on these tools. This study addressed this research gap. In this article, we describe the number, design, and function of state bed registries and the challenges to realizing their potential, and we

**HIGHLIGHTS**

- With support from federal grants, states are increasingly implementing bed tracking systems to help match patients in need of inpatient treatment to available hospital and residential beds.
- State officials, consumers, and providers reported that bed tracking systems are helpful in identifying open beds.
- Challenges remain in expanding the adoption and usefulness of these systems, including the reluctance of some providers to enter information on open beds and to use the system.

present empirical evidence on their effect on access to services.

## METHODS

We conducted an environmental scan consisting of a search of state registries, a review of the academic and gray literature, and stakeholder interviews. We began the scan by conducting a Google search to determine which states had inpatient bed tracking systems and the characteristics of these systems, such as the types of services captured and whether the registry is available to the public. We also drew on a 2017 state-level survey conducted by the National Association of State Mental Health Program Directors Research Institute, Inc. (NRI) on the status of psychiatric inpatient bed tracking systems (8).

We then searched peer-reviewed and gray literature with the key words and a snowball approach, using PubMed, Science Direct, PsycINFO, International Pharmaceutical Abstracts, JSTOR, Web of Science, and Google Scholar. Only articles published in English between January 1, 2008, and August 1, 2018, that focused on inpatient or residential registries were included. We also searched the Web sites of organizations that may have published on the topic, including the National Alliance on Mental Illness, National Association of State Mental Health Program Directors, and Facing Addiction, along with federal government Web sites. Three analysts (SM, TM, and JH) reviewed each publication's title and abstract to determine the publication's appropriateness for inclusion in the full review, including year of publication, publication type, population of focus, study methods, and overall relevancy. All articles recommended for inclusion were assigned to one of the authors (SM, TM, and JH) for more thorough review and content extraction.

Findings from the bed registry search and literature review informed the selection of states from which to recruit stakeholder interview participants. We selected states with fully functioning systems in operation for at least 2 years. We included a combination of states that made the bed registry available to both consumers and providers as well as those that did not. We also included a combination of states that had bed registries for substance use disorder settings as well as mental health settings. We identified Connecticut, Iowa, Kansas, Massachusetts, and Virginia as states that could provide insight into the methods and challenges of implementing the bed registries and into their impact.

Over a 2-month period during the summer of 2018, we conducted 13 30- to 60-minute semistructured, key-informant interviews with 18 participants representing 13 organizations and agencies to learn how the registries function, their perceived impact, and challenges encountered. In addition to identifying potential participants through our review of state registries and the literature, we requested recommendations for additional participants from our project officer (LF) from the Office of the Assistant Secretary for Planning and Evaluation and other interview participants. Interview participants selected represented the following agencies or organizations: state departments or agencies responsible for implementing or overseeing the inpatient bed registry, community behavioral health providers that may use the registry to find beds for clients, hospitals that submit information on available behavioral health beds, and patient advocacy groups that represent consumers and families who may use the bed registry systems. The interviews were transcribed and qualitatively analyzed.

## RESULTS

### Which States Have Systems and How Is Information Shared?

We identified 17 states with bed tracking systems, of which five provide direct public access to bed tracking information: Alaska, Connecticut, Kansas, Massachusetts, and Tennessee. In Connecticut, the information available for direct public access pertains only to open beds in inpatient substance use treatment settings. In Alaska, Kansas, and Tennessee, information on open beds in both substance use and mental health treatment settings is available for direct public access (Table 1). The hospital bed registry in Massachusetts is not open to the public, although information on bed openings in nonhospital behavioral health settings is publicly available.

### How Do Bed Registries Work?

The basic functioning of existing bed registries is the same: providers enter information on bed availability on a routine basis into a cloud-based database through a Web-based portal. The information is posted on a Web site either open to the public or behind a firewall available to users with a login. Providers select staff members within the organization to be responsible for entering information on bed availability. In an acute care hospital, it could be an administrative professional or a charge nurse. In psychiatric hospitals, utilization managers, case managers, or social workers may be responsible for updating bed availability. No state currently has a registry linked to electronic health records systems or hospital admission/discharge data systems that automatically update bed availability.

### How Do States Develop and Finance Bed Registries?

Some states created their own bed registries, and others worked with their Medicaid managed care organizations or contracted with outside vendors. Tennessee reported that it costs about $60,000 annually to maintain its system. Iowa's bed registry, which went live in 2015, cost $150,000 to establish. Iowa is sustaining the registry with funds from the Substance Abuse and Mental Health Services Administration (SAMHSA) Mental Health Block Grant. Connecticut built its substance use disorder bed registry with federal grant dollars from the SAMHSA State Targeted Response to the Opioid Crisis Grants program. It cost $25,000 to establish, and the state pays a small monthly hosting fee. Virginia

**TABLE 1. Characteristics of behavioral health bed registries in the United States, by state**

| State | Types of beds or services included | Open to public | URL |
|---|---|---|---|
| Alaska | Psychiatric inpatient beds, crisis beds, crisis residential beds for children and youths | Yes | http://bedcount.dhss.alaska.gov/BedCount/statewide.aspx?ProgramType=PICE |
| Connecticut | Beds in substance use facilities, including withdrawal management and recovery housing; public and private psychiatric beds (separate from the substance use Web site). | Partial[a] | Substance use treatment facilities: http://www.ctaddictionservices.com; mental health treatment facilities: http://www.ctbhp.com/providers/bulletins/2018/PB2018-03-ii.pdf |
| Georgia | Psychiatric beds funded by the state | No[b] | |
| Iowa | Inpatient psychiatric beds | No | https://iowa.carematchweb.com/csp/idhs/scrlogon.csp |
| Kansas | Inpatient psychiatric beds, "sobering beds," crisis stabilization beds, social detox beds, children's residential crisis beds, beds in intermediate substance use disorder facilities | Yes | http://bedcount.kansashealthsolutions.org |
| Massachusetts | Youth and family services, mental health services, substance use disorder services | Yes[c] | https://www.mabhaccess.com |
| Minnesota | Psychiatric beds and community-based (outpatient) mental health services | No | https://www.mnmhaccess.com |
| Missouri | Psychiatric beds | No | https://web.mhanet.com/emresource.aspx |
| Nevada[d] | | No | |
| North Carolina | Community hospital psychiatric inpatient beds; private psychiatric hospital beds; state psychiatric hospital beds; beds in state alcohol and drug abuse treatment centers; beds in facility-based crisis centers; beds in nonhospital medical detoxification facilities | No | https://www.ncdhhs.gov/bh-crsys |
| Oklahoma[d] | | No | https://www.ok.gov/health2/documents/TRAU_EMR-ResourceListcollapsed.pdf |
| Pennsylvania | Beds in licensed nonhospital detoxification facilities and in inpatient residential substance use treatment facilities | No | https://www.ddap.pa.gov/treatment/Pages/Open-Beds.aspx |
| Tennessee | Psychiatric beds, drug and alcohol treatment beds | Yes | https://healthwebaccess.tn.gov/idashboards/html5/?guestuser=guest&dashID=425&c=0 |
| Vermont | Adult inpatient beds, crisis beds, beds in substance use disorder recovery programs, intensive residential beds, residential beds, children's inpatient and crisis beds | No | https://bedboard.vermont.gov |
| Virginia | State-operated psychiatric hospital beds; beds in privately operated inpatient psychiatric units; beds in residential crisis stabilization programs. | No | https://vabedregistry.turanto.com/login?returnUrl=%2Fhome |
| Washington[d] | | No | |
| Wisconsin | Inpatient psychiatric beds | No | http://bedlocator.whainfocenter.com |

[a] Information available for direct public access pertains only to open beds in inpatient substance use treatment settings.
[b] System does not post openings to an online portal or Web site; instead, information is available only to crisis call line staff, who can see availability at all facilities, down to the individual-bed level. Providers call the crisis line to find availability.
[c] Information on some 24-hour services is not publicly available.
[d] Identified in the 2017 state-level survey conducted by the National Association of State Mental Health Program Directors Research Institute, Inc., but no information about the Web site could be found online.

funded a part-time staff position to support its bed registry; the state legislature allocates $25,000 to the Department of Health every year for its maintenance.

### How Frequently Is Information on Open Beds Updated?

Hospitals and residential treatment providers reported updating information on bed availability between once and three times a day. In some states, such as Virginia, the required frequency of updating is written into legislation, and in other states, like Massachusetts, it is written into Medicaid managed care performance contracts.

### What Impact Has Bed Tracking Had on Access?

We were unable to identify any published evaluations of bed tracking systems. However, the interviewed stakeholders felt that the bed registries were having a positive impact on access to mental health and substance use treatment. For example, Massachusetts state government leaders believe that the bed registry has improved access to psychiatric beds

and has helped reduce emergency department wait times. They reported that hospitals are routinely entering information on open beds and that emergency department staff are using the information to locate available beds. State leaders also leveraged the data collected through the bed registry to determine the need for more psychiatric beds and to convince hospitals to open five new psychiatric inpatient units. Consumer representatives interviewed in Massachusetts reported that the public-facing community behavioral health services registry was helping consumers locate services, particularly mental health services for children. Connecticut interviewees also noted positive results from the state's substance use disorder bed registry, saying that it was helping patients and peer navigators locate bed openings in substance use disorder programs.

## What Are the Limitations and Challenges of Current Bed Registries?

Implementing registry systems and realizing their potential benefits have not been without challenges. The following limitations were mentioned: some hospitals will not participate in bed registries; data on bed availability is sometimes not timely enough; bed registries do not provide enough detail on whether the facility is capable of meeting a particular patient's needs; providers have not been coached to use the bed registry system and continue existing practices; most states do not provide information to the public, and states that do provide information to the public have not publicized the existence of the registry. We describe each of these limitations and some identified solutions in more detail below.

*Hospital limitations.* In 2018, NRI conducted semistructured interviews with representatives from nine states to learn about their experiences with operating psychiatric bed registries. A key finding from those interviews was that persuading hospitals to provide information about bed availability was a major challenge (8). NRI surmised that hospitals may believe that revealing bed occupancy limits their ability to control which patients are admitted and that the bed registry may override the hospital's diversion status or that emergency medical services might see out-of-date information and might not realize that the hospital was on diversion (i.e., full and not accepting patients). In a 2015 journal article, Maryland officials detailed their experiences in a failed effort to implement a statewide inpatient psychiatric bed tracking system (9). They found that some hospitals feared that the registry would be used to monitor hospitals' compliance with the 1986 Emergency Medical Treatment and Labor Act and that the data would be used to transition inpatient care from state psychiatric facilities into community hospitals. In contrast to hospitals, substance use disorder providers appeared to be willing to enter timely information on their open beds. Interviewees in Connecticut reported that substance use providers view the state's bed registry as "free-marketing, that's driving business and filling beds that maybe wouldn't be used."

*Timeliness of information.* Given short hospital stays, hospitals must update the registries at regular intervals throughout the day and dedicate specific staff to conduct this task in order for the information on openings to be accurate. Some interviewees reported that although the staff logged the availability of beds each morning, the data quickly became out of date, and staff did not always have the opportunity to update it throughout the day. In a 2016 review, the Virginia Office of Inspector General concluded that the state's registry updates were not always in accordance with the frequency requirements and recommended that the Department of Behavioral Health develop a system for monitoring providers' procedures for updating the registry whenever a change in bed availability occurred and develop processes for addressing noncompliance (10). The office also recommended that the Department of Behavioral Health analyze the performance of the system and disseminate findings to providers to raise the visibility of the problem.

Some states use financial incentives to promote timeliness. For example, Connecticut's hospital bed registry, administered by Beacon Health Options, is trying to ensure timely updates by offering an expedited prior authorization process if a hospital enters information on open beds. Iowa noted that the legislation that created its bed tracking system indicated that providers' Medicaid reimbursement could be affected if hospitals did not enter information at least twice a day. Massachusetts included timely updates as a performance metric in its Medicaid managed care contracts.

Some states are monitoring the frequency of data entry and contacting providers not in compliance with the frequency guidelines. For example, Beacon Health Options tracks which hospitals are entering information and troubleshoots with hospitals that are not providing timely updates. Similarly, Iowa and Connecticut track participation and contact providers that are not updating regularly.

*Insufficient information about ability to meet patients' needs.* Providers reported that even when bed registries exist, they call the facility to determine whether the available bed would be appropriate given the patient's clinical needs. Some states reported that emergency room staff would prefer for the "bed registry to be a portal where the emergency services clinician could say, 'I have a 40-year-old female with these diagnoses and symptoms, and would you be able to accept her?' " They noted that although the bed registry can provide a place to start to look for an open bed, it can still be difficult to locate beds for patients with complex needs, such as those who exhibit violence or aggression; have co-occurring medical conditions; or have autism, intellectual disabilities, or dementia. This problem may be exacerbated in states with large rural populations and small critical access hospitals that are not equipped to treat patients with complex conditions. However, Massachusetts reported that the bed registry highlighted a need for more beds for particular patient populations and led to the expansion of beds for those patients.

*Providers have not been coached to use the registry system.* Some interviewees pointed out that emergency department staff should be trained to use the bed registry system. One interviewee noted that, "One of the things we are up against is 40 or 50 years of already established behavior, where the emergency department has . . . a lovely laminated list where for the last 40 years . . . they pick up the list and start dialing the phone [number]." Some interviewees also noted that established relationships among referring and accepting providers were critical. Other interviewees observed that the more collaborative the local community relationships are, the less the utility of the bed registry. Some interviewees felt that to be optimally useful, the bed registry not only should indicate when a bed is available but also make it possible to reserve the bed.

*Lack of consumer awareness.* Consumers and providers who were interviewed told us that states could do more to publicize bed registries that were open to the public. They suggested that states conduct advertising campaigns and partner with advocacy organizations to enhance awareness of the bed registries. Interviewees believed that consumers should have access to information on openings across the full continuum of behavioral health services, not only residential or hospital beds. Among individuals with opioid use disorder, information on which clinicians with buprenorphine waivers are accepting new patients could be particularly helpful. Information on openings in outpatient settings could also help hospitals and residential programs find programs to transfer patients to when discharged.

## DISCUSSION

States are increasingly adopting bed tracking programs, and the federal government is providing greater funding to support these efforts. For example, for fiscal year 2019, SAMHSA is offering grants of up to $150,000 to up to 20 states or territories to establish or expand psychiatric bed registry programs. Through comprehensive searching of the literature and Web sites, we identified 17 states with bed tracking systems, five of which had public-facing systems. We may have missed some state programs that were behind firewalls and for which no public-facing information exists. In general, stakeholders interviewed thought that bed tracking systems helped them to more readily identify open beds. However, we were unable to find any empirical studies that conclusively validated these perceptions. As the number of these systems continues to increase, additional detailed examination of the use, utility, and impact of these systems will be imperative to ensure that they are yielding the intended outcomes and that they are refined accordingly.

## CONCLUSIONS

Providing an optimal number of hospital and residential beds to meet the needs of a community, given limited resources, is an ongoing challenge. The problem is exacerbated by the fact that demand fluctuates in unpredictable ways, which can lead to an oversupply of beds to accommodate peak periods or long wait times to avoid low occupancy rates. Creating transparency across the system about which facilities have openings seems like a common-sense approach to addressing this problem. However, challenges remain in encouraging provider participation in these systems, ensuring timely and useful data entry, and facilitating consumer awareness of the information. For bed tracking systems to be effective, states, health plans, providers, and consumers must have appropriate incentives aligned and reinforced, which is still a work in progress—particularly given the fragmented nature of the U.S. behavioral health care delivery and financing system. Moreover, bed registries cannot in themselves solve the problem of a lack of beds or of outpatient services, both nationally and in particular regions, such as low-resourced and rural areas. Finally, the appropriate role of inpatient care has been a contentious issue in the United States for decades and continues to be debated and evaluated (11).

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