

# The Psychiatric Bed Crisis in the US:

Understanding the Problem and Moving Toward Solutions



Medical leadership for mind, brain and body.

May 2022

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## Executive Summary

Mental health systems optimally include a care continuum to meet people's needs in the most accessible, least restrictive environment. In broad perspectives, this continuum includes a range of services such as crisis services, accessible outpatient services, rehabilitation and recovery support services and inpatient psychiatric care. Access to inpatient psychiatric beds undergirds local mental health systems, providing essential services to help treat adults or young people who are experiencing mental illness, just like inpatient medical hospitalization serves the most acutely ill.

However, the number of psychiatric beds across private and public sectors has fluctuated and dropped significantly in the past 60 years. Today, amidst a mental health crisis, communities have no effective means to assess how many beds they need to meet demand in their population. When demand is not met, people in need of mental health care often approach the emergency department. Too often, psychiatric inpatient beds are not available when needed. As a result, people with mental illnesses end up boarding in emergency departments or being discharged prematurely. In worst-case scenarios, inaccessible treatment results in homelessness or involvement with the criminal justice system.

The American Psychiatric Association (APA) Presidential Task Force on Assessment of Psychiatric Bed Needs in the United States was created in 2020 by then APA President Jeffrey Geller, M.D., M.P.H. and was led by APA Past President Anita Everett, M.D. The Task Force members included APA leaders, other mental health professionals, experts in child and adolescent psychiatry, and decision-analytic modelers. It was charged with reviewing the historical and current context of access to inpatient psychiatric care and undertook an effort to research and assess the current capacity of outpatient and inpatient psychiatric care in the U.S. The ensuing report is separated into seven sections assessing this problem and proposing a new model for estimating the needs within a community. Those sections are:

### Historic and Contemporary Use of Psychiatric Beds

This section tracks the rise of psychiatric inpatient treatment in the United States, from the early days of family care and Dorothea Dix's efforts to grow the system, through its peak in 1955 at more than 500,000 beds (Bockoven, 1972). Due to federal policy changes, the development of antipsychotic drugs, and the rise of managed care, among other factors, that trend turned downward, and between 1970 and 2014, the resident population in state psychiatric hospitals declined from about 370,000 to 40,000 and stays grew shorter. The population within those settings was much broader than what we think of as an inpatient psychiatric hospital patient today—they served individuals with medical conditions, older adults with neurocognitive conditions, and persons with disabilities, to name a few. In addition, the emergence of the acute psychiatric bed system and managed care spawned the development of short length-of-stay inpatient units. Today, psychiatric inpatient care is complex and encompasses many factors that reflect a struggle to provide compassionate care with diminishing resources and within time frames that are often too short to evaluate treatment response or facilitate meaningful recovery.

### **Definitions of Psychiatric Beds**

An inpatient psychiatric hospital bed is a bed where an individual with mental illness receives psychiatrically supervised care 24/7, primarily for symptoms of psychiatric illness with ancillary supports for co-occurring medical conditions. This section explores the different settings offering inpatient psychiatric beds and some sub-populations using them.

### **Financing of Psychiatric Beds**

While overall spending on mental health treatment has steadily increased, the percentage of mental health care spending on inpatient care shifted from 42% in 1986 to 27% in 2014 (SAMHSA, 2016) as more and more services were provided in community settings. That spending comes from a variety of sources, including Medicaid, Medicare, private health insurance and managed behavioral health care, state systems, funding for psychiatric care in correctional systems, and child and adolescent care funding. However, there are numerous barriers to inpatient care associated with current financing systems. These barriers often result in delayed care, patients not being admitted, or patients being discharged prematurely. This section reviews these barriers, offers policy recommendations, and highlights the potential opportunity for integrating psychiatric and primary medical care to reduce the costs and burden of comorbid disease.

### **Population Variables Affecting Use of Psychiatric Beds**

Many barriers decrease access to psychiatric beds across populations, such as stigma, mental health workforce shortages, limited local resources, and insurance payor type. This section explores these barriers as well as those affecting specific sub-populations, including older adults, LGBTQ+ patients, veterans and their families, active service military, foreign-born patients, children and families, patients with substance use disorders, patients involved with the criminal justice system, and patients with comorbid general medical illness.

### **Community System Contributors and Variables Impacting Hospital Bed Use**

This section examines services and resources in community systems associated with hospital level of care. It focuses on data-supported interventions related to the entry and exit points of hospital-level care and delineates community system factors that could *increase, decrease, or have variable impact* on the need for psychiatric beds.

### **Creating Models for Estimating the Number of Needed Psychiatric Beds**

The Task Force worked on developing models for adults and for children/adolescents that might be used by communities and states to help estimate the number of beds necessary to meet the need for inpatient psychiatric care. Descriptions of the current draft of the models are available within this report. This section includes a description of the motivating question (i.e., how many beds are needed?); a discussion around why this is a complex question; an overview of the modeling approach, structure and inputs; an illustration of the model dashboard; and results for the adult model developed for a hypothetical “Anytown, U.S.”

### Child and Adolescent Psychiatric Beds

The number of children with severe and acute mental health needs is beyond current treatment capacities. Psychiatric hospitalization for children and adolescents is part of a continuum that optimally includes crisis stabilization beds, respite beds, outpatient and intensive outpatient services, partial hospitalization programs, care management and coordination, school and community-based mental health programs, and access to community supports for patients, caretakers, and families. This section discusses the needs, services and resources for children and adolescents, often varying from those of adults. The section also reviews existing standards and guidelines for inpatient child and adolescent psychiatric care and standards for determining the appropriate intensity of care.

At the heart of the Task Force's efforts was a commitment to principles of recovery, including individual empowerment and person-centered services. The success of any comprehensive continuum of mental health care relies on optimized capacity of and access to inpatient psychiatric care. This report provides background, context, and a proposed model to help policymakers decide on appropriate resource allocation in support of that goal.

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## Introduction

It's a seemingly simple question: how many inpatient psychiatric hospital beds do we need to meet the treatment needs of individuals with mental illnesses? Surely if we understand basic demand, a simple calculation will identify the supply of beds that would meet that demand nationally or for a state or a locality. A long-standing ratio has been to refer to need as the number of beds that would be needed to meet treatment needs per one hundred thousand people in a population. In a 2016 report from the Treatment Advocacy Center, the number of state-operated psychiatric hospital beds in the U.S. was reported to have been at a high of 337 per hundred thousand people in the mid-1950s and is now about 11.7 state psychiatric hospital beds per hundred thousand people (Fuller, et al., 2016). The need for beds can be understood by an exploration of both the services available and the need, or supply and demand. These factors both for children and adults are key components to developing a model for estimating the ideal number of beds in a community.

In terms of demand, there have not been dramatic changes in the prevalence of mental illnesses themselves. There have, however, been changes in the awareness of mental illnesses and with the advent of shorter stay community hospitals, perhaps an expansion in the array of situations wherein an individual might seek admission. Whereas throughout the 1970s and 1980s, the number of beds continued to shrink, the use of beds changed such that in many states the state hospital was used for very long stays (years and decades length of stay). In contrast, community-based hospitals often had lengths of stay of 30 to 90 days. Managed care impacted these weeks-long stays such that now a universal expectation for admission into most community hospitals is for a 5-10-day length of stay.

Regarding the supply side, there have been dramatic changes over the last 70 years in terms of both the development of community psychiatric hospital beds that are not state-operated beds and the development of outpatient community treatment and recovery support programs that mitigate the need for beds. There are currently several service models for outpatient care that effectively promote stable illness management and recovery and reduce the need for acute inpatient admission. Unfortunately, a central problem in the U.S. system is the wide variability in types and capacity of available community-based services. Some communities provide reasonable access to effective treatment and recovery support services which is effective in reducing the need for inpatient care. Other communities and states have very limited and difficult-to-access community-based outpatient services. Another significant factor in the supply and demand of inpatient psychiatric beds has been the increasing interface of individuals with mental illness with the criminal justice system which results in far too many individuals being arrested and incarcerated rather than treated or admitted to a hospital. In the U.S., a staggering 28% to 52% of people with a serious mental illness have been arrested at least once (Sirotych, 2009).

In 2020, an APA Presidential Task Force was established by then-President Jeffrey Geller M.D., M.P.H. and chaired by Past President Anita Everett M.D. The Task Force members included APA leaders, other mental health professionals, experts in child and adolescent psychiatry, and modeling technique



specialists. It was charged with reviewing the historical and current context of access to inpatient psychiatric care and to undertaking an effort to research, assess, and develop recommendations regarding the capacity of outpatient and inpatient psychiatric care in the U.S. This document represents the work of that Task Force. It is separated into seven sections addressing this problem and proposing a new model for calculating the needs within a community. Those sections include historical context, definitions, financing, population factors and special populations, community factors, children and adolescents, and development of the model concept.

A special innovation of this work has been working with individuals with experience in the development and use of simulation modeling as a tool to predict demand, capacity and cueing in a process with a multiplicity of options. This is the case with the array of community treatment services that could mitigate the need for admission to a psychiatric bed. Model development and refinement is ongoing at the time of this report, and the current report includes information on the development and status of the predictive model.

At the time of publication of this report, we are emerging from the COVID-19 pandemic, which has contributed to mental illnesses, such as anxiety, depression, PTSD and substance use, increasing in the U.S. and around the world. Access to treatment is “wanting” for lack of funding for care and the facilities for hospital care when needed. Early in the COVID-19 era some inpatient psychiatric wards were used for COVID-19 patients thus further reducing the available capacity for psychiatric beds. In his 2022 State of the Union Address, President Biden announced a clear focus on supporting our nation’s mental health through increasing the capacity of services, connecting more people to care, and attending to an environment that supports health and mental health. Access to psychiatric beds is a critical part of the equation.

This research report includes the work of several subgroups of the Task Force. It also presents an innovative predictive modeling tool that could ultimately be used to help communities throughout the U.S. determine the number of beds and other services required to assure that the needs of adults and children with mental illnesses are met. Despite the passage of national parity laws, individuals with mental illnesses continue to lack sufficient, effective, quality treatment in a healthcare system that is not on par with our general healthcare system. This work provides a critical component to inform services capacity development.

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**Section 1:**

Historic & Contemporary  
Uses of Psychiatric Beds





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## A. Early U.S. History

Early in U.S. history, responsibility for the care of people with severe mental disorders fell to families and local communities who did whatever they could to provide assistance and sustenance (Grob 1994). People whose needs exceeded the capacity of their families or neighbors to care for them were often housed in poorhouses or jails that were typically financed and managed by local governments. Little or no distinction was made in the confinement and custodial care of people with different types of dependence whether related to severe mental illness, poverty, dementia, disability or old age. The term *social dependent* was commonly used to describe the array of residents in these settings.

During the nineteenth century, Dorothea Dix (1802-1887) was the nation's leading advocate and reformer working to improve care for people with severe mental illnesses. She visited jails and poorhouses where she documented the prevailing abject conditions. By midcentury, she had generated significant public support. She is credited with establishing 32 state asylums throughout the country.

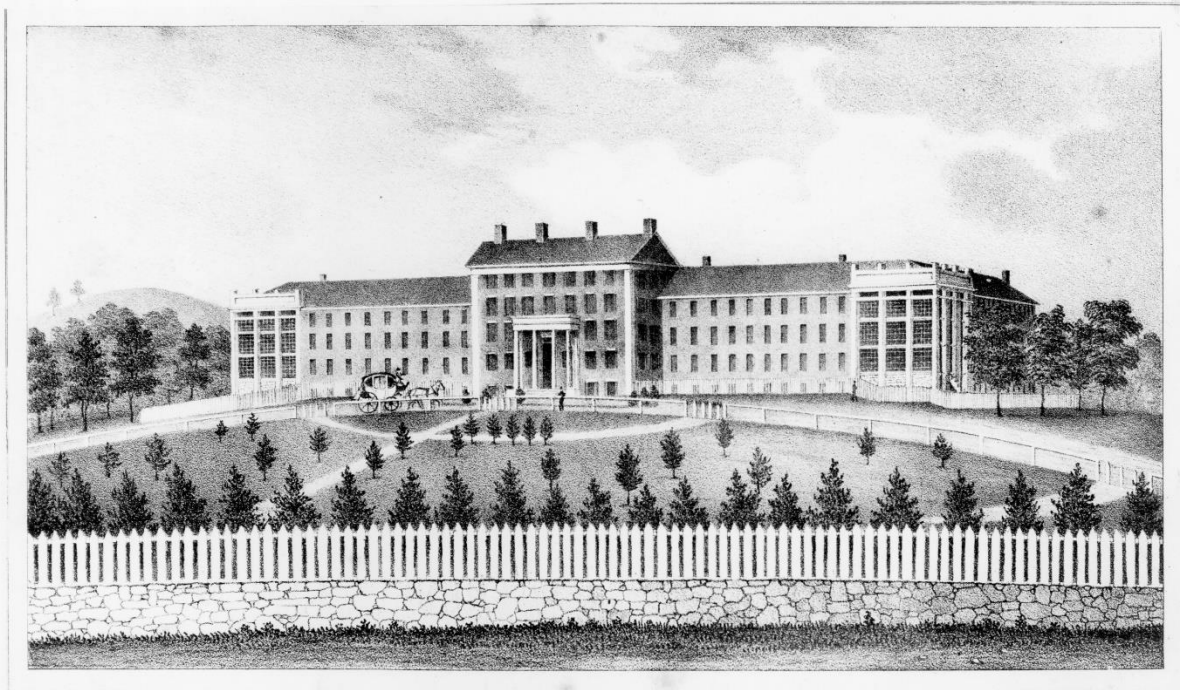
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***By 1890, every state had established one or more public institutions for the care of people with severe mental illnesses (Ozarin, 2006).***

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In the early decades of the nineteenth century, when hospitals were small, “moral treatment”—care that was kind and compassionate—prevailed. Patients were treated with respect in environments that emphasized social interactions and the cultivation of their skills and interests (Mechanic, 2014). However, moral treatment required intensive clinician involvement with extensive staffing and proved difficult to maintain as service demands increased. To accommodate rising numbers of older patients with dementia, general paresis, and other neurodegenerative conditions, smaller facilities gave way to larger, crowded custodial institutions leading to a marked deterioration in the quality of care.

From the 1860s through the 1930s, the census of inpatient facilities dramatically increased, and many facilities expanded or formed new regional hospital systems. Southern states addressed overcrowding in part by establishing segregated state hospitals for Black patients and moved Black patients from the state's other institutions into them, transforming hospitals into white-only facilities. In Louisiana and Texas, the white-only facilities became overcrowded, and whites were admitted to the Black facilities, thereby “integrating” Black state hospitals.



T. Moore's Lithography, Boston (successor to Pennington.)

STATE LUNATIC HOSPITAL, WORCESTER, MASSACHUSETTS.

State Lunatic Hospital. Worcester, Mass. (National Library of Medicine)

In the nineteenth century, children and adolescents who could not be managed by their families were also sent to poorhouses. Contemporary distinctions between developmental disabilities, juvenile delinquency, and early onset adult psychiatric disorders did not yet exist. By midcentury, rising fears over the safety of these youth, who were housed alongside adults in deplorable conditions, motivated efforts to transfer the young people to orphanages, asylums, or foster homes. In New York, this trend was accelerated by the Children's Act, which passed the State Legislature in 1875, and ordered all children aged 2-16 years to be removed from poorhouses (Katz, 1986). Although other states followed, enacting similar legislation, removal of children from poorhouses was slow. In 1880 there were 7,770 US children aged 2-16 years in poorhouses and in 1890 there were 4,987 (Thomas, 1972).

## B. 1900 to Present

It was not until 1937 that the first public psychiatric hospital unit for adolescents opened in the U.S. at Bellevue Hospital in New York City. This was followed in 1955 by the opening of the first private unit for adolescents at Hillside Hospital, also in New York City.

The history of the uses of psychiatric inpatient treatment is as much a story of accommodating urgent societal needs, economic pressures, and shifting ideologies as it is a tale of the development and delivery of new and more effective treatments. In the first half of the twentieth century, the population



in state mental hospitals rose rapidly, peaking at 558,922 in 1955 (Bockoven, 1972). Support for this model of care was fueled by economic forces and efficiencies of economies of scale. Following the U.S. Food and Drug Administration's approval of chlorpromazine in 1954, the new medication was hailed as a "miracle drug" for its calming effects on agitated patients. During the late 1950s through the middle 1960s, evidence accumulated that chlorpromazine and the other "major tranquilizers" had specific effects on psychotic symptoms in people with schizophrenia and related disorders (Moncrieff, 2013). Expanded use of these medications was credited with greatly facilitating the ensuing large reductions in state mental hospital population (Cancro, 2000). Yet careful analysis reveals that between 1955 and 1965, the number of patients in public mental hospitals declined by only 15%, while a substantially greater decline of 65% occurred between 1965 and 1985 (Mechanic 2014). In addition to the advent of antipsychotics, the decline in the inpatient census was related to federal policies including passage of two important laws. The first was the Mental Retardation and Community Mental Health Centers Construction Act (1963), envisioned by President John F. Kennedy as "a wholly new emphasis and approach to care for the mentally ill" and the second was passage of Medicaid and Medicare (1965) (Sharfstein, 2000). This era was also associated with attention to civil rights and legal reforms including revising civil commitment codes and ensuring due process for the rights of individuals who were involuntarily hospitalized (Fisher et al., 2009).

Medicare and Medicaid programs provided strong financial incentives for states to transform their financing of mental health care. Under Medicaid, the "institutions for mental diseases" (IMD) exclusion provision prohibited Medicaid billing for treatment in psychiatric units of more than 16 beds for Medicaid beneficiaries aged 21-64 years. Because states received matching federal funds through Medicaid, the Medicaid program created incentives for states to develop small units in local hospitals that could bill Medicaid and discouraged state investments in state psychiatric hospitals. An additional critical policy lever that encouraged shorter stays was the Medicare lifetime cap on the total number of days of inpatient psychiatric treatment.

Between 1970 and 2014, the resident population in state psychiatric hospitals declined from approximately 370,000 to 40,000. This massive shift from public hospital-based to community-based services was only slightly offset by an increase over the same period in general hospital psychiatric short-term inpatients from approximately 18,000 to 31,000 and growth in longer-term private psychiatric hospital patients from approximately 11,000 to 28,000 (Lutterman et al., 2017). Without adequate publicly financed community-based mental health services, some patients discharged from state mental hospitals were relocated to other institutional settings (Geller, 2000). With the expansion in nursing home capacity accompanying Medicaid and Medicare legislation, roughly one-half of older patients discharged from mental hospitals went directly into nursing homes (Kiesler and Sibulkin, 1987). See Figure 1.

A vigorous debate developed over the extent to which closing public mental hospitals coupled with under-resourced community mental health centers pushed people with serious psychiatric disorders into the criminal justice system or homeless shelters. Ecological studies and personal observations supported the view that patients discharged from state hospitals commonly entered prisons or became homeless (Raphael and Stoll, 2013; Bassuk and Lab, 1986; Whitmer, 1980; Torrey, 2014). Cohort studies,



however, suggest that homelessness and incarceration occurred only sporadically among long-term psychiatric inpatients following discharge to the community (Winkler et al., 2016). Nevertheless, adults with major psychiatric and substance use disorders remain disproportionately common in jails (Fazel and Seewald, 2012; Fazel et al., 2017) and homeless shelters (Toro et al., 2014), underscoring serious challenges in meeting basic social and housing needs of adults with major mental illnesses.

Beginning in the late 1970s, there was an increase in proprietary psychiatric hospitals that faced few constraints on service delivery. Growth in managed care during the late 1980s and early 1990s achieved health care cost savings by reducing the number of hospital admissions, shortening lengths of inpatient stay, and requiring participating physicians and other health care providers to offer their services at discounted rates. Between 1990 and 2000, the median stay of child and adolescent mental health inpatients in community hospitals declined from 12.2 to 4.4 days (Case et al., 2007).

Unfortunately, research on the effectiveness of adult or child psychiatric inpatient care has been nearly absent. A dearth of prospective clinical trials establishing the benefits of inpatient psychiatric treatment proved fertile ground for the rise of behavioral managed care and health utilization review that have narrowed the scope of inpatient psychiatric treatment. The average length of inpatient psychiatric stay for adults in private nonprofit hospitals steadily declined during the period of rising managed care (Mechanic et al., 2013) and has remained stable ever since. Between 1998 and 2017, the national average length of stay for mental health and substance use disorders in short-term facilities has hovered around seven days (AHRQ, n.d.).

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***The scope of inpatient psychiatry has progressively narrowed. Treatment has become focused on acute stabilization and integration of treatment into a continuum of care...***

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The scope of inpatient psychiatry has progressively narrowed. Treatment has become focused on acute stabilization and integration of treatment into a continuum of care even as the range of types of beds has broadened to include a variety of subspecialty beds such as geriatric beds, medical psychiatric beds, and substance use beds. To the present day, inpatient psychiatric settings concentrate on stabilizing patients in crises related to suicidal symptoms, psychosis, mania, anorexia nervosa, and other potentially life-threatening conditions that require care in safe settings and continuous observation. Within psychiatric hospitals, patients can receive more aggressive pharmacotherapy, psychotherapy, and other procedures such as complex diagnostic assessments and electroconvulsive therapy that are difficult to provide and often unavailable in other settings. An additional value in inpatient treatment includes being out of the environment the person came from for several days within a clean, orderly, caring hospital environment with regular meals. The hope for relief from an undesirable environment adds to the demand for inpatient settings.



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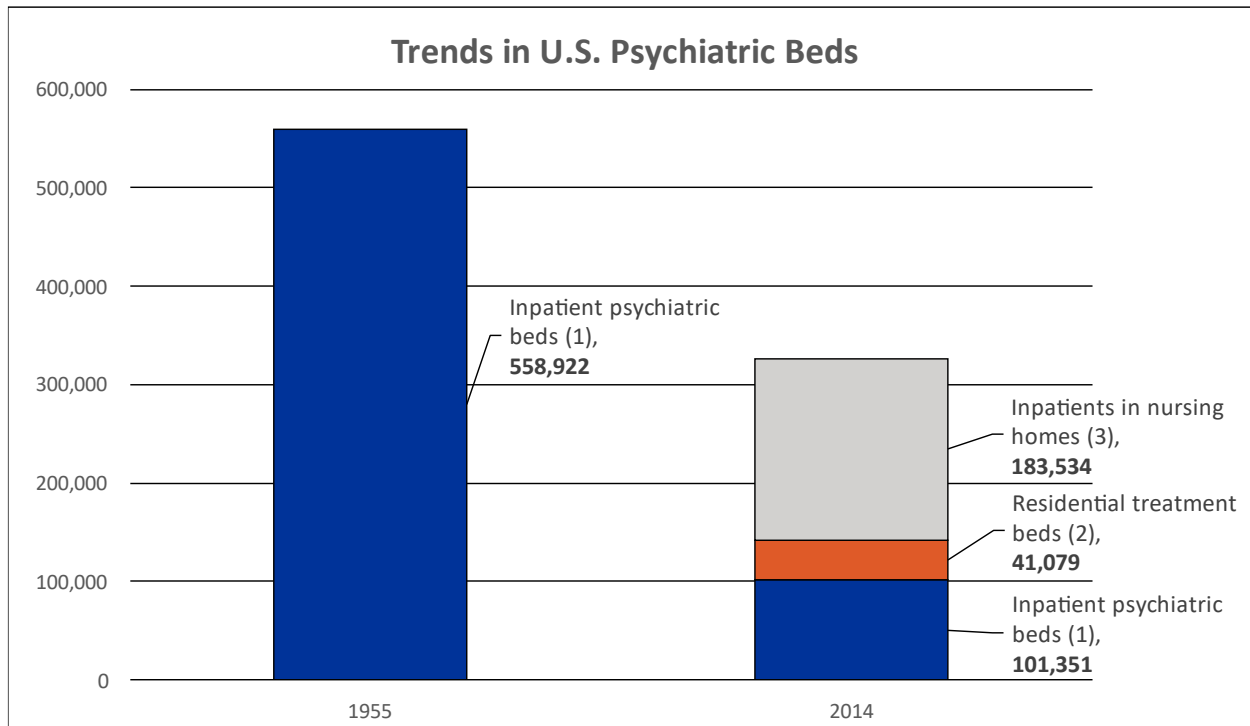
***In the era of short inpatient treatment, inpatient clinicians have little time to facilitate engagement with outpatient mental health services for continuing care.***

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In the era of short inpatient treatment, inpatient clinicians have little time to facilitate engagement with outpatient mental health services for continuing care. Between 2008 and 2018, the percentage of patients hospitalized for mental illnesses who actually attended follow-up mental health care within seven days of discharge declined from 57.2% to 45.2% for commercially insured HMO patients and from 42.6% to 35.8% for Medicaid HMO patients (NCQA, 2021). Although attention to discharge planning can reduce the risk of psychiatric hospital readmission (Stefen et al., 2009), early hospital readmission remains common. Approximately one in seven Medicare patients discharged from a psychiatric inpatient facility is readmitted to the hospital within the first 30 days (NAPHS, 2013).

The prevailing psychiatric hospital paradigm, which relies on short hospital treatment episodes, provides little opportunity to establish interpersonal connections between patients, family and inpatient clinicians or develop an effective treatment plan that is integrated with longer-term outpatient treatment. A narrow emphasis on immediate patient safety also risks dehumanizing inpatient care processes and curtailing opportunities to individualize clinical care to meet the patient's specific needs under the financial pressures for arranging an early discharge.

The modern history of psychiatric inpatient care reflects a struggle to provide compassionate care with diminishing resources and within time frames that are often too short to evaluate treatment response or initiate meaningful recovery. Within the broader context of social welfare, and medical, political, and legal systems, the future success of inpatient psychiatric care will be shaped by the extent to which effective inpatient psychiatric treatment models are developed. This will involve providing compassionate care in an efficient manner for people who cannot be safely treated in other settings and then improving their lives by integrating their recovery within a continuum of community treatment.



**Figure 1: Trends in Psychiatric Beds**

**Notes:**

(1) **1955** - Inpatient psychiatric beds in state hospitals (peak year; 337 beds per 100,000 population)

**2014** – Total 101,351 – inpatient psychiatric beds (29.7 beds per 100,000 population), includes:

37,209 – inpatient psychiatric beds in state and county hospitals

30,864 – inpatient psychiatric beds in general hospitals with separate psychiatric units

24,804 – inpatient psychiatric beds in private psychiatric hospitals

8,006 – inpatient psychiatric patients in medical/surgical “scatter”

3,124 – inpatient psychiatric beds in Veterans Affairs hospitals

3,499 – inpatient beds in other specialty mental health centers

(2) Residential treatment beds in residential treatment centers (12.9 beds per 100,000 population)

(3) Inpatients in nursing homes with a diagnosis of schizophrenia or bipolar disorder (57.8 beds per 100,000 population)

Note: Bed numbers not reported by public agencies (2017):

- Child/adolescent beds, total public and private
- Geriatric beds, total public and private
- Acute-care mental health beds, total public and private
- Residential treatment beds specialized in transitional services, public and/or private
- Residential treatment beds specialized in rehabilitation services, public and/or private
- Residential treatment beds specialized in long-term services, excluding nursing homes
- Group-living beds, total public and private
- Supported housing beds, total public and private
- Psychiatric emergency room beds

Sources: NASMPHD and Treatment Advocacy Center, 2017; SAMHSA, 2014.

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## Section 2:

### Definitions of Psychiatric Beds





### Task Force Subgroup Members Contributing to This Section

Debra Pinals, M.D. (Chair), Anita Everett, M.D. (Task Force Chair), Ted Lutterman

This section provides a set of common definitions describing settings and services where individuals receive mental health treatment and that may involve residential services and/or beds. The availability of these services impacts the overall total number of inpatient beds a community would need because often these services are an alternative to inpatient care. Because of the prominent role states have had with planning for deinstitutionalization over the last 60 years, community services have evolved into many different types of services that are not necessarily standardized.

- **Inpatient Psychiatric Hospital Bed:** A bed where individuals with mental illness receive 24/7 psychiatrically supervised care primarily for symptoms of psychiatric illness with ancillary supports for co-occurring medical conditions. An individual that is hospitalized in such a bed is also referred to as a patient or an inpatient.
- **State Psychiatric Hospital Bed:** A bed in a state-owned psychiatric inpatient facility licensed as or deemed a hospital that provides primarily inpatient psychiatric care to individuals with mental illness from a specific geographic area and/or statewide.
  - **Local Government Psychiatric Hospital Bed:** A bed in a local government (city or county) owned psychiatric inpatient facility licensed as or deemed a hospital that provides primarily inpatient psychiatric care to individuals with mental illness from a specific geographic area.
- **General Medical Hospital Psychiatric Bed:** A bed in a licensed general hospital (public or private) that provides inpatient mental health services in at least one separate psychiatric living unit. This unit must have specifically allocated staff and space (beds) for the treatment of persons with mental illness. The unit may be located in the hospital itself or in a separate building, either adjacent or more remote, and is owned by the hospital.
- **Private Psychiatric Hospital Bed:** A bed in a facility operated as a private psychiatric hospital licensed by the state that primarily provides 24-hour psychiatric inpatient care to persons with mental illness. Private psychiatric hospitals include for-profit and not-for-profit facilities.
- **Community Mental Health Center (CMHC) Inpatient Bed:** A psychiatric inpatient bed in a facility that meets applicable licensing or certification requirements for CMHCs in the state in which it is located.
- **Veterans Administration Medical Center (VAMC) or other VA Health Care Facility Psychiatric Inpatient Bed:** A psychiatric inpatient bed in a facility operated by the U.S. Department of Veterans Affairs.



- **Medical/Psychiatric Unit Bed:** A bed in a general hospital inpatient unit that provides simultaneous hospital level of care for both medical and psychiatric conditions.
- **Child/Adolescent Psychiatric Hospital Bed:** Any of the above categories where the bed is specifically designated for children or youth under the age of 21.
- **Scatter Hospital Bed:** Non-dedicated psychiatric beds used in medical hospital settings for persons who have psychiatric symptoms that would otherwise be treated in dedicated psychiatric hospital beds for their psychiatric conditions.
- **Forensic or Court Ordered Psychiatric Stay:** A bed in a state hospital that is used for individuals ordered for admission either for assessment for competency to stand trial or because of adjudication that the person is not guilty by reason of insanity. This may also include individuals with sexual offenses that are court ordered to confinement.

This report primarily focuses on beds that serve non-forensic populations with a primary mental health diagnosis (rather than forensic populations or a primary substance use disorder diagnosis). However, as noted in Section 6 on developing models, the authors recognize the overlap between these services and the dynamics at play between the different types of inpatient services (e.g., changing capacities within one part of the system will affect other parts of the system).

## Section 3:

### Financing of Psychiatric Beds





### Task Force Subgroup Members Contributing to this Section

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## A. Introduction

This section summarizes some of the major sources of funding for psychiatric beds and changes in funding over time. This section is divided into background, current status (adult and child/adolescent services), sustainability of funding sources, barriers/problems with the current model, policy recommendations, a review of the impact on medical inpatient and ambulatory care, and a brief consideration of the impact of disasters and pandemics.

## B. Background

**Pre-1960s:** Patients were in separate institutions (asylums) funded by the state or (less frequently) in private institutions funded by families or philanthropy. Adoption of insurance coverage began in the post-World War II environment.

**1960-1980s:** Medicaid provided federal matching funds to the states for the health care of individuals at or close to public assistance. In order for states to receive federal funds, they could not reduce their health expenditures, most of which went to state psychiatric hospitals.

At the time Medicare and Medicaid were enacted, Medicare limited psychiatric inpatient care to 190 lifetime days in both state and free-standing private institutions but not general hospitals, attempting to maintain dedicated state funds. Medicaid coverage to “institutions for mental diseases” (IMD; i.e., institutions where more than 50% of the discharges are psychiatric) was limited to persons under 21 and 65 years of age or older, again limiting federal support and encouraging continued direct state expenditures.

By 1974, most health insurance plans provided some coverage for hospital care of mental illnesses. General hospitals increasingly replaced public mental hospitals as the primary institutions for care.

Diagnosis-related groups (DRGs) were included in the 1982 Tax Equity and Fiscal Responsibility Act (TEFRA). Congress exempted psychiatric hospitals from this Prospective Payment System (PPS) for distinct part psychiatric units in general hospitals. The allowable cost protocols in place made psychiatric units and hospitals relatively more profitable in the early years of DRGs.

In the 1980s, for-profit managed behavioral health companies (MBHC) began contracting for oversight and utilization management of psychiatric benefits. Hospitals frequently accepted rates below their costs, because not getting a contract might eliminate patient access or loss of marginal bed capacity and contribution margin associated with psychiatric inpatient services.



**1990s-2007:** In the 1990s, state Medicaid programs also began to contract with MBHCs to manage their psychiatric benefits under [Section 1915b](#) or [Section 1115 Medicaid](#). TEFRA was modified by the Balanced Budget Act (BBA) of 1997 with payment limits, frequent rate reductions, and reduced GME payments in psychiatry.

The Balanced Budget Refinement Act of 1999 replaced cost-based Medicare reimbursement with the Inpatient Prospective Payment System (IPPS) for psychiatric hospitals and exempt general hospital units. However, the IPPS does not fully account for costs of those patients cared for in general hospitals who have significant medical comorbidities or problems with activities of daily living (Drozd et al., 2006). Since the development of the Inpatient Psychiatric Facility Prospective Payment System (IPF PPS) in 2004 there has been a relative growth in for-profit free-standing psychiatric hospitals and a decline in general hospital bed capacity (MEDPAC, 2010).

More people with serious mental illness became justice-involved and incarcerated in jails and prisons during this period, with most expenses being absorbed as part of the county (jail), state (prison), or federal (Federal Bureau of Prisons) budgets. Staff salaries and pharmacy budgets for psychiatry expanded dramatically.

**2008-2010:** The Mental Health Parity Addiction Equity Act (MHPAEA) mandated that coverage for mental health and substance use disorders be comparable to the insurance coverage for medical/surgical care if that coverage included mental health and substance use disorder benefits. Parity protections apply to Medicaid benefits, once a beneficiary is enrolled in a managed care organization (including any services delivered through another managed care plan or by fee for services). MHPAEA applies to a very small portion of Medicare Advantage plans (Medicare Advantage coverage that is issued through a group plan offered by an employer). These plans — Employer Group Waiver Plans (EGWPs) — are offered by employers or unions to their retirees.

**2010-present:** Among Medicare, Medicaid, and dually eligible populations, a majority of adults treated for a behavioral health disorder in general hospital psychiatric units had multiple co-occurring physical conditions (Thorpe, 2017), increasing the uncompensated cost of care.

In 2015, Medicare payments to inpatient psychiatric facilities, both freestanding hospitals and specialized hospital-based units, totaled approximately \$4.5 billion (MEDPAC, 2017). These payments are determined by adjusting a daily base rate (\$771 per day for 2018) based on geographic and facility-specific differences (MEDPAC, 2017). The included Inpatient Psychiatric Facility Quality Reporting (IPFQR) program carries a 2% reduction in reimbursement for failure to report specified data or to meet expected standards. In addition, Medicare pays for approximately 250,000 psychiatric discharges per year on medical services (“scatter beds”) under the IPPS (MEDPAC, 2010). State psychiatric hospital systems vary greatly in terms of funding strategies and amount per capita.



## C. Current Status

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***Overall expenditure on mental health has steadily increased in recent decades from \$32 billion in 1986 to \$186 billion in 2014.***

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Overall expenditure on mental health has steadily increased in recent decades from \$32 billion in 1986 to \$186 billion in 2014. The percentage of mental healthcare dollars spent on inpatient care, however, decreased from 42% in 1986 to 27% in 2014. (Summergrad et al., in press; SAMHSA, 2016). A further look at the sources of revenue for different types of hospitals provides additional information on trends. For private psychiatric hospitals, between 1990 and 2002 the proportion of total revenue that came from patient fees, including private health insurance, decreased from 61.3% to 42.7%. For general hospitals during this same time period, the decrease was from 36.5% to 31.5%. During the same time period, the proportion of private psychiatric hospitals' total revenue from Medicaid and Medicare increased significantly (from 9.4% to 25.9% for Medicaid and from 10.8% to 18.2% for Medicare). For general hospitals from 1990 to 2002, Medicaid revenue was essentially unchanged (24.2% to 24.0%) and Medicare revenue increased from 24.2% to 36.9% (Summergrad et al., in press).

### 1. Current Adult Financing Systems

- **Medicaid**

Medicaid and Medicare are the major sources of public funding for inpatient psychiatric care. The Medicaid IMD exclusion prohibits the use of federal Medicaid financing for care provided to patients aged 21-64 years old in inpatient mental health and substance use disorder treatment facilities with greater than 16 beds. A facility is designated as an IMD if it is licensed or accredited as a psychiatric facility, is under the jurisdiction of the state's mental health authority, specializes in providing mental healthcare, or more than 50% of its patients require admission due to a mental health condition.

The IMD exclusion is the only section of federal Medicaid law that prohibits federal payment for medically necessary care because of the type of illness being treated. States can request modifications to traditional Medicaid payments (e.g., ability to admit patients of all ages to IMDs including private psychiatric hospitals, payments for residential or nonhospital emergency or community-based care). However, waivers vary among state programs, depending on the organization of the state mental health systems, and can be based on regional, county, or statewide programs. Additionally, as of October 2018, states can receive federal payment under Medicaid for services provided to pregnant and postpartum women diagnosed with substance use disorders at IMDs. There is further inconsistency in Medicaid access, given that Medicaid expansion via the ACA has been inconsistently utilized across states.

As a result of the IMD exclusion, patients covered by Medicaid who experience acute psychiatric crises often end up in unsafe or ineffective settings including emergency rooms, jails, prisons,





homelessness services, and forensic psychiatry beds. This results in worse medical outcomes for individuals with mental illness and higher costs to county, state, and federal governments (Summergrad et al., in press).

- **Medicare**

Medicare makes payments for psychiatric services to inpatient psychiatric hospitals and certified inpatient psychiatric units in acute care and critical access hospitals, collectively known as inpatient psychiatric facilities (IPFs). Medicare calculates a per diem payment amount using the Inpatient Psychiatric Facility Prospective Payment System (IPF PPS). This per diem base rate includes all costs for a patient in the IPF, including inpatient operating and capital-related costs (routine and ancillary services). It generally excludes pass-through costs, such as bad debts and graduate medical education. The per diem base rate is then adjusted for specific facility and patient characteristics.

Facility-based adjustments include:

- (1) Adjustment to the labor portion of the per diem amount based on geographic differences using an IPF wage index.
- (2) 17% adjustment for location in a rural area.
- (3) 12% higher payment adjustment for the first day of a stay in IPFs with a qualifying emergency department.
- (4) Adjustment for teaching hospitals for indirect medical education costs.
- (5) Adjustment to the nonlabor portion based on higher cost of living specifically in Hawaii and Alaska.

Patient-based adjustments include:

- (1) Adjustment based on principal psychiatric diagnosis known as the Medicare Severity-Diagnosis Related Group.
- (2) Age.
- (3) Presence of certain specific active comorbidities.
- (4) Length of stay.

IPFs get additional payments for electroconvulsive therapy (ECT) treatments and outlier cases, which are defined as cases with extraordinarily high costs (Centers for Medicare and Medicaid Services, 2019).

- **Other State and Federal Funding Sources**

Other state and federal funding sources include the Veterans Affairs, Department of Defense, Substance Abuse and Mental Health Services Administration, and the Indian Health Service.

- **Private Health Insurance and Managed Behavioral Health Care**

In contrast to Medicare's cost-containment approach, HMOs and private health insurance companies turned to specialized managed behavioral health companies (MBHC) for oversight and management of their psychiatric benefits starting in the 1980s. These companies are often referred to as *carve-outs*. The carve-out companies developed programs of preadmission



review and continued-care certification to control the use of psychiatric services, particularly on inpatient units (Kihlstrom, 1997). In addition to reviewing admissions and continued care, these carve-out companies would often negotiate reduced rates with individual hospitals.

Unlike Medicare, which has contracts with every hospital, often standardized by region, prevailing wage, and employment costs, these private for-profit companies chose which hospitals could have their contracts. As small carve-outs consolidated or were bought up by larger ones, these companies developed significant purchasing power. In many markets, their consolidated purchasing power approached monopsony, allowing them to dictate rates to hospitals. Hospitals frequently accepted rates below their costs, because not getting a contract would mean a loss of so much volume that the unit would have to be downsized or closed. Patient and provider dissatisfaction with these programs generated many complaints to state insurance regulators and legislators. In response, a portion of the 2008 Mental Health Parity Addiction Equity Act (MHPAEA) mandates that the Department of Labor oversees insurance plans offered by employers to mitigate these practices (Summergrad et al., in press).

- **State Systems (Including Forensic Beds)**

Because of the unique responsibilities that states bear for the direct provision of psychiatric services, the organization, budgeting, and interrelationship of state mental health systems with Medicaid and Medicare are unique components of hospital psychiatry. States have often modified their state-run systems in coordination with Medicaid waivers (often Medicaid Section 1115) and have used state and federal funding streams from both Medicare and Medicaid programs to create more comprehensive systems of care.

Nationally, 46% of beds within state and county psychiatric hospitals are occupied by forensic patients (NASMHPD, 2014).

- **Funding for Psychiatric Care in Correctional Systems**

While a person is incarcerated in the United States, Medicaid and Medicare generally cannot be billed for health care services. The one exception to this rule has historically been overnight stays in a community hospital other than emergency department visits and observation stays. Even with this opportunity for federal matching funds to pay (typically) 50% of the eligible expenses, many states have not chosen to exercise this option due to the complexity of the billing process on a per-inmate basis and the need to coordinate closely with the state Medicaid authority (Trestman, 2015).

The Patient Protection and Affordable Care Act (ACA) offers an increase in Medicaid coverage to two subsets of inmates. First, it allows pre-trial jail inmates the opportunity to initiate or maintain Medicaid enrollment (Blair et al., 2011). This does not allow for billing; however, it eases access to entitlements following release (Minton, 2010). The one exception to Medicaid billing remains overnight community hospital stays, with federal reimbursement at 90% of allowable charges. Additionally, the ACA requires coverage for children up to the age of 26 by a parent's health care plan. This may allow for billing and cost recovery for off-site specialty care or overnight hospitalizations of inmates in this category (Blair et al, 2011; PPACA, 2010).



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***Because Medicare and Medicaid funds are not available for the majority of inmates, prison health care is funded almost exclusively with state resources.***

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Because Medicare and Medicaid funds are not available for the majority of inmates, prison health care is funded almost exclusively with state resources. State departments of correction typically receive between 2.5% and 2.9% of the entire state budget and correctional healthcare consumes between 9% and 25% of states' total correctional budget (Schaenman et al., 2013; Trestman, 2015). The average per inmate per year medical cost in American prisons in 2010 was just over \$6,000 (Kyckelhahn, 2012). Of that total, approximately one quarter (\$1,500) is spent on mental health services.

Jails are typically funded by the county they serve. Each of America's 3,283 jails has a constitutionally mandated responsibility for health care (Stephan and Walsh, 2006). The system for health care delivery typically varies by size of the facility: small, medium, or large jails, with respective bed capacities of 50 or fewer, 1,000 or fewer, and over 1,000. Most small (50 or fewer beds) to medium (51-1,000 beds) facilities contract out care on a fee-for-service or hourly basis for nursing, mental health, and medical staff. Most connect closely with a local hospital for emergency, psychiatric, and medical care when needed. Large jails (>1,000 beds) often have an internal health care system more closely resembling a prison than a small jail, with substantial on-site staff and capacity for sub-acute care (Trestman, 2015).

## **2. Current Child and Adolescent Funding**

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***The funding for child and adolescent psychiatric beds comes from multiple sources including Medicaid, private insurance, private pay, child welfare, juvenile justice, intellectual and developmental disabilities programs, substance use disorder programs, and schools.***

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The funding for child and adolescent psychiatric beds comes from multiple sources including Medicaid, private insurance, private pay, child welfare, juvenile justice, intellectual and developmental disabilities programs, substance use disorder programs, and schools. (See Section 7.) These funding sources can also be blended to support the inpatient stay with schools paying for the educational needs of the child and insurance or a state agency paying for the clinical and 'bed costs' associated with the stay. DRGs are only relevant for the minority of children who are deemed 'dual eligible' for both Medicaid and Medicare, typically by meeting a qualifying condition for Medicare such as a developmental disorder. The Children's Health Insurance Program (CHIP) is a state and federal combined health insurance program for children in families who earn too much to qualify for Medicaid but not enough to buy private health insurance. CHIP provides free or low-cost health



coverage and goes by different names in every state. The majority of inpatient services are funded on a fee-for-service basis in the private sector (non-profit and for-profit organizations). Rates are negotiated with each payer and utilization management varies from payer to payer. Some rates are inclusive of professional fees, others separate. Some plans have pay for performance, which includes differential rates based on historical lengths of stay (LOS) and readmission rates.

An intermediate care level for children and adolescents is a psychiatric residential treatment facility (PRTF). As noted by Medicaid (CMS, 2020):

“A PRTF provides comprehensive mental health treatment to children and adolescents (youth) who, due to mental illness, substance abuse, or severe emotional disturbance, need treatment that can most effectively be provided in a residential treatment facility. All other ambulatory care resources available in the community must have been identified, and if not accessed, determined to not meet the immediate treatment needs of the youth.”

The settings of inpatient treatment for children and adolescents also differ from adult settings with an increasing number of community-based settings providing these services, particularly for younger children. These beds are variably called community-based acute treatment (CBAT) or acute residential treatment (ART). Their funding is similar to more traditional, hospital-based inpatient facilities although the per diem costs are significantly less and the settings are much less medically oriented. Many of these programs are based in residential facilities that lack laboratory testing capacity or other medical specialists but will have on-site or contracted psychiatric treatment providers who oversee the child’s treatment program. The lengths of stay in these community-based programs tends to be longer than for hospital-based care.

Longer-term out-of-home treatment for children and adolescents is increasingly being provided in private, non-, and for-profit residential settings as states have increasingly been closing their state hospitals for children. Funding for these placements also comes from a variety of sources but is more likely to come from public state agencies (child welfare, juvenile justice, intellectual/development disability, schools) than from either public or private insurance although states may bill Medicaid for some of the services provided.

Per the July 2018 *Faces of Medicaid Data Series* (by the Center for Healthcare Strategies) there was an increase in the percentage of children enrolled in Medicaid hospitalized psychiatrically from 3.2% in 2008 to 5.2% in 2011 (Pires et al., 2018). At the same time, the mean expense per hospitalization decreased from \$11,803 to \$4,840 (a drop of 144%). Per the authors of the study, this may suggest lower average lengths of stay due to more children being enrolled in Medicaid managed care, children leaving inpatient treatment and moving to residential treatment (which has remained fee for service in many states), or states using alternatives (such as wraparound, respite, multisystemic therapy, or MST). There is also a crisis in terms of bed capacity in the U.S. Carubia et al. (2016) found that between 2009 and 2012, the number of general inpatient psychiatric beds declined by 3,000, and the average wait time for an appointment with a child and adolescent psychiatrist was estimated to be nearly eight weeks. This crisis has led to children often having to ‘board’ on pediatric units while awaiting an inpatient bed to become available. It is not uncommon for these



'boarders' to stay a week or longer, often receiving little in terms of child psychiatric treatment other than consultation and in some cases, being discharged to home rather than ultimately being admitted for treatment in an inpatient facility as they may no longer meet medical necessity criteria.

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***This crisis has led to children often having to 'board' on pediatric units while awaiting an inpatient bed to become available.***

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#### **D. Sustainability of Current Financing Models**

For more than 20 years while psychiatric units were exempted from DRGs, they also did not receive adjustments to their rates reflecting increased labor, GME and IME costs, rural adjustments or patient-based adjustments while medical/surgical services received regular increases. The additional regulatory and legal environment applicable to psychiatry required additional and uncompensated support from the hospital. Psychiatry reimbursement went from favorable to unfavorable relative to medical and surgical services. Acute care hospitals found that the narrow and often negative margins for their psychiatric services were no longer favorable compared to services such as orthopedics, transplant and intensive care. In that context, psychiatric units were often closed or repurposed. The recent focus on ligature by CMS and the Joint Commission often required extensive and costly renovations which made psychiatric units even more disadvantaged and accelerated downsizing and closures.

It will only be through substantial increases in reimbursement that acute care hospitals will once again consider increases to inpatient psychiatric services. In addition, physician and other clinician and network investments by hospitals and health systems are often predicated on the profitability of inpatient or ambulatory procedural care. In general, given the competition for physicians overall and especially the current demand for psychiatrists, hospitals and health care systems will not be willing to invest limited capital for psychiatric beds, integrated electronic records or psychiatrists unless the overall hospital payment model for inpatient psychiatry is reformulated.

#### **E. Barriers/ Problems with the Current System**

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***Providing psychiatric inpatient care to patients with acute psychiatric symptoms proves challenging given limited hospital beds and the availability of community services.***

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Providing psychiatric inpatient care to patients with acute psychiatric symptoms proves challenging given limited hospital beds and the availability of community services. Many communities across the United States lack a comprehensive continuum of care that includes



treatment services shown to improve outcomes for diverse populations. Reduced access is reflected in emergency department overcrowding and waiting lists for acute care. There are many barriers to providing care for patients in inpatient psychiatric settings such as the paucity of reimbursement for patients' care, lack of insurance coverage, prior authorization requirements, utilization review techniques, and lack of clinically appropriate level of care criteria. These barriers often result in delayed care, patients not being admitted, or being discharged too early.

As hospital costs continue to rise and as health care inflation exceeds the general rate of inflation, reimbursement in psychiatric inpatient units typically cover only half of the total costs of care. As long as the units cover their direct costs and make some incremental contribution to the margin, there is some economic basis for their retention. But as hospitals' overall economic situation deteriorates, units that do not come close to covering their full cost allocations look like prime targets for replacement by more profitable services (Applebaum, 2003).

Consequently, the number of acute psychiatric inpatient beds has decreased steadily over the past decade. If reimbursement rates for psychiatric hospitalizations do not cover the cost to deliver care, this treatment option may cease to be available, and a less appropriate setting, such as correctional facilities, may become the alternative "treatment setting" for individuals with severe mental illness.

The process of requiring prior authorization by third-party insurance plans or other entities is detrimental to patient care. This process often results in delays for patients in receiving life-sustaining treatment, and for psychiatrists, it typically results in an extensive amount of required paperwork to be submitted, multiple phone calls back-and-forth to insurance companies, and significant wait times for approval, resulting in delayed or disrupted medical care for patients. This also burdens emergency room departments that are struggling with boarding. In a survey conducted of American College of Emergency Physicians members, 48% of respondents said that psychiatric patients are boarded one or more times a day in their emergency department. When asked how long the longest patient waiting in the emergency department for an inpatient bed was boarded, nearly 38% of respondents said 1 to 5 days (American College of Emergency Physicians, 2016).

While length of stay for inpatient services varies by state and county, the median length of stay for inpatient psychiatric care has declined from 42 days in 1980 to about seven days in 2014. (Lutterman et al., 2017) This decrease is due, in part, to more effective treatments becoming available, along with greater recognition of patient preferences for outpatient services and involvement of patients and families in treatment/discharge planning activities. At the same time, both public and commercial payers have contributed to these trends via reduced payments to hospitals and the use of stringent utilization review practices to restrict inpatient services. Requiring prior authorization and concurrent review for inpatient psychiatric services as well as application of medical necessity criteria to determine whether care is approved or



denied has enabled managed care organizations to tightly control access to and duration of inpatient psychiatric care.

Utilization review practices used by managed care organizations may unreasonably limit inpatient care and put patients at risk for poor outcomes when they are experiencing a crisis. Studies have shown the period immediately following discharge from inpatient psychiatric care carries substantial risks for serious and even life-threatening events. Utilization review criteria that limit inpatient length of stay to the minimum “medically necessary” can lead to premature discharge and adverse outcomes including relapse and hospital readmission, homelessness, violent behavior, criminal justice involvement, and all-cause mortality including suicide (Compton et al, 2006; Olfson et al., 2010; Lin and Lee, 2008). These risks are especially concerning given the high rates of failed transitions from inpatient to outpatient mental health care: 42%-51% of adults and 31%-45% of youth do not receive any outpatient mental health treatment for their disorder within 30 days of inpatient discharge (Nelson et al., 2000).

The long-standing Conditions of Participation (COP) in CMS are required for an organization to bill to, and be reimbursed by, Medicare and Medicaid (Code of Federal Regulations, 42 CFR 482 Subpart E). These requirements include substantial administrative burdens that date back to the 1970s and are no longer relevant. One such example is the obligatory and time-consuming treatment plans, which are not required of any discipline other than psychiatry. They may have had relevance at a time when the average length of stay was measured in months but are no longer applicable.

The lack of clinically appropriate level of care criteria has resulted in reduced patient access to necessary services and has negatively affected clinical status and outcomes. Patient outcomes may further be negatively impacted by not focusing on social determinants of health, which are nonclinical factors influencing health, such as socioeconomic status and employment. These are rarely if ever considered in utilization criteria.

## F. Recommendations for Policy Changes <sup>1</sup>

- Reduce regulatory burden that drives up costs without commensurate benefit: Eliminate 42 CFR part 482 Subpart E COPs (e.g., Subpart E, 482.60; 482.61 (medical record requirements: treatment plans); 482.62 (staff requirements)).
- Develop a modified per diem rate based on actual audited costs by type of facility and geography with compensation for complexity; severity; and additional tests/treatment clinically indicated to achieve a realistic operating margin of at least 10%.
- Rebase payment system to allow the marginal value of approximate equivalence to a market basket of all medical-surgical services over 3-5 years. This would require re-basing procedural margins for inpatient and outpatient care at the hospital level.

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<sup>1</sup> Note: These recommendations were based on the deliberation and extensive experience of authors of this Section and do not represent APA policy from the APA Board of Trustees.



- Provide adequate funding for a continuum of care inclusive of community and residential options.
- Make parity with general medical services outcomes-based, rather than merely equivalent length of stay based. This applies also to housing/boarding in the emergency department.
- Evaluate the impact of eliminating the IMD exclusion on state, for-profit, and not-for-profit facilities: concerns include commoditizing services, increased health inequity and access, decreased general hospital investment in beds, and state reduction in investments in beds.
- Evaluate elimination of the 190-day lifetime limit for psychiatric hospitals: concerns include commoditizing services, increased health inequity and access, decreased general hospital investment in beds, and state reduction in investments in beds.
- Ensure effective enforcement of the Emergency Medical Treatment and Labor Act to reduce inappropriate manipulation of the system.

## G. Impact on Medical Inpatient and Ambulatory Care

While modeling of these impacts has not been done reliably, the relative costs of psychiatric care are enormous. Those with serious mental illness as a group have high rates of comorbidity that lead to decreased life expectancy, higher medical costs, more frequent medical hospital readmissions, and longer medical lengths of stay (Rivelli and Shirey, 2014). The opportunity for integrated care to reduce the costs and burden of comorbid disease is substantial and complex (Roehrig, 2016; Anfang and Liptzin, 2014). Model programs have demonstrated the financial viability of integrating psychiatric care into primary medical care (e.g., Reiss-Brennan et al., 2010).

## H. Disaster/ Epidemic Planning

The experience gained during the current COVID-19 pandemic suggests opportunities for building resilience into the system. Such approaches include prospective multi-month all-payer global budgets based on prior claims (e.g., Vermont's ACO model) or variations of Maryland's Health Services Cost Review Commission (Murphy et al., 2020).

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## Section 4:

### Population Variables Affecting Use of Psychiatric Beds





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## **A. Introduction**

The challenge for this workgroup was to review and create a working description of what populations should be included in considering a community alternative to a psychiatric bed and make recommendations regarding how to account for portions of populations that include variabilities in the social determinants of health. In this section, the authors suggest the use of a tool for identifying variables for psychiatric bed need and prioritization of variables to be incorporated into the model.

## **B. Guiding Framework**

To provide a guide for identifying specific population variables, we identified the following key concepts:

1. The definition of need, psychiatric bed, mental illness, and social determinants of health.
2. The generally accepted criteria for inpatient admission to include agreed-upon risk factors that most need treatment available at an inpatient psychiatric unit.
3. The population variables which correlate to these agreed-upon risk factors.
4. How the variables change regarding voluntary and involuntary hospitalizations.
5. The populations currently included in decision making.
6. The populations currently not included, or traditionally not counted in terms of bed need or access (see Barriers to Care in Appendix).
7. The correlates of inpatient hospital bed use.
8. Recommendation after review of relevant databases.

## **C. Background**

Before the last third of the 20th century, psychiatric hospitals and units within general hospitals could be opened when administrators were convinced of a need for them. Convincing was, as historians tell us, largely a political process. In the 1970s, as health care costs were accelerating, policymakers who were looking for factors driving these increases identified excessive spending on what were in some cases unnecessary capital projects. In an effort to curb these excesses, states established “Determination of Need” or “Certificate of Need” (CON) processes, which required parties advocating any new capital expenditure on health care services to submit a statement demonstrating, among other things, that the proposed development did not duplicate existing resources in the healthcare market, and that there was a need for it within that market.

A variety of approaches were taken to the CON processes. With respect to mental health services, specifically hospital beds, applicants have typically relied on the use of an area’s socioeconomic and



sociodemographic characteristics to make their case for expansion. That such would be the case is not surprising; indeed, by the mid-1960s, the relationship between mental illness and social deprivation, social isolation, poverty, and other factors was becoming well-described in the psychiatric and social science literature. It seemed only logical that relevant attributes of an area's population, many of which were measured by the U.S. Census, could be used to make the case for implementation or expansion of services, and, moreover, with sound scientific grounding.

Published observations dating back more than two centuries have described a strong linkage between serious mental illness (SMI) and low socioeconomic status (SES) (Jarvis, 1865; Faris and Dunham, 1939; Draine et al., 2002). This view, which might be termed the "social determinants of mental health" perspective, sees poverty increasing one's risk of developing mental illness (Manseau, 2015). Others argue that poverty among persons with SMI is a consequence of developing an SMI, via the downward drift process (Faris & Dunham, 1939), and that only low levels of support are obtainable through public disability benefits. It might be argued as well that, along with the low income associated with carrying an SMI diagnosis, persons in this population experience many of the environmental features associated with low SES.

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***The onset and course of all mental illness are mediated by a complex interaction between the person's biology/genetics, the community and environmental factors in which they were born and grew up in, and their unique life experiences.***

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The onset and course of all mental illness are mediated by a complex interaction between the person's biology/genetics, the community and environmental factors in which they were born and grew up in, and their unique life experiences. It is important to recognize that race is a social construct that has no scientific basis or biological reality, yet it continues to have a wide range of deleterious effects with respect to educational outcomes, criminal justice, and health institutions. Hence, it is reasonable to identify conditions that are the result of racism to be a risk factor for disease. Critical race theory is [defined](#) as a "framework based on the premise that race is not a natural, biologically grounded feature of physically distinct subgroups of human beings but a socially constructed (culturally invented) category that is used to oppress and exploit people of color." It has applications in population health research (Graham et al., 2011) and in consideration of how and where health resources and more specifically mental health hospitals and beds are developed.

Measures of racism include but are not limited to access to health care, access to education, housing stability, and interactions with the legal system. Attention to those variables influenced by racism requires consideration in mental health research and the determination of those population variables that affect inpatient psychiatric bed use. However, with respect to the need for psychiatric inpatient capacity, whatever the causal relationship, SES patterns in an area are inversely correlated with the



area's prevalence of mental illness and hence the need for mental health services.

For the purposes of this discussion, the key issue is defining the inpatient psychiatric bed needs of a given population. As noted in Section 2, an inpatient psychiatric hospital bed is defined here as a bed where individuals with mental illness receive 24/7 psychiatrically supervised care primarily for symptoms of psychiatric illness with ancillary supports for co-occurring medical conditions. An individual that is hospitalized in such a bed is also referred to as a patient or an inpatient.

## **D. Existing Databases and Correlates of Inpatient Psychiatric Bed Use**

### **1. Existing Databases**

The popularity of using variables that can be associated with the need for mental health services by various populations has contributed to the growth of databases that capture significant numbers of these factors. Notable among these is the Area Health Resource Files, developed by the U.S. Health Resources and Services Administration, which combines county-level U.S. Census data on socioeconomic and socioeconomic factors. These are the kinds of variables that are incorporated in needs assessment analyses by Maryland, Tennessee, and likely other states.

Other factors related to social disorganization that might be worth examining include how criminal justice activity and mental illness both relate to levels of social disorganization, and inclusion of arrest rates in a model of bed need could prove useful. Similarly, measures of neighborhood instability, such as the percentage of households in a county in which current residents had moved in the past year are often indicators of poverty and low SES neighborhoods. One author discussed using poverty as a proxy to narrow the number of variables that are captured in the Area Health Resource Files.

Clinical severity also has been used to measure the need for mental health services. The Finland (Ala-Nikkola, 2016) mental health index is an indicator of population mental health status that can be calculated for each catchment area using three years of data. The data includes: 1) the number of suicides and suicide attempts, 2) persons eligible for special reimbursement for antipsychotic medication, and 3) persons receiving disability benefits (18–64 years old) due to mental disorders.

## **E. Correlates of Inpatient Psychiatric Bed Use**

Several studies detail those statistically significant variables that correlate with inpatient hospital bed use, thus should be considered for inclusion as listed below. One can see the duplicity of measures such as welfare, as a source of income, is a measure of poverty (US Census). The more common population variables that are used in studies are listed in Table 1 below.



**Table 1: Common Population Variables**

• Address	• Life cycles (fertility, mortality, migration)	• Poverty
• Age	• Living situation	• Presence of mental health clinic
• Annual personal income	• Marital status	• Race/ethnicity
• Any lifetime homelessness	• Mental health disorders	• Region
• Any lifetime incarceration	• Mental illness severity	• Religion
• Any suicide attempts	• Mobility	• School enrollment
• Educational attainment level	• Nationality	• Sex or gender
• Employment	• Number of children	• Sexual orientation
• English language proficiency	• Occupation	• Substance-use disorders
• Ever served in the military	• Occupational status	• Urbanicity/county type
• Family size	• Overall health	• Hourly wage
• First language	• Ownership's (home, car, pet, etc.)	• Social support score
• Healthcare coverage/insurance	• Parenthood status	• Socioeconomic status
• Housing cost burden	• Past-year criminal justice involvement	• Welfare
• Immigration status		

Although several studies revealed that demographic data (e.g., race, gender, ethnicity, county type) showed no correlation to inpatient use (Miller, 2016), one study revealed counterevidence where age, gender, race/ethnicity, homelessness and employment status were all significantly related to hospitalization (Unick et al, 2011).

Another useful correlate is the level of impairment. Clinical severity was a consistent predictor of hospitalization (Unick et al, 2011). Suicidal ideation provided the greatest discriminating power in children and adolescents with eating disorders.

The legal status (i.e., involuntary vs. voluntary) of patients during psychiatric hospital admission and discharge is also a useful correlate. Legal status can significantly impact the likelihood of future hospital admission (Craw and Compton, 2006). The availability of involuntary outpatient commitment may also affect inpatient hospital bed usage.

Studies also reveal that certain SES characteristics correlate to inpatient use. These include school enrollment as measured by the education index (education years after primary school) (Ala-Nikkola, 2016), residential stability, and living situation. Those associated with higher rates of admission include employment status, overall health, and past year criminal justice system involvement, past year substance use as measured by alcohol sales - liters of 100% alcohol per person (Ala-Nikkola, 2016), and insurance status (Alegria, et al, 2012). Of note, ethnic differences in the use of inpatient mental health services were not significant in a generously insured population (Padgett, 1994).



## F. Recommended Priority Variables for Inclusion in Bed Needs Determination

The authors recommend the following:

1. High priority variables.
  - a. The Area Deprivation Index (ADI) was the greatest predictor of bed needs and correlated with other variables identified. (See discussion of ADI below.)
  - b. SES characteristics relating to poverty.
    - i. Employment status.
    - ii. Overall health.
    - iii. Past year criminal justice system involvement.
    - iv. Insured versus uninsured status.
    - v. Education status.
2. Low priority variables.
  - a. Number of actual suicides and suicide attempts per 100,000 people.
  - b. Persons eligible for coverage of antipsychotic medication.

Additional variables that may be important but require more research:

1. Homelessness or housing status.
2. Past year substance use (drug and alcohol use relate to poverty and could also account for people being readmitted or reentering the system if they are on probation) (Cerdá, 2010; Zgoba et al, 2020).
3. Rates of SMI in jail and prison population (Prins, 2014; Nowotny, 2017).
4. Emergency department wait times, psychiatric boarding, volume of service.
5. Number of psychiatric admissions per 100,000 people.
6. People admitted or readmitted with SMI.

## G. Recommended Tool for Identifying Variables

The authors recognize that inpatient bed needs center on lack of access to other community supports. Poverty and the associated variables (i.e., unemployment, income, education) have the most robust effect on inpatient admission and should be prioritized. The basis of the ADI is census data and can show where areas of deprivation and affluence exist within a community (Singh, 2003; Knighton, et al, 2016). The ADI has been well-studied in peer-reviewed literature and was created by and has been used for 20 years by the Health Resources and Services Administration (HRSA). Elevated levels of deprivation have been linked to health outcomes. The Neighborhood Atlas is built using these data (Kind and Buckingham, 2018; U. of Wisconsin, 2015). Therefore, the authors recommend the Area Deprivation Index as a tool for identifying variables for psychiatric bed need for the following reasons:



1. The ADI is a robust source of poverty data.
2. Some studies have looked at increased mortality and hospitalization rates, however there are no studies that have looked at psychiatric hospitalizations.
3. A study using ADI to show widening inequalities in U.S. mortality (Singh, 2003) used 21 SES indicators identified in the 1990 census including:
  - a. Education, population age, employed persons age 16 and over in white-collar occupations, median income, income disparity, median home value, median gross rent, median monthly mortgage, owner-occupied housing units, civilian labor force population 16 up who is unemployed (unemployment rate), families below poverty level, population below 150% of the poverty threshold, single-parent households with children under 18 years old, houses with motor vehicles, households without telephone, households without plumbing, households with more than one person per room (crowding), proportion of total variates explained by any particular factor.
  - b. The variables in this study coordinate with the variables identified by the subgroup as high priority and SES characteristics correlating with poverty.
4. Level of poverty is a priority correlate.
5. The current ADI is consistent with 2011 – 2015 data.
6. The ADI does not contain general demographic information. Some studies found higher correlation with SES than demographic information like race and age.

### See also

Appendix A: Glossary of Terms Related to Psychiatric Bed Needs

Appendix B: Barriers to Care

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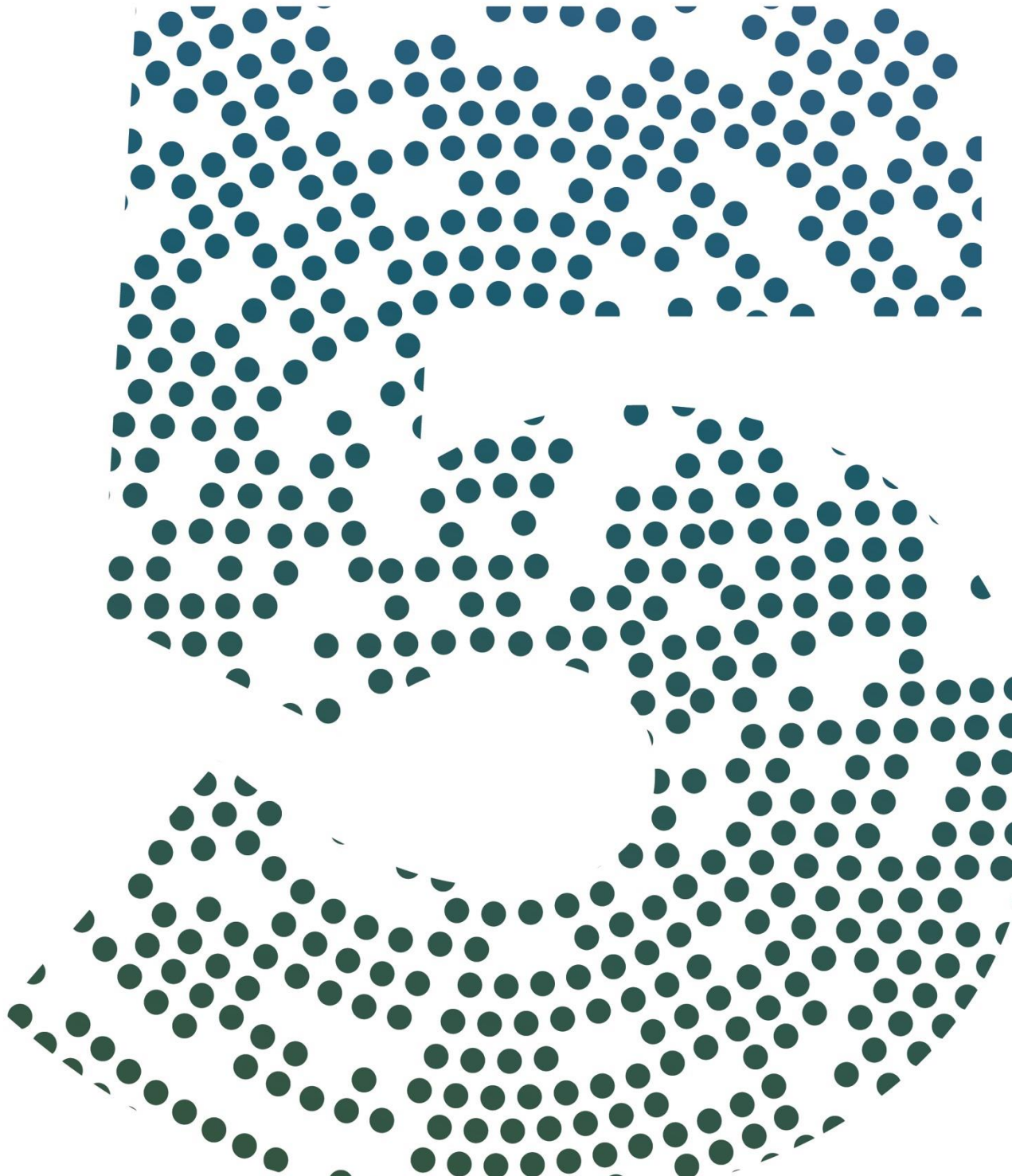


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## Section 5:

### Community System Contributors and Variables Impacting Hospital Bed Use





## Task Force Subgroup Members Contributing to This Section

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### A. Introduction

What services and resources in a community system might reduce the need for functional psychiatric beds? What system elements and variables might increase need? This section focuses on data-supported interventions proximal to the entry and exit points of hospital-level care, as well as an array of variables that can impact the number of hospital-level placements needed in a given community.

In a 2016 position statement, the American Psychiatric Association called for a series of features to be part of a comprehensive system to support individuals with serious mental illness (APA, 2016). Many of these features apply to effective community mental health systems in general. Drawing from and expanding on that statement, we propose that services shall be:

- Accessible (including access to telehealth technology).
- Evidence-based (when an evidence base has been established).
- Delivered in the least restrictive setting possible.
- Appropriate to functional status.
- Integrated to address co-occurring conditions and complex human service needs of the person served.
- Adequately funded and resourced.
- Person-centered, strength-based, recovery-oriented, trauma-informed.
- Culturally and linguistically sensitive, taking into consideration social, cultural, ethnic, racial, language spoken, gender identity and expression, sexual orientation, sensory disabilities, and economic factors (through an intersectional approach, with care delivered in a way that is culturally relevant).
- Accountable for coordinating and supporting transitions across levels and sites of care.
- Systematically evaluated through a High-Value Care Performance lens, where dimensions of efficacy, effectiveness, mortality, safety, cost, and experience (patient, family, employee and other key stakeholders) are defined uniformly and quantified and measured over time and across systems.

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***Ideally, a comprehensive community system would provide an appropriate array of services to meet all levels of intensity and complexity of need. Hospitalizations within such a community system would be appropriately utilized and readily available for those individuals who need that level of intensive supervision and intervention.***

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Ideally, a comprehensive community system would provide an appropriate array of services to meet all levels of intensity and complexity of need. Hospitalizations within such a community system would be appropriately utilized and readily available for those individuals who need that level of intensive supervision and intervention, with 24-hour medical/nursing management. All hospital beds would be utilized for their intended purpose, and discharge disposition options—be they intensive outpatient referral, residential crisis services, transition placements, rehabilitative programs, or shelter placements—would be comprehensive and tightly interconnected to community services. Reimbursement rates would be proportionate to levels of service, including hospitalization and diversion beds (placements that are appropriate alternatives to hospital-level care). Payor guidelines would consistently facilitate matching an individual’s care needs with medically necessary and most appropriate resources. Compensation for physicians providing the service would be equivalent to those providing medical/surgical services, and financial incentives ensuring that the right patient is treated at the right time, in the right place, would be built in the model. Critical exploration on this topic was completed in 2005 by the Acute Care Work Group, whose recommendations included that acute care fully involve patients and families, promote assessments of community readiness, increase community-based alternatives to inpatient and residential acute care, train the acute care workforce, reduce fragmentation, and modify financing to fund the full continuum of acute care services (Acute Care Work Group, 2005).

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***In reality, a wide range of variables impacts hospital bed utilization.***

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In reality, a wide range of variables impacts hospital bed utilization. An individual's wellness can be shaped by psychiatric diagnosis, burden of illness, treatment and response trajectories, and psychosocial and legal factors across jurisdictions. Complex determinants of mental health and functioning may include co-occurring substance use and/or intellectual/developmental challenges, psychosocial factors, educational factors, vocational factors, financial factors, and general medical comorbidities. (For a discussion of population variables, see Section 4 Population Variables.)

Further, no two communities have identical resources or systems. For a given community, it is important to know not only whether certain service elements exist and are accessible, but whether they are of sufficient *scale* (capacity, reach, accessibility) to meet the community’s needs. Reimbursement variables impact not only hospital-level services but the entire continuum of care. (See Section 3 Financing of Psychiatric Beds.)

Acknowledging that there are innumerable population and system variables that can affect hospital level of care in a given community, this section focuses on specific system variables and influences that can affect the need to use hospital-level care. Variables are organized, below by the generalized expected impact on bed utilization for purposes of modeling: “likely to decrease/increase” functional bed utilization or “variable impact” on utilization. The authors acknowledge that the services and variables identified would, in reality, impart nuanced and potentially bidirectional impact at any given point in a system; implications for bed utilization are generalizations offered for purposes of modeling.



The section authors recognize the limitations inherent in looking at a cross-sectional, versus a longitudinal, view of a community system and factors that impact it. They also recognize that there will be individuals and populations not yet identified (or “visible”) to a given system, who will require services of that system.

Rather than limiting the below descriptions to what services may be associated with the designations *serious mental illness* (SMI) or *serious and persistent mental illness* (SPMI), this section adopts a broader approach, considering functional needs of any individual, with any level of service need, at a given point in time. The below outline represents a collection of services which in most communities are administered by diverse provider types (with equally diverse funding sources), and that a single unified system overseeing all such services would, to many, represent the true “ideal.” While such discussion is critical, it falls outside the scope of this section.

It is not the intention of this section to suggest that bed utilization is inherently desirable or undesirable. Rather, the authors seek to elucidate a range of potentially *high-impact* or *high leverage* factors worth consideration in estimating bed need, including for purposes of modeling.

## **B. Services and Variables Influencing Utilization Hospital-Level Care**

A comprehensive crisis system responds early, has a full range of diversion services (resources serving as appropriate alternatives to hospital-level care for an individual at a given point in time) and continuing care through a crisis, offers ongoing support and transition from higher levels of care, and recognizes that a crisis typically extends for a period of time, and is not a one-time event.

### **1. Likely to Decrease Functional Bed Utilization**

#### ***a) Full Continuum of Crisis Services***

A portion of the general population will experience a mental health crisis which may be a single or circumscribed lifetime event. Rapid access to a responsive and comprehensive crisis services system can play a crucial role in determining whether a hospital-level of care will be required. A well-developed crisis system with a call center, mobile crisis service, walk-in center, crisis center, and crisis beds can divert many individuals to appropriate hospital alternatives (NASMHPD, 2017). Comprehensive self-assessment tools and tool kits are publicly available and include, among others: the Crisis Now Scoring Tool (NASMHPD, 2021), the National Councils’ Roadmap to the Ideal Crisis System (National Council for Mental Wellbeing, 2021), and SAMHSA’s National Guidelines for Behavioral Health Crisis Care Best Practice Toolkit (SAMHSA, 2020).

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***Elements of a crisis continuum typically are designed to meet the needs of a person in crisis and generally include three tiers of services: someone to talk with, someone to respond and a place to go.***

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Elements of a crisis continuum typically are designed to meet the needs of a person in crisis and generally include three tiers of services: someone to talk with, someone to respond and a place to go.

**Call Center and Helpline.** Effective call centers can function to address the reason for the call which could include crisis resolution, provision of information, as well as triage to other available urgent care and in-term care services. Information from the National Suicide Prevention Lifeline (NSPL) finds that many individuals rate the interaction with NSPL call alone as effective in having averted actual suicide. Data from a community system in Arizona demonstrated that as many as 80% of calls result in crisis resolution without need for further higher level of care or intervention (Balfour, 2020).

Beginning in July 2022 a new dialing code, 988, will be available nationwide to access a helpline with trained counselors to respond to suicide and mental health related distress. It will operate through the existing NSPL's (1-800-273-8255) network of more than 200 locally operated and funded crisis centers across the country. The transition to 988 is an important step in strengthening crisis care throughout the U.S. (SAMHSA, 2022).

**Mobile Crisis Teams.** Many communities are developing mobile behavioral health crisis response teams that include behavioral health professionals that are equipped to deescalate and address crises in community settings. These may be part of a clinic-based setting and may also be part of a community first responder cadre that is deployed from a community 911 dispatcher either with or in lieu of emergency medical service or law enforcement.

**Crisis Hub or Crisis Center.** These are centers staffed with behavioral health professionals that are designed to assess and manage all individuals that arrive. These may be walk in individuals and often also include law enforcement drop offs for individuals who might otherwise have been detained and arrested. The rate of need for inpatient admission varies but these can play an important role in reducing demand for inpatient beds by resolving the crisis at hand and providing effective aftercare. "Living room" type crisis centers are distinct in that they typically accept self-referred individuals in distress.

Different intensities of facility-based crisis services are associated with different outcomes — for example, "living room" type crisis centers that accept low-acuity voluntary patients versus secure inpatient units that accept high-acuity patients.

**Medical Triage and Screening.** This is an important issue that is too often a rate limiting step if it mandates a screening and assessment through an emergency room physician and has been resolved differently with the myriad of models for staffing of call centers, mobile teams and crisis centers. For the purposes of this report, it is highlighted because some crisis systems require a general screen for acute medical problems before acceptance, whereas others accept all individuals and are adequately staffed to screen for, diagnose and manage basic medical problems that would be presenting along with the behavioral crisis.



**Psychiatric Services in Emergency Care Delivery.** Ideally, there would be no wait time in an emergency department setting prior to transition to hospital level of care once necessary next level of care has been determined. Emergency services may be delivered outside of emergency departments. Active treatment is initiated early in engagement, as in the EmPATH (Zeller, 2017) and Alameda models (Virginia Division of Legislative Services, n.d.).

- Psychiatric evaluation (including via telehealth when on-site psychiatry is unavailable), including recommending the most appropriate level of care and acute treatment pending disposition.
- Psychopharmacology: initiation, monitoring, adjustment of medication if indicated, and treatment of acute agitation.
- Detoxification under medical monitoring and buprenorphine induction.
- Peer support services.
- Social services.
- Care coordination, including “warm” hand-offs.
- Staffing, training, and facilities to care for high behavioral acuity.

**Crisis Residential Services.** These are settings that typically provide 1–2-week length of stay for individuals in crisis. Typically, there is some access to psychiatrist and nursing staff, but these are not designed to provide medical monitoring that is on par with hospital level of care. Examples include “adult treatment units” or “subacute facilities” which may provide diversion or step down from inpatient level of care and may accept individuals as a step down from inpatient care.

**Intensive Community-Based Crisis Intervention and Critical Time Intervention** (North Carolina Dept. Health and Human Services, 2019). There are services (including service provided by specialized teams) that can meet the needs of those requiring “routine” crisis services, and those who frequently utilize crisis services and either, do not engage readily with or benefit from routine services (including those with a history of frequent hospitalizations without improvement). Intensive community-based crisis intervention is a component of the ideal crisis continuum that is described in detail in the National Councils’ Roadmap to the Ideal Crisis System report (National Council for Mental Wellbeing, 2021). It consists of intensive team-based 30- to 90-day “bridge services” that may be home or office based, and which help individuals and families who have experienced a crisis episode (which may include anything from a single mobile crisis visit to a hospital stay) to receive appropriate levels of intensive and flexible support and treatment until they are able to be successfully connected to “routine services.” These services are generally designed to function for people in crisis as they present in the system. One subtype of this service is an intensive team designed for a specific cohort of high-risk individuals who are frequent service users. The cohort is followed over time to reduce their frequency of crisis presentations. Within any of these service types, critical time intervention is an evidence-based practice that can be successfully applied to organize service delivery.





**Post-Crisis Follow-up.** This can include availability of routine access to post-crisis follow up services, including phone calls for caring contacts, home visits, intensive crisis intervention team outreach, and provision of transportation to facilitate service access.

***b) Comprehensive Ongoing Community-Based Services***

Community mental health centers and community-based providers play an essential role in mitigating the need for inpatient psychiatric treatment. Accessible, high quality outpatient treatment that has some capacity to help each patient identify their risk for crisis (triggers), develop a person-centered crisis management plan as a part of routine treatment planning, and work with individuals to step up the intensity of service when persons are at risk of crisis can be very effective. There are populations of individuals with a higher intensity of need for psychiatric services who may be at chronic high risk of hospitalization unless provided comprehensive continuing care services on an ongoing basis (Crisis Now/NASMHPD, n.d.; SAMHSA, 2020). There are several services that can be effective in assisting a person in the management of illnesses and crisis management before they become a full crisis.

**Outpatient Psychiatric Services.** Outpatient services, including pharmacologic evaluation, monitoring and support can help individuals manage illness and address risk for crisis early so that admission is avoided. This requires the capacity to increase intensity of visits and adjust medication to avert decompensation. Best practices for psychopharmacology that maintain illness stability include access to clozapine therapy and the use of long-acting injectable medications for some illnesses. The Certified Community Behavioral Health Clinic model is currently supported as a demonstration by CMS and as an expansion grant series by SAMHSA and this model includes required outpatient access standards and crisis services.

**Partial Hospitalization and Intensive Outpatient Programs.** These programs can serve as step up to routine outpatient and also as step down from psychiatric hospitalization. They often allow for a much longer length of stay (several weeks) compared to inpatient length of stay which is too often less than a week. They typically are comprehensive and provide psychiatric diagnosis and treatment monitoring including for psychopharmacologic treatment and provide intensive group based and individual interventions. Transportation is often a barrier to regular participation and smaller communities may not have sufficient demand to render these programs as financially sustainable.

**Team Based Care Models.** There are several models of team-based care that are generally designed for a specific and defined population of high needs and have been demonstrated to be very effective in addressing treatment needs in community settings and in voiding hospitalization. Two examples of these team-based models are Assertive Community treatment and Coordinated Specialty Care.

**Assertive Community Treatment (ACT).** This wrap around team-based care model is typically utilized for individuals with known serious mental illness and who have had multiple hospitalizations. They work with individuals intensely, often multiple times a day, and include a nurse and psychiatrist so that the full range of treatment can be provided and supported. Outcomes



data shows that ACT services lead to a reduction in crisis presentations and admissions, particularly for individuals identified as high utilizers of crisis services without the ability to engage in conventional outpatient treatments (Georgia Dept., 2015). ACT is widely known to reduce hospitalization, homelessness, arrest and to improve functioning.

**Coordinated Specialty Care (CSC).** CSC is a type of team-based care that is designed to address the needs of transitional-age youth who are experiencing the onset of psychosis. Like ACT, CSC is a multidisciplinary team that is designed to work with the individual and can increase or reduce intensity of contact depending on the needs of the person at a point in time. (National Council for Mental Wellbeing, n.d.).

**Assisted Outpatient Treatment (AOT) and Mental Health Court.** AOT is outpatient civil commitment and can serve as step up to increase engagement with treatment or as step down to facility discharge from inpatient care. Most states have AOT as a component of civil commitment statutes, however the actual utilization of AOT varies considerably. For individuals who are recurrently admitted and are unable to engage effectively with effective treatment, AOT can promote more sustained symptom remission, thereby reducing the likelihood of a need for hospital level of care (APA, 2019). AOT is a civil legal process and does not require a criminal charge. Mental Health Courts on the other hand, provide similar supervision for engagement with treatment but are triggered by an arrest and arraignment in a criminal court and their availability as an alternative to regular criminal court varies considerably.

**Case Management and Care Coordination.** These services are centered on care coordination and recovery support in the community. They are often involved in helping individuals address practical community living and support care coordination and follow up. In New York, for example, the Office of Mental Health developed a web-based platform for sharing data that supports care coordination (New York State, n.d.).

**Homeless Outreach Services.** Homeless outreach, coupled with access to scattered-site and congregate housing, may reduce hospitalizations for “street homeless” individuals with serious illness and substance use disorders. Lack of available housing may contribute to bed utilization, both by increasing initial admission rates and extending length of stay due to inadequate disposition options. (Center for Urban Community Services, n.d.; Coalition for the Homeless, 2021).

**Peer Support Services** (SAMHSA, n.d.). Peer support services include recovery support for individuals with mental illness or substance use disorders or dual diagnosis finding placement in rehabilitation programs in the community that provide housing, substance use disorder treatment and mental health care. Peer support services can be provided as a component of outpatient treatment or by peer run organizations.

**Psychosocial Rehabilitation and Clubhouses.** There are several models often provided in communities that provide general rehabilitation services and companionship and support recovery



by providing a sense of purpose and belonging. While they are not directly related to crisis management these types of services play a role in crisis prevention and early identification and intervention (Clubhouse International, n.d.).

**Community Based Recovery Support Services.** Two critical categories that support recovery and community stability include supported employment (SAMHSA, 2020) and access to supported housing.

***c) Facilitation of Transitions to the Community***

Successful transitions across levels and settings are vital to an effective system.

**From Hospital Level of Care.** Ideally, a hospital length of stay is sufficient to achieve stabilization and facilitate a smooth transition to the next level of care. A well-developed system reduces length of stay through access to stepdown beds and follow-up crisis care. Rapid follow-up (within 3 days) after discharge with suitable crisis intervention services reduces recidivism (McCullumsmith et al., 2015; AHRQ, 2015). Inappropriately foreshortened hospital stay raises the risk of recidivism.

**From Correctional Facilities.** Ideally, individuals transitioning back into the community following incarceration receive support sufficient to promote successful integration into community-based services. Detailed guidance has been published by the Bazelon Center for Mental Health Law (2009). Services may include assistance with housing, transportation, benefits, employment, outpatient services intake, and access to necessary pharmacotherapy resources. Case management services and peer support services within correctional settings can contribute to successful transitions. Rather than deactivate Medicaid, programs may suspend Medicaid, or allow individuals to enroll and be approved, pending release (Urban Justice Center, n.d.).

***d) Specialized Services for Specific Sub-Populations***

The capacity of a system to provide a continuum of services for populations with complex service needs is vital.

**Access to Specialty Units.** Some individuals require hospital-level care in a setting that provides specialty services, such as eating disorders treatment, medical-psychiatry services, intellectual disability services, sensory impairment-sensitive services, substance use disorder services, Dialectical Behavioral Therapy (DBT) programs, traumatic brain injury (TBI) and neurocognitive disorder-related services. Such capacity diverts and facilitates emergency department back-up and inappropriate utilization of general functional beds. Such availability impacts a system bidirectionally (both entry into and exit from hospital-level care). Having professionals with specialty expertise participate in care and transitions facilitates successful movement within a system.

**Transition Placements.** Individuals with complex care needs (e.g., with intellectual and developmental disabilities, individuals with TBI or neurocognitive disorders, individuals who require skilled nursing facility level of care) who cannot be discharged to available placement and await alternative placement may have a hospital stay extended. Caregivers may decline to have individuals



return to their care during a hospital admission. A crisis center can provide brief stabilization for 1-2 days then an individual can return to the home with in-home services. An individual in this instance can benefit from stabilization in the environment in which they will be living. A highly responsive system has processes to expedite disposition options for individuals in need of alternative placement, such as a skilled nursing facility or adult foster care. A responsive system “moves at the speed of the crisis.”

***e) State Hospital Facility Placements***

The impact that closed state hospital beds has had on the availability of acute psychiatric beds varies from state to state. Currently, there is a wide variety in utilization of state hospital beds such that some beds are available for acute and long-term admissions while others are only available for longer term use, or for unusual needs that cannot be met in the community. The proportion of state beds used for court-mandated assessments and admissions has increased tremendously such that some state hospitals are virtually only court-ordered admissions.

***f) Availability of Psychiatric Residential Placements***

Individuals with sufficient resolution of acute symptoms during an acute inpatient stay may not yet be ready to transition to an outpatient level of care but are able to transition to psychiatric rehabilitative residential care. Individuals with comorbid substance use disorder and intellectual/developmental disability may be represented in this group. Lack of available residential placement may extend an otherwise acute hospital stay.

***g) Availability of Intermediate Levels of Care***

Individuals no longer requiring an acute level of hospital care, but who may need longer-term care (including for treatment-refractory conditions) may require intensive residential treatment placements outside a hospital setting (Plakun, 2018).

***h) Appropriate Competency Restoration Placements***

Many individuals who are not diverted from arrest are referred, by default, for competency restoration. This phenomenon can be a major driver of the expansion of waitlists for hospital placements. Ideally, competency restoration referral would be applied extremely rarely. Competency restoration is frequently requested by courts even when there is no substantial value in prosecution, but only for the purpose of directing an individual to mental health care. This mechanism is expensive and non-productive. As reported by SAMHSA’s GAINS Center, “Hospital competency restoration is the most expensive form of restoration; due to cost pressures, there are not currently and likely never will be enough hospital beds to meet the demand. Further, even when, after a long wait, individuals are sent to a state hospital (rather than receiving treatment in jail or in the community), their ability to move forward following restoration is uncertain” (SAMHSA/Gains Center, n.d.). The availability of non-hospital alternatives in a community for such referrals is essential (Leifman and Coffey, 2020; OConnor, 2021).

***i) Availability of Highly Supervised Non-Hospital Alternatives***



A network of highly supervised residential settings may be utilized in combination to support individuals previously confined to long-term hospital placements. The state of Vermont implemented such a system after its state hospital was abruptly lost due to flooding (Nemethy, 2011).

***j) Persistently Symptomatic and High-Risk***

A small percentage of individuals outside of those with forensic service need a care setting with 24-hour medical management and support appropriate to the level of psychiatric care need.

***k) Forensic High-Risk***

Highest-risk individuals who have committed severe offenses, have unremitting psychiatric illness, and are considered at risk for high-risk behavior if outside of a secure treatment setting require long-term hospital level of care.

## **2. Likely to Increase Functional Bed Utilization**

***a) Diversion from Law Enforcement, Arrest, or Incarceration***

If a higher percentage of individuals in acute psychiatric crisis were diverted to the crisis system rather than arrested, the number of individuals coming into the whole crisis continuum would increase. Some of those diverted would require hospitalization. Data offers clues about the estimated volume of individuals who are diverted versus arrested by law enforcement related to presentations that are considered directly connected with a mental health crisis; diversion can occur post-booking but before arraignment, as well as pre-arrest, pre-booking (Leifman and Coffey, 2020; CSG, n.d.). Trauma-informed care is vital, considering that correctional settings house society's most traumatized individuals (Miller and Najavits, 2012).

***b) Access to Involuntary Admission***

In an agile system, most functional beds have the capacity to accommodate involuntary admissions. In many states, however, this is not the case, and therefore functional bed access is limited (Crisis Now/NASMHPD, n.d.). In states where emergency civil commitment has fewer barriers, more individuals will be presenting for hospitalization.

***c) Identification of Individuals with Complex Conditions***

In a comprehensive system, early identification of individuals who may have treatment-resistant conditions, but who are not currently in acute psychiatric crisis, may lead to hospital bed utilization to initiate complex treatment (e.g., electroconvulsive therapy, clozapine therapy) in a medically monitored environment. Population-based demographic trends—as a driver of increased demand—pertains here.

***d) Treatment Refractory Conditions***

Individuals with the onset of, or in the midst of an episode of, serious illness may show low treatment response to initial interventions during acute admission, and therefore require intermediate lengths of stay to allow for further evaluation, exploration of alternative interventions, and monitoring of response prior to transition to a less intensive level of care. Individuals with



comorbid cognitive disorders or those who are deemed to be Medically Frail may be represented in this group.

### 3. Variable Impact on Functional Bed Utilization

***Emergency Evaluation and Hold Statutes.*** Emergency evaluation and hold statutes vary from one state to another. Such laws impact the rate of release from, and retention within, hospital settings.

## C. Additional Considerations

There will be a disconnect between what hospital-level placements appear to be available in a system, and what placements are available in reality. For example, considerations such as milieu management in a hospital setting affect functional availability. The presence of double vs. single occupancy rooms, staffing considerations, and facility licensure affect access. “Patient mix” in a care setting exerts variable impact on functional bed utilization. Risk mitigation to ensure safety for all in the treatment environment also has an impact on bed capacity.

In some communities, additional types of resources may require consideration. For example, some communities are developing alternative supervised treatment settings for high utilizers of behavioral health and criminal justice acute services who require a supervised intermediate care setting—but not hospitalization—for that length of time (Medina, 2015). Some communities may have access to specialized services, such as Intensive Home Treatment, which may reduce the demand for functional hospital beds (Heath, n.d.).

Every system has unique nuances that incentivize how inpatient placements are utilized. Some states have institutions for mental disease (IMD) exclusion waivers that allow for increased capacity, while others do not (Treatment Advocacy Center, 2016; Eide and Gorman, 2021). Coordination between state agencies beyond the Department of Mental Health (or its equivalent), which varies widely from one jurisdiction to the next, can affect functional bed utilization by impacting numerous service intersections within a system.

There is much work to be done in considering and addressing structural/institutional racism within the field of psychiatry and within mental health systems of care, and how it affects access (NIMH, 2019).

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***Resources outlined above are far from equally, or equitably, available within and across communities.***

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Resources outlined above are far from equally, or equitably, available within and across communities. Further, barriers such as prescription medication pricing, lack of access to food and housing, and other socioeconomic factors are critical to consider in any community system and are not captured in this basic outline. Payor source heavily impacts resource availability. Insurance carried (or not carried) regularly determines whether an individual actually has access to the services needed.

Ideally, a model predicting capacity needs into the future would need to account for estimated changes in demographics over the period modeled—which may influence a gradual shift in the demand of services, year over year. (For example, demand for geriatric and home health care and autism specialty services for adults would be expected to increase.)

**Notes on implications for bed need capacity modeling.**

*A better-functioning system is expected to reduce bed need overall. However, it will also result in improved identification of individuals for whom higher intensity services such as ACT and AOT are appropriate, potentially increasing service use for some in need. The bed need capacity model will need to account for such differences in need. Individuals receiving early interventions may demonstrate decreased functional bed utilization over time.*

**Consultants**

*The subgroup members thank the following consultants for volunteering their time and expertise to assist the subgroup in improving and expanding this section:*

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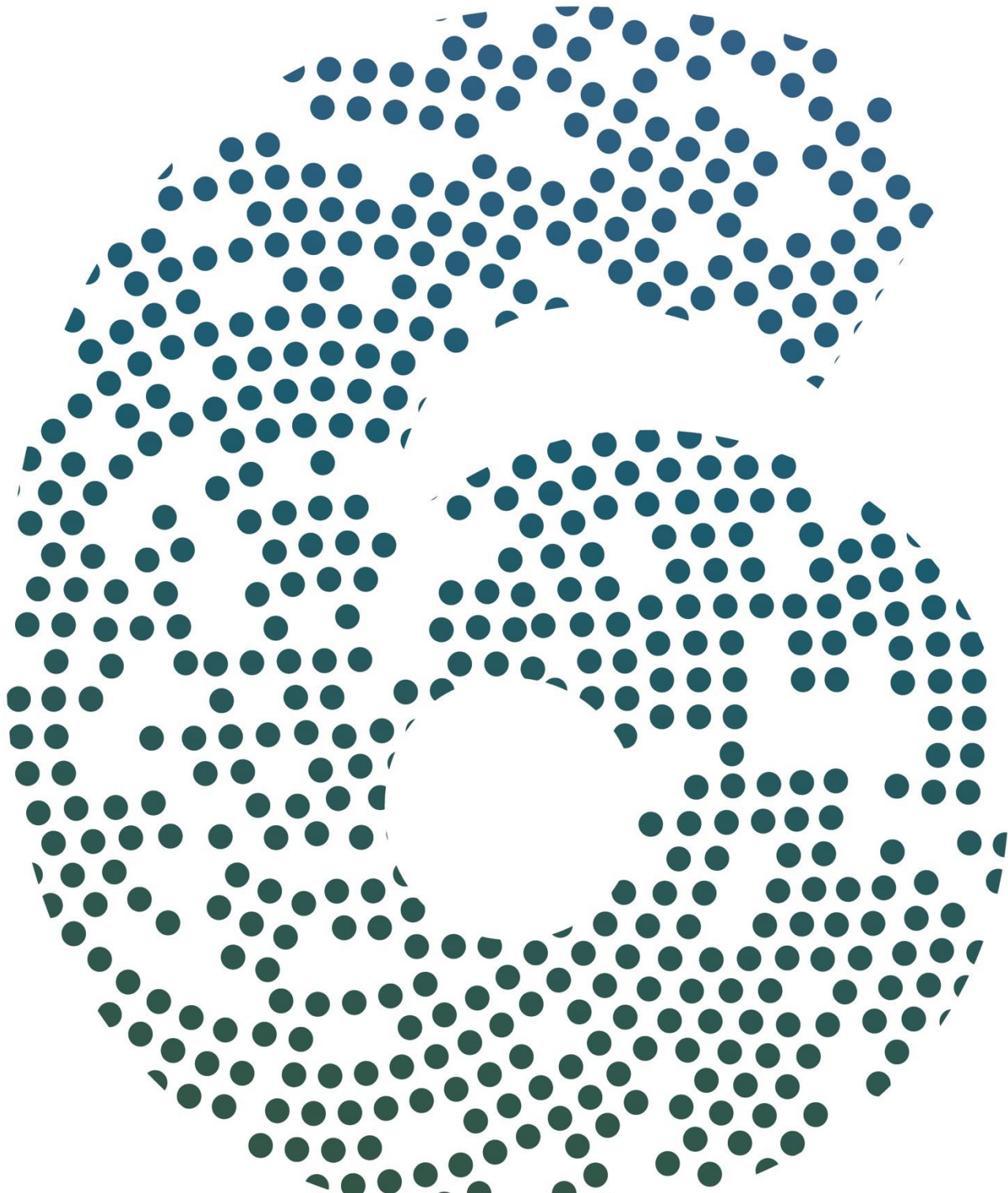
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#### Additional Resources:

- Pinals, Debra A. (2020). *Crisis Services: Meeting Needs, Saving Lives*. Alexandria, VA: National Association of State Mental Health Program Directors. [Crisis Services: Meeting Needs, Saving Lives \(nasmhpd.org\)](#)
- NASMHPD and the Treatment Advocacy Center. (2017). *Beyond Beds: The Vital Role of a Full Continuum of Psychiatric Care*. [TAC.Paper\\_.1Beyond\\_Beds.pdf \(nasmhpd.org\)](#)

## Section 6:

### Creating Models for Estimating the Number of Needed Psychiatric Beds





### Task Force Subgroup Members Contributing to This Section

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## A. Motivating Question: How Many Beds are Needed?

Within mental health systems, a continuum of care is required to meet individuals' needs in the most accessible and least restrictive environment (e.g., including outpatient services, crisis services, community support services, and inpatient psychiatric care) — as described well in other sections of this report (e.g., Sections 5 and 7). Although inpatient psychiatric care provides essential services to help stabilize individuals who are experiencing acute mental health crises, it is unclear how many beds are needed within a given community, region, or state to meet demand. To date, local and state decision-makers have typically been limited in their ability to effectively assess how many beds are needed within a given catchment region, relying on historical bed use and waitlist data for the region, rough estimates of the numbers of beds needed per 100,000 population, and/or budget and resource constraints. What is clear is that the number of beds per number of people alone is not sufficient to estimate system capacity. It is essential to also consider services that provide treatment and crisis services in advance of possible admission, as well services that could facilitate discharge once an admission does occur.

## B. Why is this a Complex Question?

Determining the number of inpatient psychiatric beds needed within a given region is a complex question. In particular, there are a number of different types of inpatient beds available that vary from community to community and state to state. The demand for these beds depends not only on the distribution of these beds (e.g., the percentage of inpatient beds in state psychiatric hospitals versus general hospitals) but also the array of other outpatient services, crisis services, and community support services available within the region. Communities with more robust outpatient, crisis, and community support service systems may require fewer inpatient psychiatric beds than those regions with a less robust non-inpatient service system. The number of beds required in a given region is also dependent on the underlying population within that region and the frequency with which acute psychiatric crises are experienced by the population, for example, varying depending on the population variables noted in Section 4. In addition, services that can result in effective and accessible discharge or step down are also a necessary consideration. Because of these interdependencies, the number of beds needed within a given region cannot be estimated using a simple ratio of the number of beds required per population or similar approach.

Decision support tools are needed to help inform and refine decisions about the availability of mental health services within a given area to ensure that individuals in need of services are receiving the appropriate level of care in a timely manner. Decision-analytic models can be used to simulate the



current demand for and supply of inpatient and outpatient mental health services to evaluate changes to the service system in real-time without making potentially costly and/or time-consuming changes to the actual system. For example, these models can estimate the effects of adding inpatient capacity on the number of individuals who can be served and amount of time these individuals wait for admission (for example, see La, et al., 2016). Similar scenario analyses can be conducted on other types of services as well (e.g., evaluating the effects of adding assertive community treatment (ACT) team, and/or mobile crisis capacity).

### C. Approach to Bed Needs Estimation

With mental health care delivery differing by context and content, state by state, building a universal model to estimate bed need proves challenging. The system dynamics model explained here is a preliminary effort at capturing the complex dynamics at play in a given service system. Our intention was to build a "concept model" representing common service components and pathways and realistic (adjustable) parameters that can be used to illustrate nonlinear queueing dynamics and feedback loops present in real-world systems. Feedback loops document interconnections between model variables that are important in shaping how the system responds to change over time. As one example, when waits for care in the ED or crisis receiving facility become longer, individuals in acute mental health crisis might be arrested, temporarily pulling them from the acute mental health crisis system. However, some fraction of these individuals will need competency restoration, which utilizes limited inpatient resources, and may lead decision-makers to consider shifting civil inpatient capacity to meet urgent forensic needs. Doing so makes civil inpatient capacity more limited, leading to longer wait times (and the loop continues until other decisions are made).

Our concept model representing "Anytown, US" is meant to be realistic, but not real. We hope that such a model can serve as a prototype for future model iterations, adapted to capture more complex dynamics in a specific system or used to learn what balance of capacities is most appropriate under which community characteristics. We also believe that where definitions move the field toward adopting a common crisis service system vocabulary, discussion of an explicit conceptual (concept) model can promote a shared understanding of the most common but distinct patterns of system utilization and encourage revision of cross-system decision-makers' "mental models" (internal and too-often unshared and unchecked understanding) of how the system should function.

While there are many approaches to building a simulation model, a system dynamics model was chosen because: (1) it focuses attention on the interconnected stocks (accumulations, e.g., people currently served or waiting in various model components or discrete services) within the system as shaped by the balance between in-flow (demand) and out-flow (e.g., stabilization, transfer, discharge) over time – and the factors that affect those flows; (2) it allows for studying a system more broadly by mapping and then modeling its behavior at a higher level of aggregation than other approaches like individual-based microsimulation or discrete event simulation modeling; and, (3) it encourages consideration of system feedbacks – ways in which the system responds to changes in outcomes over time that can either create



balance (“balancing” or control loops) or encourage further change (“reinforcing” vicious/virtuous cycles) (Lich et al., 2013; Morrissey, et al., 2012; Hassmiller Lich and Kuhlberg, 2020; Sterman, 2000).

Related to the second point, system dynamics allows the creation of a model dashboard that decision-makers could interact with in real time to learn how changes in the capacity of different model components affect system outcomes. This is useful to communities striving to learn how to improve community-level outcomes (e.g., collaborations seeking to find the right balance of system resources that reduce wait times with fixed resources/budgets). They can be used to make the business case for growing resources within a given system component (e.g., hospital unit, community crisis resource, jail diversion program) or for shifting resources across organizational/sector lines (e.g., increasing the budget for mobile crisis or civil inpatient care through re-allocating forensic or criminal justice resources that can be used to prevent and reduce criminal involvement of individuals in acute mental health crisis). Decisions about how resources are allocated are made at the community, regional, and state levels – and decision support models such as this can inform piece-wise decisions as well as grow coordination across the system. Whether decision-makers represent community organizations, local or state government, health system leadership, payers, patients, patient advocates, legislators, or other perspectives, decision support models can be used to check their understanding of cause-and-effect relationships (e.g., how changes in model parameters they or others might affect will alter outcomes they care about). System improvement starts from having a better and shared understanding of complex system dynamics. Despite these benefits, a recent review of simulation applied to mental health (Long and Meadows, 2018) found that interactive dashboards such as this were incredibly rare, having been built for only eight studies (of 160 identified), largely with a much narrower modeling focus than proposed here. The model’s dashboard was designed for direct decision-maker use in only one of these eight studies, and that with a very narrow purpose (menu planning). Clearly a concept model with an interactive dashboard is needed to advance the use of simulation in mental health system strengthening initiatives.

A system dynamics model was developed using Vensim software (<https://vensim.com/>) to simulate the stocks (numbers of) individuals in each of nine clinical service components of the system serving adults in acute mental health crisis over time: number in community, in the emergency department waiting, in the emergency department (receiving care and/or boarding), in a hospital bed, in a crisis receiving center, in a community-based crisis bed, engaged with intensive team-based care, in jail awaiting competency restoration, or in competency restoration. Flows into and out of each stock are depicted in the model structure diagram presented in Figure 1 (Panels A-F), along with key variables affecting rates of flow and important outcomes to track. The model structure diagram was developed by coauthors of this section, with input from Task Force members, with the goal of providing an overview of system structure common across many U.S. communities.

The current version of the Anytown, US concept model includes structure in the diagram, except for that indicated with dashed lines, and simulates outcomes over time that are described in bold plum-colored font. Clouds are used to denote model boundaries; flows from a cloud indicate data or equations are used to calculate inflow, but specific model structure producing those numbers are not included in the model (e.g., the community-based outpatient care system and how it affects the incidence rate of acute



mental health crises). Flows out to a cloud indicate explicit tracking of subpopulations ceases. The concept model simulates outcomes for a generic region of the US over a 1-year period. Definitions of key model components are provided in Table 2. For the Anytown, US concept model, we sought to include common acute mental health crisis system components present in diverse communities, though this required aggregating different types of inpatient psychiatric hospital beds delineated in Section 2 (e.g., state psychiatric hospital beds, general medical hospital psychiatric beds, private psychiatric hospital beds, VA health care facility psychiatric inpatient beds, medical/psychiatric unit beds, and scatter hospital beds).

**Table 2. Psychiatric Bed Need Model Definitions**

Model Component	Definition
Acute mental health crisis	Mental health crisis that "requires something more than a typical outpatient or phone intervention" (National Association of State Mental Health Program Directors, 2018)
Community-based crisis bed	Mental health beds located in community-based facilities that are less secure than mental health hospital beds
Intensive team-based care	Programs such as Assertive Community Treatment (ACT) teams that provide care to the most severely ill individuals in a given community, responding to their clients' acute MH crises.
Mental health crisis receiving center	Community-based facility where individuals experiencing acute mental health crises can receive up to 23 hours of psychiatric treatment and observation, resolving the crises or triaging patients to next levels of care (e.g., emergency departments, community-based crisis beds, inpatient care)
Mental health hospital bed	Inpatient psychiatric beds in secure facilities (e.g., state psychiatric hospitals, private psychiatric hospitals, general hospital psychiatric units, general hospital scatter beds, medical units with psych support)
Mobile crisis	Mobile teams that can be dispatched to respond to acute crises, resolving the crises on site or triaging patients to next levels of care (e.g., emergency departments, mental health crisis receiving centers)
Step-down program*	Treatment programs such as intensive outpatient programs and partial hospitalization programs that allow individuals to return to the community while receiving more intensive services that might otherwise be received in an inpatient setting

\*Included in qualitative model structure diagram but not in the quantified concept model

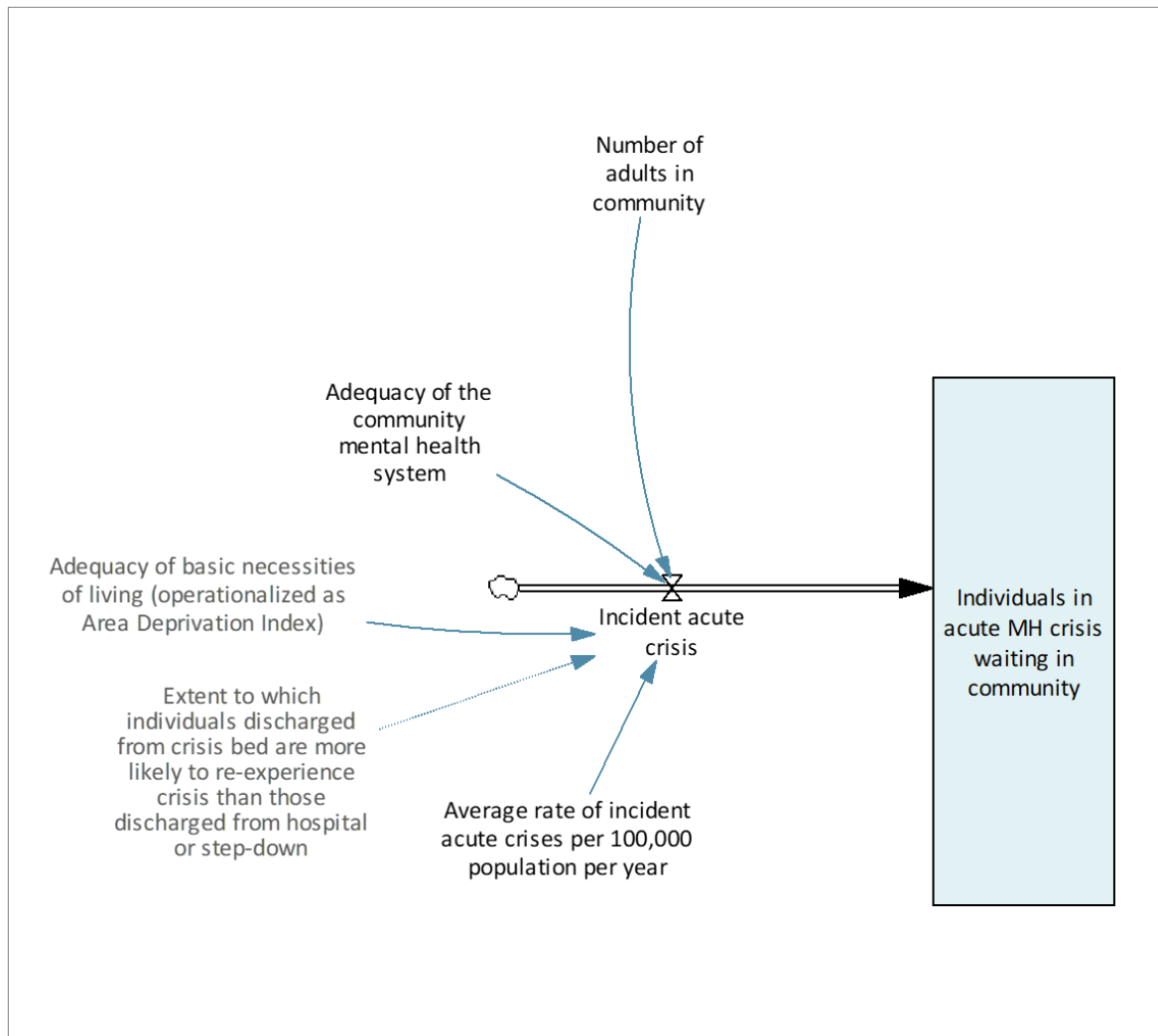
Note: these are simplified definitions for use in the concept model.

## D. Model Structure

For the concept model representing Anytown, US, we considered multiple factors influencing the magnitude of bed need in many service areas including the population size, estimates of the rate of acute mental health crises per 100,000 population, adequacy of the community mental health system, intersection between the mental health and criminal justice systems, and outpatient and inpatient capacities. While model community outpatient service system adequacy or capacity is not explicitly modeled, it enters the model through a parameter adjusting the rate of acute mental health crises per year, assuming a stronger and more accessible outpatient system will reduce but not eliminate acute crises. Relationships between each of these factors and bed need are illustrated schematically in the model structure diagram presented in this section (built up through Figure 2 Panels A-F). Empirical studies and expert opinion were used to inform the directionality and magnitude of these relationships, with placeholder data used to populate concept model input parameters. When adapted to a given community, these parameter values represent a starting point, but will need to be re-estimated/updated given local data, expert opinion, and current evidence.

As shown in the model structure diagram (Figure 2A), individuals in the community experience a given number of acute mental health crises annually. This number of crises is affected by several factors, including the average annual rate of crises per 100,000 population, the number of adults in the modeled community, and other relevant characteristics of the community (i.e., the adequacy of the community mental health system represented through a multiplier that could scale up or down the acute crisis rate), and the number of individuals engaged with intensive team-based care). Future iterations of the model may further take into account other factors affecting rates of acute mental health crises (e.g., adequacy of basic necessities of living), as denoted in the diagram using dashed lines.

Patients in acute crisis enter the acute mental health crisis system through three pathways — the emergency department, community-based crisis care, and the carceral system — and then stabilize after receiving this or other downstream care. These three pathways correspond to three overlapping service strata whose capacity to deliver mental health care depends on several factors whose relationships to each other and outcome variables are delineated in model structure diagrams and text below. The model attempts to measure key outcome variables important to different decision-makers and other stakeholders within a given community. These include the number of acute mental health crises, mobile crisis encounters (if such services exist in the area), time spent in the emergency department, jail, or other patient pre-admission holding area, the volume of mental health crisis arrests, utilization of beds (e.g., average and variation in census), as well as length of stay in service components. For some, discharge from the acute mental health crisis system will eventually precede re-admission, making it important to capture key “feedback loops” shaping the special circumstances like arrest during acute crisis and release with/without linkage to community supports or discharge support from emergency departments, inpatient stay, crisis beds, or other service components have on the expected time to a next acute crisis.

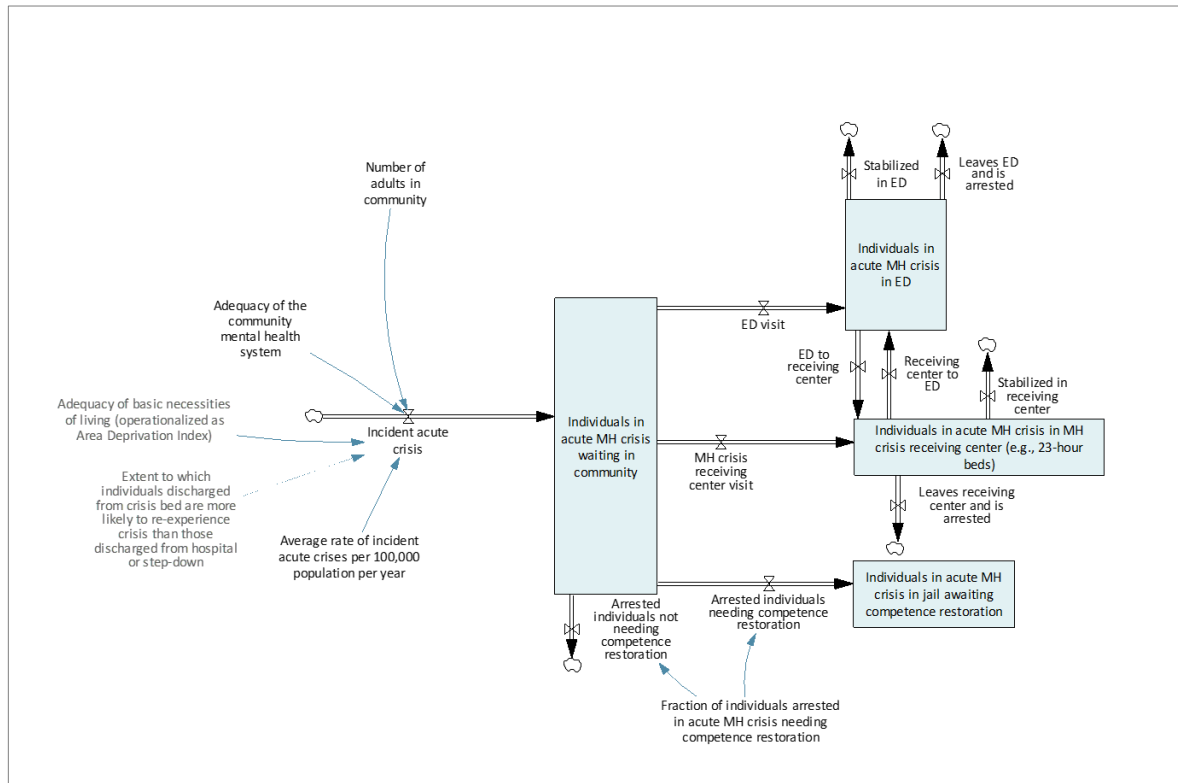


**Figure 2 Panel A: Model structure diagrams are used to present an overview of the model’s structure, including key variables and their effects (black text and blue arrows) and flows (pipelines) that determine the number of adults in acute mental health crisis in each stock (shaded box) over time. Here we see the modeled factors affecting the number of incident acute mental health crises among adults over time. Initially, individuals in crisis are in the community (as opposed to an acute care setting) until they transition out (not shown). A cloud indicates model boundaries – dynamics not explicitly modeled. For example, while we track incident crises, we do not model how they occur as a function of population interactions with a community outpatient care system. NOTES: MH = mental health.**

The model assumes that individuals in acute mental health crisis who are waiting in the community can access mental health services or experience events that impact future service use through one of three pathways: by visiting an emergency department (ED), by visiting a mental health crisis receiving center, or by being arrested (where they may or may not receive competency restoration or other therapeutic services). Based on expert clinical opinion, a typical community might see approximately 47.5% of individuals experiencing crises seeking care in an ED or mental health crisis receiving center, each, with the remaining 5% of individuals expected to be arrested. The longer an individual has to wait in either



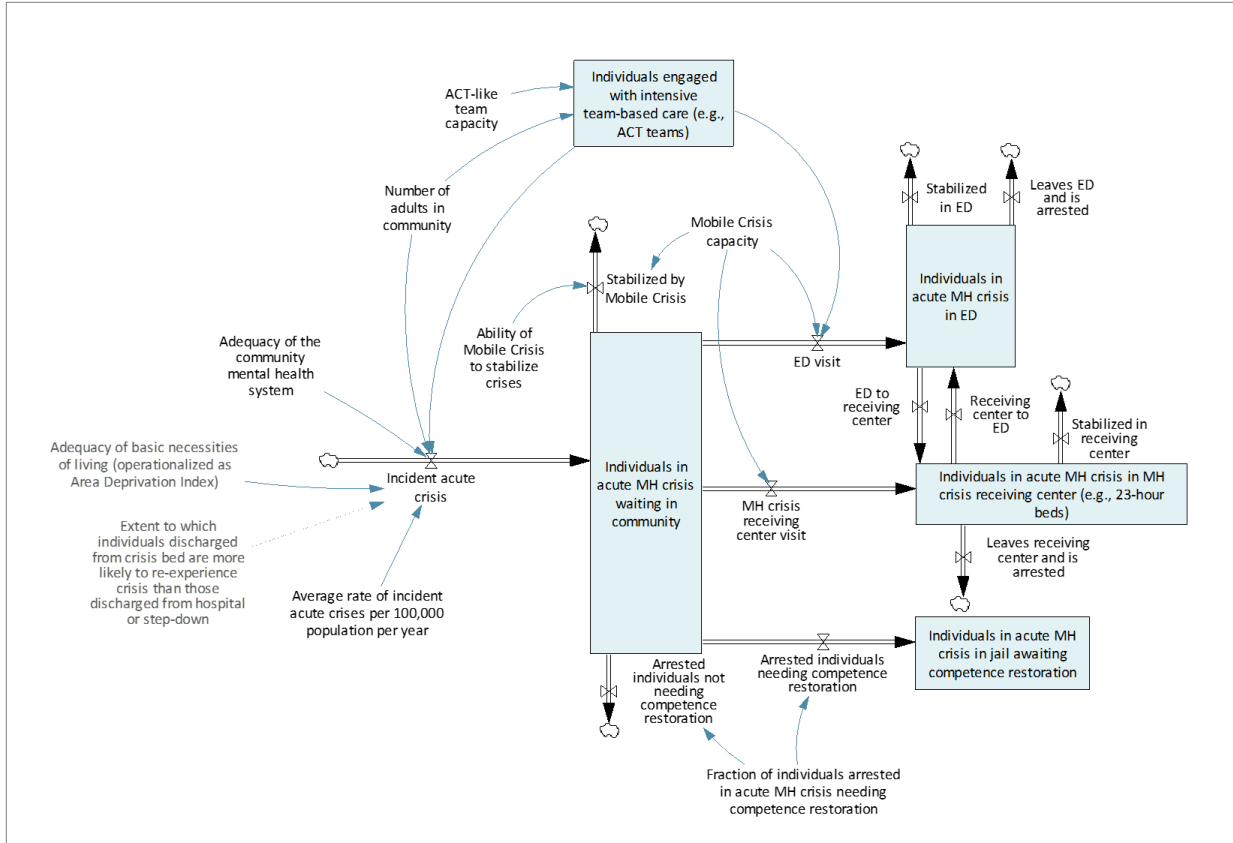
care setting, the chances increase that they will abandon the facility, leading to a chance of arrest once back in the community before they receive additional support.



**Figure 2 Panel B: Model structure diagram depicting three pathways through which adults in crisis enter the acute mental health crisis system – through an ED, crisis receiving center, or jail. Not illustrated, if wait times exceed a specified threshold in the ED or the crisis receiving facility, we assume individuals cycle back to the community where they are again at risk of arrest. As described in Figure 2-A, clouds indicate model boundaries. In Figure 2-B you can see that we do not model community services received after individuals leave the acute crisis system (e.g., after they are stabilized or arrested without need of competency restoration). NOTES: ACT = Assertive Community Treatment; ED = emergency department; MH = mental health.**

Beyond these three pathways, the model includes the provision of mobile crisis and intensive team-based care (added in figure 2-C). Mobile crisis teams go onsite to help an individual in acute crisis with the goal of stabilizing the situation, which this model estimates to be 50% of the time or directing the individual to a crisis receiving center or ED where they can receive the most appropriate care, which 50% of the time results in hospitalization. Each mobile crisis team may engage up to four individuals per day in acute crisis.

Intensive team-based services work with an identified group of individuals with chronic need who experience an estimated 12 crises per year (“frequent users” of the acute care system). Intensive wrap-around services are estimated to reduce the number of acute crises entering the system by 90%. When inpatient care is needed, patients are routed to the ED (avoiding risk of arrest). Each team services a group size consisting of 50 individuals.



**Figure 2 Panel C: Model structure diagram adding intensive team-based care stocks and mobile crisis capacity (which supports stabilization pre-receiving facility in some cases and guides patients to the most appropriate receiving facility, avoiding arrest). NOTES: ACT = Assertive Community Treatment; ED = emergency department; MH = mental health.**

As illustrated in Figure 2-D, individuals in acute mental health crisis in an ED can stabilize and return to the community, leave the ED before being stabilized (some will return to the ED or seek care at the crisis receiving center, while others may be arrested with the same probabilities as used for initial routing) or they may be admitted to a mental health hospital bed. As described in Section 5, because the length of stay for individuals admitted to a mental health hospital bed or crisis bed can either be short (e.g., “acute” -- under 30 days) or, less frequently, longer, we assume that length of stay follows an exponential distribution to capture both. To ensure a minimum length of stay once admitted, we implement a third-order exponential time delay (i.e., pass individuals through a series of three exponentially distributed delays before being discharged). Individuals admitted to mental health hospital beds are assumed to have an average length of stay of seven days and then are discharged from the hospital. While not currently included in the concept model, Figure 2-E documents the potential role step-down programs could play in offering an alternative treatment option from inpatient care (hospital or crisis beds).

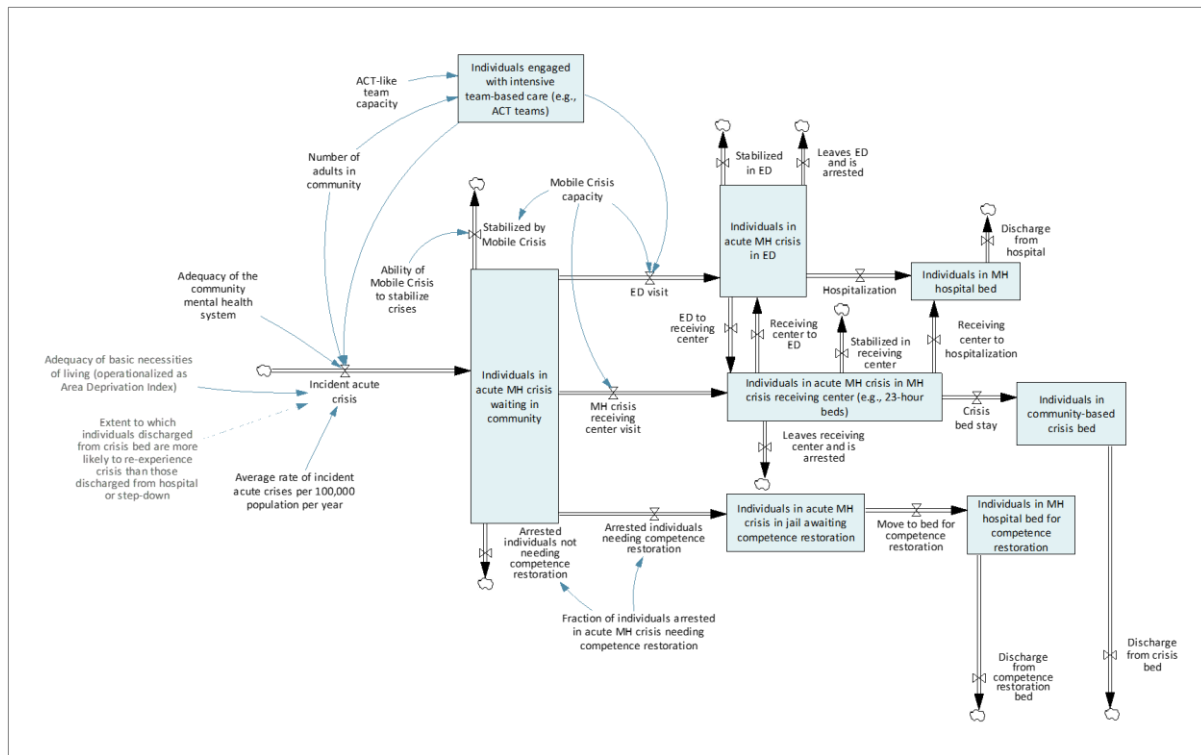
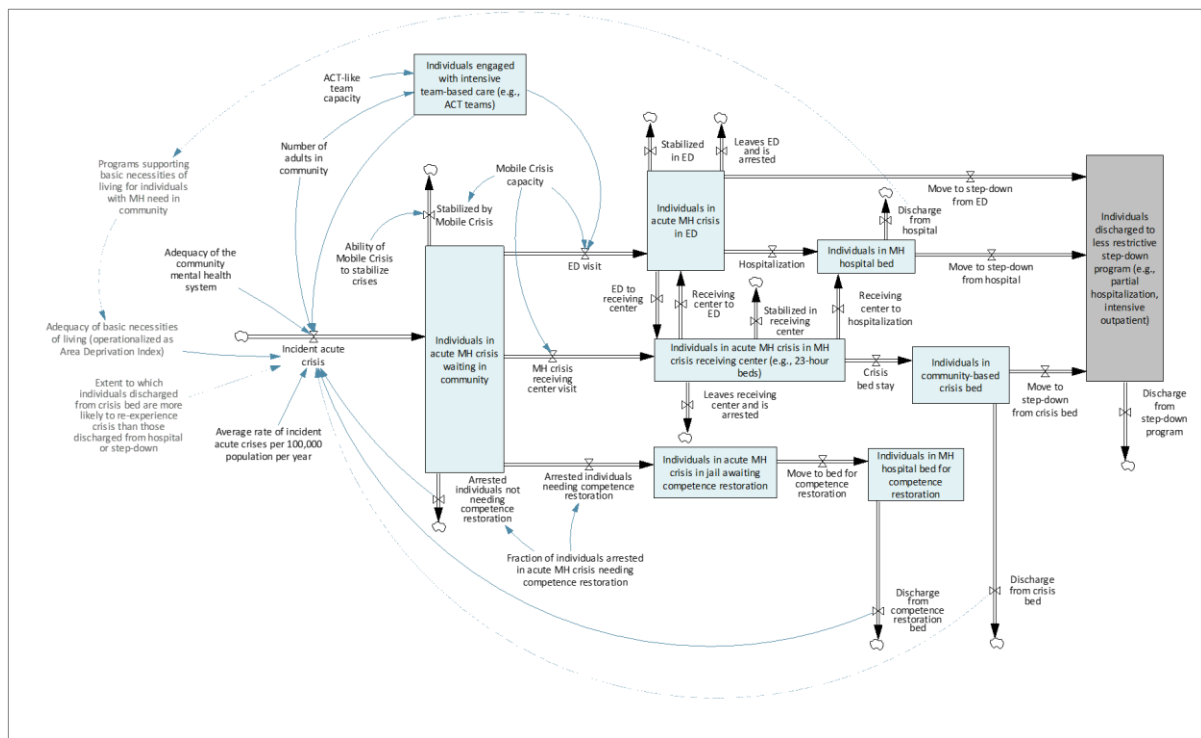


Figure 2 Panel D: Model structure diagram adding flows between receiving centers, and from receiving centers to inpatient services and the community. NOTES: ACT = Assertive Community Treatment; ED = emergency department; MH = mental health.





**Figure 2 Panel E: Model structure diagram depicting role of step-down programs (not currently included in the concept model, thus shaded in grey). NOTES: ACT = Assertive Community Treatment; ED = emergency department; MH = mental health.**

Individuals seeking care from a receiving center (e.g., 23-hour bed) can stabilize and return to the community, leave the receiving center before being stabilized (and as with EDs, seek care subsequently in either an ED or return to the crisis receiving center, or be arrested, with the same probabilities used for initial routing), or be admitted to either a mental health hospital bed or a community-based crisis bed. From the ED and mental health hospital bed, pathways are the same as described above.

Individuals admitted to a community-based crisis bed are assumed to have an average 14-day length of stay before being discharged.

And last, for individuals in acute mental health crisis who are arrested, the model assumes that 80% do not require competence restoration. The current version of the model focuses on the remaining 20% of arrested individuals who do require competence restoration and does not yet include other aspects of the forensic mental health system – because there is little interaction among resources on the civil and other aspects of forensic care (though this simplifying assumption can be revised if appropriate when adapting the model to a specific location). Individuals requiring competence restoration wait in jail before moving to an inpatient mental health hospital bed for competence restoration. The competence restoration process is assumed to take an average of 90 days before individuals are discharged. While jail time is not explicitly modeled, we do model individuals having been arrested undergoing an assessment of competence restoration needs, which requires five days to complete. Individuals released directly from jail into the community, after a delay (time served), do have an increased risk of acute crisis in the following 30 days. Given that these individuals were experiencing an acute mental health crisis when arrested, and have not received therapeutic care, the incidence of being in acute crisis for these individuals upon release is assumed to be high (85%), with the onset delay of occurrence following an exponential distribution. When these acute crises occur, individuals may engage one of the three initial service pathway portals described above.

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***The model structure describes the flow of individuals from the onset of an acute mental health crisis through the engagement of mental health services and care pathways (or lack thereof) and the role that facility capacity and resources limitations have on the process/outcomes.***

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The model structure describes the flow of individuals from the onset of an acute mental health crisis through the engagement of mental health services and care pathways (or lack thereof) and the role that facility capacity and resources limitations have on the process/outcomes. The model is required to address the flow of individuals who often have discrete outcomes or choices along a pathway, thus making it necessary to incorporate some details that can only be represented through random events which are drawn from probability distributions during the simulation execution. Most of these random events are associated with a decision by the individual (e.g., randomly determine whether an individual



in acute crisis goes to the ED, to the crisis receiving center, or is arrested prior to receiving care), however, there are also instances where the number of individuals in a specific population may be deemed to have an acute crisis at a time point. These random events sampled from probability distributions result in the stochastic behavior observed with the model. This is a deviation from conventional system dynamics modeling, making this a hybrid system dynamics/discrete event simulation model. It is a critical complexity to add, as most acute mental health crisis systems are operating right at the edge of their tipping points, where day-to-day variation drives undesirable outcomes such as excessive wait times.

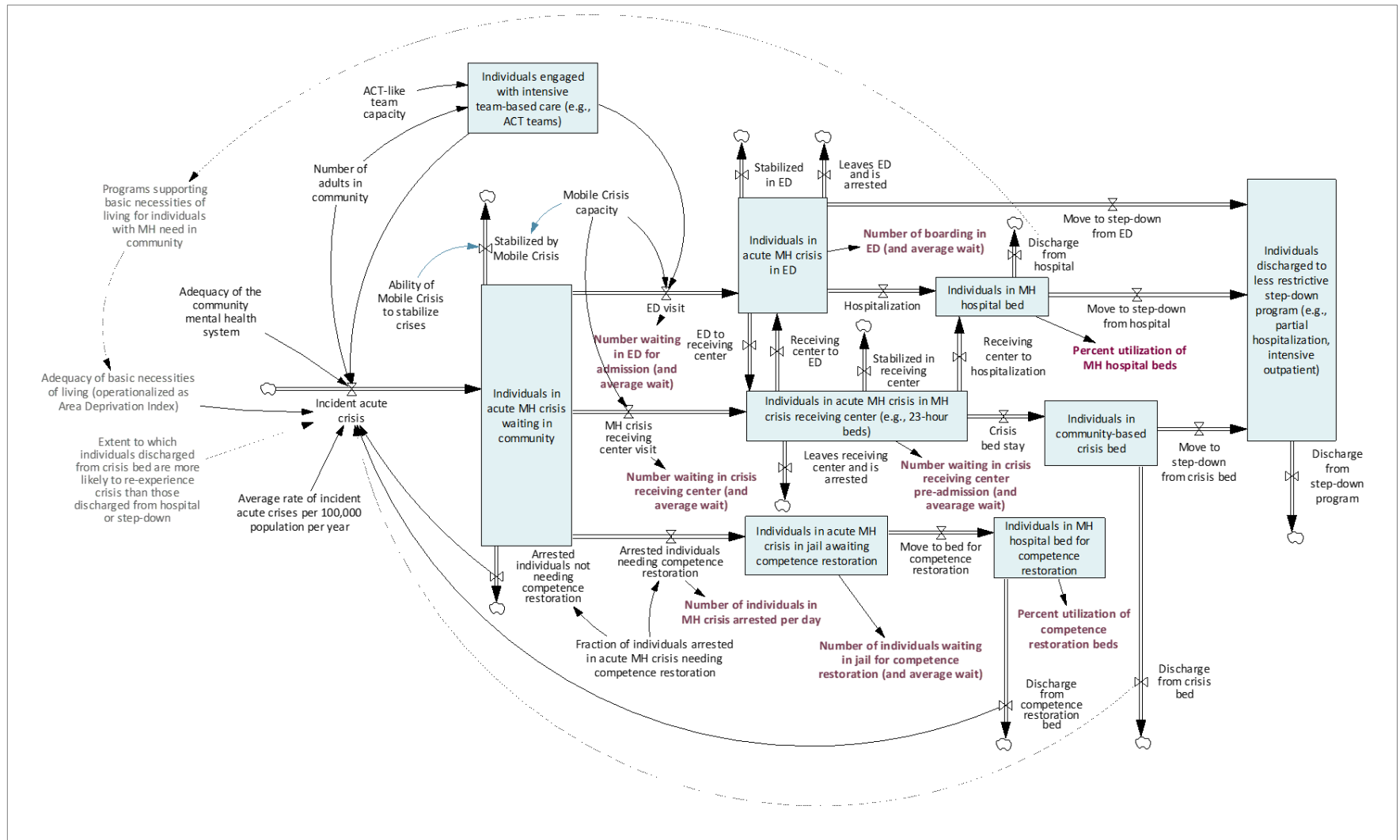


Figure 2 Panel F: Full model structure diagram, adding simulated outcome variables in bold plum-colored font. NOTES: ACT = Assertive Community Treatment; ED = emergency department; MH = mental health.



## E. Anytown, US Model Parameters, Results, and Dashboard Overview

### 1. Anytown, US Model Parameters

The current version of the model includes placeholder input values based on a hypothetical community, Anytown, US. These input values are based on expert clinical opinion, published literature, and/or assumptions. 3 presents the key model input parameters, including default values, sources, and assumptions.

**Table 3. Preliminary Psychiatric Bed Needs Model Parameters**

Input Parameter	Default Values	Sources and Assumptions
Population size (18+)	250,000	
Average annual rate of incident acute mental health crises per 100,000 population (Note: this excludes “high utilizers population” described in the next row)	2,400	Substance Abuse and Mental Health Services Administration (2020; estimated that each month 200 individuals per 100,000 population will experience a mental health crisis episode.)
Percent of the adult population who are “high utilizers” – defined as having an average of 12 acute mental health crises per year and eligible for intensive team-based care (if capacity allows)	0.1%	
Percent of individuals arrested who will re-enter the acute mental health crisis pathway within 30 days of release	85%	Assumption: high percent reflects fact that individuals were in acute mental health crisis when arrested. Note: If an acute crisis occurs, then the regular pathway distribution would be followed (0.475, 0.475, 0.050, see below).
Proportion of individuals in acute crisis entering Mental Health system through specific pathways		Expert clinical opinion
Arrival at ED	0.475	
Arrival at MH crisis receiving center	0.475	
Arrest	0.05	
Average capacity within the ED for adults in acute mental health crisis (varies over time to reflect fact that other patients compete for ED bed capacity)	50	Assumption (model starts initially with 3 individuals waiting to be seen, 8 being treated, and - 2 stabilized waiting for hospital boarding)
Number of individuals in acute crisis being treated/stabilizing in ED at start of simulation	8 people	Assumption
Average time spent waiting in community while in acute crisis before arrival at ED	0.25 days	Assumption
Average time before an individual leaving the ED due to excessive wait times is redirected back to care	0.25 days	Assumption
ED disposition (proportion of individuals, among individuals seen in ED)		Expert clinical opinion



Expected to stabilize in ED and return to community	0.4	
Admitted to MH hospital bed	0.6	
Average time for individuals to stabilize in ED	1.5 days	Assumption
<b><i>MH crisis receiving center-specific input parameters</i></b>		
MH crisis receiving center bed capacity	50 beds	Placeholder value: model starts initially with 20 waiting to be seen, 15 receiving treatment/stabilizing, 10 waiting for community bed, 2 waiting for hospitalization, and 0 waiting for step down.
Average time spent waiting in community while in acute crisis before arrival at MH crisis receiving center	0.25 days	Assumption
MH crisis receiving center disposition (proportion of individuals, should sum to 1)		Assumption and expert clinical opinion (1/3 distributed to pathways not hospitalized)
Requiring MH hospitalization	0.35	
Requiring community-based crisis stay	0.35	
Moving directly to step-down program	0.15	
Expected to stabilize and return to community	0.15	
Average time for individuals to stabilize in MH crisis receiving center	0.75 days	Assumption
<b><i>Community-based crisis bed-specific input parameters</i></b>		
Community-based crisis bed capacity	48 beds	Assumption: Model starts with initial occupancy at 30 individuals
Average delay in admission to community-based crisis bed from MH crisis receiving center once capacity becomes available	0.125 days (3 hours)	Assumption
Community-based crisis bed disposition (proportion of individuals)		Assumption (Step-down care alternative currently does not enforce capacity limits in concept model.)
Discharged and returned to community	0.30	
Discharged and requires Step-Down program	0.70	
Average length of stay	14 days	Expert clinical opinion (length of stay distribution unknown but likely with an average of approximately 14 days with a long right tail implemented as a 3 <sup>rd</sup> order delay to approximate an exponential service time)
<b><i>MH hospital-specific input parameters</i></b>		
MH hospital bed capacity	90 beds	





Number of MH hospital beds occupied at start of simulation	90 beds	Assumption – model initializes with 100% occupancy with varied time remaining before discharge.
Average delay in admission to MH hospital bed from ED or jail, given bed availability	0.125 days (3 hours)	Assumption
MH hospital disposition (proportion of individuals)		Assumption (Step-down care capacity does not currently restrict flow in concept model)
Discharged and returned to community (proportion directed to step-down program 0.2, discharged to community 0.8)		
Average length of stay for civil patients	7 days	Expert clinical opinion (length of stay distribution unknown but likely with an average of approximately 7 days with a long right tail implemented as a 3 <sup>rd</sup> order delay to approximate an exponential service time)
<b><i>Criminal justice system-specific input parameters</i></b>		
Average time spent waiting in community while in acute crisis before arrest	3 days	Assumption
Average time required to determine competence restoration needs	5 days	Assumption
Proportion of individuals arrested who require competence restoration		Assumption
Required	0.20	
Not required	0.80	
Average length of stay in MH hospital bed to complete competence restoration	90 days	Expert clinical opinion (length of stay distribution unknown but likely with an average of approximately 90 days with a long right tail implemented as a 3 <sup>rd</sup> order delay to approximate an exponential service time)
MH forensic hospital bed capacity = 20 (with occupancy initialized with 12 individuals in care)		
<b><i>Intensive team-based care (e.g., ACT teams)-specific input parameters</i></b>		
Average annual rate of incident acute crises per individual in ACT-like team	12 crises/year	Assumption
ACT-like team capacity	150 people	Placeholder values (assuming 0-3 ACT-like teams, with each team handling up to 50 individuals; model initiates with 1 team)
Proportion of ACT-like team interventions successful in avoiding ED visits	0.9	Individuals receiving ACT-like team care will avoid hospital admission 90-95% of time
<b><i>Mobile crisis-specific input parameters</i></b>		
Mobile crisis capacity	0	Assumption: Model allows 0 to 3 mobile crisis teams to operate. Initially the model is set to 0 teams. Each mobile crisis team can respond up to 4 acute crises per day



Ability of mobile crisis to stabilize crises

50%

Assumes each mobile crisis team can stabilize 50% of crises that they respond to; remaining crises are routed to the MH crisis receiving center (if the community has a MH crisis receiving center with capacity available; if not, the remaining crises are routed to the ED); of the routed crises, the model assumes 25% are directed to the ED, where they may be hospitalized, and 25% are directed to a crisis receiving center.

ACT = Assertive Community Treatment; ED = emergency department; MH = mental health.

We assume that individuals waiting in the ED or at the mental health crisis receiving center for long periods of time have some probability of leaving before being seen. We assume that this probability increases the longer they have to wait for admission. To accommodate model structure, we estimate this relationship as a function of the number of people waiting for admission when they arrive. Tables 4 Panel A (ED) and Panel B (crisis receiving center) map individuals waiting to the probability an individual will leave, with the time they leave drawn from an exponential distribution with a mean of 12 hours. Individuals leaving return to being in the community, where they will select any one of the pathway portals as before.

Number waiting	Probability Leaves over 12 hours (0.5 day)
0-9	0.00
10-19	0.05
20-29	0.10
30-44	0.16
45-64	0.28
65-79	0.50
80-149	0.62
150-199	0.88
200+	1.00

**Table 4 Panel A. The probability an individual leaves the ED without being seen based on the number of others waiting when they arrive**

Number waiting	Probability Leaves over 12 hours (0.5 day)
0-24	0.00
25-49	0.12
50-74	0.45
75-99	0.75
100-149	0.85
150-199	0.95
200+	1.00

**Table 4 Panel B. The probability an individual leaves the mental health crisis receiving center without being seen based on the number of others waiting when they arrive**



## 2. Results from the Anytown, US Adult Acute Mental Health Crisis Model

Key outcomes simulated by the Anytown, US concept model are denoted in bold plum text in the model structure diagram (Figure 2) and include the following:

- Emergency Department (ED)
  - Number of individuals waiting in ED per day
  - Average time spent in ED waiting to be seen
  - Number of individuals in ED boarding per day
  - Average time spent in ED boarding
  - ED bed capacity utilization (includes care and boarding)
- Mental Health Crisis Receiving Center (CRC)
  - Number of individuals waiting in CRC per day
  - Average time spent in CRC waiting to be seen
  - Number of individuals in CRC boarding per day
  - Average time spent in CRC boarding
  - CRC chair capacity utilization (includes care and boarding)
- Civil hospital beds
  - Civil hospital bed capacity utilization
- Community crisis beds
  - Community crisis bed capacity utilization
- Individuals arrested during acute mental health crisis
  - Number of individuals in crisis arrested and potentially divertible per day
  - Number of individuals waiting for competency restoration per day
  - Competency restoration bed capacity utilization

Status quo analyses are conducted for the hypothetical community, based on assumptions made about its current capacity, demand for, and utilization of mental health services. In this way, the model aims to approximate the real-world patterns observed within the community with regards to individuals experiencing acute mental health crises waiting for care and moving through the system. We have built a model interface that can be used to adjust (across plausible ranges):

- Number of mobile crisis teams.
- Number of intensive care teams.
- ED bed capacity.
- Crisis receiving center chair capacity.
- Civil mental health hospital care capacity.
- Competency restoration capacity.
- Community crisis bed capacity.

As capacity changes are made, simulated model results described above adjust, so the model user can learn how the system responds. All other parameters are set to default values described in Table 3. A screenshot of a simplified model interface is provided in Figure 3. To illustrate the impact of randomness

(variation from day to day) on model trends and path dependence (e.g., what it can take to work through a long queue, when it happens), we present three versions of model runs (Panels A-C).

Figure 3 Panel A:

**ANYTOWN, USA - Acute Crisis Mental Health System**

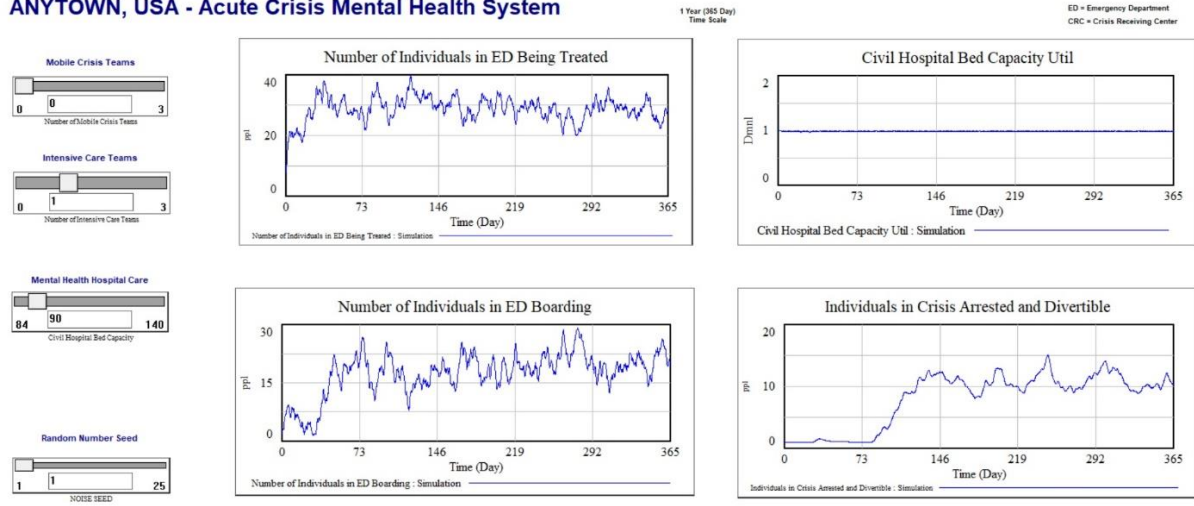


Figure 3 Panel B:

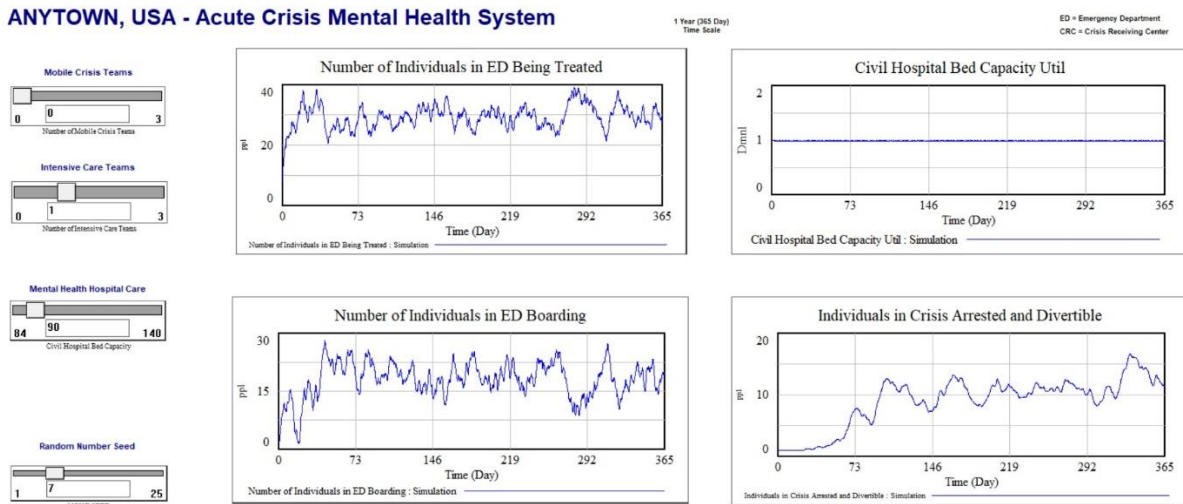
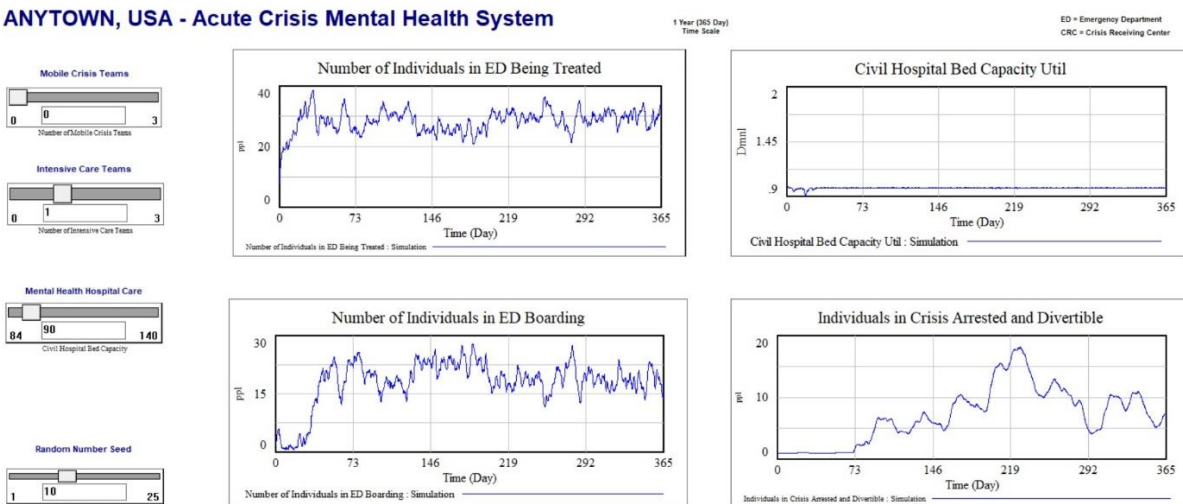


Figure 3 Panel C:



**Figure 3 Panels A-C: Simplified model dashboard with three random number seeds (1,7 and 10) – to illustrate how randomness can affect model results over time.**

Across 200 runs of the status quo model, the average number of individuals in the ED being treated at any point in time is 29.3, the number of individuals in the ED boarding is 18.7. An average of 98.4% of civil hospital bed capacity is utilized, and 8.4 individuals in acute mental health crisis are arrested and divertible per week.

The dashboard can then be used to learn how changing capacity affects outcomes. To illustrate, Figure 4 Panel A presents the status quo scenario, which you can compare to the dashboard (with the same random number seed) with the following changes, one at a time: two mobile crisis teams are added (Panel B), a second intensive care team is added (Panel C), and 10 additional civil mental health hospital

beds are added (panel D). To understand the impact of these change scenarios with 200 replications of the model, see results in Table 5.

Figure 4 Panel A:

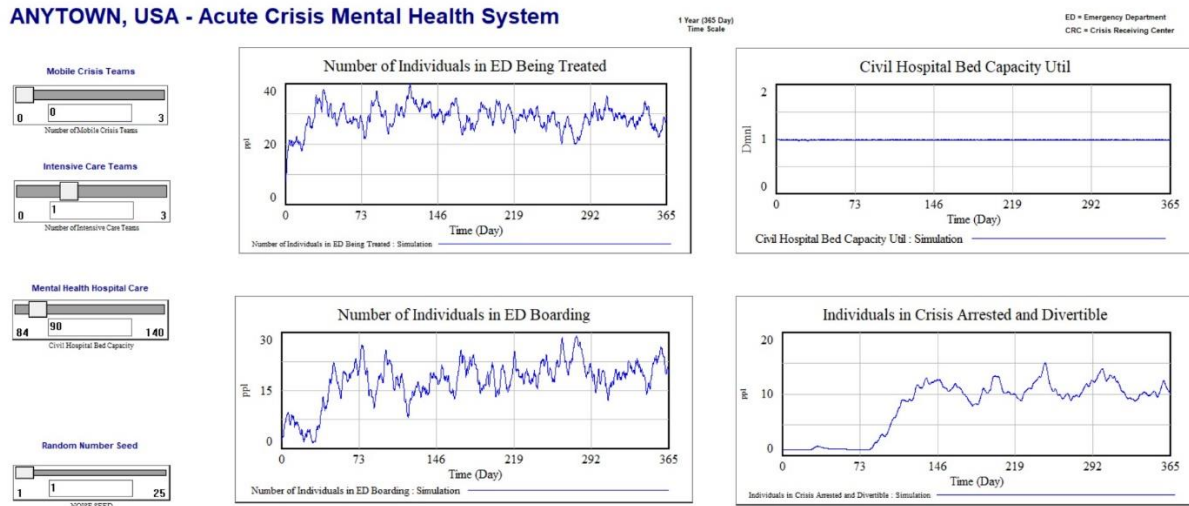


Figure 4 Panel B:

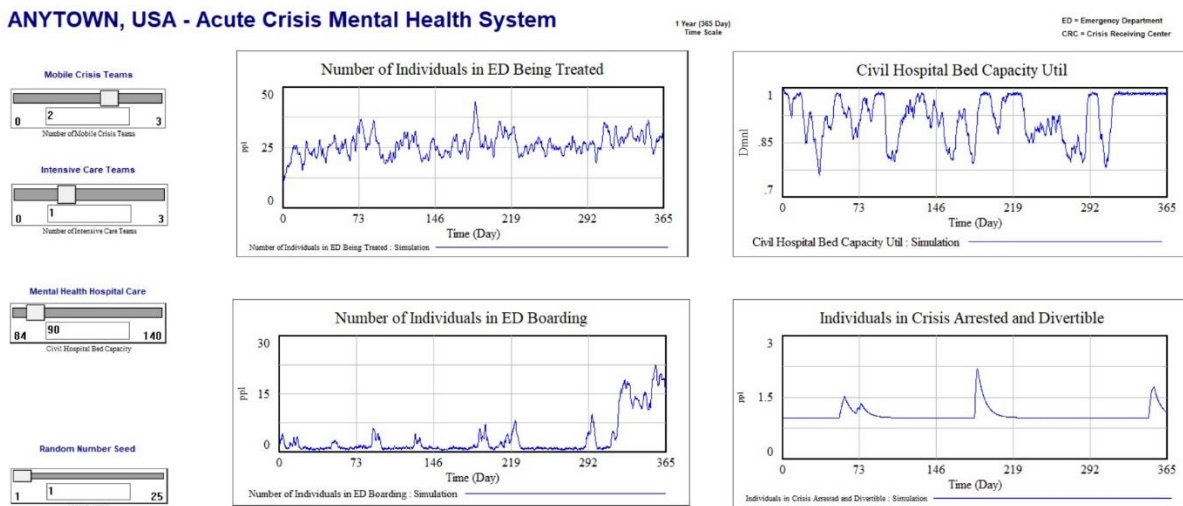


Figure 4 Panel C:

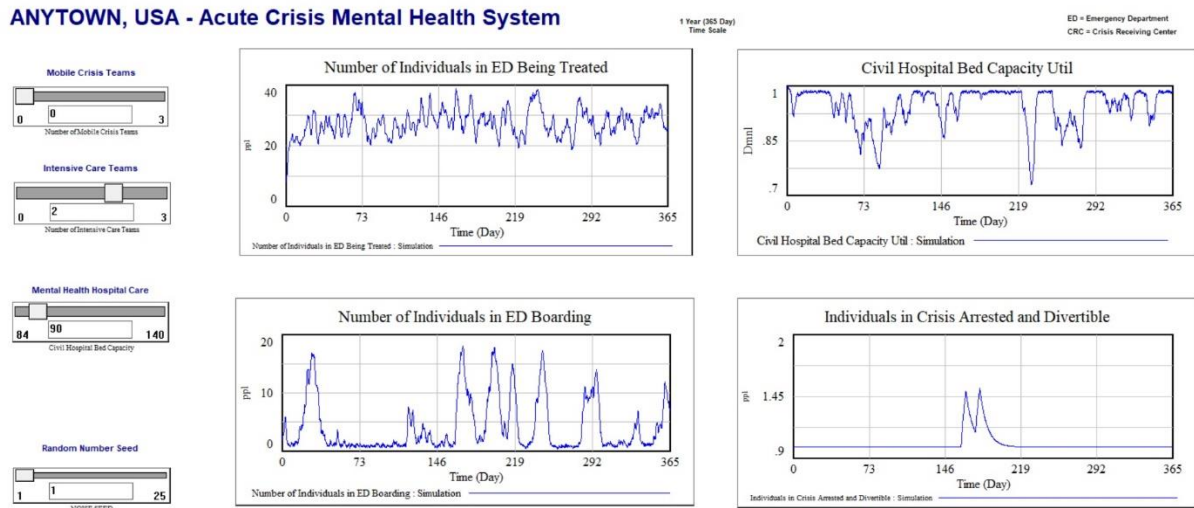


Figure 4 Panel D:

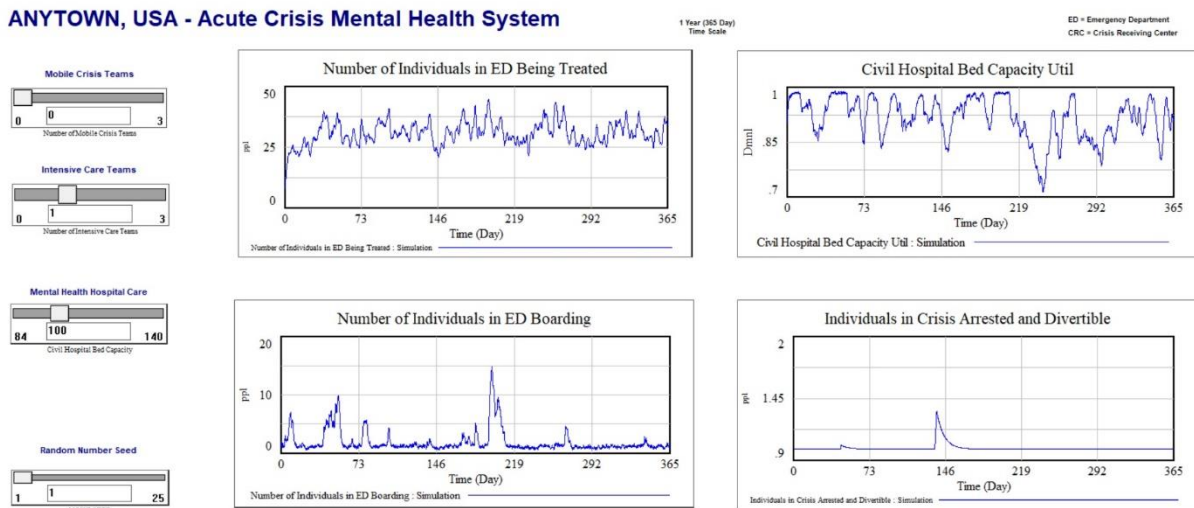


Figure 4 Panels A-D: Simplified model dashboard under status quo capacity scenario (Panel A) compared to a scenario where two mobile crisis teams are added (Panel B), a second Intensive Care Team is added (Panel C), or 10 additional civil mental health hospital beds are added (Panel D).



**Table 5: Simulated outcomes under the status quo and three illustrative intervention scenarios, adding (one at a time): two mobile crisis teams, a second intensive care team, or 10 additional civil mental health hospital beds. Results are point-in-time averages (number in ED being treated, number in ED boarding, percent of civil mental health hospital beds in use) and seven-day averages (number in crisis arrested and divertible), along with 90% uncertainty intervals (5th percentile-95th percentile), across 200 replications of the model.**

Scenario	Number in ED being treated (90% UI)	Number in ED boarding (90% UI)	% of civil mental health hospital beds in use (90% UI)	Number in crisis arrested and divertible (90% UI)
Status quo	29.3 (23.4 – 34.6)	18.7 (13.2-24.7)	98.4% (98.0-98.7)	8.4 (1.2-14.0)
Two additional mobile crisis teams	26.4 (19.8-34.2)	2.6 (0.6-12.3)	90.0% (76.6-98.4)	1.0 (1.0-1.2)
One additional intensive care team	27.6 (20.2-34.2)	6.2 (0.7-20.1)	94.0% (81.6-98.5)	1.2 (1.0-1.8)
Ten additional civil MH hospital beds	31.2 (24.1-40.3)	2.7 (0.8-9.8)	91.6% (81.1-98.5)	1.1 (1.0-1.5)

As you reflect on these results, ask yourself whether the impacts were what you expected? If not, why not? Substantial learning can happen with concept models such as this if you allow your own “mental model” – or understanding of how the system responds to changes in capacity of system components alone or in combination – to be tested. One potential reason is that the way an intervention is implemented in the Anytown, US model is not how you would implement it (for example, perhaps we assumed that mobile crisis teams serve too few or too many patients or are too or not effective enough – compared to your setting). Or perhaps the impact is due to capacity in other aspects of the model. Should you believe the parameters in the Anytown, US model do not reflect your community, consider working with us to modify the assumptions and simulate scenarios that better represent your community (see the next section to learn more about what that would take). What the Anytown, US concept model is doing is bringing the assumptions and parameter values described above to life in a virtual world and asking “if-then” questions. If we add capacity (to a specified component of the model and with a specified change), then what happens to the simulated outcomes?

### 3. Dashboard Overview

Before we leave the Anytown, US model results, we would like to share a screenshot of a more comprehensive dashboard. For an acute mental health crisis system with as many components as included in the Anytown, US model, we should not make decisions from as narrow an understanding of cross-system impacts of actions as depicted in Figures 3 and 4. Figure 5 presents a screenshot with a fuller set of simulated trends depicted in Figure 2 Panel F and includes sliders for changing additional capacity within the system (with three panels corresponding to three random number seeds).



Figure 5 Panel A:

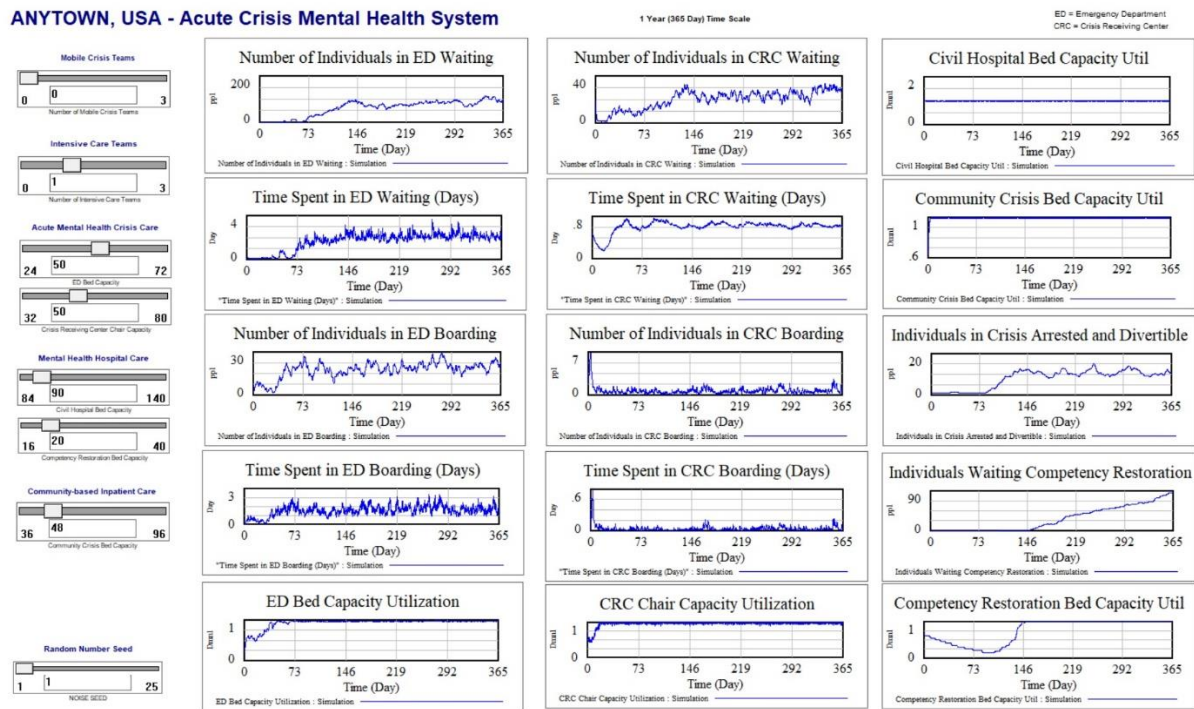


Figure 5 Panel B:

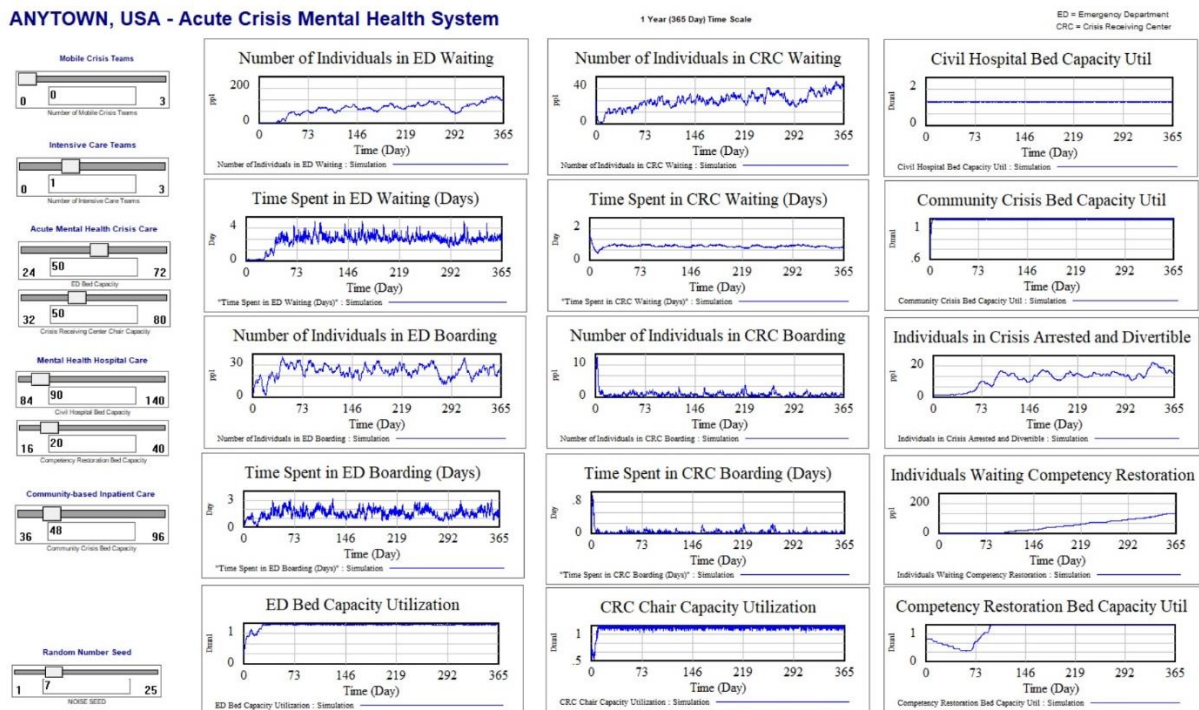




Figure 5 Panel C:

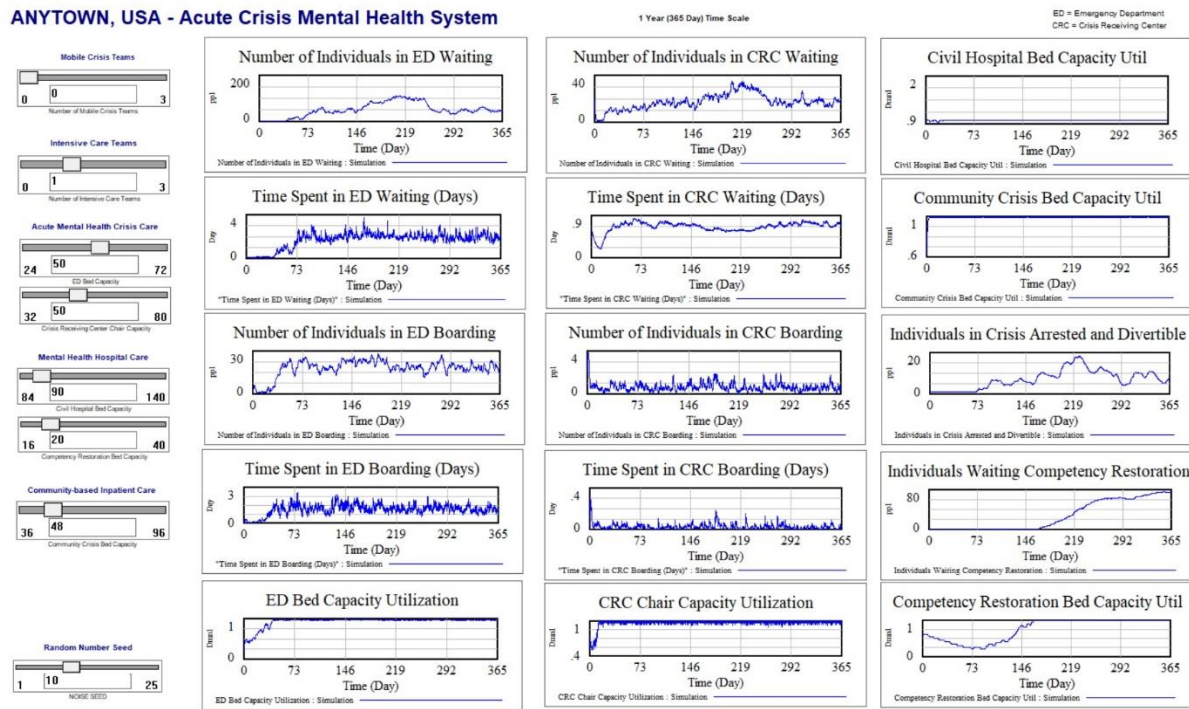


Figure 6 Panels A-C. Full Anytown, US model dashboard under the status quo scenario. Panels A-C present findings under the same three random number seeds as presented in Figures 3 and 4.

## F. Conclusions

This section has described the methodology involved with the use of contemporary simulation modeling methods to build a model that will enable states, communities or other planning regions to address one of the most enduring problems in U.S. mental health services planning: the number of psychiatric inpatient beds needed to adequately address the needs of their people. As is the case with many emerging processes, this process is ongoing and at the time of writing this report is not complete. We have included in **Appendix E** a detailed accounting of the kinds of variables each community or planning region would need to consider to use this type of model. The current plan is to work to make the model available online where state and local planners can use it to facilitate planning for psychiatric bed and other service needs. This is an emerging model in the process of development, including participation by communities working with model developers to input the specific population and services variables. The APA together with model developers anticipate an effective tool that can be used by planning regions across the U.S. to provide a benchmark for services demand against available community services resources including inpatient psychiatric beds.



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## Section 7:

### Child and Adolescent Psychiatric Beds



**Task Force Subgroup members contributing to this section**

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**A. Overview**

This section focuses on the unique needs of children and adolescents (together referred to as “youth”) and their families in child and adolescent psychiatry (CAP) inpatient care and other service settings providing intensive evaluation and treatment. This separate section is necessary because of the significant differences between adult and youth systems of care and the role that inpatient care plays within the respective systems.

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***For youth, inpatient care provides acute crisis management, including but not restricted to a mental health exacerbation, as well as intensive evaluation and treatment.***

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For youth, inpatient care provides acute crisis management, including but not restricted to a mental health exacerbation, as well as intensive evaluation and treatment. Whereas arrests were identified as an entry way to a hospital bed for adults, for children, referrals from schools are more likely to lead to inpatient stays.

The need for youth psychiatric beds has to be understood in the context of the overall continuum of care for youth. The organization of this section parallels that of the overall report, including the following parts: overview, introduction, historic and contemporary use of CAP beds, financing of CAP beds, population variables, community system contributors and variables (What does the ideal look like for each service?), and creation of the model.

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***After emerging in the 20<sup>th</sup> century, CAP beds have been increasingly in demand over the last three decades.***

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After emerging in the 20<sup>th</sup> century, CAP beds have been increasingly in demand over the last three decades. However, the supply has decreased in the context of managed care and utilization review. A complex and inconsistent system of financing has hampered the viability of CAP inpatient services and access to acute care for youth. This chapter outlines a proposed model of a continuum of care including inpatient care. Inpatient represents the most restrictive and, because it requires specialist-staffing, the most expensive component of the continuum. Potential standards for inpatient care and for determining transitions between levels of care are discussed. Finally, population definitions and factors involved in a CAP simulation model are described.



#### 4. Introduction

In 2016 the American Psychiatric Association (APA) issued a position statement on Psychiatric Hospitalization of Children and Adolescents that begins by describing a crisis of access to inpatient care for youth (APA, 2016). It details the decline in psychiatric hospitals and public beds; long wait times and the problem of “boarding” in which youth wait in emergency rooms and pediatric inpatient units until inpatient psychiatric beds become available; the shortage of psychiatric care for youth in general; and how these system deficits leave many youths untreated and families without help. Currently, less than 50% of children with an identified behavioral health condition receive any treatment, resulting in increased costs and acuity of clinical presentation (Bostic and Hoover, 2020).

The APA Position Statement concludes:

“It is the position of The American Psychiatric Association to:

- 1) Advocate for the development of a full spectrum of appropriate, financially affordable, inpatient facilities and services for the diagnosis and treatment of children and adolescents in need of psychiatric care in the United States. These facilities are to include both psychiatric and general medical hospitals. Efforts should be focused on both increasing current inpatient services and also improving financial sustainability of existing inpatient programs.
- 2) Emphasize that the health of children and adolescents will be best served if primary treatment decisions such as admissions, medications, psychotherapy and appropriate disposition planning are the responsibility of a psychiatrist specialized in child and adolescent psychiatry whenever available.
- 3) Emphasize that, when possible, inpatient psychiatric hospitalization of children and adolescents should be provided close to their homes, so that their families may be included and participate during the treatment process.
- 4) Work to provide parity in mental health treatment for all age groups by increasing mental health resources for children and adolescents and subsequently providing opportunities for early treatment and intervention to benefit young patients suffering from mental illness.
- 5) Work to educate the public and health care community that inpatient psychiatric care is necessary and justified when psychiatric illness severely affects a young person’s safety or ability to function.
- 6) Address the shortage in child and adolescent psychiatrists by recruiting psychiatrists-in-training and early career psychiatrists into specialized training.”

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***The need to address the even greater shortage of child and adolescent psychiatrists who reflect the diversity of the patient population is also acute.***

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The need to address the even greater shortage of child and adolescent psychiatrists who reflect the diversity of the patient population is also acute.

This chapter focuses on Position 1 of this statement, and specifically the need for “the development of a full spectrum of appropriate, financially affordable, inpatient facilities and services for the diagnosis and treatment of children and adolescents.”

In 2020, the most commonly diagnosed psychiatric health conditions in children aged 3 to 17 years were: attention deficit hyperactivity disorder (ADHD) (9.4%); disruptive behavioral disorders (7.4%), anxiety (7.1%), and depression (3.2%) (Bostic and Hoover, 2020). These conditions often co-occur and can be even more prevalent in groups affected by poverty and other environmental stressors. Suicide rates in youth have increased by 56% since 2010, and suicide is now the second most common cause of death in those ages 10-24 in the U.S. (Bostic and Hoover, 2020). Disparities are in evidence, particularly among racial and sexual minorities. For example, Black youth under 13 years are twice as likely to die by suicide as their white counterparts (U.S. Congressional Black Caucus, 2019).

There are four contexts in which children and adolescents are psychiatrically hospitalized: 1) clear mental illness with or without a comorbid medical illness; 2) developmental disability with comorbid mental illness or behavior problems; 3) referrals in which a psychiatric disorder may exist but the reason for hospitalization is psychosocial (e.g., unsafe home environment); and 4) family or juvenile court referrals. Particularly complex cases, diagnostic evaluations of major symptoms, and first presentations of chronic illness (e.g., first-episode psychosis) often warrant hospitalization regardless of whether intermediate-level services are available. For a list of common diagnoses requiring admission, see Table 6. These presenting problems are often compounded by cross-cutting symptoms such as aggression, severe temper outbursts, the effects of developmental trauma, self-injurious behavior, avoidant behaviors, and subtle neurodevelopmental deficits. Social issues such as stressful family environments, school refusal, state agency involvement, immigration status, and lack of English fluency can further compound the clinical presentation.

In child and adolescent psychiatry, hospitalization for mental health reasons is complicated by a number of issues: whether the hospital is a general hospital that has beds specifically identified for people with mental illness; whether beds are for children, adolescents, or both; whether the hospital is a children’s hospital that integrates beds for children with psychiatric disorders into general wards or has a specifically designated psychiatric unit; whether the child or adolescent psychiatric unit is in a free-standing psychiatric hospital; or whether the bed is in a state-funded hospital. Thus, the youth’s age and site of the hospital bed must be considered when interpreting data and have implications for cost and access. For example, patients with significant co-occurring medical conditions may be deemed inappropriate for certain types of units. Typically, triaging a youth in crisis is based more on what resources exist and where a bed is available than what would be a clinically optimal placement for that youth. For example, in rural states, where the children’s hospital may provide the only inpatient psychiatric unit, families may drive long distances to have their child admitted.

The core of a successful therapeutic inpatient unit is 24-hour supervision and safety monitoring by trained staff and a multi-disciplinary team. This team includes a child and adolescent psychiatrist to address the youth’s mental health, family, and psychoeducational requirements. Specialty services for certain sub-groups are needed, including young children (<10 years); those with developmental disorders or eating disorders; those with medical complexities; and those requiring certain safety protocols for treatments that require high security. Although alternatives in the community such as acute residential treatment beds are desirable, more data are needed to demonstrate their relative effectiveness (Lamb, 2009; Shepperd et al., 2009).

**Table 6: Most common primary and comorbid pediatric mental health inpatient diagnoses nationally and in free-standing children's hospitals for 3- to 20-Year-Olds in 2009 (Bardach et al., 2014) (Reproduced with permission from Pediatrics, Vol. 133, Page 606, Copyright © 2014 by the AAP.)**

Ranking	Primary Mental Health Diagnosis <sup>a</sup>		Any Mental Health Diagnosis <sup>b</sup>	
	National Inpatient Hospitals (N = 228 808) <sup>c</sup>	Children's Hospitals, Inpatient (N = 12 542)	National Inpatient Hospitals (N = 523 105) <sup>c</sup>	Children's Hospitals, Inpatient (N = 66 660)
1	Depression*: 100 988 (44.1)	Depression*: 5290 (42.2)	Depression: 187 902 (35.9)	Developmental disorder: 21 796 (32.7)
2	Bipolar disorder*: 41 345 (18.1)	Externalizing disorder: 1351 (10.8)	Substance abuse: 177 680 (34.0)	Depression: 15 936 (23.9)
3	Psychosis*: 27 589 (12.1)	Bipolar disorder*: 1325 (10.6)	ADHD: 101 658 (19.4)	ADHD: 15 247 (22.9)
4	Externalizing disorder: 14 087 (6.2)	Anxiety: 971 (7.7)	Anxiety: 90 140 (17.2)	Autism: 7120 (10.7)
5	Reaction disorder: 11 856 (5.2)	Psychosis*: 823 (6.6)	Bipolar disorder: 79 352 (15.2)	Externalizing disorder: 6509 (9.8)
6	Anxiety: 9288 (4.1)	Eating disorder: 684 (5.5)	Externalizing disorder: 63 368 (12.1)	Substance abuse: 5918 (8.9)
7	Substance abuse: 8501 (3.7)	Miscellaneous: 535 (4.3)	Developmental disorder: 61 662 (11.8)	Anxiety: 5326 (8.0)
8	ADHD: 6920 (3.0)	ADHD: 343 (2.7)	Psychosis: 51 158 (9.8)	Psychosis: 4545 (6.8)
9	Eating disorder: 2398 (1.1)	Substance abuse: 308 (2.5)	Reaction disorder: 28 030 (5.4)	Bipolar disorder: 4539 (6.8)
10	Autism: 2353 (1.0)	Autism: 271 (2.2)	Personality disorder: 26 666 (5.1)	Reaction disorder: 3012 (4.5)

Data are presented as n (%). Conditions shown with an asterisk (\*) indicate the most common and costly primary diagnostic groups in the nationally representative KID. "Developmental disorder" includes learning and communication disorders and intellectual disabilities; "Externalizing disorder" includes oppositional defiant disorder, intermittent explosive disorder, impulse control disorder, and conduct disturbance; "Miscellaneous" includes psychogenic pain, postconcussive syndrome, sleep disorders, and tension headaches.

<sup>a</sup> Mental health diagnoses are designated as primary based on physician discharge documentation. Comparison of national KID and free-standing children's hospitals (PHIS) data sets using Wilcoxon rank sum testing,  $P = .002$ .

<sup>b</sup> "Any" mental health diagnosis refers to primary or nonprimary (ie, comorbid) mental health diagnoses. Comparison of national KID and PHIS free-standing children's hospitals datasets using Wilcoxon rank sum testing,  $P = .001$ .

## 5. Historic and Contemporary Use of Psychiatric Beds

In the nineteenth century, children and adolescents who could not be managed by their families were sent to poorhouses. Contemporary distinctions between developmental disabilities, juvenile delinquency, and early-onset psychiatric disorders did not yet exist. By midcentury, rising concerns over the safety of these youth, who were housed alongside adults in often deplorable conditions, motivated efforts to transfer the young people to orphanages, asylums, or foster homes. This trend was accelerated by the New York State Children's Act of 1875 which ordered all children aged 2-16 years to be removed from poorhouses (Katz, 1986).

Bradley Hospital at Brown University, founded in 1929, was the first neuropsychiatric hospital for children and adolescents. In 1937 the first public psychiatric hospital unit for adolescents in the U.S. opened at Bellevue Hospital. This was followed in 1955 by the opening of the first private unit for adolescents at Hillside Hospital, also in New York City.

Starting in the 1980s, research into effective treatment for youth increased, and the availability of evidence-based treatment options, including medications, drove an increased need for child psychiatrists. In 1983, the American Academy of Child and Adolescent Psychiatry (AACAP) called for an evidence-based approach in "Child Psychiatry: A Plan for the Coming Decades." Reimbursement patterns and legislative changes which first required and then incentivized the study of medication safety and efficacy in pediatric patients resulted in increased demand for child psychiatry services. The 1990 Americans with Disabilities Act, which increased mental health funding for schools; the 1994-98 Pediatric Rule from the U.S. Food and Drug Administration, requiring that all new drugs be studied in pediatric populations; and the 1996 Mental Health Parity Act followed by the 2008 Mental Health Parity and Addiction Equity Act all had the effect of increasing demand. Demand for youth psychiatric services (including inpatient) also increased as the rates of mental health diagnoses increased (specifically of autism, mood disorders, suicide, substance use disorders and anxiety). The supply of child psychiatrists did not grow concurrently. Today, virtually all states have significant CAP physician shortages, and the pediatric population is underserved (AACAP, 2022). A 2020 SAMSHA Behavioral Health Workforce Report states the current CAP workforce is approximately 8,000-9,000 and that another 48,000-49,000





CAPs are needed to meet the current needs of youth with serious mental illness, severe emotional disturbance, and substance use disorders (SAMSHA, 2020).

In the last decade, psychiatric hospitalizations of youth have increased, and a trend toward specialization of these beds (e.g., detoxification, autism and intellectual disability) has been noted (Teich et al., 2018; Huffman et al., 2012; Siegel et al., 2012; Righi et al., 2018; Pedersen et al., 2018). Both clinical factors (e.g., risk of self-harm) and non-clinical factors (e.g., age, insurance status, bed availability) reportedly influence the decision to hospitalize and the selection of an appropriate unit. Specialization trends for inpatient autism care have resulted in a proliferation of studies identifying risk factors and comparative effectiveness of these interventions (Siegel et al., 2012; Righi et al., 2018; Pedersen et al., 2018).

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***While demand for CAP services has increased due to the factors described above, the supply of inpatient CAP beds has decreased.***

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While demand for CAP services has increased due to the factors described above, the supply of inpatient CAP beds has decreased. After a boom in inpatient capacity during the 1970s and early 1980s spurred by private investment, there was a downturn in bed capacity in the context of aggressive utilization management by the insurance industry in the late 1980s and early 1990s. During this time, behavioral health spending was dramatically reduced by reducing the number of hospital admissions, shortening the length of inpatient stays, and discounting rates for psychiatric professional services. Inpatient psychiatric care for young people was particularly impacted. Between 1990 and 2000, the median stay of child and adolescent mental health inpatients in community hospitals declined from 12.2 to 4.4 days (Case et al., 2007). Providers and advocates proved unable to counter the market forces resulting from the rise of the behavioral managed care and health utilization review industry, which has narrowed the scope of inpatient psychiatric treatment. While length of stay is related to cost (Bardach et al., 2014), the relationship between length of stay and access to and quality of care has not been well studied.

At the time of this writing, the U.S. is emerging from the COVID-19 pandemic. Its resulting economic crisis and what some are calling a second pandemic in mental health is likely to increase demand for CAP services. In an unprecedented action, the American Academy of Pediatrics, the American Academy of Child and Adolescent Psychiatry, and the Children's Hospital Association declared a state of emergency in child and adolescent mental health (AAP, 2021). Evidence suggests that throughout the country there has been an increase in stress, substance use, domestic and interpersonal violence, and mental health problems. Children, many of whom were not able to be in school or access in-person mental health care, appear to be at increased risk; initial data suggests a significant increase in pediatric mental health service demand which is expected to continue for some time. The Centers for Disease Control and Prevention (CDC) reported in November 2020 that during the COVID pandemic, from April to October 2020, the proportion of mental health-related ED visits for children aged 5-11 years increased 24% and for those 12-17 years increased 31% compared with 2019 (Leeb et al., 2020). On Jan. 4, 2021, the Massachusetts Hospital Association reported that 300 children and adolescents were boarding in emergency rooms awaiting beds in metropolitan Boston and the southeast and northeast regions of Massachusetts (Personal communication to SMDJ 01-05-21). Rates of suicidal thinking and behavior are up by 25 percent or more from similar periods in 2019 and the deficits in the mental health system for



youth are being exposed (Hill et al., 2021; Carey, 2021).

## **D. Definition of a Child and Adolescent Psychiatric “Bed”:**

### ***CAP Inpatient in the Continuum of Care for Youth Mental Health***

A child and adolescent psychiatry (CAP) inpatient “bed” is a place in a secure setting managed by child-trained mental health professionals. It is used when a child’s mental health condition or behaviors preclude them from safely living in the community with only outpatient support, or the capacity of the community environment is unable to meet the needs of the child and ensure safe functioning. A CAP “bed” represents the most restrictive setting in the continuum of care for those with mental health and safety needs that cannot be met in a less restrictive setting. Some beds are specifically defined as “short-stay beds” and are used for observation, assessment and treatment pending placement or discharge (Damiani et al., 2011). Some inpatient services in CAP specialize in treating certain sub-groups such as units for those with autism and other developmental disorders (approximately 12-15 such units exist in the U.S.); detoxification and substance use units; and eating disorder units.

Locked inpatient units for youth with psychiatric diagnoses who are in crisis are generally considered a last resort to be used only when other services fail to reduce the acuity. They should exist in a coordinated continuum of services that function to “wrap around” the youth and family and prevent exacerbation of symptoms, functioning and behavior. See Table 7 for the desired elements of this continuum and the characteristics of each. The continuum from community care to inpatient care increases in security and the capacity to address risk.

In addition to serving youth and families in crisis, psychiatric hospitalization should be used as a site of intensive evaluation and treatment when a child’s diagnosis, formulation and treatment plan are in question, or the child needs closer observation to clarify them. When the treatment team from the lower level of care (e.g., outpatient, group home, or residential facility) needs help in formulating a case and identifying an appropriate treatment plan, inpatient hospitalization with 24/7 clinical monitoring, daily assessments by trained staff, and an opportunity for closely assessing the effects of interventions can be extremely helpful. Medication discontinuation where intensive oversight is needed is another indication, especially where less than optimal outpatient follow-up or family collaboration precludes doing this in a less restrictive setting.



**Table 7. Model Continuum of Care for Youth Mental Health<sup>1</sup>**

Type of Service or Bed <sup>2</sup>	Location	Security and legal status	Typical Length of Stay	Purpose
<b>Residential<sup>3</sup></b>				
Acute	Hospitals or community facilities	Voluntary, unlocked units	2-3 weeks	Alternative to or stepdown from acute inpatient
Intermediate	Hospitals (often state hospitals) or community facilities. includes psychiatric residential treatment facilities (PRTFs) which are an allowable Medicaid service.	Involuntary locked or voluntary and unlocked	8-12 weeks or longer (up to 6-12 months)	For patients with recurring hospitalizations. Includes on-site accredited school
Long term	State hospital or community-based settings. Combined funding (school, state agency, such as child welfare or mental health, local education authority)	Variable	12 months to indefinite	Long term care of chronically ill patients who have not been successfully stabilized in other settings and/or who are unable to function in the community.
<b>Non-residential</b>				
Acute inpatient beds	Pediatric psychiatric units in children’s hospitals, psychiatric hospitals, or community hospitals.  Includes specialized beds for autism/developmental delay, eating disorders, substance use disorders, very young children, first-episode psychosis	Locked, voluntary and involuntary	5-8 days	For acute crisis with safety issues and complex assessments and treatments. Specialized beds include milieu programming and staffing expertise designed for that patient population.
Crisis Stabilization beds/ observation beds	Emergency departments or community facilities	Locked, voluntary and involuntary	Less than 24 hours up to 5 days	To mitigate the need for inpatient
Respite beds	Home, day treatment center, or healthcare facility.	Unlocked voluntary	1-2 weeks	To provide short-term relief for primary caretakers and patients
Forensic/juvenile justice beds	Special facilities	Locked involuntary and/or court-ordered	Variable	For evaluation of competency and criminal responsibility; may include court-mandated psychiatric and/or substance use treatment
Pediatric beds with psychiatric consultation	Pediatric units in children’s or general hospitals.	Unlocked medical floors.	Variable	For youth with a primary medical diagnosis and co-occurring psychiatric diagnosis that requires psychiatric consultation to the pediatric team, e.g., youth with complications of nonadherence to diabetes treatment.
Emergency psychiatric services	Hospital emergency rooms, community urgent care centers, or	Locked voluntary or involuntary	Variable, ideally less than 24 hours	Psychiatric evaluation and triage



	mobile crisis response and stabilization services.			
Partial hospitalization units	Hospitals	Unlocked voluntary	Full day (no less than 6 hours) for stays of 1-2 weeks.	Intermediate level outpatient care. Used to step up from outpatient or step down from inpatient.
Day treatment programs	Typically located at community clinics or DMH sites.	Unlocked voluntary	Serve patients during hours for up to several weeks	Intermediate level outpatient care. Used to step up from regular outpatient or step down from inpatient.
Intensive outpatient	Outpatient offices, clinics.	Unlocked voluntary	Multiple visits per week of outpatient services (see below).	Used when patient is starting to destabilize with less frequent outpatient visits.
Outpatient	Individual and family treatment; groups for youth and caretakers	Unlocked voluntary	1-2 visits per week	Initial and ongoing treatment; recovery support
Wraparound and team-based services	Multiple community sites typically coordinated by a central agency	Unlocked voluntary	Variable	Combination of services (e.g., outpatient clinicians, case manager, family support specialist, in-home therapy) designed to reduce the risk of youth needing re-hospitalization
Community supports for patients, caretakers, and families	Variable	Unlocked voluntary	Variable	Education, advocacy and support, e.g., peer and family support specialists; NAMI, Autism NOW, PALS; therapeutic mentors and sponsors
School-based services <sup>4</sup>	Schools in partnership with community entities	Voluntary	Sept.-June; services in summer vary by community	Comprehensive school-based mental health system (CSMHS). Partners with behavioral health to provide a multi-tiered approach including health promotion, prevention and early intervention and crisis services
Primary pediatric care services	Primary care offices and clinics with co-located mental health clinicians and/or a collaborative/integrated care model and/or remote consultation	Voluntary	Year-round 24/7 access	Prevention and early intervention. Mental health and developmental screening and appropriate triage. Capacity for crisis management.
Other community-based services	Variable. Includes law enforcement trained in mental health assessment, triage and, where appropriate, diversion; after-school programs; faith groups; youth sport and recreational leagues and associations; Big Brother/Big Sister programs, etc.	Variable	Year-round and as needed	Community-based prevention and early intervention

Notes:

- 1 Pinals, 2020; Bostic and Hoover, 2020.
- 2 See SAMSHA, 2015 for recommended characteristics of these services.
- 3 Different states call these residential facilities by different names. Emphasis here is on how the service functions within the continuum of care.
- 4 New York State has school-based day treatment with mental health providers. The program, lasting 30 days several months, is for children needing more psychiatric support than what is available in “SED classrooms”; often stepdown from inpatient.



### ***Standards for Inpatient Care for Youth***

There are federal guidelines regarding inpatient psychiatric care and conditions of participation for being a Medicare and/or Medicaid provider. ([§ 482.60 Special provisions applying to psychiatric hospitals in the U.S. Code of Federal Regulations](#)). The National Committee for Quality Assurance (NCQA), Joint Commission on Accreditation of Healthcare Organizations (JCAHO), and state health agency standards may further define the service components and requirements for CAP beds. However, these provide little specific guidance for the clinical processes and outcomes that should be the focus of an inpatient unit for youth. Section 482.60 of the US Code of Regulations specifies requirements for psychiatric evaluation, treatment planning and discharge summaries, including the requirement for goals and objectives of the inpatient stay; however, no details or guidance are provided about how to most effectively achieve those goals and objectives. Best practice guidelines have been developed for inpatient care for the hospitalization of youth with autism or intellectual disability (McGuire et al., 2015).

The authors' opinion is that clinical standards for inpatient hospitalization should build on those outlined in the AACAP Principles of Care for Treatment of Children and Adolescents with Mental Illness in Residential Treatment Facilities (AACAP, 2010).<sup>2</sup> See Table 8 for best practices of inpatient care.

**Table 8. Best Practices in Psychiatric Inpatient Care for Youth**

#### **Best Practices in Psychiatric Inpatient Care for Youth**

- Evidence-informed treatment, including medication evaluation and adjustments with sufficient time allowed to determine effectiveness.
- Measurement-based care, i.e., defined and measured outcome metrics.
- A family driven/centered and youth-guided approach, to include an understanding of the role of family and social systems in the presentation and in developing treatment recommendations about improving family functioning.
- An individualized, strengths-based, and evidence-informed approach to teaching skills to remedy the underlying reasons for the hospitalization.

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<sup>2</sup> Although written more than 10 years ago, AACAP Principles of Care for Treatment of Children and Adolescents with Mental Illness in Residential Treatment Facilities the content is still applicable and directly relevant to acute inpatient care with appropriate attention to psychiatric staffing differences. These practice parameters delineate details of what a program should include staffing, admission, treatment and discharge planning; how to maintain safety; therapeutic services standards; educational services; and the therapeutic environment. The report also has an Appendix for "Special Populations and Programs," including children on the autism spectrum. A significant caveat to this approach is that residential treatment centers (RTCs) exist at five distinct levels, and it is important to recognize this gradation and its impact on expertise, staffing and cost. RTCs themselves must be distinguished from inpatient psychiatric units that care for the most complex cases at the highest level of acuity and require the highest proportion of child psychiatrists and other professionals in their staffing.



- Equipping children and families to manage situations at home or in less intensive environments, including practice with applying the skills the child and parent are learning during the hospital stay in the home and community.
- Consideration of the specific needs of youth with DDs, LGBTQ+ youth, youth with co-occurring SUDs, youth from impoverished backgrounds, youth and families impacted by structural racism and youth with co-occurring medical disorders.
- Cultural, racial, and linguistic responsiveness, competence and equity, including providing language interpreting to non-English speakers.
- Development of a cultural formulation with an eye towards how structural racism and inequities may be contributing to the child and family's presentation (Pumariega, 2013).
- For youth at higher risk, inpatient staff provide warm handoffs to aftercare services and to home as indicated (Family First, n.d.).
- For youth at higher risk, including a Transition Service as part of the hospital episode of care, continuing to provide support and transition during the weeks after hospitalization.
- Coordination and collaboration with outpatient clinicians and others at lower levels of care using case management as needed

## 6. Financing of Child and Adolescent Psychiatric Beds

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***The funding for child and adolescent psychiatric beds comes from multiple sources including Medicaid, private insurance, private “out-of-pocket” pay, as well as state and local behavioral health and department of education funding sources.***

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The funding for child and adolescent psychiatric beds comes from multiple sources including Medicaid, private insurance, private “out-of-pocket” pay, as well as state and local behavioral health and department of education funding sources. These funding sources can also be blended to support the inpatient stay, especially in residential settings, with schools paying for the educational needs of the child and health insurance or a state behavioral health agency paying for the clinical and “bed costs” associated with the stay. (In some situations, parents need to sign over custody to the state in order to get help for their child). Diagnosis-Related Groups (DRGs) are only relevant for the small fraction of children who are deemed ‘dual eligible’ for both Medicaid and Medicare, typically by meeting a qualifying condition for Medicare such as a developmental disorder. The Children’s Health Insurance Program (CHIP) is a state and federal combined health insurance program for children in families who earn too much to qualify for Medicaid but not enough to buy private health insurance. CHIP provides free or low-cost health coverage and goes by different names in every state. The majority of inpatient services are funded on a fee-for-service basis in the private sector (non-profit and for-profit organizations). Rates are negotiated with each payor and utilization management varies from payor to payor. Some rates are inclusive of professional fees, others separate. Some plans have pay for performance, differential rates based on historical lengths of stay (LOS) and readmission rates. A psychiatric system for youth typically needs sufficient scale to be able to ensure effective contract



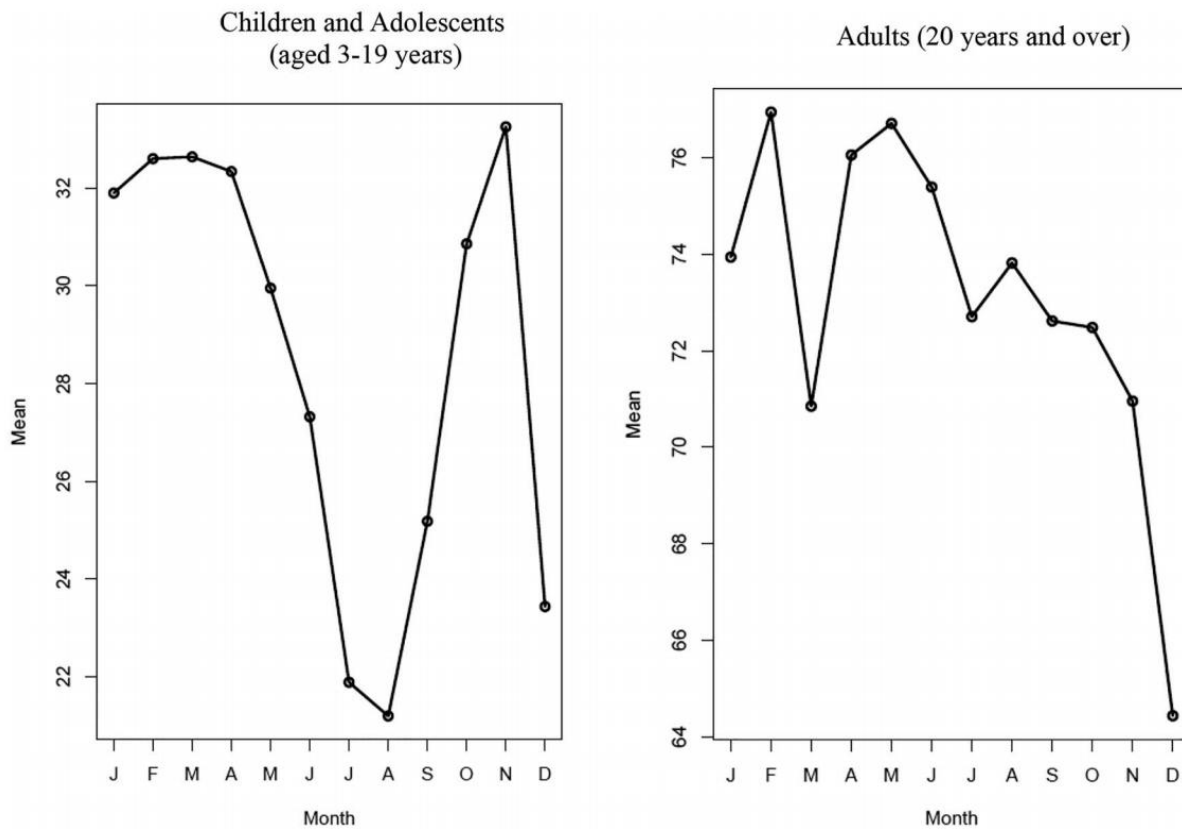
brokering and voice in state and other systems, as well as adequate staffing and expertise to ensure sustainability.

The economic reality for inpatient child psychiatry services located in pediatric or general medical hospitals is that they have high fixed costs due to overhead, staff salaries, and the cost of compliance with extensive regulations, but reimbursement rates which are inadequate to cover overall operating costs. This is especially problematic for units in general hospitals and is aggravated by fluctuations in census in context of seasonal and non-seasonal fluctuations in demand. In areas of staff shortage or unionized staff, salaries may need to be higher than average to fill slots. Reimbursements may be low due to insurance (e.g., [Wit v. United Behavioral Health/Optum case.](#)) and insurance contracts; network inadequacy; discriminatory payment practices compared to other physicians for the same evaluation and management codes (Melek et al., 2019). In the authors' experience, child mental health is often not prioritized from a financial perspective despite community need.

In the current healthcare reimbursement system, other higher-reimbursing services such as obstetrics and surgery tend to be more competitive in acquiring space within general hospital systems. Until true parity is enforced, an inpatient CAP service needs to be a priority for hospital administrators for some reason other than revenue, and its costs need to be offset by revenues from more lucrative services. Another alternative is to offer inpatient service in community-based settings such as acute residential rather than medical hospitals in an effort to lower overhead rates. Free-standing psychiatric hospitals, which may be not for profit or for profit, operate under a different business model. Their cost may be higher due to staffing but, if large enough in scale, they can develop their own version of a continuum of care within their system and lobby directly with the state for contracts. Not-for-profit psychiatric hospitals typically re-invest profits into the development of systems that are consistent with their mission. While for-profit hospitals also invest in the continuing development of treatment systems, they must account for the capital they use by generating a financial return to their investors.



Other challenges include widely varying reimbursement rates across and within public and private payors, and seasonal fluctuations in census, particularly with younger children. Reimbursement can vary significantly from payor to payor; thus, admitting a range of patients with different payors may be necessary to achieve adequate average reimbursement. This practice can diminish access for publicly insured children. Census can vary significantly between winter (highest average census) and summer when children are out of school and typically under less stress (see Figure 6).



**Figure 6. The monthly average of psychiatric admission for children and adolescents aged 3-19 years and adults per 100,000 (20 years and older), (2004-2014). Standardized by population and the average number of days per month. (Slaunwhite et al, 2019) (Reproduced with permission.)**

Many states provide services to people under 21 through [psychiatric residential treatment facilities](#) (PRTFs). A PRTF provides Medicaid-funded comprehensive mental health treatment to youth who, due to mental illness, substance abuse, or severe emotional disturbance, need treatment that can most effectively be provided in a non-hospital-based residential treatment facility. All other ambulatory care resources available in the community must have been identified, and if not accessed, determined to not meet the immediate treatment needs of the youth.

The range of settings for inpatient treatment of youth also differs from adult settings, with an increasing number of free-standing community-based settings providing these services, particularly for younger children. These beds are variably called community-based acute treatment (CBAT) or acute residential treatment (ART). Their funding is similar to more traditional, hospital-based inpatient facilities although the *per diem* costs are significantly less and the involvement of psychiatric providers is much less intensive. Many of these programs are based in residential facilities that lack laboratory testing capacity





or other medical specialists but will have on-site or contracted psychiatric treatment providers who oversee the child's treatment program. The length of stay in these community-based programs tends to be longer than for hospital-based care. These may be private for-profit or not-for-profit and involve blended funding as described above.

Per the July 2018 *Faces of Medicaid Data Series* (Pires, et al., 2018) the percentage of children enrolled in Medicaid who were hospitalized psychiatrically increased from 3.2% in 2008 to 5.2% in 2011. At the same time, the mean expense per hospitalization decreased from \$11,803 to \$4,840 (a drop of 144%). The study authors suggest the following trends: lower average lengths of stay due to more children being enrolled in Medicaid managed care; children leaving inpatient treatment and moving to residential treatment; states using alternatives (such as wraparound, respite, or multisystemic therapy); the costs of youth who board may look lower, but these patients are in a clinically challenging limbo which can prove inhumane for youth and families.

## 7. What Does the Ideal Look Like for Each Service? Theory and Practice

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***While broad consensus exists that the number of youths presenting with severe and acute mental health needs is high and beyond current treatment capacities, the best way to approach this serious public health problem remains a vigorous debate***

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While broad consensus exists that the number of youths presenting with severe and acute mental health needs is high and beyond current treatment capacities, the best way to approach this serious public health problem remains a vigorous debate. Proposed solutions often vary according to the variety in viewpoints on the development and causes of emotional-behavioral problems in youth. For many, especially those who ascribe to more traditional conceptualizations of mental illness, the primary solution to the current problem is to increase inpatient bed capacity. Others, however, view mental health crises as more related to the environmental context, social determinants of health (socioeconomic factors such as poverty, lack of early quality childcare, discrimination, and poor access to basic needs) and/or adverse experiences (including abuse, neglect) and would much prefer funds to be directed to these areas. Still others hold that bolstering upstream mental health services such as outpatient treatment and comprehensive non-hospital-based crisis intervention and other services offer the best promise to reduce the number of youths needing psychiatric hospitalization. These different conceptualizations of the principal drivers of child mental health and how to address them translate to robust discussions on the best ways to use limited funds.

This section will attempt to describe reasonable standards that might be in place in community settings for services that could mitigate the need for acute inpatient care for youth. The feasibility of actual quality metrics or fidelity measures for these services will be deliberated.



### **Ideal Model in Theory: Reasonable standards**

In 1999, the U.S. Surgeon General’s report on mental health concluded the following about child mental health:

“The multiple problems associated with serious emotional disturbance in children and adolescents are best addressed with a systems approach in which multiple service sectors work in an organized, collaborative way. Research on the effectiveness of systems of care shows positive results for system outcomes and functional outcomes for children; however, the relationship between changes at the system level and clinical outcomes is still unclear.” (USDHHS, 1999, p. 193).

The dearth of data documenting the relationships between systems changes and clinical outcomes data has continued, resulting in the lack of clear and explicit standards of pediatric mental health care, including inpatient. The “Unified Vision for Transforming Mental Health and Substance Use Care” published by Mental Health America with input from mental health organizations, including the APA, posits the following:

“To improve health outcomes and quality of life for people with mental health and substance use conditions, it is necessary to establish and hold systems accountable to implementing standards of quality care and to adopting payment models that support the cost of providing effective, integrated care.” (Mental Health America, 2020, p. 14).

**Table 9: Recommended Steps from the “Unified Vision for Transforming Mental Health and Substance Use Care”**

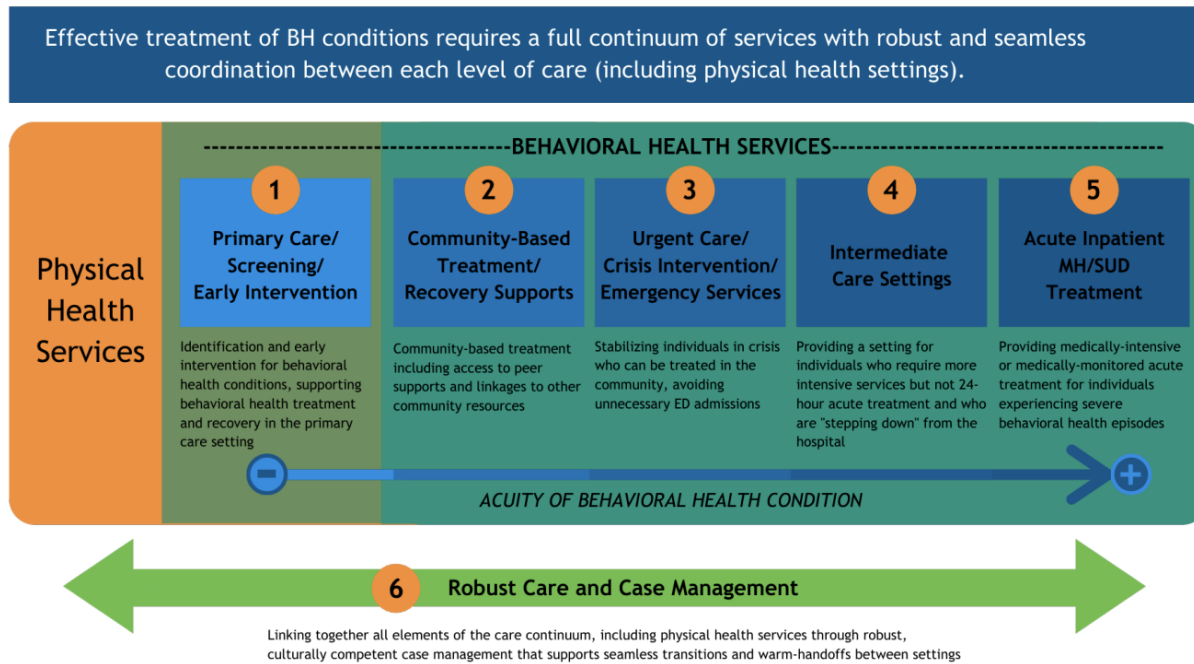
### **Recommended Steps from the “Unified Vision for Transforming Mental Health and Substance Use Care”**

- Develop and frequently update evidence-based standards of care developed by clinical specialty organizations that do not service managed care organizations (MCOs) as primary clients for Mental Health and Substance Use Disorders.
- Extend measurement-based care requirements to primary care (see Utilization Review Accreditation Commission (URAC) requirements, extend current [Joint Commission](#) (JCAHO) requirements).
- Implement quality measures to reduce disparities, improve outcomes, and improve MH/SUD experience of care and transitions in care.
- Remove barriers to filling gaps in the continuum of care, such as sub-acute care and alternatives to hospitalization.
- Fund and scale the Certified Community Behavioral Health Clinic (CCBHC) model nationwide, which incorporates core federal standards reflective of the vision outlined here.

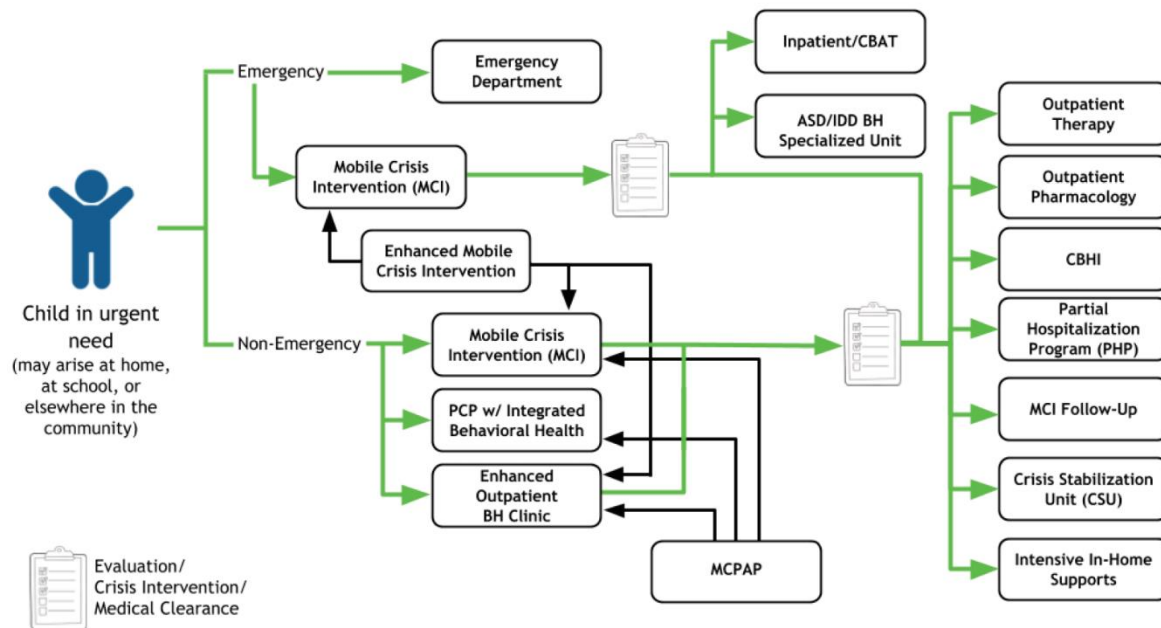
The “Unified Vision for Transforming Mental Health and Substance Use Care” was published online by Mental Health America, 2020

Table 9 above outlines the critical components of a system of care. A visual graphic of such an optimal system is below (Figure 7). A system for crisis intervention is outlined in Figure 8.

**OVERVIEW OF A MODEL BEHAVIORAL HEALTH CARE SYSTEM**



**Figure 7: Proposed model for pediatric behavioral health care. Blue Cross Blue Shield of Massachusetts and Manatt Health. Presented in *Pediatric Behavioral Health Urgent Care Report, 2<sup>nd</sup> ed.* (p. 35) from the Massachusetts Association for Mental Health. (Reproduced with permission.)**



**Figure 8: Proposed model for pediatric behavioral health urgent care. Massachusetts Association for Mental Health Children’s Mental Health Campaign. Presented in *Pediatric Behavioral Health Urgent Care Report, 2<sup>nd</sup> ed.* (p. 37). (CBHI= Child Behavioral Health Initiative, a statewide system of wraparound services for publicly insured children/adolescents. CBAT= Community-Based Acute Treatment program. ASD = autism spectrum disorders. IDD = intellectual/developmental disability. (Reproduced with permission.)**

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***A key question remains: How should it be determined whether and when a youth should move up or down within the continuum of care?***

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A key question remains: How should it be determined whether and when a youth should move up or down within the continuum of care? The Child and Adolescent Services Intensity Instrument (CASII, now the CALOCUS-CASII) and the Early Childhood Services Intensity Instrument, ECSII) can help answer this question. These instruments were developed by the American Association of Community Psychiatrists and AACAP and are increasingly recognized as standards of care for determining level of care (Fallon et al, 2006; for more information see Appendix C). These instruments continue to be used by several states and apply to the population of 6-18-year-olds with mental illness/severe emotional disturbance, substance abuse, and/or developmental disabilities.

The CALOCUS-CASII outlines six principles and theoretical foundations for child mental health care:

- **Systems of Care:** community- and family-centered treatment in the least restrictive, most normative environment that is clinically appropriate.
- **Developmental Theory:** youth have a trajectory of normative physical, emotional, cognitive, and social changes that they undergo.
- **Family Empowerment:** the family leads the process.



- **Cultural Competence:** respect and accommodation of cultural factors and special needs, and service provision by culturally competent professionals.
- **Wraparound Concepts:** integration of formal and informal supports, blended/flexible funding, strengths-based, individualized service planning.
- **Clinical Expertise:** psychiatrists serving youth and young adults.

The CALOCUS-CASII also espouses the following Child and Adolescent Service System Program (CASSP) Principles for Determining Level of Care:

- Least restrictive level of care without sacrificing intensity; intensity and restrictiveness of care de-linked.
- Care delivered within the child’s home and community.
- Care driven by the child and family’s individual needs, strengths, and values.
- Care composed both of professionally delivered *and* natural services, skills, and supports from the family and community, combined and tailored through a wraparound process.

Appendix C illustrates how the CALOCUS-CASII and the CASSP principles can be used to determine the appropriate level of care moving both up and down the continuum and the degrees of restriction.

Meeting the need for pediatric inpatient care requires distinguishing between actual physical bed capacity and patients’ access to care. While beds may be open within a system, children may be denied admission to those inpatient services on the basis of other factors. These factors may include type of insurance; presence of a developmental disorder; medical issues felt to be beyond the capacity of a specific inpatient unit; anticipation of the patient remaining “stuck” on the unit due to disposition difficulties; public insurance; lack of inpatient service at the point of emergent evaluation; acuity of the milieu; need to turn rooms into singles due to gender/sex variables; and potential danger to others.

In many communities, youth in crisis are brought to an emergency department. Once the decision has been made that admission to an inpatient unit has been made, that youth is “boarded” in the emergency department until a bed becomes available. Children can also “board” in inpatient pediatric beds or other community beds. Reported time spent boarding fluctuates from days to weeks; evidence suggests children with behavioral health conditions, co-occurring autism spectrum disorders or intellectual and developmental disabilities, and/or suicidal ideation experience the highest rates and longest durations of emergency department boarding (MAMH, 2020; McEnany, et al., 2020). While boarding may be one of a number of necessary approaches to managing the variation in census discussed above, it often provides less than optimal care and should be minimized.

Further validated and reliable instruments for assessing the quality of care at each level of service remain sparse; in particular, the lack of definition of standards for CAP inpatient care have meant a lack of consensus on quality metrics for that type of service (Zima et al., 2019). Across the U.S., data about child mental health service use, lengths of stay, admission chief complaint or diagnosis, and follow-up care appear to be sparse. What data exist are complicated by lack of breakdown by age, use of different terminology between states, and different approaches to systems of care. Improvement in the collection and reporting of pediatric mental health service data is a vital recommendation of this report.



Certain states that have been undertaking recent reforms of their child mental health services appear to have better data overall. One example is New Jersey, which in 2000 underwent a revamping of its system to replace it with one entitled “Child System of Care.” In its 15-year anniversary report, it provided data describing the utilization, characteristics, and performance of their system of care. (New Jersey, 2000):

- Out-of-home placements.
- Number of cases requiring case management.
- Use of mobile crisis response and stabilization services.
- Proportion of cases in the system who were under 15 years.
- Use of services by youth with developmental disorders, substance use disorders.
- Family satisfaction.
- Demand for and length of stay in residential treatment center beds.
- Demand for acute inpatient beds.

***Ideal Model in Practice***

The following is a case vignette from a public, coordinated system of care such as Massachusetts (Figure 1). The vignette is not based on an actual patient, but rather represents a synthesis of the authors’ experience and understanding of how care is currently happening and how it should ideally proceed. Key points are identified following the vignette.

**Table 10: Case Vignette: Current Practice and Ideal Model**

How care is currently happening	Expert commentary on ideal
<p><i>Juan lives with his parents and older sister in a state which has made investments in developing a public system of care for youth with mental health needs. At birth, the pediatrician noted Juan had low muscle tone. At 18 months, the pediatrician screened Juan for developmental delays using the Modified Checklist for Autism in Toddlers.</i></p>	<p><i>Such early screening is critical, especially for developmental disorders.</i></p>
<p><i>Juan’s results were borderline, and so he was not determined to be eligible for <a href="#">Early Intervention Services</a>.</i></p>	<p><i>Ideally determination of eligibility for services would be based on need and not a specific diagnosis of developmental disability. In this case, an opportunity was missed for Juan to receive help with speech and language, gross motor and fine-motor skills.</i></p>
<p><i>His parents, who were native Spanish speakers, did not receive interpreter services and therefore were not able to adequately complete developmental ratings scale as part of the pediatrician’s evaluation, missing an opportunity to receive parenting support in Spanish.</i></p>	<p><i>Interpreter services should be available at all levels of care. Had Early Intervention services been started, at age 3 Juan would have been considered for an Individualized Education Plan (IEP) and for a Head Start preschool to prepare him for kindergarten.</i></p>



*Instead, Juan's needs continued to go unaddressed, and by the time he started kindergarten his developmental delays had become compounded by aggression as he struggled to communicate with others. Upon entry to kindergarten his teacher noted social skills deficits and behavioral difficulties, but his school in a gateway city had limited resources, and staff were discouraged from making referrals of kindergarteners for evaluation.*

*Juan should have been referred for a formal evaluation to determine if he met criteria for an Individualized Educational Plan (IEP), which could have led to speech and language services, a social skills group, applied behavioral analysis services, occupational therapy services as well as other specialized educational interventions.*

*His parents were unaware of the services that Juan was entitled to and the school district lacked any family navigator supports.*

*Family navigators are parents with lived experience of parenting a child with special needs that can help families advocate for the needs of their child in a non-blaming or shaming manner.*

*In first grade, he struggled to learn to read, and his aggression worsened to the point that he was suspended from school.*

*Ideally the school would at this point noted Juan's developmental and educational delays and conducted an evaluation to determine Juan's eligibility for an IEP.*

*Juan's parents, who were both working multiple jobs to make ends meet, couldn't stay home with Juan and left him in the care of his 12-year-old sister who had to stay home from school to watch Juan. When Juan left the family's home while his sister was watching TV, a neighbor called the child welfare department reporting Juan was wandering in the street unattended. The child welfare agency opened a case and told the parents they were at risk of Juan being placed in foster care due to their apparent neglect.*

*Ideally the child welfare agency would have looked at the root cause of Juan's apparent neglect and engaged the family in strategies to help his parents get Juan the services and supports he needed in school and the community.*

*Fortunately, at his next pediatric visit the pediatrician, who was working at a Federally Qualified Health Center with funding for co-located behavioral health providers, identified Juan's developmental needs, and the family was assigned a social worker to help advocate for services and supports. After advocacy by his Spanish-speaking social worker, Juan was determined to be eligible for an IEP and started to receive services through his school. Juan showed some improvement in his school functioning but had learned maladaptive ways of coping with his frustration with academic demands and had fallen significantly behind his peers in his emotional and behavioral functioning. This problem escalated until an incident at school in which he punched a classmate. The incident resulted in the school calling the police who brought Juan to the emergency department of the local hospital.*

*Ideally the school would have accessed a mobile mental health response and stabilization service which would have diverted Juan from the emergency department and ensured he was connected to outpatient behavioral health services and supports.*



*After a conversation with the triage clinician, who did not speak Spanish and was not accustomed to working with such young children, Juan was referred to an inpatient psychiatric unit. When Juan's parents wanted to take him home, the emergency department filed a report with the child welfare agency who threatened to remove him from their care if they refused to allow him to be admitted.*

*Ideally the hospital would have an evaluator trained to assess children in a behavioral crisis. The evaluator would ideally be able to speak Spanish with the family or at least access interpreter services, making it more likely the family could understand the rationale for referral for further assessment via admission to the psychiatric facility.*

*During Juan's hospital stay that lasted just 4 days, Juan was very disruptive and aggressive resulting in numerous doses of an antipsychotic and he was discharged on an antipsychotic, an alpha-agonist and a stimulant.*

*Ideally the hospital stay would have been an opportunity to develop a biopsychosocial determination of Juan's strengths and needs; involve the family and their natural supports in identifying appropriate aftercare services; and initiate behavioral interventions that the family was trained in [which would require a longer length of stay]; and connect the patient and family to a wrap-around team in the community that could continue the evidence-based parent behavioral training that had been initiated during the hospital stay.*

*After no communication from the inpatient staff with the pediatrician or the school, Juan was discharged on three meds and his parents were given a list of providers to contact for aftercare.*

*Ideally, an instrument such as the CALOCUS-CASII would be completed to help determine if stepdown to outpatient services was appropriate, and a detailed aftercare plan and psychoeducation would have been developed with the family, the school, and the pediatrician. A HIPAA-compliant shared platform for communication would help ensure adequate communication.*

*Juan soon started to gain significant weight, alarming the parents who discontinued Juan's medications all at once. Juan returned to school and continued to present with behavioral disturbances despite the interventions the school had put in place. Within two weeks, Juan again became aggressive towards a teacher and the police were called and he was again hospitalized psychiatrically. After a six-day admission Juan was restarted on the prior three medications and an additional medication was added to address what was formulated to be Juan's PTSD from the neglect he suffered from his parents.*



**Table 11: Key Points for Mental Health Services for Youth****Key points: Mental health inpatient services for youth must ....**

- Be accessible to families geographically, linguistically and culturally.
- Be used only when another set of resources is not appropriate and available to accomplish vital clinical objectives.
- Be part of a continuum that includes school, primary care, law enforcement, child welfare and community-based services, e.g., mobile crisis and stabilization services.
- Include a digital communication platform linking key services.
- Focus on prevention and early intervention.
- Include assessment of parental/caregiver mental health and functioning and integrate family into the treatment plan, including psychoeducation and skills acquisition.
- Have a centralized access point from a single phone number (e.g., mental health hotline) or website.
- Be user-friendly with minimal bureaucratic requirements for all involved.
- Allow for movement up and down between levels of care based on standard assessment.
- Share the same assessment/screening instruments system-wide.
- Include technological platforms for communication between all components of continuum.
- Have trained staff members who adhere to evidence-based models of care.

**8. Population Variables**

The term “severe emotional disturbance” (SED) is often considered to be the pediatric equivalent of “serious mental illness,” and both are used by SAMSHA and other federal government agencies. SED refers to “a diagnosable mental, behavioral, or emotional disorder in children and youth experienced in the past year that resulted in functional impairment that substantially interfered with or limited the child’s or youth’s role or functioning in family, school, or community activities” (SAMSHA, 2020). However, the term’s roots are in education not healthcare. Emotional disturbance is one of 13 disabilities included in the Individuals with Disabilities Education Act (IDEA Section 300.8 (c) (4), <https://sites.ed.gov/idea/regs/b/a/300.8/c/4/i>). The definition of autism is in section, 300.8 (c) (1) in IDEA. (See Appendix D.)

The authors believe that the SED definition risks setting a problematic threshold for child mental health services. As the CDC suggests:

“Mental health is not simply the absence of a mental disorder. Children who don’t have a mental disorder might differ in how well they are doing, and children who have the same diagnosed mental disorder might differ in their strengths and weaknesses, in how they are developing and coping, and in their quality of life. Mental health as a continuum and the identification of specific mental disorders are both ways to understand how well children are doing.” (CDC, n.d.)



The SED definition has other limitations: Some mental health problems do not include readily apparent functional impairment. For example, an adolescent who is using cannabis daily may look superficially like they are functioning well; however, the substance may be damaging the normal development of their brain and may evolve into a path of more serious substance use. The definition of SED also fails to take into account children with atypical development whose functioning is impaired at baseline. Fluctuations in functioning may be key and may be due to a psychiatric disorder that can be overshadowed by a developmental disorder (Riess et al., 1982). These fluctuations need to be recognized and may warrant access to intensive services. For example, a child with non-verbal learning disorder may have social and academic functioning difficulties at baseline that require long-term services; however, if that child becomes depressed due to bullying or some other stressor, they may need acute services. Finally, some children may have multiple co-occurring conditions.

Thus, when SED is used as the criterion for admission or for Medicaid reimbursement, the risk is that too many children in need will be left out. A more nuanced approach may try to assess in a biopsychosocial framework the baseline functioning of the child and the capacity of current care providers, and then evaluate the extent to which the child's current circumstances deviate from baseline and whether the care providers are able to manage the exacerbation.

Population subgroups that represent discrete needs are important to identify in order to provide a number of specialized beds. Community health needs assessments should identify the number of residents with autism and other developmental or intellectual disorders; mental health and complex medical conditions including eating disorders; and substance use and co-occurring disorders. As the number of adults with autism and developmental disorders increases, coordination of these services with adult resources will be important.

## 9. Factors Involved with Creation of the Model for Youth

As the team developed a diagram of model structure for adults in mental health crisis (See Section 6, Creating a Model), the changes that would need to be made to realistically depict system structure for youth were noted, and include the following. As psychiatric patients, youth differ from adults in that they are a vulnerable, dependent population whose treatment must (by law) include family and guardians. Developmental and psychosocial factors may have a heightened role in the need for psychiatric services, including the legal mandate to protect minors. Schools are a vital part of mental health treatment and a frequent source of referrals to acute care; for example, about a third of adolescents who receive mental health care receive it at school (Mojtabai & Olfson, 2020). Thus, mental health care overlaps with community entities such as schools and the child welfare system. In general, hospitalization is considered a last resort, and a host of community-based resources have been developed to provide alternatives. However, few areas of the country have a complete child mental health system. Gaps in the continuum, in part due to significant shortages of child psychiatrists, reduce access and sometimes necessitate relying on distant inpatient care. School is both a source of mental health services and a stressor for vulnerable children, and seasonal variation in need for admission is typical. Finally, youth present in the early stages of psychiatric illness, often before a clear diagnosis has presented itself. Inpatient care may be needed to provide in-depth evaluation and treatment interventions under the safety of 24/7 monitoring.



Because of real-world differences between children and adults and the mental health systems developed to help them, certain adjustments to the adult model were needed. The need for an inpatient bed is based on two potential situations: an acute crisis OR need for in-depth evaluation and treatment management by an expert clinical team. The model of child and adolescent intensive evaluation and treatment was developed from the adult counterpart (See Section 6, Creating a Model) with adaptations made to include the features unique to the mental health needs of and systems for youth. It integrates both current and “real world” features and elements of the ideal model. While the model structure diagram has not yet been translated into an interactive system dynamics model as was done for adults in a generic community (“Anytown,” See Section 6), the process would be parallel.

At the time of publication of this report, development of the full model estimating the number of child and adolescent psychiatric beds needed is actively underway. The series of diagrams in draft form can be seen in **Appendix F**. As is the case with the adult version the diagram is best viewed in order as elements are added from one to the next. These schematics will serve as the basis for full development of the child and adolescent model.

### **10. Value of Simulating the Youth Intensive Evaluation and Treatment System**

As we wrestle with the child mental health crisis during the COVID pandemic, the challenges of determining what resources, including how many inpatient beds, are needed for youth has risen to the fore as emergency rooms and medical inpatient units house youth awaiting psychiatric hospitalization. Hospitals have made large capital expenditures in hopes of addressing this issue. As we have discussed, answering this question involves answering a whole host of others about the continuum of care, method of payment, and more factors.

With a simulation model in hand, healthcare systems, insurers, county and state administrators, and advocacy groups would have the capacity to explore a variety of potential scenarios and solutions. By adjusting different variables one by one, they could analyze the potential impact of any one change. Thus, a model has the potential to answer not just the question of how many inpatient beds are needed, but also such questions as, “What if we increase our school-based mental health counselors throughout our school district? What if we provide 24-hour crisis stabilization services based in the community? What if we add an unlocked acute residential treatment facility or day treatment program for inpatient diversion and stepdown?”

### **11. Summary Points**

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***Children’s inpatient services should be part of a coordinated continuum of care that involves healthcare systems and community stakeholders: pediatric primary care, mental health experts and systems, schools, juvenile justice and law enforcement, state agencies, peer and family support services, and other community agencies.***

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- Children’s inpatient services should be part of a coordinated continuum of care that involves healthcare systems and community stakeholders: pediatric primary care, mental health experts and systems, schools, juvenile justice and law enforcement, state agencies, peer and family support services, and other community agencies.
- Standards for inpatient services should be based at a minimum on the AACAP Practice Parameters for Residential Treatment, recognizing that residential treatment includes five different levels and is distinct from the higher-level staffing of acute inpatient care.
- The CALOCUS-CASII and ECSII offer widely accepted standards for determining the appropriate intensity of care and are now used in several states.
- Whatever “ideal” model of care a catchment area or healthcare system adopts, fidelity to this model must be assessed at regular intervals and adjustments made accordingly.
- Validated quality measures for each service in the continuum of care for children and adolescents are sorely needed.
- Development of the full model estimating the number of child and adolescent psychiatric beds needed is actively underway.

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## APPENDIX A:

# Glossary of Terms Related to Psychiatric Bed Needs

### **Severe Mental Illness/ Serious Mental Illness (SMI)**

Individuals with SMI are defined in National Survey on Drug Use and Health (NSDUH) as adults who in the past year have had a diagnosable mental, behavioral, or emotional disorder (excluding developmental and substance use disorders) of sufficient duration to meet diagnostic criteria and has resulted in serious functional impairment substantially interferes with major life activities (SAMHSA, 2021).

### **Severe Emotional Disturbance/ Serious Emotional Disturbance (SED)**

For people under the age of 18, SED is a “diagnosable mental, behavioral, or emotional disorder in children and youth experienced in the past year that resulted in functional impairment that substantially interfered with or limited the child’s or youth’s role or functioning in family, school, or community activities” (SAMHSA, n.d.).

### **Mental Illness / Any Mental Illness (AMI)**

Any mental illness “among adults aged 18 or older is defined as having had a diagnosable mental, behavioral, or emotional disorder (excluding developmental and substance use disorders) of sufficient duration to meet diagnostic criteria specified within the fourth edition of the “Diagnostic and Statistical Manual of Mental Disorders” (DSM-IV)” (SAMHSA, 2021).

### **Substance Use Disorders**

“Substance use disorders occur when the recurrent use of alcohol and/or drugs causes clinically significant impairment, including health problems, disability, and failure to meet major responsibilities at work, school, or home” (SAMHSA, n.d.).

### **Intersectionality**

Intersectionality refers to the interconnected nature of social categorizations such as race, class, and gender as they apply to a given individual or group. It is used to address identities beyond race and gender, including class, religion, sexual orientation, age, ability and ethnicity. (NCCJ, n.d.)

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## APPENDIX B: Barriers to Care

Barriers to care limit or prevent access to quality health care services. Access is important for promoting and maintaining health, preventing, and managing disease, reducing unnecessary disability and premature death, and achieving health equity (IOM, 1993). Hence, as we assess bed need, there are several factors affecting access that must be considered.

1. We recognize the level of “Community Risk Factors” that might increase the rate for psychiatric hospitalization e.g., housing instability; food insecurity; low-quality education more prevalent; higher rate of unemployment; poverty and low SES; degree of community-level trauma such as higher rates of violent injuries or deaths, gun violence, unsafe neighborhoods.
2. We recognize the level of “Community Protective Factors” that might lower the rate of psychiatric hospitalization e.g., high housing stability; food security; high-quality educational opportunities; job security; middle and high SES; lower degree of community-level trauma such as lower rates of gun violence, safe neighborhoods.
3. We recognize the need to identify or define the general communities where people live:
  - Geographically e.g., rural, suburban, urban.
  - Type of living situation e.g., single-family home, apartment, prisons/places of incarceration, nursing homes and other long-term care facilities, schools/institutions.
  - Quality of living situation e.g., stable vs unstable housing; level of gun violence, level of SES.
4. We must look for a metric that can help encapsulate the above data and may also assist with depicting the degree of difficulty for accessing quality mental health care e.g., use zip code? (Perhaps as community protective factors and access to quality mental health care increase, the rate of psychiatric hospitalization for members of that community decrease.)

Note that the number one reason for adults aged 18 and over, with an unmet need for mental health services, for not receiving mental health care is “could not afford cost” (38.3%) and the next two most common reasons were “Thought Could Handle the Problem Without Treatment” (28%) and “Did Not Know Where to Go for Services” (27.8%). (SAMHSA, 2020)

The World Health Organization (WHO) identifies risk factors for suicidal behavior at the societal and systems level, the community level, and the individual level (WHO, 2014).

Societies and systems with poor access to health care, easy access to means for suicide, inappropriate media sensationalizing suicide, and high levels of stigma against people who seek help for mental health increase the risk of suicide in their populations.

War and disaster, stresses of acculturation, discrimination, isolation, abuse, violence and conflictual relationships are communal risk factors for suicide.

Risk factors at the individual level include previous suicide attempts, mental disorders, harmful use of alcohol, financial loss, chronic pain and a family history of suicide.



## A. General Barriers to Care

The following barriers decrease access to mental health care across all populations and are also amplified by intersectionality:

- Insurance payor type (e.g., Medicare, Medicaid, private Cadillac vs high deductible private insurers, uninsured, etc.).
- Socioeconomic status (personal/familial resources including education, financial wealth, and social networks).
- Local resources (physical location & distribution of resources in a community- influenced by government sanctioned racist practices including red-lining, internment, and forcible relocation to reservations).
- Inadequate mental health research (high-quality, evidence-based care requires ongoing research to innovate, implement, and evaluate mental health care).
- Stigma (limits accessibility and acceptability of receiving and giving mental health care on an individual and community level and on a systems level limits resources available for mental health consumers and providers).
- Mental health workforce shortages (amplified by stigma against providers of mental health treatment, inequitable reimbursement/funding across systems and locations, and limited initiatives to attract and retain a diverse workforce).
- Inaccessibility of mental health care (poor cultural competency on the part of healthcare providers and systems, inadequate accommodation for disabilities or health literacy, prohibitory paperwork or other pre- admission requirements, lack of technology and/or infrastructure to support the use of technology).

## 12. Barriers Specific to Special Populations

### *Older Adult Patients:*

- Other sources of stigma: ageism, neurocognitive challenges, physician disability, lower SES (Levy, 2015).
- Caregiver burden: demand for caregiver support far exceeds the availability of services (AARP, 2020).
- Suicide: increased lethality of attempts and decreased likelihood of asking for help (Suicide Prevention Resource Center, 2017).
- Vulnerability: increased risk of isolation, neglect, or exploitation (Acierno et al., 2010).
- Decisional capacity and legal barriers (surrogate decision-making laws vary state to state with regard to how older adults access mental health treatment).

### *LGBTQ+ Patients:*

- Stigma: bigotry/discrimination due to sexual orientation or gender identity, lower SES (Connors et al, 2020).



- Lack of access to competent healthcare providers (systemic lack of training for healthcare providers w regard to cultural and medical competency, especially for trans & gender-nonconforming individuals).
- History of pathologizing any non-cis-heterosexual individuals (Freud, 1923).
- Invisibility, patients are assumed to be cis-heterosexuals and are often not asked about their gender identity, preferred pronouns, or orientation.

*Veterans and Families:*

- Assumption that the well-being of veterans and their families is solely the VA's responsibility.
- Inaccessibility of care due to systemic bureaucratic delays and barriers to obtaining benefits.
- Lack of culturally and clinically competent healthcare providers (Tanielian et al., 2014).
- Invisibility, patients are assumed to be civilians and often not asked about their military service history or connection to veterans.
- Male spouses of veterans and women veterans are especially likely to be under-identified (the 2010 Census identified 2.2 million women veterans).
- Increased risk of PTSD and suicide compared to the general population (Wynn et al., 2020).

*Active Service Military:*

- Stigma and fear of career repercussions for seeking MH care.
- Limited confidentiality (medication prescription and doses are mandated to be released to soldiers' commanding officers).
- Increased prevalence of mental illness and suicide than sociodemographically matched civilians. (Kessler et al., 2014; Trautmann et al., 2017).
- High rates of military sexual trauma or MST (Department of Defense, 2017) that is distinct from other forms of sexual trauma because "the victim and the perpetrator may have power relationships, work and live together, and expect to deploy together."

*Foreign-Born Patients:*

- May experience increased risk factors for mental illness or substance use (lack of community integration, fear of apprehension and deportation, discrimination, acculturative stress, family separation) (Hacker et al., 2011).
- Some female patients may experience decreased access to communal and familial resources due to cultural gender norms.
- Care may be compromised due to a lack of English proficiency, cultural & health literacy; especially if adequate interpreter services are not available (Al-Hachim, 2017).
- Lack of culturally and clinically competent healthcare providers (Patel and Sreshta, 2017).
- Decreased access to insurance coverage. (Foreign-born individuals are twice as likely as U.S. citizens to have no health insurance coverage (U.S. Census Bureau, 2018). Undocumented, non-elderly adults are four times as likely as nonelderly U.S. citizen adults to lack health insurance



coverage, and undocumented children are nearly five times as likely as U.S. citizen children to have no coverage.) (Kaiser Family Foundation 2021).

- Stigma, trauma and mistrust of centralized systems, lack of knowledge of other sources of care, and cultural norms may lead to a preference for seeking alternative treatments, religious leaders, folk practitioners, family, and friends and delay timely contact with mental health professionals (Derr, 2016; Chan et al., 1996).
- May lack financial or linguistic resources to access personal or public transportation.
- May avoid seeking care or accessing public insurance options due to concerns that accessing care or acquiring a diagnosis could place restrictions on their immigration status. (Hong et al., 2017; U.S. Citizen and Immigration Services 2019a; U.S. Citizen and Immigration Services 2019b).
- If the USCIS-designated doctor checks the Class A Condition box on USCIS Form I-693, the applicant is inadmissible (U.S. Citizen and Immigration Services 2019a, 2019b).

#### *Children and Families:*

- Must rely on the “proxy voice” of others to represent their needs.
- Parents and caregivers may themselves have difficulties accessing care because of cost, time constraints, ongoing stressors (domestic violence).
- Difficulty recognizing that a problem exists, such as early-onset, child does not disclose (bullying).
- Many other systems/organizations may be involved (school systems, child-serving agencies including child welfare and juvenile justice).
- Serious workforce shortage – currently 9,400 child psychiatrists but 30,000 needed (Njoroge et al., 2016); programs specific to children e.g., Children’s Health Insurance Program or CHIP require separate funding.

#### *Patients with Substance Use Diagnoses:*

- Large unmet need for treatment with SAMHSA 2018 study showing that 1 in 13 people in the U.S. needs treatment but only 12.2 % received treatment in the previous year.
- Long-considered the number one health crisis in the US (Robert Wood Johnson, 2001) however “antiquated models of addiction that formulate addiction as a moral and criminal problem” have contributed to “stigmatizing and criminalizing” individuals with substance use diagnoses, and evidence-based practices have lagged behind.
- Best strategies are prevention-based.
- The type of substance use (alcohol; cannabis; cocaine; stimulant including methamphetamine; sedative-hypnotic; opioid including heroin and prescription opioids) contributes to wide variations in the types of barriers.
- Rural vs urban – availability of treatment often correlated with population density; rural settings have fewer substance use treatment facilities and “are rated lower in quality measures including access to highly educated counselors, presence of a physician, and availability of wraparound services; urban settings are “impacted by different structural factors, including higher rates of criminalization, with drug diversion programs being used at lower rates.”



- “The effects of stigmatization and criminalization have disproportionately impacted underrepresented minorities and have led to health disparities in substance use treatment” (Lagisetty et al., 2019) e.g., increased addiction mediated through judicial system, including heavy policing, increased rates of incarceration, higher sentencing in the absence of medical treatment, and lack of treatment provision in a culturally informed manner.
- Destigmatization and remedicalization of substance use treatment is especially necessary to decrease barriers.
- Need policy and legislative changes at both state and federal level to expand access to evidence-based life-saving treatment e.g., increase access to opioid agonist treatments like methadone and buprenorphine by eliminating X-license waiver requirements.
- Greater focus on harm-reduction strategies.

*Patients Involved with Criminal Justice System:*

- The rates of “serious, disabling, or chronic health conditions, including behavioral health, are higher than those found in the general population, including a four times greater rate of mental illness and 72% of those with mental illness having a co-occurring rate of substance use.
- Profound stigma against people who are incarcerated including by prison and administrative staff
- Specialized knowledge of criminal justice system and patients’ rights is necessary
- High rate of recidivism because of homelessness, substance use and victimization
- Despite effective models for diversion from jails and prisons into treatment settings, these have had difficulty with leadership, resources, funding, workforce shortages, legislative and implementation

*Medically Ill Patients:*

- Co-morbid medical and psychiatric illnesses have “reduced access to medical care, higher rates of undiagnosed and untreated physical illness, and poorer health outcomes (DeHert et al., 2011) and subsequently have reduced life expectancy by 13-30 years with 60% of excess mortality attributable to physical health conditions.
- Conversely patients with chronic medical conditions have increased rates of mental health diagnoses, such as depressive disorders (Katon, 2003) and higher rates of treatment nonadherence (DiMatteo et al., 2000).
- Need to have more family-level interventions for issues such as care provider burden and family distress.
- Need for greater collaboration with medical team (may require specialized training in communication techniques such as “SBARE” to decrease stigma directed by a medical team towards patient/family).



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## APPENDIX C: CALOCUS-CASII

For determining appropriate level of care for children, including the need for inpatient care, the CALOCUS-CASII works in the following manner:

- **Six dimensions** are reviewed.
- Each dimension has a **five-point rating scale**, from least to most severe.
- Each possible rating on the five-point scale has a list of descriptors.
- Only one descriptor needs to be met for that rating to be given.
- Always choose the highest category with one matching descriptor.
- The scores are totaled at the end and correspond to one of **seven levels of intensity**.
- Ratings should take clinical judgment and other sources of information into account.

Table 12- A: CALOCUS-CASII’s Six Dimensions

CALOCUS-CASII’s Six Dimensions	
1. Risk of Harm	The measurement of a child’s risk of harm to self or others and assessment of child’s vulnerability to victimization.
2. Functional Status	Assessment of child’s ability to function in age-appropriate roles and the effect of the presenting problem on daily living activities.
3. Co-Occurrence of Conditions	Measurement of co-existence across four domains: developmental disability (includes autism spectrum disorders, mental retardation, and learning disabilities), medical, substance abuse, and psychiatric.  This requires that you first select which domain is primary and exclude the primary from assessment in this dimension.
4. Recovery Environment	Divided into two subscales: Environmental Stress and Environmental Support. Requires an understanding of both strengths and needs from the family perspective, as well as the resources available.
5. Resiliency and/or Response to Services	Resiliency refers to a child’s capacity for successful adaptation. It also measures the degree to which past services have been effective. <i>(Note: Ratings in this dimension are particularly sensitive to those deficits seen in autism spectrum disorders.)</i>
6. Involvement in Services/ Acceptance and Engagement	Divided into two subscales: A-Child/Adolescent and B-Parent/Primary Caregiver. Unlike the Recovery Environment Dimension, <b>only the subscale with the highest score</b> is used when scoring the CALOCUS-CASII. Reasons for non-engagement may be found within the service provider as well as the child/family.





Table 12-B: CALOCUS-CASII’s Seven Levels of Intensity

<b>CALOCUS-CASII’s Seven Levels of Intensity</b>	
<b>Level 0: Basic Services-</b>	Prevention and health maintenance services available to everyone in the population being served.
<b>Level 1: Recovery Maintenance and Health Management</b>	Step downs from higher level of care that need minimal involvement/ intervention to maintain functioning such as medication management.
<b>Level 2: Outpatient Services</b>	Traditional outpatient services such as individual therapy. <i>Note: Levels 0-2 do not require case management.</i>
<b>Level 3: Intensive Outpatient Services</b>	More complex services with more frequent contact between family and providers. Often includes case management and individualized service plans.
<b>Level 4: Intensive Integrated Service Without 24-Hour Psychiatric Monitoring</b>	Increased intensity of services requiring more extensive collaboration, a more elaborate wraparound plan, and active case management. Can include day treatment or partial hospitalization, or additional supports such as respite.
<b>Level 5: Non-Secure, 24-Hour Services with Psychiatric Monitoring</b>	Traditionally refers to group homes or unlocked residential facilities but may be provided in foster homes or family homes with adequate community supports. Complex array of services with high level of coordination.
<b>Level 6: Secure, 24-Hour Services with Psychiatric Management</b>	Traditionally refers to inpatient psychiatric settings or residential settings. Can be provided in a community setting if medical and safety needs can be met.

Table 12-C: Level of Care Transitions

<b>Level of Care Transitions</b>
<ul style="list-style-type: none"> <li>• Child and family’s service needs are likely to change as treatment progresses.</li> <li>• Level of care transitions do not have to occur sequentially.</li> <li>• Child may make level of care transition after adequate stabilization and based on the family’s and treatment team’s clinical judgment.</li> <li>• Flexible wraparound treatment plan can create highest intensity of services and facilitate seamless transitions, with the same clinicians and staff providing care whenever possible.</li> <li>• Re-administration of CALOCUS-CASII can help determine a child’s readiness for another level of care and identify focus/ goals of subsequent treatment.</li> <li>• The higher the level of service intensity, the more frequently the CALOCUS-CASII should be re-administered.</li> <li>• When considering transition from foster care to family home, it may be helpful to rate the CALOCUS-CASII for both environments.</li> </ul>



## APPENDIX D: Individuals with Disabilities Education Act

From Individuals with Disabilities Education Act (<https://sites.ed.gov/idea/regs/b/a/300.8/c>)

### (c) Definitions of disability terms.

#### Autism

##### (1)

(i) Autism means a developmental disability significantly affecting verbal and nonverbal communication and social interaction, generally evident before age three, that adversely affects a child's educational performance. Other characteristics often associated with autism are engagement in repetitive activities and stereotyped movements, resistance to environmental change or change in daily routines, and unusual responses to sensory experiences.

(ii) Autism does not apply if a child's educational performance is adversely affected primarily because the child has an emotional disturbance, as defined in paragraph (c)(4) of this section.

(iii) A child who manifests the characteristics of autism after age three could be identified as having autism if the criteria in paragraph (c)(1)(i) of this section are satisfied.

#### Emotional disturbance

##### (4)

(i) Emotional disturbance means a condition exhibiting one or more of the following characteristics over a long period of time and to a marked degree that adversely affects a child's educational performance:

(A) An inability to learn that cannot be explained by intellectual, sensory, or health factors.

(B) An inability to build or maintain satisfactory interpersonal relationships with peers and teachers.

(C) Inappropriate types of behavior or feelings under normal circumstances.

(D) A general pervasive mood of unhappiness or depression.

(E) A tendency to develop physical symptoms or fears associated with personal or school problems.

(ii) Emotional disturbance includes schizophrenia. The term does not apply to children who are socially maladjusted, unless it is determined that they have an emotional disturbance under paragraph (c)(4)(i) of this section.



## APPENDIX E:

### Adapting the Anytown, US Model to a Specific Context/Community

The Anytown, US acute mental health crisis system concept model was designed as a generalized modeling framework able to represent key features common to many systems. Some communities may find the generalized model does not represent their system very well due to many contributing factors. Certain components or features may not be present in their community or other system components important in their context may not be in the Anytown, US model. The Anytown, US model can be changed to address these differences. Modifications to the model may be as simple as turning off a pre-existing component (i.e., setting its capacity to zero). Or they may be more complex, requiring the development of a new feature and logic in the model to better represent your system. Outlined below are a set of generalized steps that would be followed when evaluating the “model-fit” and modification of the Anytown, US model for a specific community.

**Step 1. Describe your decision problem:** What questions are you seeking to answer about your acute mental health crisis system? Determine the purpose of your desired simulation modeling engagement: (1) modeling to develop decision-maker understanding of typical mental health systems’ dynamics, perhaps in the form of an interactive model, and/or (2) modeling to perform a quantitative analysis of your system’s performance and precise estimates of capacity needs (i.e., system component capacity scenarios that will help you reach desired system performance targets). You will also want to consider whether your system is expected to continue functioning in its current state, or whether any impending or recent changes render your future system substantially different from your past system (make sure you can describe these changes). Consider the boundary/scope (e.g., are you studying outcomes among adult, children, and/or geriatric populations; publicly, privately, and/or uninsured versus the full population; what geographic region). Also, what are the network of service components included (e.g., community, regional, state; public, private; civil, forensic)? Identify any known areas of concern with respect to system performance.

**Step 2. Assess the adequacy of the Anytown, US model and determine required model updates:** Evaluate the Anytown, US generalized modeling framework to determine the model’s fit relative to your community’s acute mental health crisis system. We recommend starting by reviewing the model components included in Anytown, US (Table 1), and the model structure diagram (Figure 1 panels A-F). Engaging with the Anytown, US model can help your group understand the value of such a decision support model and appreciate what is/is not in it currently. You’re likely to need to adjust parameters like the population size, capacity of system components (perhaps setting some to zero). You will also want to discuss whether the amount of aggregation in the model is appropriate for your system and modeling needs – for example, all inpatient psychiatric hospital beds are aggregated, regardless of whether they are in a state psychiatric hospital or community hospital. Simplifications like this allow the model to more readily approximate system behavior, but they may need to be adjusted if your system’s inpatient hospital beds are used in substantially different ways, affecting broader flow through the



system (e.g., if one particular hospital unit is a bottleneck whereas another is not). Disaggregating introduces more detail in the model and increases data needs (e.g., for every service component added, you will need data about how patients flow between that and all other system components). We advise keeping the model as simple as possible at first, adding complexity when needed to capture local dynamics. Decision support modeling is an iterative process of building, testing, and improvement. After a model demo, we will discuss your sense of the goodness of fit between the Anytown, US model and your community, discuss the complexity that would need to be added to make desired changes (considering data availability and resources), and prioritize next steps. Should you feel substantial revision to the model is necessary, we will encourage you to undertake system mapping, to create an adaptation of the model structure diagrams presented in Figure 1. We have developed a questionnaire that can be used to guide discussion with your community stakeholders to inform model fit and the identification of data sources to support model adaptation. Please contact [apa@psych.org](mailto:apa@psych.org) for more information.

**Step 3. Collect system data:** Whether or not substantial revision to the Anytown, US model structure is required, you will need to collect data on the community acute mental health crisis system. Begin by reviewing parameter values in the Anytown, US model in Table 2. For simple model adaptation, seek out improved parameter estimates for these values through a combination of local data and local expert opinion. In order to adapt the model more fully, communities would need to gather as much of the following types of data as possible. When data is missing, assumptions can be informed by local experts, other communities, and the scientific evidence.

- For any component of the system that has constrained capacity, we need to know what is available and how availability varies over time. For example, how many ED beds are typically available to adults in acute mental health crisis? Anytown, US does not model full ED use/queueing (e.g., demand for ED use among non-psych patients), rather it focuses on use by individuals in acute mental health crisis. How much capacity is typically available for these patients across your community's EDs over time? How many inpatient beds are typically in use by adults in acute mental health crisis (from the population modeled)? We recommend subtracting use by patients from outside your focal population (e.g., residents from another county hospitalized in your focal county) and add patients from your focal population receiving care in outside services/hospitals. You will want to consider how capacity varies day-to-day (randomness), as well as whether there is an increasing/decreasing trend over time or seasonality (e.g., patterns repeating across days of the week, months of the year, etc.).
- The size of your focal population, and whether it is increasing/decreasing over the time horizon you are interested in modeling.
- The demographics of individuals in acute mental health crisis (e.g., age, gender, insurance status/access to care, comorbidities. (See important factors in Section 5.)
- Length of stay in system components, both overall (on average) and variation across patients. Are there distinct profiles affecting length of stay within a given system component (for example, a bi- or tri-modal distribution in inpatient hospitalization where a subset of patients stays between 2 and 7 days, a second subset 2-3 weeks, and a third subset 4-6 months). How common is each length-of-stay profile, and what typically distinguishes each?



- When patients are discharged or transferred from a given system component, where are they discharged or transferred to (and with what probability)? How common is recidivism – re-entry to the acute mental health crisis system – after someone is stabilized and connected to community resources? You will need to understand how services received affect recidivism.
- How long do patients typically wait for each system component?
- While they are not currently included in the Anytown, US concept model, how often are step-down services used in your acute mental health crisis system? Step-down programs are defined as “treatment programs such as intensive outpatient programs and partial hospitalization programs that allow individuals to return to the community while receiving more intensive services that might otherwise be received in an inpatient setting” (Table 2 in Section 6). While these programs might be referred to as “step-up programs” (relative to community outpatient care), you should focus on capacity for their use as step-down resources, quantifying slots available and typical length of stay for this type of use. When used, where do patients wait for slots (e.g., inpatient/crisis bed or from home after being sufficiently stable to return home in anticipation of a slot)?
- How often do adults in acute mental health crisis enter an ED waiting room or crisis receiving bed and leave before receiving care? Or, once care starts, how often do they leave against medical advice? When this happens, what is likely to happen in the following week, month, year? Are these patients likely to re-enter the acute mental health crisis system or to be arrested? What affects the likelihood of any of these transitions?
- How many individuals are arrested while in acute mental health crisis, and how many need mental health services (e.g., jail diversion, competency restoration, etc.). When individuals are arrested in mental health crisis and released, how are these individuals re-engaged to mental health services. What impact does incarceration have on recidivism to the acute mental health crisis system?

**Step 4. Update the model:** Through steps 2 and 3, you will develop schematics (like the model structure diagram in Figure 1) and parameter tables (like Table 3 in Section 6) representing your community acute mental health crisis system. In step 4, these are translated into programmatic modifications of the Anytown, US model (e.g., model code). Thereafter, experienced modeling analysts should verify that the simulation model executes as intended, using a variety of techniques.

**Step 5. Test/build confidence in the model:** Compare the model’s performance under known conditions with performance of the real system in your community. Perform statistical inference tests and review the model with system experts (i.e., model structure, parameters, and behavior through interaction with the model dashboard). While it may feel like a failure when your model does not predict data well, it is actually an opportunity to investigate why this is. What model assumptions are incorrect or missing, making the model and community data incongruous? Work to improve the model until its alignment with available data is sufficient given your modeling objectives. Note that uncertainty analysis can be useful in the face of uncertainty about system structure or parameter values – multiple versions of the model can be run to learn whether decision recommendations are robust to this uncertainty. If not, the model can be used to prioritize research needs to inform aspects of uncertainty most contributing to your inability to identify clear strategies for improving outcomes.



**Step 6. Document the model, key insights, and schedule dashboard interaction:** After the model has been tested, it is time to use the model to support system change. It is very important that models not be seen as crystal balls; the more understandable they are, the more likely decision-makers are to use them. Invest in sharing model structure, parameter assumptions, and allowing stakeholders to interact with and learn from the model. This would require the development of an interactive model interface (dashboard, such as that illustrated in this section of the report) for a user to experience the acute mental health crisis system model representing your community. Decisions would be needed on who should be provided access, how the interactive capability would be hosted, and the affordability of this solution. Even if you do not provide a dashboard/interactive exercise to decision-makers and other stakeholders, you can support change through sharing simulation analysis results. For this, you will need to select an appropriate experimental design as set by the initial requirements (Step 1). Then, you will need to establish the experimental conditions for the model, performing simulation runs, observing and interpreting the results, and providing recommendations. The process can be quite iterative and require the use of further experiments to increase precision and to perform sensitivity analyses.

Contact [apa@psych.org](mailto:apa@psych.org) for more information.



## APPENDIX F

# Draft Model Diagrams for Estimating the Number of Needed Child and Adolescent Psychiatric Beds

*Model structure diagram: Representing the youth intensive evaluation and treatment system*

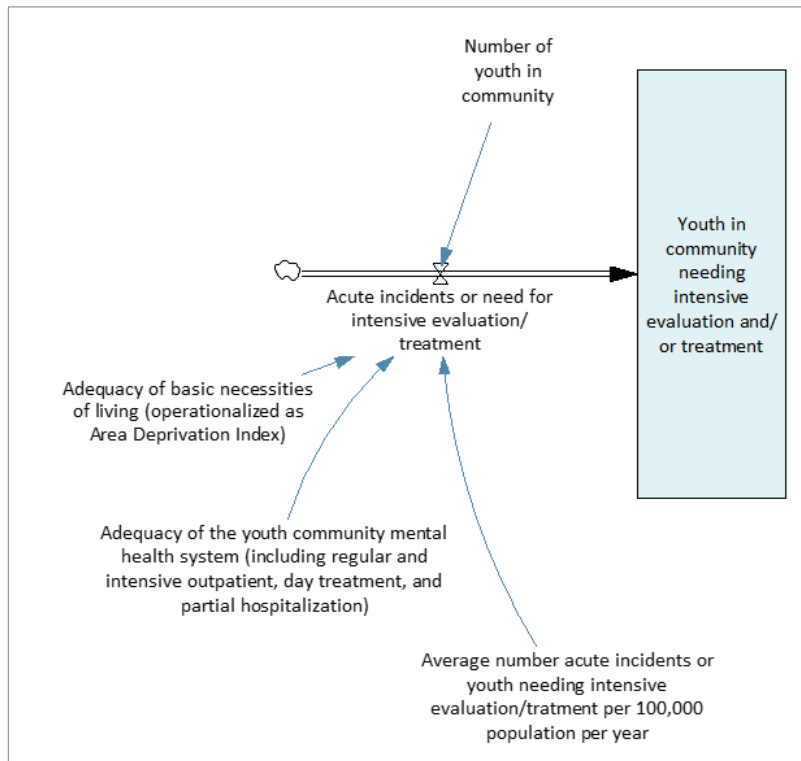


Figure 9 Panel A

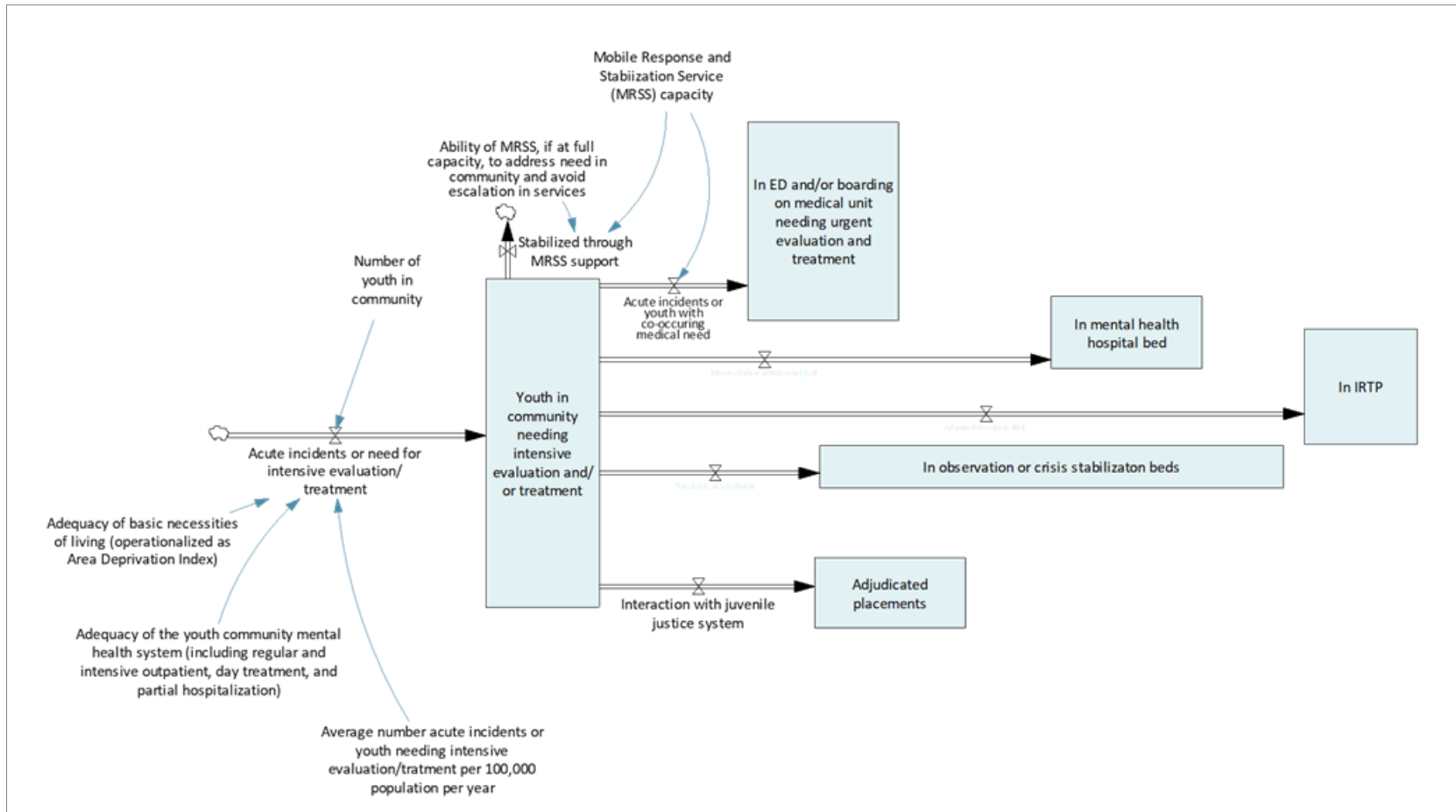


Figure 9 Panel B



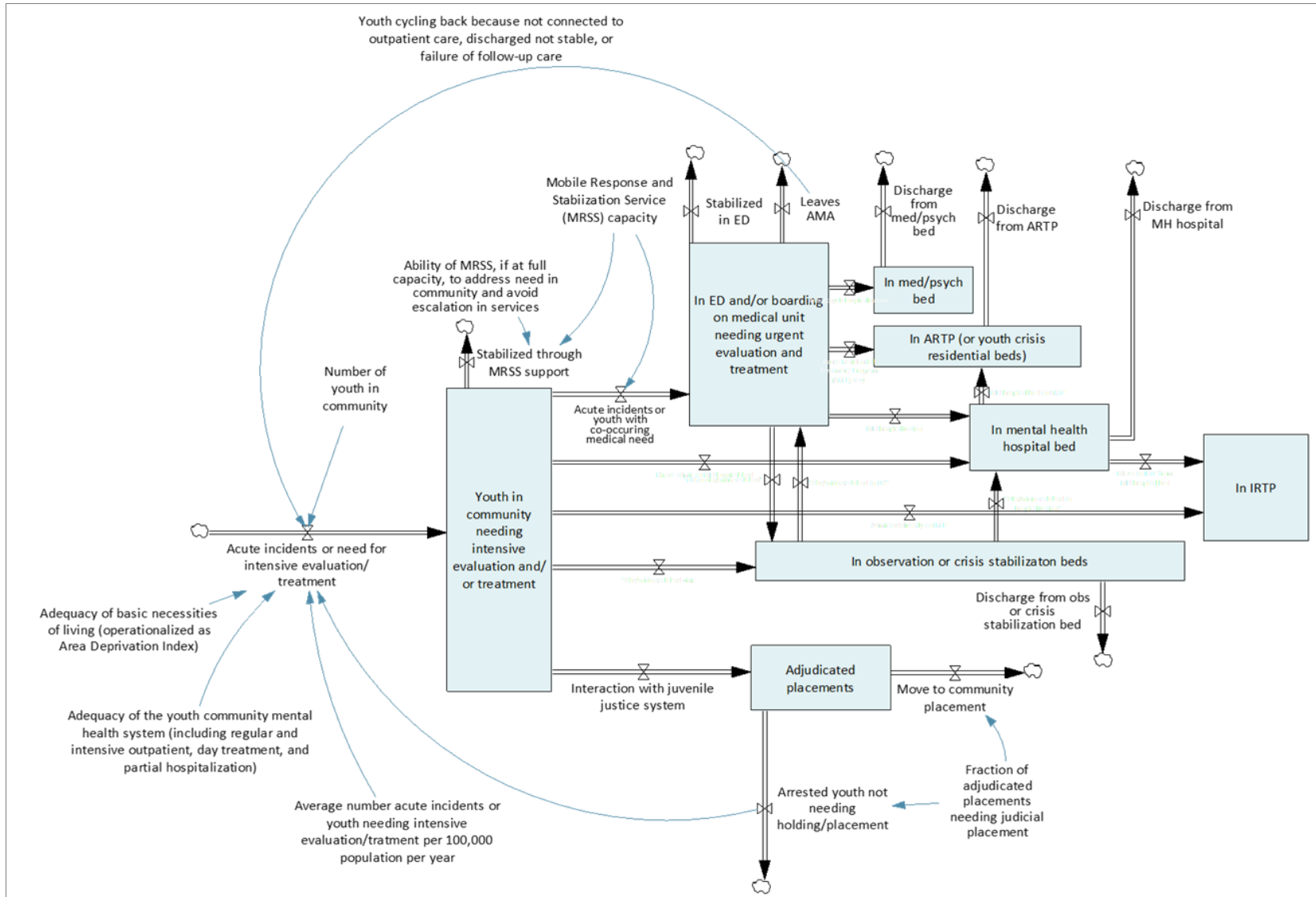


Figure 9 Panel C

# The Psychiatric Bed Crisis in the US

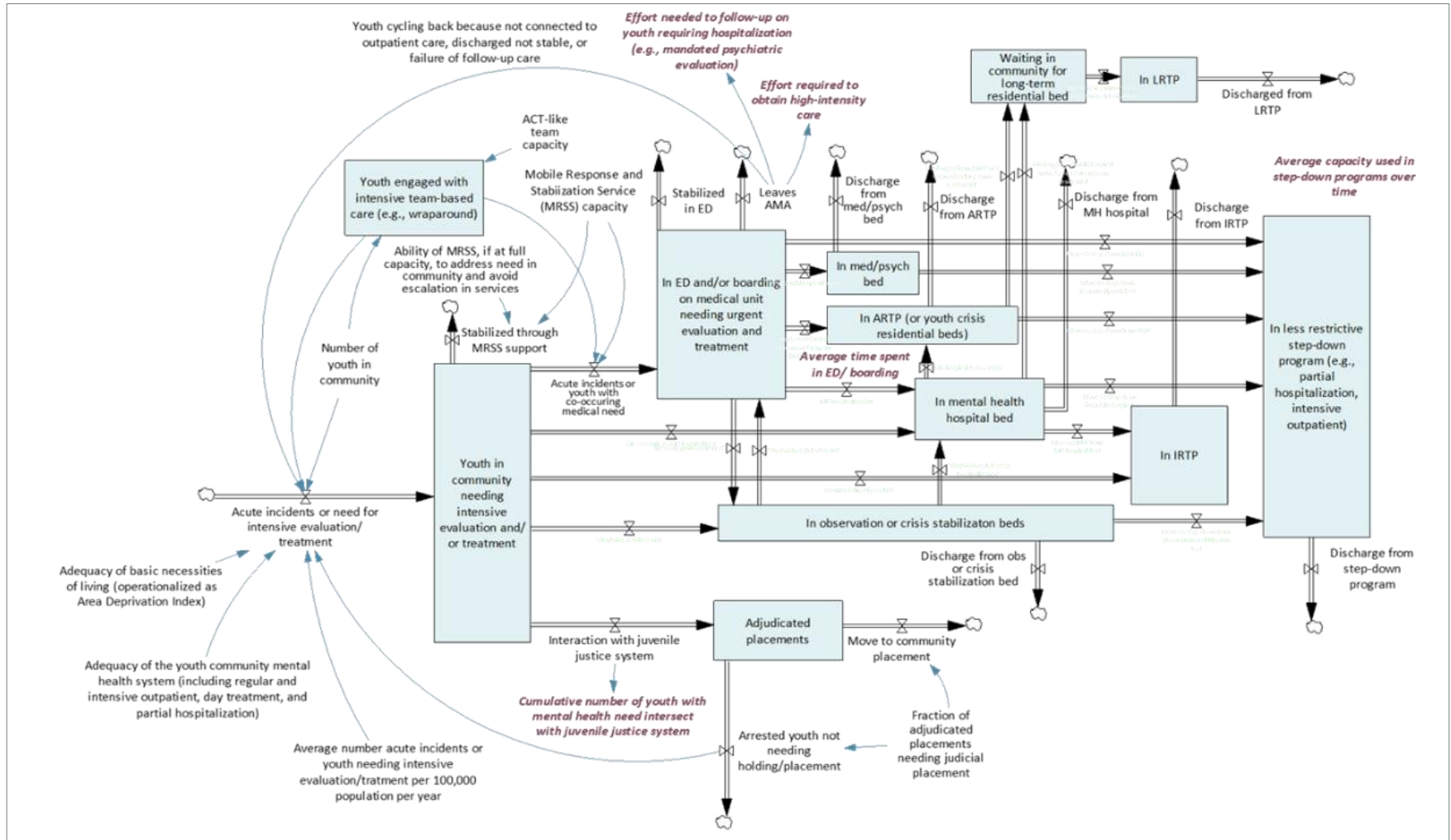


Figure 9 Panel D



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