



Assessing the Optimal Number of Psychiatric Beds for a Region

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O'Reilly et al.'s paper in this issue on determining optimal numbers of psychiatric beds makes a number of important arguments and offers an interesting approach, but errs by relying on anecdotal, inconsistent, invalid data, which often lead to incorrect conclusions (Gueron 2007). In this commentary, we lay out points of agreement, disagreement, and omission, and suggest additions to their proposed research.

Background

Several of the authors' starting points deserve emphasis. Many countries have been reducing psychiatric hospital bed capacity for decades, many regions are struggling to meet mental health needs, and some patients with complex needs undoubtedly require more supervised treatment for a time. Nevertheless, the optimal number of beds per capita for any system of care remains unknown. Countries define bed types, psychiatric disorders, and lengths of stay in different ways, making comparisons across countries difficult if not impossible. Computerized algorithms—systems for combining complex data—are now used for many medical as well as marketing, business, scientific, finance, and even sports decisions, but none exists for determining the optimal number of hospital beds. For all the reasons the authors enumerate, traditional approaches to calculating the optimal number of hospital beds—by expert consensus, normative data, and population health statistics—are unlikely to be accurate.

Thus, countries, regions, and local systems have no evidence-based guidelines to determine the appropriate amount

of hospital-based psychiatric care, even though, in many jurisdictions, half or more of the total mental health budget goes to hospitals. This lack represents an enormous gap in the mental health services literature.

The authors propose an “observed outcome approach,” based on the proposition that when a system eliminates beds below some minimal threshold, key indicators will signal problems. Some of their proposed key indicators relate to hospital functioning, such as boarding of patients waiting for beds in emergency rooms, level of acuity (acuteness might be a more accurate term) on inpatient wards, lengths of stay, and discharges to homelessness. Others relate to patient outcomes, such as homelessness, suicide, and criminal justice system involvement. They argue that hospital-related indicators are proximal and likely to signal problems before patient-related indicators, which are more distal. To their credit, the authors acknowledge that almost no research consistently supports this proposition. Nonetheless, they proceed to cite correlational studies and anecdotal evidence to support their observed outcomes proposition, while omitting countervailing evidence that would provide a more balanced view. We consider these two types of outcomes separately.

Hospital Functioning

One logical problem with hospital functioning as a key indicator is that the mental health system's purpose is, or should be, to benefit people with mental health difficulties, not the hospital industry. Hospital functioning provides a poor indicator of need for several additional reasons. First, the rationale for deinstitutionalization and community alternatives, which the authors do not adequately represent, includes persistent and ongoing reports of abuse of hospitalized patients, evidence of clinical deterioration while in hospitals, consistent patient preferences for community living, legal protection of a patient's right to autonomy and freedom, disability legislation across most high-income and middle-income countries, economic factors, and so on (Lloyd-Evans and Johnson

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2019). For example, the Americans with Disabilities Act (1990) in the US mandated that people with disabilities have a right to live in the least restrictive environment and participate as fully as possible in community life, and multiple legal settlements under the Olmstead Decision (U.S. Supreme Court 1999) have mandated less institutional care.

Second, hospital functioning reflects many factors unrelated to patient care and patient outcomes: legal processes of admission and discharge, hospital budgets, workforce availability, and staff training, to name a few. Rural areas, for example, often have difficulty recruiting experienced mental health professionals (Sawyer et al. 2006). South Korea has perhaps the highest level of psychiatric hospital use in the world, largely due to the fact that doctors own the hospitals (Organisation for Economic Co-operation and Development 2013).

Third, hospital functioning depends on numerous environmental factors that differ across communities, such as level of poverty, urban drift, illicit drug prevalence, immigration statistics, low-income housing availability, local employment rates, and more. For example, although urban hospitals do not create homelessness, they are obligated to cope with demands for the care of homeless patients, who often have minimal financial, social, and housing supports. Further, some areas have little or no affordable housing for people who are disabled, and research consistently shows that a lack of housing, not serious mental illness, determines homelessness (Hopper 2002).

Fourth, hospital functioning depends on the availability of community mental health resources. For example, assertive community treatment linked with permanent supportive housing enables hospitals to discharge complex patients safely (Mueser et al. 1998; Tsemberis et al. 2004). In the absence of these basic services, discharging such patients becomes difficult and problematic, resulting in high rates of readmission.

Finally, our previous work has established that patients themselves can use the hospital for their own purposes, manipulating admission processes in relation to their temporary living preferences (Drake and Wallach 1979, 1988, 1992). Patients know what to say and do in order to either avoid or gain admission to the hospital. For example, patients who need shelter to avoid the weather or drug dealers owed money know that specific kinds of statements will result in a hospital admission because of legal standards. In these respects, hospitalization is a living alternative that patients can manipulate. Patients seem intact enough to formulate and fulfill living preferences the same way as non-patients. A “psychiatric bed,” after all, offers a lot more than treatment.

Population Outcomes

If hospital functioning fails as a valid indicator of need for hospital beds, what about population outcomes? Here the authors emphasize four constructs: homelessness, early mortality including suicide, criminal justice system outcomes, and caregiver/family burden. They assert that too few hospital beds may be one of many factors that affect these population outcomes, but they acknowledge a lack of consistent empirical support for any of the proposed relationships. Anecdotal evidence is in fact highly inconsistent on these relationships. For example, the country with the highest suicide rate, South Korea, also has the highest rate of hospital bed use (Organisation for Economic Co-operation and Development 2013).

The authors discuss the Penrose hydraulic hypothesis (Penrose 1939), which postulates that number of hospital beds inversely correlates with incarceration rates, but research, especially in wealthy countries, has not supported this relationship (Large and Nielsen 2009). More significantly, the authors omit another hydraulic model that research strongly does support: The use of evidence-based community practices inversely correlates with amount of hospital use (Lloyd-Evans and Johnson 2019). Furthermore, much of the research on effective community services and community tenure is not only consistent but also supported by randomized trials, enhancing causal inferences.

Starting with deinstitutionalization in the 1960s and 1970s, clinicians and researchers began to develop, test, implement, and disseminate community-based interventions that enabled patients with serious mental disorders to avoid hospitalization, minimize lengths of hospital admissions, and sustain community living without further hospitalization. Over the last four decades, many of these interventions (described below) have received robust empirical support.

The prototypical community service for people with serious mental disorders, developed in the 1970s, was (and remains) *assertive community treatment*, which enabled people who would otherwise be in hospitals to live in the community by delivering treatments and supports to their living settings (Stein and Test 1980). In this model, a multi-disciplinary team of professionals (social workers, nurses, doctors, case managers, and others) assumed full-time responsibility for helping a discrete group of patients receive treatment (often in the community), find housing and supports, develop skills for community living, and pursue activities of choice. Over time, assertive community treatment has evolved to incorporate other evidence-based interventions, such as substance use disorder services, medication management, supported employment,

family psycho-education, and other specific interventions; it remains the standard of community care for people with complex and challenging difficulties (Bond and Drake 2015).

In the early years of deinstitutionalization, most patients lived with their families, and clinical researchers developed a series of evidence-based approaches to help families with needed education, support, and coping skills. These interventions, called *family psych-education*, have enabled families to support their relatives in the community with less stress and greater effectiveness (Dixon et al. 2001).

Many patients were, however, unable or unwilling to live with their families. In the early years of deinstitutionalization, hospitals often discharged these patients to nursing homes or supervised group homes, two living settings that, despite consistent objections from patients, have nevertheless persisted in many areas of the US. To address this problem, a housing model that most patients prefer, called *permanent supportive housing*, has developed and demonstrated success (Rog et al. 2014). This model combined scattered-site, independent apartments with case management. In some approaches, such as *housing first*, access to housing has not required treatment acceptance, yet still has enabled the great majority of participants to maintain community living (Tsemberis et al. 2004). Further, patients in supportive housing often become engaged in treatment over time.

People with mental illness living in the community are more stable and have a better quality of life if they learn to use medicines and cognitive strategies to manage their symptoms, if they avoid alcohol and drugs, and if they find employment to improve income and self-esteem. Specific evidence-based interventions support these efforts and improve community tenure: for example, *medication management* (Velligan et al. 2010), *cognitive behavioral therapy* (National Collaborating Center for Mental Health 2014), *integrated dual disorders treatment* (Drake et al. 2008), and *supported employment* (Drake et al. 2016).

When people do experience relapses of illness, *hospital diversion services and alternatives to hospitalization* have developed to enable most to avoid institutional care. Crisis hotlines, mobile crisis teams, crisis apartments, walk-in crisis centers, police crisis intervention teams, mental health and drug courts, and other crisis services are among the interventions that prevent unnecessary hospitalizations (National Institute for Health and Care Excellence 2016).

Furthermore, several types of *transition services* have enabled people with mental disorders to leave the hospital as quickly as possible with rapid linkages to needed community services. Empirically supported transition services include rapid and specific discharge planning, transitional case management, critical time intervention, hospital liaisons, and other interventions (National Institute for Health and Care Excellence 2016).

What about combining these evidence-based interventions to reduce hospitalization? As far as we are aware, studies have not examined the overall impact of combining several evidence-based services in routine outpatient settings to maximize community tenure. Assertive community treatment, which consistently and substantially reduces hospitalizations for the highest-risk patients, incorporates many of the interventions reviewed above and continues to evolve (Drukker et al. 2013). Yet the limit on combined interventions is unknown.

Decreasing need for inpatient care almost certainly asymptotes at some point greater than zero, but we do not know what that point is. Improving community-based services definitely reduces need. Increasing hospital efficiency may also reduce need. Patients and their supporters generally prefer local general hospitals because they make admissions and discharges less stressful by keeping patients closer to their families, support systems, and caregivers. How much they reduce the need for large, regional hospitals is uncertain, but at least one country (Italy) has switched to using only local general hospitals for over 30 years (Barbui et al. 2018).

Discussion and Conclusions

In summary, we agree with O'Reilly et al. (2019) on several points. We have little data to determine the optimal number of psychiatric beds for a region or population, and current approaches to estimation are inadequate. We also concur that we need a standard taxonomy of bed types, coupled with rigorous research, to develop a metric for estimating optimal psychiatric hospital bed capacity.

The “observed outcome approach” offers some advantages but also has marked weaknesses. For reasons elaborated above, credible outcomes should relate to patients, not to hospital functioning. In addition, the model for determining optimal bed numbers must include psycho-socio-environmental factors, especially patient preferences, all of which are conspicuously absent from the present model, as well as legal standards, community health resources, hospital types, housing stock, and social services—factors that clearly influence the need for hospital beds.

Currently we have little information on combining multiple psychological, social, environmental, legal, and health approaches. The needed research will necessarily be complex: estimates and guidelines must include modifications based on numerous confounders, not only health risks but also social and behavior risks. For example, local employment, drug prevalence, housing availability, and community-based services are critical. Research should also include preferences assessed at the level of the given patient, since weightings for combining factors into overall preferences

will likely vary idiosyncratically to some degree. For example, family involvement may be viewed as a plus by some patients and a minus by others.

Studying relatively small systems may have advantages over studying large regional, state, or national data. The larger the database, the more blunt the assessment approaches will be, resulting in lowest common denominators far removed from the individual patient. International data are fraught with problems—controlling for the reliability and comparability of data is nearly impossible—and small systems offer several advantages, such as relatively stable estimates of disorder prevalence, insurance coverage, housing stock, legal regulations, local hospitals, and community mental health services. Using data from several small systems, regional variation research approaches could permit estimating critical parameters and confidence intervals for patient outcomes. Areas with national health insurance, mental health registries, and well-functioning electronic health records may best serve to develop such data at the level of individual patients. In this way, the problems of larger databases may be mitigated and complex computer algorithms developed. Research on small area variation and patient registries has been successful in numerous areas of medical care (Nelson et al. 2016; Wennberg 2010).

If estimating optimal hospital beds were easy, scientific guidelines would be widely available. Nevertheless, worthwhile goals are often hard. Is it just hard or is it, like the spectral gap problem in physics, unsolvable? Despite uncertainty, we encourage O'Reilly et al. (2019) to keep trying. As Nelson Mandela said, "It always seems impossible until it's done."

Compliance with Ethical Standards

Conflict of interest The authors report no conflicts of interest.

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