

SAN FRANCISCO DEPARTMENT OF PUBLIC HEALTH

Behavioral Health Bed Optimization Project

Analysis and Recommendations for Improving Patient Flow

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Executive Summary

The San Francisco Department of Public Health (DPH), like most other health systems in the world, is challenged to consistently match its behavioral health bed supply with the demand for services across the spectrum of care. The advantages of a system with optimized bed capacity are significant; patients get the care they need when they need it, the system benefits when resources are used efficiently, and investments have the greatest impact.

In early 2020, through the financial support of Tipping Point Community, the DPH Mental Health Reform team engaged a simulation modeling vendor, Mosimtec, to answer this most pressing question: *How many beds are needed in each behavioral health bed category to maintain consistent patient flow for adult clients in San Francisco with zero wait time?*

Through an in-depth analysis of patient placements in nearly 1,000 beds in the DPH behavioral health system of care in Fiscal Year 2018-2019, bed simulation modeling offered quantitative recommendations for improving patient flow. Furthermore, the Mental Health Reform team, through discussions with subject matter experts, contemplated additional considerations for behavioral health bed investments.

Summary Recommendations:

1. Invest in **additional bed capacity** in the following categories of care:
 - a. Locked Subacute Treatment
 - b. Psychiatric Skilled Nursing Facilities
 - c. Residential Care Facilities, aka Board and Care
 - d. Residential Care Facilities for the Elderly
 - e. Mental Health Residential Treatment (12-month programs)
2. Complement all **behavioral health bed investments one-to-one with long-term housing placements** such as Permanent Supportive Housing or Residential Care Facilities, to better serve the high volume of people experiencing homelessness who use the system.
3. **Address the unique needs of specialized populations** who commonly encounter longer wait times, including but not limited to monolingual non-English speakers, people with criminal justice involvement, and patients who are non-ambulatory.
4. Create a **robust wait time and patient placement data-tracking system** to better understand the impact of operational barriers on patient wait time.
5. Invest in facilities with **fixed beds dedicated for use by DPH clients** rather than shared with other health systems. Currently DPH does not have fixed beds set aside for its patients at a number of facilities, challenging its exercise to plan and place patients in a timely manner.
6. **Repeat bed simulation annually** to understand trends and inform long-term planning, mitigate data limitations encountered in this project, and explore other interventions that would improve patient experience.

Background

Managing behavioral health beds – how many a system of care needs to serve its clients – is a consistent challenge for healthcare systems worldwide. A mismatch of bed capacity to demand has significant implications for both client health outcomes and a healthcare system’s bottom line. A system with capacity that matches demand is one that provides optimal patient “flow.” In an optimized system, patients flow freely between levels of care according to their clinical health needs rather than system constraints. In San Francisco, where the Department of Public Health (DPH) serves nearly 30,000 behavioral health clients per year, highly variable bed demand, persistent bed constraints, and inconsistent data collection prevent DPH from comprehensively understanding bed capacity needs and optimizing patient flow.

In Fiscal Year 2018-2019 (FY1819), DPH provided behavioral health care to people in more than 2,000 beds across a continuum from high acuity (e.g. Acute Inpatient Psychiatry) to low acuity (e.g. Hummingbird Psychiatric Respite).¹ As the behavioral health needs of the population shift with time, the demand for services similarly shifts, further complicating the need to appropriately finance and provide services for clients. Various previous reports evaluating DPH’s behavioral health system, including the *BHS Performance Audit* (BLA, 2018) and *Homelessness and Behavioral Health* (JSI-Tipping Point, 2019), have called for improvements in patient wait times, investments in additional beds, and data to quantify and qualify capacity needs.

In early 2020, the Mental Health Reform team identified an innovative solution to its behavioral health bed optimization challenge: bed simulation modeling. Bed simulation modeling has been used internationally as a risk-free strategy for quantifying demand and identifying the impact of novel allocations of treatment beds on patient flow. Recent studies have concluded that using historical, operational data in a simulation model can help identify the appropriate type and number of beds required in public behavioral health systems.²

Methods

Through the financial support of Tipping Point Community, DPH engaged an experienced simulation modeling vendor, Mosimtec, to produce a mathematical model that would answer the key question: *How many beds are needed in each behavioral health bed category to maintain consistent patient flow for adult clients in San Francisco with zero wait time?* To answer this question, the model used FY1819 billing data of more than 25,000 admissions to mental health and substance use residential programs (greater than 24-hour stays) and urgent care settings (Psychiatric Emergency Services at Zuckerberg San Francisco General, Psychiatric Urgent Care, and Sobering Center). The data incorporated the demographics of the patients admitted to these care settings, including gender, age, race and ethnicity, and housing status. The analysis also considered the transitions of individuals across the behavioral health care continuum. The analysis

¹An overview of the bed categories and counts is provided in the Appendix. A subset of 1,000 of these beds was included in the analysis due to data availability.

²La et al. “Increasing Access to State Psychiatric Hospital Beds: Exploring Supply-Side Solutions.” *Psychiatric Services*, 67:5, May 2016, 523-528.
Devapriya et al. “StratBAM: A Discrete-Event Simulation Model to Support Strategic Hospital Bed Capacity Decisions.” *J Med Syst*, 39:130, 2015, 130.
Yin et al. “Applying Simulation Modeling to Quantify the Impact of Population Health and Capacity Interventions on Hospital Bed Demand” *Proceedings of the 2018 IISE Annual Conference*, 2018.

was not able to calculate “true” demand; that is, people who attempted to receive services but were unsuccessful in doing so. This limitation is considered in more detail in the Discussion section.

To ensure the input data would generate model results that accurately reflect the real-world system, the Mental Health Reform team worked closely with Mosimtec and City subject matter experts to verify that the data provided were complete and that preliminary outputs of the analysis were consistent with operational experience.

Results

The results from the simulation model are presented as “input analysis” – detailed information about how DPH’s system of behavioral health beds operated in FY1819 – and “output analysis” showing how the system functions in hypothetical scenarios.

Input Analysis: The input analysis provides critical information about how and by whom the behavioral health system was utilized in FY1819. More than 7,000 individuals accounted for more than 25,000 admissions in the fiscal year at nearly 1,000 different bed placements. *Table 1* provides a summary analysis of the characteristics of the patients who used behavioral health beds in FY1819; people experiencing homelessness represent a significant share. Males experiencing homelessness were the most common patient demographic to admit to the

Table 1: Characteristics of Patients Admitted to nearly 1,000 DPH Behavioral Health Beds FY1819

| Characteristic | | Number of Unique Patients ³ | Percent of Total Unique Patients |
|---------------------------|------------------------|--|----------------------------------|
| Homelessness ⁴ | Yes | 4,140 | 68% |
| | No | 1,955 | 32% |
| Gender | Male | 4,032 | 66% |
| | Female | 1,763 | 29% |
| | Other | 300 | 5% |
| Race/Ethnicity | White | 2,015 | 33% |
| | Black/African American | 1,434 | 24% |
| | Latino/a | 720 | 12% |
| | Asian/Pacific Islander | 359 | 6% |
| | Other/Not Stated | 1,567 | 26% |
| Total | | 6,095 | 100% |

system. A disproportionate share of Black/African Americans utilized the system, representing 24 percent compared to 6 percent of the population of San Francisco. In future reports, DPH will recommend ways to address the equity issues highlighted by this analysis.

The input analysis also helped visualize where the system is currently overburdened, by revealing the utilization of beds in each category (for programs with fixed bed counts).⁵ Utilization is calculated as the ratio of bed days occupied, divided by bed days available.⁶ Due to limitations in the input data, utilization

³ An additional 1,387 identified clients did not have demographic information to include in this analysis.

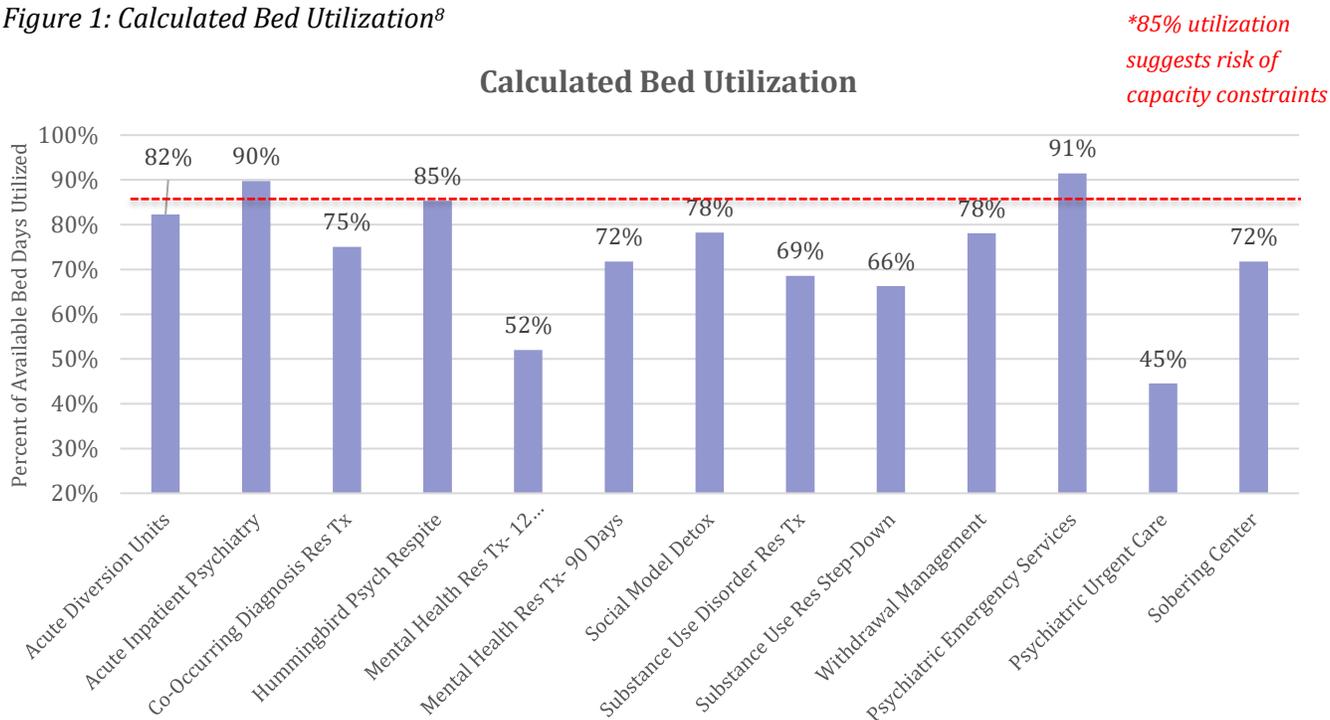
⁴ Homelessness defined by DPH Coordinated Care Management System (CCMS). CCMS defines people as experiencing homelessness in the fiscal year if they either: 1) utilize a City service that indicates housing instability, for example, a City shelter, or 2) self-report homelessness while accessing health care services.

⁵ Most of DPH-funded behavioral health beds are contracted annually at a “fixed” bed count. Other beds are purchased individually as needed and as budget and facilities allow.

⁶ Bed utilization calculations relied on bed counts provided by the DPH Bed Inventory.

calculations for certain bed categories likely underrepresent the true demand on these services. These categories include Sobering Center, Psychiatric Urgent Care, and Mental Health Residential Treatment 12-month programs. These limitations are detailed, and adjusted as needed, in the Discussion section of this report. Utilization calculations of over 85 percent indicate a care setting that is at risk of being capacity-strained.⁷ Using this rule, *Figure 1* demonstrates the categories with potential bed capacity shortages.

Figure 1: Calculated Bed Utilization⁸



Output Analysis: The model then created a hypothetical scenario to identify bed capacity adjustments that would improve patient flow by decreasing patient wait times. In general, waiting time experienced by patients in the system can be attributed to limited bed capacity and/or operational processing time (required health screenings, missed appointments, transportation, legal permissions, and other intake protocols). This analysis focused on quantifying wait time that occurs due to capacity constraints. The model considered the system holistically, identifying where patients currently wait prior to admission and then modeling the capacity needed to eliminate the observed wait times. Additionally, as outlined in the Appendix, the model considered a scenario specific to Psychiatric Emergency Services and Acute Inpatient Psychiatry.

The model carefully estimated current utilization in order to identify bed categories with wait times that occur due to capacity constraints. Then, the model simulated expansion scenarios that would reduce wait time to zero.

⁷ Bagust A, Place M, Posnett JW. "Dynamics of bed use in accommodating emergency admissions: stochastic simulation model." *BMJ*. 1999; 319 (7203):155-158

⁸ Locked Subacute Treatment, Residential Care Facilities, and Psychiatric Skilled Nursing do not have fixed bed counts and therefore do not have input data Bed-Day Utilization Calculations.

Table 2: Recommended Bed Counts to Decrease Patient Wait Due to Capacity Constraints

| Bed Category | Average Wait Due to Capacity (Days) ⁹ | Recommended Bed Count Increase For Zero Wait | Bed Count Increase for 50% Wait Time Reduction |
|--|--|--|--|
| Locked Subacute Treatment | 62 | 31 | 20 |
| Psychiatric Skilled Nursing Facilities | 121 | 13 | 8 |
| Residential Care Facility aka Board and Care | 60 | 31 | 13 |
| Residential Care Facility for the Elderly | 44 | 22 | 9 |

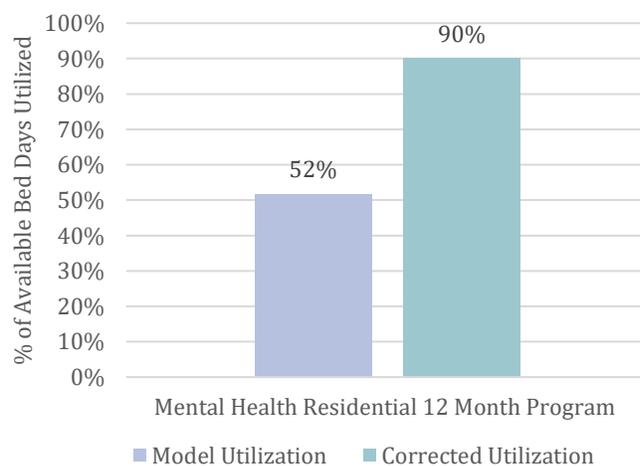
Table 2 displays the four bed categories the model identified as having wait times greater than one day. For each of these bed categories with wait times, the model then recommended a bed count increase that would reduce wait time to zero in order to create optimal flow. The table also provides an estimate for halving current waits.

Discussion

The model results provide substantial information for improving operations and recommending investments. Because each recommendation to increase capacity in identified bed categories has a different impact on patient flow and budget, the model results must be carefully evaluated in collaboration with DPH’s clinical, operational, policy, and financial leadership. Funding priorities must be accompanied by strong policy recommendations. For example, the value of increasing capacity in Locked Subacute Treatment and Psychiatric Skilled Nursing Facilities is only achieved when matched with conservatorship policies that enable efficient patient placements. Furthermore, recommendations must be refined to target populations who historically encounter more challenges in finding appropriate placements, such as people with a history of criminal justice involvement, monolingual non-English speakers, and people who are non-ambulatory.

In reviewing the model results, the Mental Health Reform team found a significant limitation in the utilization calculation for Mental Health Residential Treatment, 12-month programs. Certain bed days were excluded from the input data due to the analysis’ inclusion criteria: admissions that occurred within the fiscal year. For Mental Health Residential Treatment, this unintentionally excluded many patients who occupied beds at the start of, and well into, the reporting period. To correct for this limitation, the Mental Health Reform team considered additional billed days that were originally excluded. This had a significant impact on results. The inclusion of the previously excluded data resulted in a report of 90 percent utilization of these beds, as

Figure 2: Adjusted Utilization Using All Billed Days



⁹ The model identified wait directly associated with the patient arrivals per day against the bed capacity. The model is not able to account for waiting time associated with processing and other operational barriers that DPH clients often encounter.

demonstrated in *Figure 2*. Because utilization of over 85 percent suggests a need for additional capacity, and due to the recommended increase at the upstream category, Locked Subacute Treatment, an additional investment of 20 Mental Health Residential Treatment 12-month beds is recommended to improve flow.

The Mental Health Reform team recommends that all investments be directed toward facilities where DPH has a fixed number of beds that are dedicated for use by its clients. Currently, many counties share contracted facilities, which often leads to delays in client placement and a lack of transparency about the length of those delays for DPH clients.

The Mental Health Reform team also recommends that, because of the high volume of people experiencing homelessness utilizing the system, each behavioral health treatment investment be paired with a similar expansion of housing options for those clients. The benefits of treatment can quickly diminish if a client is discharged without adequate housing, and waits for housing can impede flow throughout the behavioral health system.

Contextualizing the Recommendations: The DPH Behavioral Health System of Care is represented in Figure 3. Services range from prevention and early intervention for low-acuity patients to intensive treatment, provided in locked facilities, for the most acute patients. This analysis focused on adult residential settings, which are the bottom four categories represented in Figure 3. The results highlight two broad categories that currently bottleneck the system: residential treatment and locked facilities. The specific categories include Mental Health Residential Treatment, Locked Subacute Treatment, Psychiatric Skilled Nursing Facilities, and Residential Care Facilities (for adults and older adults). Detail on these categories and the services provided are listed in *Table 3*. In addition to identifying categories that are overburdened, the model highlighted bed categories with utilization levels and capacity that sufficiently accommodate flow in current operations. These categories include Acute Diversion Units, Substance Use Residential Treatment, and Withdrawal Management programs.

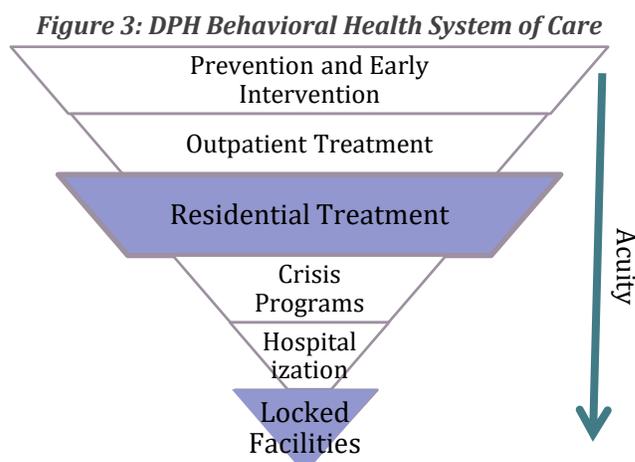


Table 3: Programmatic Detail on Categories with Recommended Capacity Increase

| Bed Category | Description | FY1819 Bed Count ¹⁰ | Example Facilities |
|---|---|--------------------------------|--|
| Mental Health Residential Treatment, 12-month | Residential group living program that provides treatment for managing life with mental illness, building life skills and social skills, developing positive coping strategies, pre-vocational/vocational skills, medication adherence and wellness recovery stabilization. Twelve-month programs are commonly used for patients discharging from Locked Subacute Treatment. | 30 | Progress Foundation Clay Street and Dorine Loso Houses |

¹⁰ Bed count based on FY1819 contracts for Mental Health Residential Treatment Programs (12-month) and the patient census as of April 30, 2019 for all other categories.

| Bed Category | Description | FY1819 Bed Count ¹⁰ | Example Facilities |
|--|---|--------------------------------|---|
| Locked Subacute Treatment – aka Mental Health Rehabilitation Center (MHRC) and Institute of Mental Disease (IMD) | These facilities are for clients placed on a Lanterman-Petris-Short (LPS) Conservatorship due to grave disability or on a forensic court-ordered hold. These programs provide psychosocial rehabilitation to stabilize mental illness impact on daily functioning, establish medication adherence, improve life and social skills, develop positive coping strategies, and stabilize wellness and recovery. | 132 | MHRC at SF Behavioral Health Center, Crestwood (SF Healing Center, Canyon Manor, Vallejo) |
| Psychiatric Skilled Nursing Facility | A licensed health facility, or a distinct part of a hospital, providing 24-hour inpatient care that includes physician, skilled nursing, dietary, and pharmaceutical services, and an activity program. The Psychiatric SNF specializes in treating patients with severe psychiatric disorders who cannot be safely managed in other settings. This setting can be locked or unlocked. | 160 | Idylwood Care Center, Crestwood (Fremont, Stevenson, Stockton), Medical Hill |
| Residential Care Facilities (RCF)– also known as Board and Care | RCFs offer group living for people with disabilities (either medical or psychiatric) who need help with meal preparation, medication monitoring, and personal care, but do not need daily acute medical care. Individual RCFs may specialize in certain clinical areas such as mental health rehabilitation and geriatrics. | 305 | United Family Home Care, South Van Ness Manor, BMB Sunshine Residential Care |
| Residential Care Facilities for the Elderly (RCFE) | RCFEs generally offer group living for seniors (with either medical or psychiatric needs) who need help with meal preparation, medication monitoring, and personal care, but do not need daily acute medical care. Individual RCFEs may specialize in certain clinical areas such as mental health rehabilitation and geriatrics. | 267 | Crestwood Hope, Victoria Manor, Country Place Assisted Living |

When conducting the cost-benefit analysis of adding beds at different levels of care, it is important to understand how the system functions dynamically as a continuum. Investments at each level of care impact not only that bed category, but also the upstream and downstream bed categories. For example, if DPH follows the recommendation to increase bed capacity in Locked Subacute Treatment, the upstream bed categories Acute Inpatient Psychiatry and Psychiatric Emergency Services will be able to release the patients waiting for that downstream category. Furthermore, choosing to increase capacity only at Locked Subacute Treatment could result in a new bottleneck if housing or step-down programs are not secured for patients discharging from that care level.

Because of the high volume of people experiencing homelessness utilizing the system, all temporary placement investments (e.g. Locked Subacute Treatment) should be complemented one-to-one by investments in permanent placements such as Permanent Supportive Housing or Residential Care Facilities. Without a pathway to reliable housing upon discharge, patients who are experiencing homelessness will struggle to maintain the benefits of treatment.

Cost Analysis: DPH should identify which sequence of investments would have the biggest impact on health outcomes and budget, while maintaining focus on what is operationally feasible. The Mental Health Reform team will work with DPH operational subject matter experts and the Controller’s Office, which

completed a flow analysis project for DPH in 2019, to create a decision-making framework for prioritizing investments. Once prioritized and sequenced, these recommendations should be incorporated into San Francisco’s budgeting and planning processes, including in the allocation of 2,000 placements that Mayor London Breed has committed to create for people experiencing homelessness and behavioral health issues.

Because the system is financially constrained, the prioritization process must consider the marginal cost benefit of adding a bed to one category versus another. *Table 4* outlines the associated operating costs for the bed increases suggested by the model. An additional cost would be associated with any start-up required, such as building acquisition.

Table 4: Cost of Recommended Bed Investments

| Bed Category | Annualized Median Cost Per Bed | Recommended Bed Increase | Annual Cost Recommended Bed Increase |
|--|--------------------------------|--------------------------|--------------------------------------|
| Locked Subacute Treatment | \$177,208 | 31 | \$5,493,433 |
| Psychiatric Skilled Nursing Facility | \$106,580 | 13 | \$1,385,540 |
| Residential Care Facilities aka Board and Care | \$31,390 | 31 | \$973,090 |
| Residential Care Facilities for Elderly | \$38,873 | 22 | \$855,195 |
| Mental Health Residential Treatment (12-month) | \$97,127 | 20 | \$1,942,530 |
| Total | N/A | 117 | \$10,649,788 |

It is important to also consider the anticipated cost savings that result from relieving the bottlenecks occurring in high-cost care settings. For every patient who spends “extra” time – beyond what is clinically necessary – in Acute Inpatient Psychiatry while waiting for a lower level of care, DPH is unable to bill Medi-Cal for the service. These days spent waiting are therefore a burden for both the client’s recovery and for the financial health of the organization. By calculating the annual revenue potential lost due to this issue, we can balance the cost of the bed investments against the revenue gained by using Acute Inpatient Psychiatry resources for patients who clinically need the service. *Table 5* demonstrates the potential revenue recovery and net difference from the recommended investment using this model.

Table 5: Potential Revenue Recovery and Net Cost Difference

| Bed Category | Admin Days Inpatient Psychiatry | Potential Revenue Recovery* | Annual Cost Recommended Bed Increase | Annual Net Cost Difference |
|--|---------------------------------|-----------------------------|--------------------------------------|----------------------------|
| Locked Subacute Treatment | 4,131 | \$4,361,964 | \$5,493,433 | (\$1,131,469) |
| Psychiatric Skilled Nursing Facility | 1,060 | \$1,694,060 | \$1,385,540 | \$308,520 |
| Residential Care Facilities aka Board and Care | 1,351 | \$2,159,128 | \$973,090 | \$1,186,038 |
| Residential Care Facilities for Elderly | 289 | \$461,871 | \$855,195 | (\$393,324) |
| Mental Health Residential Treatment (12-month) | 531 | \$858,217 | \$1,942,530 | (\$1,084,313) |

*DPH receives \$1,598.17 per day for acute level patients at ZSFG Acute Inpatient Psychiatry. The revenue recovery calculation assumes the non-billable days in FY1819 convert to acute patient bed days. For patients waiting for Locked Subacute Treatment, DPH can bill Medi-Cal for administrative days at \$542.26 per day, making the revenue recovery per day \$1,055.91. For patients waiting for other bed categories listed, DPH receives no reimbursement from Medi-Cal.

Limitations: The information used for this analysis is limited by two main factors. First, DPH does not have a centralized data system to capture admissions for all 2,000 of its behavioral health beds. In order to include the full continuum of care in the study, a significant effort was made to unify the data. However, the project was limited by the source data systems and their disparate methods for data management. Second, DPH used only one fiscal year of admissions to these beds. The decision to use one year of data balanced the advantage of relying on recent data and fixed bed counts against the disadvantage of undercounting information related to programs with long lengths of stay (e.g. 12-month Mental Health Residential Treatment, Residential Care Facilities, Psychiatric Skilled Nursing Facilities, Substance Use Residential Step-Down). The Mental Health Reform team worked with the DPH subject matter experts and Mosimtec to mitigate the impact of these limitations on the results of the project. As shown earlier in the discussion section, the limitation affiliated with long-stay programs was corrected in the case of Mental Health Residential Treatment through post-modeling analysis.

Furthermore, while the model can estimate wait times based on input data, this wait-time calculation is limited and not fully representative of reality. For example, in the real system, certain patients may be redirected or choose alternative care settings when wait times are not tolerated by the system or the patient. In this way, it is likely that wait times, and therefore capacity needs, are underrepresented in this exercise. Additionally, the model failed to identify wait times in bed categories where clients are known to wait in practice, for example, Mental Health Residential Treatment. This result is attributable to a few factors; there is no data system concretely tracking wait time, and wait time in the current system could be fully due to processing time and operational barriers rather than capacity shortages. These possibilities and limitations will be fully evaluated by the Mental Health Reform team in collaboration with Behavioral Health Services as a follow-up to this report. Critical to this follow-up is the development of a robust wait time and patient placement data-tracking system. This system will enable a better understanding of the impact of operational barriers on patient wait time.

Conclusion

The Behavioral Health Bed Optimization Project offers new and important insights for expanding the current capacity and improving the flow of behavioral health beds in San Francisco. In addition to recommendations for bed investments, the model illuminates who uses the complex system of care, and how. It also shows the limitations of current data systems. In summary, the final recommendations from this project include:

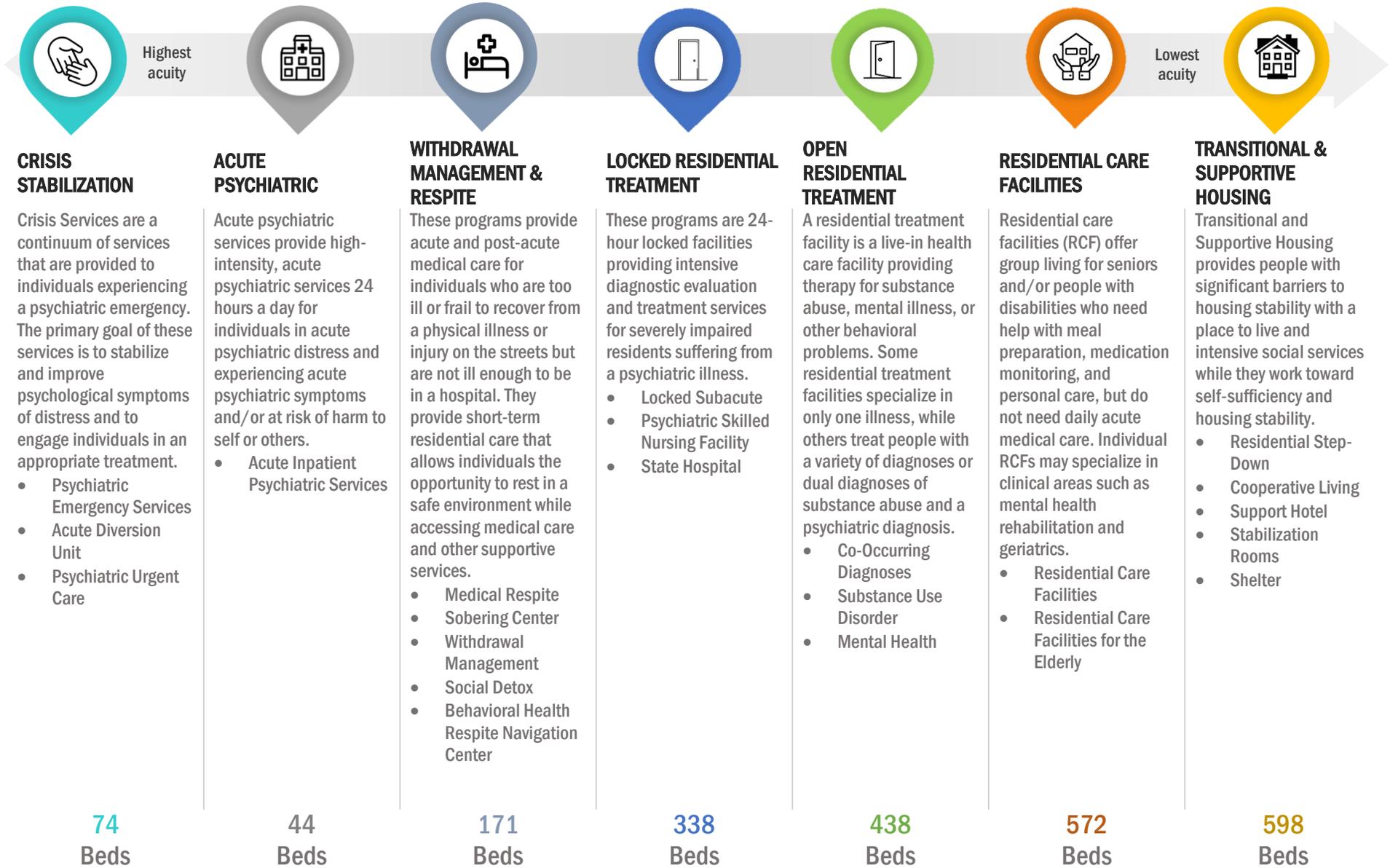
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 - d. Residential Care Facilities for the Elderly
 - e. Mental Health Residential Treatment (12-month programs)
2. Complement all **behavioral health bed investments one-to-one with long-term housing placements** such as Permanent Supportive Housing or Residential Care Facilities, to better serve the high volume of people experiencing homelessness who use the system.

3. **Address the unique needs of specialized populations** who commonly encounter longer wait times, including but not limited to monolingual non-English speakers, people with criminal justice involvement, and patients who are non-ambulatory.
4. Create a **robust wait time and patient placement data-tracking system** to better understand the impact of operational barriers on patient wait time.
5. Invest in facilities with **fixed beds dedicated for use by DPH clients** rather than shared with other health systems. Currently DPH does not have fixed beds set aside for its patients at a number of facilities, challenging its exercise to plan and place patients in a timely manner.
6. **Repeat bed simulation annually** to understand trends and inform long term planning, mitigate data limitations encountered in this project, and explore other interventions that would improve patient experience.

Despite the limitations mentioned in this analysis that likely contribute to an underestimation of capacity needs, the Mental Health Reform team is confident that the bed categories identified are consistent with the greatest need. A series of investments that include increasing capacity in high-demand bed categories downstream from Acute Inpatient Psychiatry, coupled with Permanent Supportive Housing units for the high proportion of patients experiencing homelessness, will undoubtedly improve flow and decrease cost and bottlenecks at upstream bed categories. The bed simulation methodology should be replicated to further interrogate the information available, mitigate the data limitations, and explore other interventions that would improve patient experience. Because the health care system and client needs are in constant evolution, the methodology is most effective if used at least annually. The exercise should therefore become a standard operating procedure for DPH to consistently improve health outcomes and reap financial rewards.

Appendix:

SFDPH Behavioral Health Beds FY 2018-19



Additional Model Results:

Scenario 2 Results: In Scenario 2, the model adjusted historical data using the assumption that all patients who stay more than 24 hours in Psychiatric Emergency Services do so because of a lack of capacity in the “next stop” treatment location, Acute Inpatient Psychiatry, at Zuckerberg San Francisco General (ZSFG). Subsequently, the model calculated the number of beds needed to prevent this wait time. In this scenario, the model identified that in order to prevent bottlenecks at Psychiatric Emergency Services, the bed count at Acute Inpatient Psychiatry would need to be increased significantly (61 percent). However, because investments made in downstream bed categories have been proven to reduce or even eliminate bottlenecks upstream, DPH, in discussion with the experts at Mosimtec, decided against including this result as a final recommendation. This approach will be tested and analyzed when the bed simulation modeling exercise is repeated annually.

Table 6: Scenario 2 Recommended Bed Counts

| Bed Category | Baseline Bed Count | Recommended Bed Count | Percent Increase |
|---------------------------------|---------------------------|------------------------------|-------------------------|
| ZSFG Acute Inpatient Psychiatry | 44 | 71 | 61% |

Validity Reports: The following tables provide detail on the outputs of the model compared with historical input data. These reports support the conclusion that the model reflected reality within a reasonable degree of confidence.

Table 7: Arrivals Per Day

| Category | Calculated Input | Scenario 1 Output | % Difference |
|--|-------------------------|--------------------------|---------------------|
| Acute Diversion Units | 2.91 | 2.92 | 0% |
| Acute Inpatient Psychiatric Services | 3.42 | 3.40 | (1%) |
| Co-Occurring Diagnosis Residential Treatment | 0.75 | 0.75 | 0% |
| Hummingbird Psychiatric Respite | 1.79 | 1.79 | 0% |
| Locked Subacute Treatment | 0.54 | 0.54 | 0% |
| Mental Health Residential Treatment | 0.88 | 0.88 | 0% |
| Option - St Francis | 0.81 | 0.81 | 0% |
| Psychiatric Emergency Services | 21.94 | 21.95 | 0% |
| Psychiatric Skilled Nursing Facilities | 0.21 | 0.22 | 5% |
| Psychiatric Urgent Care | 7.07 | 7.06 | 0% |
| Residential Care Facility aka Board and Care - In County | 0.27 | 0.27 | 0% |
| Residential Care Facility aka Board and Care - Out of County | 0.12 | 0.11 | (8%) |
| Residential Care Facility for the Elderly - In County | 0.23 | 0.23 | 0% |

| Category | Calculated Input | Scenario 1 Output | % Difference |
|---|------------------|-------------------|--------------|
| Residential Care Facility for the Elderly - Out of County | 0.16 | 0.16 | 0% |
| Sobering Center | 18.03 | 18.03 | 0% |
| Social Model Detox | 2.88 | 2.87 | 0% |
| Substance Use Disorder Residential Treatment | 3.40 | 3.40 | 0% |
| Substance Use Residential Step-Down | 0.65 | 0.65 | 0% |
| Withdrawal Management | 2.12 | 2.12 | 0% |

Table 8: Average Length of Stay (Days)

| Category | Calculated Input | Scenario 1 Output | % Difference |
|--|------------------|-------------------|--------------|
| Acute Diversion Units | 13 | 12 | (8%) |
| Acute Inpatient Psychiatric Services | 12 | 11 | (8%) |
| Co-Occurring Diagnosis Residential Treatment | 52 | 51 | (2%) |
| Hummingbird Psychiatric Respite | 15 | 14 | (7%) |
| Locked Subacute Treatment | 205 | 203 | (1%) |
| Mental Health Residential Treatment | 65 | 64 | (2%) |
| Option - St Francis | 8 | 8 | 0% |
| Psychiatric Emergency Services | 1 | 1 | 0% |
| Psychiatric Skilled Nursing Facilities | 106 | 99 | (7%) |
| Psychiatric Urgent Care | 1 | 1 | 0% |
| Residential Care Facility aka Board and Care - In County | 272 | 268 | (1%) |
| Residential Care Facility aka Board and Care - Out of County | 155 | 143 | (8%) |
| Residential Care Facility for the Elderly - In County | 195 | 185 | (5%) |
| Residential Care Facility for the Elderly - Out of County | 154 | 142 | (8%) |
| Sobering Center | 0 | 0 | 0% |
| Social Model Detox | 6 | 6 | 0% |
| Substance Use Disorder Residential Treatment | 51 | 50 | (2%) |
| Substance Use Residential Step-Down | 99 | 97 | (2%) |
| Withdrawal Management | 10 | 10 | 0% |

Table 9: Bed Utilization

| Category | Calculated Input | Scenario 1 Output | % Difference |
|--|------------------|-------------------|--------------|
| Acute Diversion Units | 82% | 79% | (4%) |
| Acute Inpatient Psychiatric Services | 90% | 83% | (8%) |
| Co-Occurring Diagnosis Residential Treatment | 75% | 73% | (3%) |
| Hummingbird Psychiatric Respite | 85% | 84% | (1%) |
| Locked Subacute Treatment | *unknown | 79% | NA |
| Mental Health Residential Treatment | 60% | 52% | (13%) |
| Psychiatric Emergency Services | 91% | 82% | (10%) |
| Psychiatric Skilled Nursing Facilities | *unknown | 86% | NA |
| Psychiatric Urgent Care | 45% | 42% | (7%) |
| Residential Care Facility aka Board and Care - In County | *unknown | 74% | NA |
| Residential Care Facility aka Board and Care - Out of County | *unknown | 79% | NA |
| Residential Care Facility for the Elderly - In County | *unknown | 75% | NA |
| Residential Care Facility for the Elderly - Out of County | *unknown | 75% | NA |
| Sobering Center | 72% | 36% | (50%) |
| Social Model Detox | 78% | 72% | (8%) |
| Substance Use Disorder Residential Treatment | 69% | 64% | (7%) |
| Substance Use Residential Step-Down | 66% | 54% | (18%) |
| Withdrawal Management | 78% | 74% | (5%) |