An analysis of Utah State Hospital performance (Forensic and Civil units), the anticipated future demand and the implications for bed requirements over the next five years.

Alex Knight, Chris Robbins, Helen Gibb
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1 Introduction

Evaluating the future demand for beds at Utah State Hospital (USH) is one important part of a more wider review of the provision of mental health services across Utah. This document updates and expands on an analysis carried out one year ago and has been written to support current strategic and budgetary discussions on the future of mental health care in Utah. This report:

- summarizes the recent performance and improvements at USH since the settlement agreement of 2017,
- updates the analysis of the implications of future demand scenarios on bed capacity and length of stay over the next five years based on maintaining a 14-day service level on the forensic unit,
- carries out a new analysis for the civil unit based on similar demand scenarios and the latest information regarding growth in the number of citizens with mental health issues and the likely continued transfers from forensic,
- makes conclusions and recommendations to ensure the continuation of high quality, safe and timely access to care in the state of Utah over the next five years.

2 Summary of recent performance

Under the 2017 Settlement Agreement, USH was required to achieve a 14-day forensic access requirement against a starting position of patients waiting up to 18 months. As part of its overall response the hospital implemented the ‘Pride and Joy’, Theory of Constraints-based approach to improving patient flow. Within nine months the 14-day access target was achieved. This was six months ahead of the requirements of the settlement agreement. (Finished length of stay reduced from 217 to 148 days in the same period.) Through a combination of focused improvement initiatives within USH, as well as changes in practice in the wider mental health and associated systems, the ‘active length of stay’ of Forensic patients reduced from an average of 1100 days in January 2018 to consistently less than 600 days by September 2018 (See Appendix 1 Graph 1: Active length of stay for Forensic unit) and throughout there have been no breaches of the 14-day access target. One aspect of these changes resulted in an increase in transfers from the forensic to civil unit (See Appendix 1 Table 1: Forensic to Civil transfers
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2016 to YTD). Even with this increase in demand and patient complexity the civil unit has also managed a 7.5% reduction in their active length of stay (pre Covid-19) across all unit. (See Appendix 1 Graph 2: Active length of stay for Civil unit)

However, more recently a new situation is developing since the Covid-19 outbreak started earlier this year:

- the forensic unit has seen a 10% reduction in the monthly admission rate since April 2020, as well as a slight increase in discharge rates. This has resulted in the unusual situation of as many as eighteen empty Forensic beds. Prior to Covid-19 the gap between a peak in referrals in any one period compared to discharges in the same period required a ‘capacity bed buffer’ of ten beds, as occupancy floated between 90 and 100%. Pre Covid-19 the average number of free beds was four and there were seven periods in the previous year when the forensic unit was running at 100% occupancy.

- the current level of empty beds also masks the underlying trend of an increase in the forensic ‘active length of stay’ from 600 days to 780 days, and an increase from 23% to 38% of patients in delay during the recent Covid-19 period.

In parallel there has been a recent extension of the Pride and Joy approach into the Local Mental Health Authorities (LMHAs). Previously there was no way of recording the actual demand for civil beds. Only when a bed became available would each individual LMHA put forward the next patient for treatment. However, for the last four months the hospital now has a picture of the demand from each LMHA and across the whole state of Utah. This also has enabled the hospital to start to measure access times and the causes of delay to timely admission. Although early days in this implementation, this extension of Pride and Joy into the LMHAs has also enabled much better discharge co-ordination between the civil unit and the LMHAs. The LMHAs now have live access to their patient plans and more focused and timely discharge discussions are in place. This has also enabled the hospital to analyze the top causes of discharge delay and allows a better understand the type and quantities of capacity required in the wider mental health system. Currently the civil unit has a small number of empty beds (between five and ten over recent months.) However, in this recent Covid-19 period, like the forensic unit, the active length of stay in the civil unit has increased from 800 to 930 days even though the total number of patients in delay has reduced by 54% since the start of the implementation in the civil unit in July 2019. The remaining patients in delay are still occupying 35 of the 150 available beds.

### 3 Implications for Forensic bed capacity over the next five years

In 2019, an analysis was undertaken to identify the probability of the number of beds required to maintain the 14-day service level over the next five years. To help establish boundaries to the overall analysis, four key forensic scenarios were explored:

- **Scenario 1:** this assumes no growth in the demand placed on the forensic services of the hospital despite a long history of growth over time and a predicted growth in the population of Utah. This scenario is unrealistic but places a lower boundary on the three other scenarios under consideration.
- **Scenario 2:** this assumes a growth in Forensic referrals in line with population growth and does not consider any historical growth in referral rates.
- **Scenario 3:** this assumes the growth in referral rates based on a linear extrapolation of historical rates and assuming population growth rates are no larger than in the past.
- **Scenario 4:** this assumes the growth in referral rates based on an exponential extrapolation of historical rates and assuming population growth rates are no larger than in the past.

To investigate these four scenarios and all the impact of all other variables, a computer based simulation has been developed that explores 100,000 randomly generated variations of outcomes under each scenario. This enables us to better understand the range of possible referrals and outcomes and the impact on additional bed requirements in the future. It is important to note that any such analysis is not covering all possible outcomes but the outcomes covered through 100,000 simulations of outcomes.

Since these simulations were first run we now have a further year of data on actual demand and discharge rates for the forensic unit and the jail-based unit as well as the actual discharge rates from the first year of implementation of the civil unit. This data shows that forensic admissions are higher than anticipated in 2019 accompanied by an increase in discharge rates (See Appendix1: Graphs 3 and 4: A comparison of actual (2020) and predicted (2019) forensic referral and discharge rates along with details of
An analysis of Utah State Hospital performance (Forensic and Civil units), the anticipated future demand and the implications for bed requirements over the next five years. These scenarios). This has allowed a re-run of the calculations for the forensic unit. The results are highlighted below:

**Figure 1:** USH (excluding jail-based unit beds, indicating the number of beds required after five years with all scenarios overlaid)

**Figure 2:** USH and jail-based beds indicating the number of beds required after five years with all scenarios overlaid
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To consider the implications of these outcomes a further analysis has been undertaken to establish the increase in discharge rate that will be required to maintain the 14-day access target in the forensic unit if there were no further beds added. This is highlighted below for each scenario.

The impact of this on the reduction in length of stay required is also indicated below:
4 Implications for Civil bed capacity over the next five years

A new analysis has been undertaken to identify the probability of the number of beds required to maintain a similar 14-day service level over the next five years in the civil unit. To help establish boundaries to the analysis, three key civil scenarios have been explored:

- Scenario 1: this assumes no growth in the demand placed on the civil services of the hospital despite pre Covid-19 access issues and a predicted growth in the population of Utah. This scenario places a lower boundary on the two other scenarios under consideration.
- Scenario 2: this assumes a growth in Civil referrals in line with population growth and does not consider any historical growth in referral rates.
- Scenario 3: this assumes the growth in referral rates based on overall growth in mental health illness in Utah over the last six years.

To investigate these three scenarios and all the impact of all other variables, the same computer based simulation has been used to explore 100,000 randomly generated variations of outcomes under each scenario. This enables us to better understand the range of possible referrals and outcomes and the impact on additional bed requirements in the future. It is important to note that any such analysis is not covering all possible outcomes but the outcomes covered through 100,000 simulations of outcomes. (See Appendix 1: Details of civil scenario analysis)

The results are highlighted below: The marker lines show the highest frequency values not the mean.
An analysis of Utah State Hospital performance (Forensic and Civil units), the anticipated future demand and the implications for bed requirements over the next five years.

Figure 3: Number of beds required at the end of five years with all scenarios overlaid
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Note: To take account of the additional referrals from forensic to civil over the next five years it has been assumed this addition is equivalent to the demand for forensic and jail based beds in any year multiplied by 20% for years 1 and 2 and then 10% for years 3, 4 and 5. (The higher level for years 1 and 2 is based on the known backlog of patients due for transfer from forensic to civil.) A further assumption has been made that 60% of these forensic transfers result in blocked beds in Civil that will not become available within the five-year analysis period. (This is based on experiences gained over the last two years and the legal status and age of a proportion of this population.)

To consider the implications of these outcomes a further analysis has been undertaken to establish the increase in discharge rate that will be required to maintain the 14-day access target in the civil unit if there were no further beds added. This is highlighted below for each scenario.

The following graphs show each scenario in turn with values given after 1, 2, 3, 4 and 5 years.
5 Conclusions

Assuming the Covid-19 impact is the cause of the short term drop in forensic referrals, conclusions have been drawn based on outcomes lying between scenario 2 and scenario 3 and closer to scenario 3.

1. Covid-19 may have created a false sense of security around Forensic bed requirements over the next five years. The recent drop in demand accounts for approximately 50% of the current empty beds. A return to the previous referral rates combined with the catch up of referrals backed up during Covid-19 would quickly start to place pressure on the 14-day access target.

2. To examine what impact ongoing improvement initiatives can have on increasing discharge rates in the forensic unit the corresponding reductions on lengths of stay have been calculated if no beds were to become available. Clearly, there is a limit to how much disruption and delay can be removed until all that remains is the clinical recovery time of the patient. With the current length of stay of patients being discharged running at just over 200 days and with no further beds, a 70% to 90% chance of continuing to hit the 14-day target in scenarios 2 and 3 requires a further length of stay reduction in the region of 30%. Continuing to ‘guarantee’ the 14-day target over the next five years with no extra beds is likely to mean a further reduction in length of stay of over 50% in scenarios 2 and 3. Even if 100% of all the current delay was eliminated this is likely to be unachievable.

3. In the civil unit, the situation is slightly different. The analysis has also shown the need for an increase in beds or corresponding reduction in length of stay when considering the implications of a sustained increase in transfers from Forensic into Civil. The risk with no additional beds is that the civil unit becomes overwhelmed with Forensic patients, resulting in a reduction in access opportunities for the wider community.
6 Recommendations

The recommendations below are based on continuing the improvement work within the hospital alongside a wider engagement in the systemic changes needed across the mental health system of Utah. Delivering on both the internal and system wide changes recommended below is paramount if the State is to avoid simply adding many more beds or expecting everything to be resolved with further massive and unrealistic reductions in length of stay, particularly in the forensic unit.

1. **Additional 30 Forensic or Civil bed unit:** Space is currently available at USH already. USH would just need some small re-modelling/prep time and funding to staff for initially 15, then 30 patients. This is in line with what was included in the Governor's Budget last year and subsequently funded by the Legislature in HB 35.

2. **Expanding ORP:** Additional outreach staff to provide short term restoration in jails and the community for individuals released on their own recognizance. Other states have contracted with community-based providers to provide education, pharmacological, psychotherapeutic restoration services. States have identified the benefit of having an agency in the community provide community-based restoration services since they are connected to key stakeholders and able to provide services and support after competency restoration is complete. USH should consider hiring or contracting with Forensic Navigators to act as a court liaison and provide intensive case coordination to help link individuals to services and support needed to restore competency and remain stable in the community.

3. **Utilize CRU to capacity and expand to upper floor:** Utilizing full capacity may require hiring one additional staff. Expanding would require increasing the contract with SLCO Jail and adding additional staff for restoration.

4. **Leasing space or contracting with another entity for 8-bed group home, step down unit for long term Forensic/NGI/GMI patients:** There is an option for a locked facility with lower levels of staffing, wrap around services in coordination with local community providers and slow integration into community. This could be multiple units across the state operating in partnership with Counties.

5. **Build a 60-bed long term care program:** This would be intended for high risk individuals with serious charges (Capitol Offenses, Sex Offenses, Assaultive, Fire Starting etc.) with complex Mental Health issues requiring a locked Unit, 24/7/365 staffing, but less intense clinical programming/staffing than USH. It would also be for high risk individuals with Co-occurring Mental Health, Physical, Neurocognitive or Developmental Behavioral conditions.

Additional Statewide recommendations:

6. **Continued support for court-led diversion and step down options along the Sequential Intercept Model:** A team of Utah judges, Court staff, legal counsel and DHS agreed in July 2019 to implement a high-level Sequential Intercept Model (SIM). The Chief Justice and Administrative Office of the Courts in Utah agreed to facilitate the SIM implementation. This is a planning process to collaboratively address intercept points within a tiered justice process including forensic restoration. Utah is receiving technical assistance from the National Center for State Courts to help implement SIM statewide. The initial “kick-off” meeting was scheduled for August of 2020 and due to COVID-19 was postponed to spring of 2021. Once SIM is implemented, this will divert the non-violent misdemeanor cases from competency restoration services and into appropriate community-based services and support. During Fiscal Years 2019 and 2020, 569 cases were ordered to restoration services and 162 (28%) of these cases involved clients with non-violent
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misdemeanor charges only. In total, 145 of the 162 cases involving only non-violent misdemeanors had a final ruling or some other kind of resolution. The majority (61%) of the 145 clients received restoration services at the Utah State Hospital (USH) with an estimated average length of stay (LOS) of 150 days. Finding ways to effectively restore competency for the people involved in these cases will result in increased efficiencies of the existing beds and resources.

7. Continued support for County-led diversion and step down options with Crisis Line, Mobile Crisis Outreach Teams, Receiving Centers, Assertive Community Treatment (ACT) and Forensic ACT teams: Services and supports that are part of a continuum of care for individuals with a Serious Mental Illness (SMI) diverted from the justice system may include but are not limited to the following: Statewide crisis services including crisis hotline and warmline, crisis receiving centers and Mobile Crisis Outreach Teams (MCOT). Currently, Davis County operates a Receiving Center with three additional receiving centers in a build phase in Salt Lake, Utah, and Washington Counties. MCOT teams operate in 22 of the 29 counties in Utah. Expansion of ACT Teams and Forensic ACT (FACT) Teams statewide. The ACT and FACT models provide clients access to individualized psychiatric treatment and social services that address immediate needs and improve stabilization using an integrated, multidisciplinary, teaming approach, through intensive staffing and case management. There is one FACT team in Salt Lake County that has the capacity to serve 100 individuals. The cost of one full FACT team is $1,300,000.00.

8. Quality and efficiency of initial competency to stand trial evaluations: The following efforts are underway in Utah to improve quality and efficiency in the competency to stand trial and Not Guilty by Reason of Insanity (NGI) evaluation process:
   • Administrative Rule to set standards for forensic evaluator qualifications and certification process based on national standards
   • Forensic evaluator training
   • Forensic evaluator certification process
   • Increase forensic evaluators employed by DHS
   • Forensic Post-Doctoral Fellowship to increase qualified workforce
   • A systematic peer review process of competency evaluations using a quality assurance review tool based on national best practice standards around procedural, factual, and opinion elements. The peer review process and quality assurance tool will help achieve better quality, efficiency and outcomes across the forensic system.

Due to lack of capacity of qualified forensic evaluators, DHS may not be able to stay within the statutory timeframes for initial competency evaluations and support quality improvement measures needed to ensure quality competency evaluations are submitted to the courts and attorneys. DHS would need an additional $285,000 to support Utah’s quality assurance plan, certification, and training efforts to move towards national best practice standards for competency evaluations and increase a qualified workforce. This additional funding amount is based on an increased rate for competency and NGI evaluations to match the current Medicaid and DHS contract rate for standard psychological assessments, .5 FTE to implement and supervise the forensic evaluator certification process and one additional post-doctoral fellowship position to increase the workforce. A majority of competency and NGI evaluations are completed by a psychologist and on a limited basis a psychiatrist or licensed clinical social worker. The time spent on a competency and NGI evaluations is similar, if not higher, than a standard psychological and requires specialized education and training to meet national standards. As a result of these efforts, DHS expects the number of individuals found competent by the court, after the initial competency evaluation, will increase and plan on tracking this outcome.
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7 Appendix 1

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of transfers</th>
</tr>
</thead>
<tbody>
<tr>
<td>2016</td>
<td>3</td>
</tr>
<tr>
<td>2017</td>
<td>8</td>
</tr>
<tr>
<td>2018</td>
<td>37</td>
</tr>
<tr>
<td>2019</td>
<td>27</td>
</tr>
<tr>
<td>2020</td>
<td>16</td>
</tr>
</tbody>
</table>
An analysis of Utah State Hospital performance (Forensic and Civil units), the anticipated future demand and the implications for bed requirements over the next five years.

Table 1: Forensic to Civil transfers 2016-YTD

<table>
<thead>
<tr>
<th>Length of stay of patients in the system</th>
</tr>
</thead>
<tbody>
<tr>
<td>1145 days</td>
</tr>
<tr>
<td>729 days</td>
</tr>
</tbody>
</table>
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Graph 1: Active length of stay of Forensic patients

Graph 2: Active length of stay of Civil patients
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Graphs 3 and 4: A comparison of actual (2020) and predicted (2019) referral and discharge rates in the forensic unit

(Note, the jail-based figures were adjusted in line with the changes in USH referral and discharge rates)
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Base data Forensic

Table 2: Details of Forensic scenario analysis, Case 1: USH only

<table>
<thead>
<tr>
<th>Number of beds (8 PDD not applicable)</th>
<th>116</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number initially occupied</td>
<td>111</td>
</tr>
<tr>
<td>Weekly average admission rate</td>
<td>3.019</td>
</tr>
<tr>
<td>Weekly average discharge rate</td>
<td>2.893</td>
</tr>
</tbody>
</table>

Table 3: Details of Forensic scenario analysis, Case 2: USH and Jail only

<table>
<thead>
<tr>
<th>Number of beds (8 PDD not applicable in USH)</th>
<th>116 + 22</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number initially occupied</td>
<td>111 + 17</td>
</tr>
<tr>
<td>Weekly average referral rate</td>
<td>3.817</td>
</tr>
<tr>
<td>Weekly average discharge rate</td>
<td>3.659*</td>
</tr>
</tbody>
</table>

* Extrapolation based on USH values: $3.659 = 2.893 \times \frac{3.817}{3.019}$ (note, rounded digits given on the RHS).

Scenarios

The weekly average referral/admission demand follows the following four scenarios:

Scenario 1: No growth in demand.

$D = D_0$
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Scenario 2: Growth with projected population growth which is assumed to be linear at a rate of increase of 0.075 and 0.059 per year for the USH + Jail and USH only scenarios. These are scaled from the 0.0484 per year value used for the previous study (average demand 2.46 per week).

\[ D = D_0 + 0.075t \quad \text{(USH + Jail)} \]
\[ D = D_0 + 0.059t \quad \text{(USH only)} \]

Scenario 3: Linear growth based on a fit of historical data (pre-COVID). This gives a rate of increase of 0.324 per year. for the USH + Jail case, which is scaled to give an increase of 0.256 per year for the USH only case (this assumes there is capacity in the jail system).

\[ D = D_0 + 0.324t \quad \text{(USH + Jail)} \]
\[ D = D_0 + 0.256t \quad \text{(USH only)} \]

Scenario 4: Exponential growth based on a fit of historical data (pre-COVID). This gives a constant of increase of 0.0852 per year. As this form is a product, a single growth constant is appropriate for both cases.

\[ D = D_0 e^{0.0852t} \]

In the above, D is the referral/admission demand at time t in years, and D_0 is the base starting rate for the case (USH only or USH + Jail) given in the first two tables.
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**Base data Civil**

*Table 4: Details of Civil scenario analysis*

<table>
<thead>
<tr>
<th>Number of beds</th>
<th>150</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number initially occupied</td>
<td>140</td>
</tr>
<tr>
<td>Weekly average admission rate based on average of historical data to end of March 2020</td>
<td>1.779</td>
</tr>
<tr>
<td>Weekly average discharge rate based on average of historical</td>
<td>1.882</td>
</tr>
</tbody>
</table>

**Other simulations assumption:**

- Maximum admissions per day: 5
- Number of permanently occupied beds: 12
- Initial number in queue for admission: 5 (to match the forensics simulation)

**Scenarios**

The weekly average referral/admission demand follows the following four scenarios:

**Scenario 1:** No growth in demand.

\[ D = D_0 \]

**Scenario 2:** Growth with projected population growth which is assumed to be linear at a rate of increase of 0.039 per year. These are scaled from the 0.0484 per year value used for the previous study (average demand 2.46 per week).

\[ D = D_0 + 0.039t \]
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Scenario 3: Linear growth based on a fit of historical data (pre-COVID)\(^1\). This gives a scaled rate of increase of 0.086 per year. The source data show a near linear growth.

\[
D = D_0 + 0.086t
\]

In the above, \(D\) is the referral/admission demand at time \(t\) in years, and \(D_0\) is the base starting rate for the case given in the first table.

**Weekly average admissions and discharges**

The admissions and discharges are modelled using a Poisson distribution which is characterized only by the average values given in the previous table. The data and the model are compared below.

**Day of admission and discharge**

Historical data give the following distributions for the day on which admission or discharge takes place.

\(^1\) Summers, L. et al., "Utah’s Mental Health System", August 2019 (updated 2020).
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The demand growth from Summers et al. is shown below. The trend is almost linear and there is little difference between a linear fit and an exponential fit. Because of this the exponential case is dropped as a scenario.
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Graph 5: Demand growth from Summers et al