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When Will the Department of Social and Health Services Meet the Wait-time Compliance Requirement for Inpatient Competency Services?

Prepared by the Office of Decision Support & Evaluation
Division of Behavioral Health and Recovery
Behavioral Health Administration

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Summary Outline

- Background and Overview
- Projection results: Base Model and how it compares with other models in this analysis
- Subsequent slides provide the following information:
  - Factors used in the projections;
  - Base model assumptions;
  - Differences between the current and previous projections and how they may change when models are updated in the future;
  - What do the projected results mean;
  - Next steps
  - Appendices

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Background and Overview

- DSHS has been working to meet the wait-time compliance requirement of seven days or less for Trueblood class members ordered by the court for inpatient competency services in the state hospitals.
- The Office of Decision Support and Evaluation (DSE) was asked to project when DSHS will be able to meet that wait-time requirement and if additional beds are needed to meet that requirement.
- DSE worked closely with the Office of Forensic Mental Health Services (OFMHS) and the state hospitals to develop statistical models that included identifying key factors and appropriate assumptions to project an average wait-time for inpatient evaluations and restorations .
- A total of seven (7) statistical models were developed:
  - **2** evaluation models[1]: including the base model and one scenario model with added bed capacity;
  - **5** restoration models: including the base model and 4 scenario models based on different schedules of reaching maximum dedicated capacity (as defined on Slide 8) or added bed capacity.
- Twelve (12) months of administrative data collected by the state hospitals were used in the projections (August 2015 – July 2016).

[1]We did not run additional scenario models for evaluation projections as was done with restoration projections because data indicated that DSHS has already reached the maximum dedicated bed capacity (13 beds) for inpatient evaluations (i.e., beds not utilized for NGRI or individuals with a Civil Legal Authority). See Slide 8 for details.

Projection Results[1]

1. The base model

- The average wait-time *for* inpatient ***evaluations*** is estimated to reach 7 days around **September 1, 2017**.
- The average wait-time *for* inpatient ***restorations*** is estimated *to* reach 7 days around **September 21, 2017**.

2. Comparison to other scenario models

A. Inpatient Evaluations

Evaluation Models[1]	Base Model (13 beds in total)	Added Capacity Model (5 beds added on January 1, 2017 for a total of 18 beds)
Average wait-time Projected to Reach 7 Days or Less	September 1, 2017	May 1, 2017

[1]Results assume all conditions in the models are met and no other changes in the system moving forward.

[2]Base Model for evaluations differs from previous projections. In one of the previous models, DSE adjusted upwards the softly allocated capacity for inpatient evaluation services to account for the fact that the occupancy rate for evaluation was often well above 100%. However, the current Base Model adheres to the softly allocated capacity estimate for evaluation (13 beds).

Projection Results[1] (*cont.*)

2. Comparison to other scenario models

B. Inpatient Restorations

Restoration Models	1. Base Model (**201** beds with no change in capacity)	2. Max Dedicated Capacity (**222** beds) on **November 1, 2016**	3. Max Dedicated Capacity (**222** beds) on **January 1, 2017**	4. Max Dedicated Capacity (**222** beds) on **March 1, 2017**	5. Max Dedicated & Added Capacity (**241** beds) on **January 1, 2017**
Average wait-time Projected to Reach 7 Days or Less	September 21, 2017	August 2, 2017	August 14, 2017	August 23, 2017	July 19, 2017

- Not surprisingly, the projections estimate that DSHS could reach the compliance level sooner if we add more beds (19 in this analysis) AND max. dedicated capacity is reached (Model 5): 2 months ahead compared with base model and 1 month ahead compared with Model 3 that assumes max. dedicated bed capacity is reached at the same time without added bed capacity.
- This suggests that adding beds alone may not have significant impact on wait-time if other things do not improve (e.g. demand level, speed in admissions and discharges, etc.).
- As the results show, adding beds for evaluations (5 beds) appears to have greater impact on wait-time reduction (4 months) than for restorations (1 month). This is most likely due to differences in length of stay (LOS) between evaluation and restoration patients, i.e. shorter LOS for evaluation patients means hospitals can move patients through the system more quickly.

[1]Results assume all conditions in the models are met and no other changes in the system moving forward.

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Factors used in the models

1. Core factors (See Appendix A for details)

Demand

- Size of wait-list
- Number of new signed court orders
- Average Wait-time from the previous day

Supply

- Number of available beds (estimated based on bed capacity and census data)
- Admissions
- Length of stay
- Discharges

2. Other factors (See Appendix B for details)

Others

- Seasonality (to account for monthly variation in all components of the model)
- Increased demand in new orders (based on 5% annual growth rate & mental health prevalence)
- Peak demand
- Changes in policy that may affect operations

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Assumptions used in the models

All models used the following base assumptions:

- Capacity in all facilities is utilized and solely for inpatient competency evaluation and restoration services;
- Daily bed occupancy rates between 92% and 96% for evaluations (gradually increasing over the projection period);
- Daily bed occupancy rates between 90% and 94% for restorations (again, gradually increasing over the projection period);
- Seasonality (monthly variation) in all model factors;
- Increased demand in new orders (based on a 5% annual court order growth rate and the mental health prevalence estimate among WA's projected arrest population);
- Continuous improvement in admissions throughout the projection period.

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Assumptions for bed capacity and allocations

1. Base Model capacity – adjusting bed capacity for the month of August 2016 based on July 2016 data: **214** total beds for competency services: **13** beds for inpatient evaluation and **201** beds for restoration. This adjustment reflects the current status that beds unofficially allocated for competency services were not solely used for competency service orders.

2. Maximum dedicated capacity – **235** beds for inpatient competency services allocated per Table 1 below and solely dedicated to inpatient competency services (i.e., not utilized for NGRI or individuals with a Civil Legal Authority as is currently the practice).

Table 1 Maximum bed capacity by location*

Site	Evaluation beds	Restoration beds	Total beds
Western	7	119	**126**
Eastern	6	49	**55**
Maple Lane	NA	30	**30**
Yakima	NA	24	**24**
Total beds	**13**	**222**	**235**

*Figures estimated in consultation with the Office of Forensic Mental Health Services (OFMHS) and the state hospitals.

Why are the results different from previous projections?

Differences may have resulted from these model improvements:

- A dynamic data system in which data is continuously updated (e.g. lag time in data collection and data entry, delays for DSHS to receive case information from the court, data corrections/validations, etc.) that capture changes in system performance.
- Utilized more historical data: 12 months (vs. 6 months) of daily historical data (August 2015 – July 2016);
- Utilized statistical models[1] that allow for dynamic interactions among the factors in projections;
- Incorporated growth demand for new orders into the model that were represented by
  (1) Mental health prevalence estimate among WA's projected arrest population[2] ; and
  (2) A 5% annual increase in new orders;
- Accounting for seasonality in the models.

[1]Differential equation models.
[2]Data Sources:
1) WA OFM: 2014 Adult arrests from WA Crime Stats Online and 2014 WA population estimate;
2) National Survey on Drug Use and Health (NSDUH) for mental health prevalence estimate (2013-2014).

How might the projections change in the future?

- Changes in system performance and environmental conditions: The projected compliance timelines may change if system performance changes between now and the projected dates. For example, a decrease in new orders or new policy implementations that result in improved system performance. In this case, DSHS could reach the compliance sooner. Conversely, if things worsen, it may take longer to reach compliance.

- Data lag or data updates: Given the lag time in data (~ 1 month) as well as the dynamics of the data system, any results are essentially based on data from at least 30 days prior so depending on when the models are run, the results may change.

- Factors not considered in the model impact compliance: The model does not consider all potential factors believed to have an impact on wait-time for competency evaluation and restoration services (e.g., staffing levels, delays beyond hospital system such as transport time, etc.). Data for these other factors were either not available or not collected at the time of this analysis, but these other factors do impact wait-time.

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What do the projected results mean?

- The statistical models projected when an average wait-time of seven days or less would be reached [1].
- All projections presented in this document are based on the assumption that **at least all of the following conditions are met AND assume no other changes in the system moving forward**:
  - Daily occupancy rate from 90% to 94% for restorations and 92% to 96% for inpatient evaluations;
  - Maximum dedicated capacity reached as specified in the different models;
  - All beds in all facilities are utilized and solely for inpatient competency evaluation and restoration;
  - Seasonality patterns stay the same;
  - No more than 5% annual growth in court orders;
  - Continuous improvement in admissions;
  - Continuous improvement in discharges and length of stay to allow for additional admissions;
  - Sufficient staffing levels to maintain the assumed occupancy and increase in admissions/discharges.
- **CAUTION:** The projections presented in this document are based on statistical estimates using a set of assumptions about system performances which may or may not reflect what is actually going on in the hospitals. Additionally, statistical estimation is always associated with errors so these projected compliance dates should be used as a guide only.

[1]It is important to note that an average wait-time of seven days or less does not guarantee all orders will reach this compliance level.

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What are the next steps?

- Given the lag in data availability (~ 1 month) as well as the dynamics of the data system which necessitates regular updates to the data, DSE plans to update the projections each time when we have received three additional months of complete data to monitor changes in estimated compliance. For instance, the data entry for the next projection update would start on December 1, 2016 at which point DSE would have complete data for August, September, and October 2016.

- We will share our updates with the Assistant Secretary's office and OFMHS.

Appendix A: How do the core factors impact average wait-time?

- Core Factors may have a direct effect on Average Wait-Time.
  - For example, an increase in the number of New Orders would most likely lead to an increase in Average Wait-Time even if nothing else changed because demand would most likely be increasing faster than the supply of beds. DSE used historical data in the model to describe how each of the core factors might affect Average Wait-Time.
- Core Factors may also affect other Core Factors (interacting with each other), meaning they may have a direct AND indirect effect on Average Wait-Time.
  - For example, if there is a decrease in the number of Admissions and an increase in New Orders, the combined effect may result in an increase in wait-time. The statistical approach we used in this analysis takes into account these types of impacts.

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Appendix B: What other factors impact average wait-time?

- Seasonality or patterns of variation in the core factors.
  - For example, historical data indicated a seasonal pattern in new court orders. We used standard statistical techniques to adjusted for these variabilities.
- Increased demand for inpatient competency services, reflected in New Orders.
  - We incorporated an annual growth rate of 5% for both Evaluation and Restoration (based on historical data) and also incorporated a mental health prevalence estimate among the projected arrest population in WA state to account for changes in demand.
- Peak demand, or more demand on some days (reflected in New Orders).
  - Based on the pattern of historical data, we defined peak demand as more than 1 order per day for evaluation and more than 3 orders per day for restoration and used standard statistical techniques to account for peak demand.
- Changes in policy and environment.
  - We used standard statistical techniques to account for policy changes and other changes that may have happened between August 2015 and July 2016.