

# Psychiatric Bed Need Methodology Subgroup Update

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# Psychiatric Bed Need Methodologies

- Found in Sec.3.(1-3) in Review Standards
  - Pediatric (age 0-17) Bed Need, Sec.3.(1-2)
  - Adult (age 18+) Bed Need, Sec.3.(3)

# Terminology

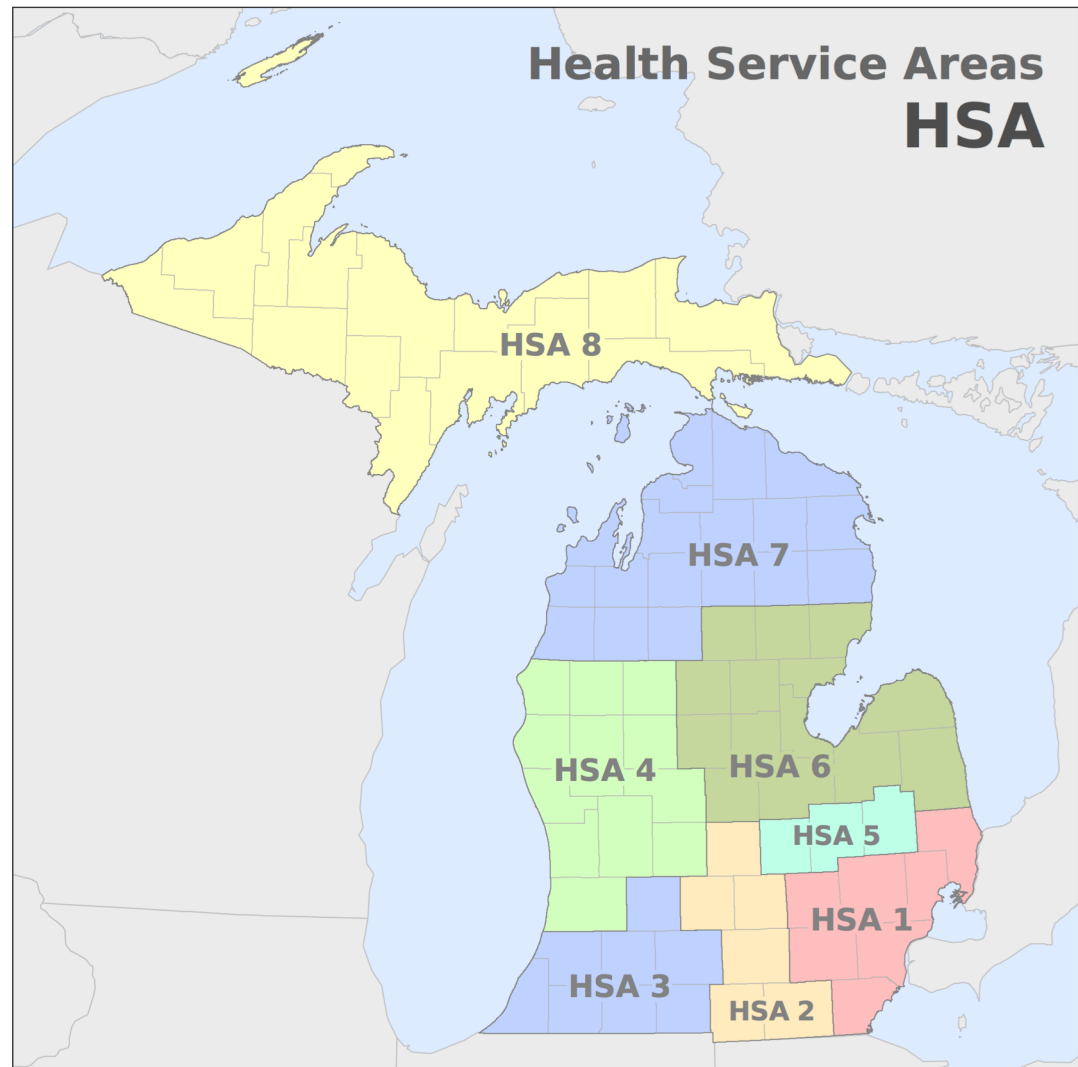
- Base Year: the most recent year with available data
  - Generally is 1-2 years prior to “current” year
- Planning Year: the (future) year of the predictions
  - Generally is 5 years from Base Year
- For example, in the last calculation
  - Current Year was 2014, Base Year was 2012, Planning Year was 2017
- Pediatric: Beds for patients age 0-17
- Adult: Beds for patients age 18+

# Terminology

- Patient Day: One night spent in the hospital by one person
- Bed: one physical bed in a hospital, but also a unit of measurement
  - One bed can accommodate 365 patient days in a calendar year – one bed equals 365 bed days
- Average Daily Census (ADC): Total patient days in a year divided by 365
- Occupancy Percent: Total patient days in a year divided by potential bed days in a year (beds \* 365)

# Terminology

- Planning Areas: the geographic units for which the pediatric and adult psychiatric bed need predictions
  - Same as Michigan's Health Service Areas (HSAs)



# Outline

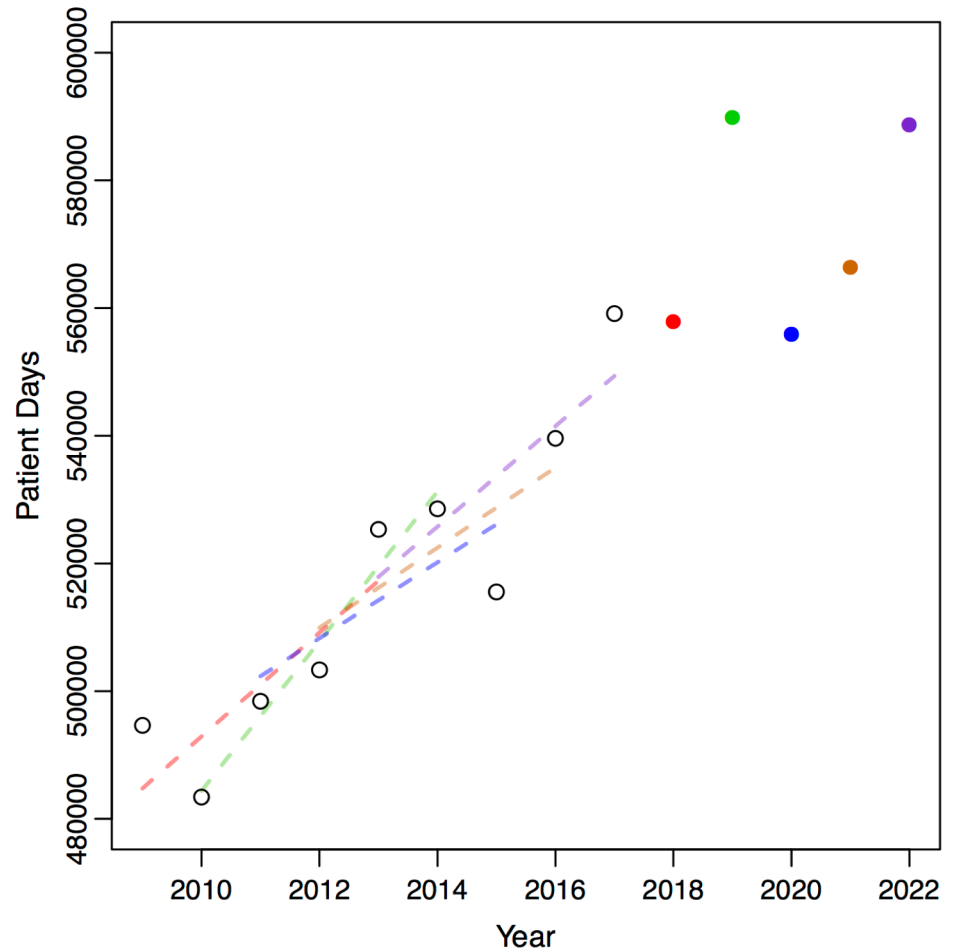
- Initial Consideration
- Proposed methods / results
  - Pros and Cons
- Discussion of population- vs facility-based methodology
- Next steps

# Initial Consideration

- Should we change the Bed Need Methodologies?
  - The working group discussions (and UNC/MSU, MDHHS CON internal discussions) have determined that the bed need methodologies are not “at fault” for the current issues with access to inpatient psychiatric services
- My opinion is, “yes”
  - We have a group of experts gathered
  - The current methodologies are not good
    - Especially the adult methodology (bed based)
  - I believe that we can do better

# Time-series Approach (State)

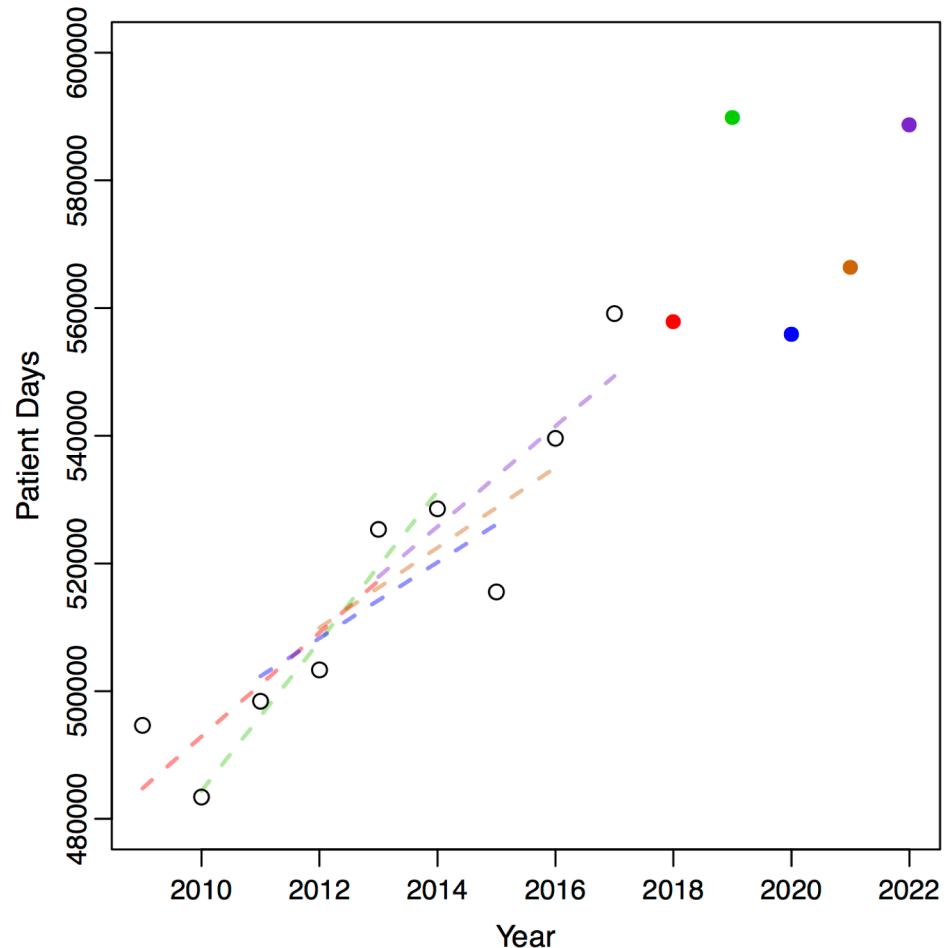
- At the state-level, use temporal trends to predict patient day utilization in the future
  - Suggestion, five years of recent data to predict five years into the future





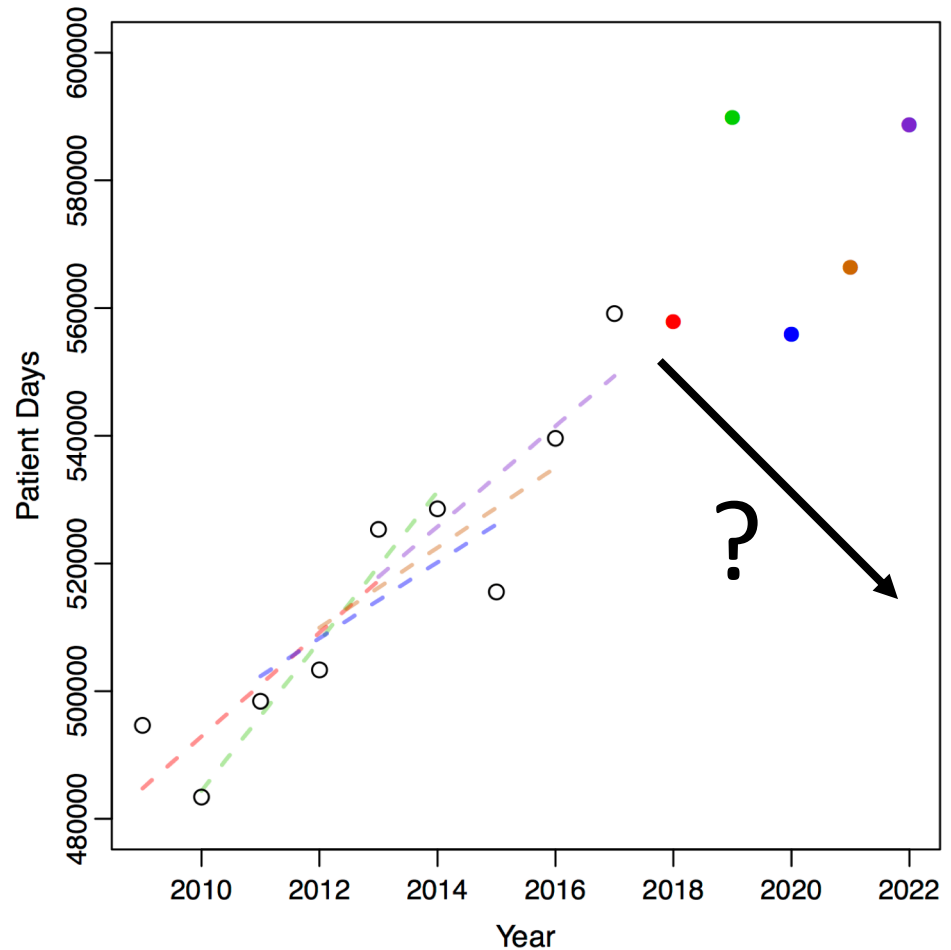
# Time-series Approach (State)

- Pros
  - Extends observable trends into the future
  - Recent data suggest a general increase in patient days
  - Generally, data appears relatively stable (year-to-year variation)
  - Useable for both adult and pediatric methodologies
  - Similar to method used in acute care hospital bed need methodology
  - Requires only utilization data



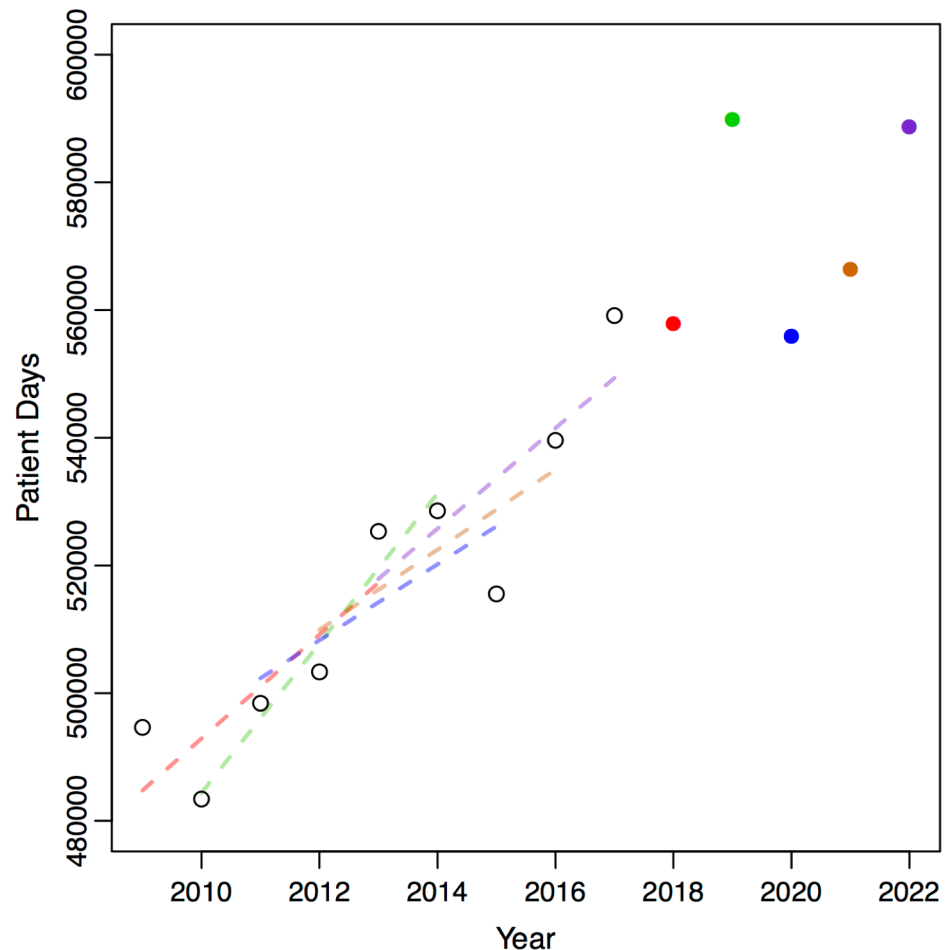
# Time-series Approach (State)

- Cons
  - Will not capture shifts or deviations from “linear” change
  - What if there’s no strong trend?
  - Requires a mechanism to “allocate” patient days from state-level to the HSAs



# Time-series Approach (State)

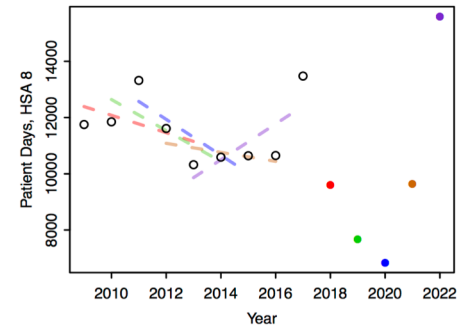
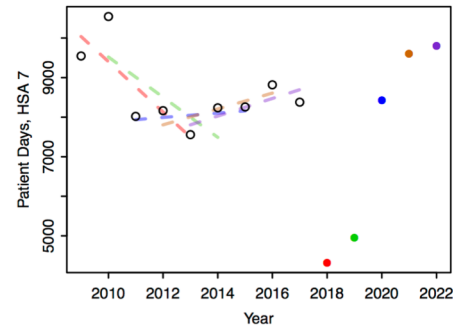
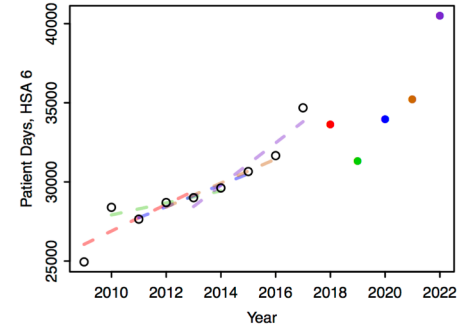
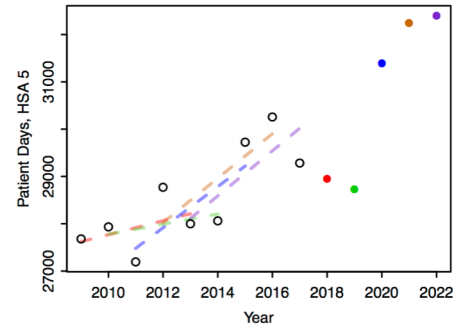
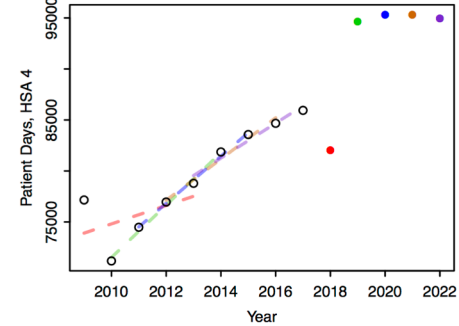
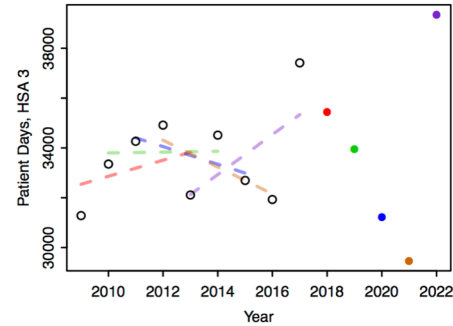
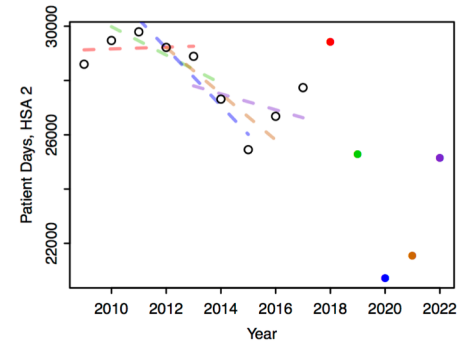
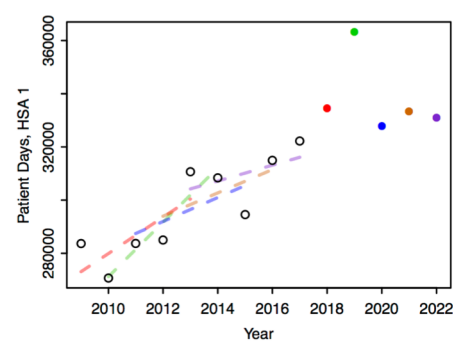
- At the state-level, use temporal trends to predict patient day utilization in the future
  - Suggestion, five years of recent data to predict five years into the future



**Opinion:**  
**Is a suitable replacement**

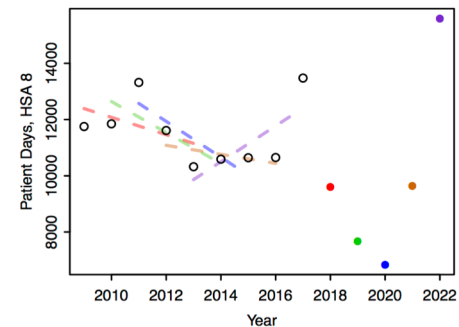
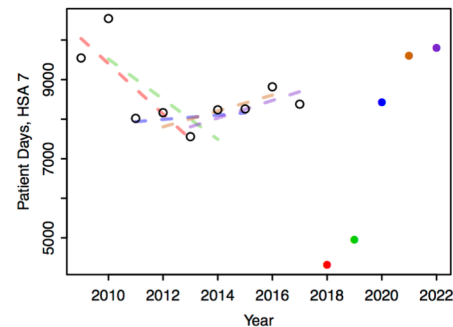
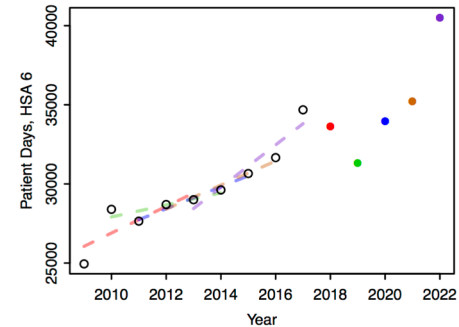
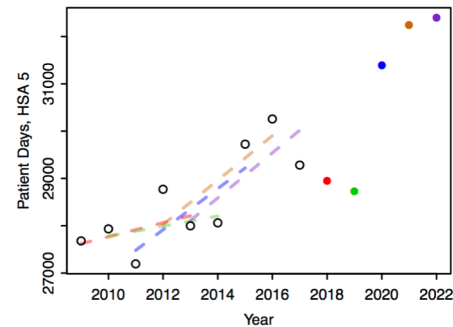
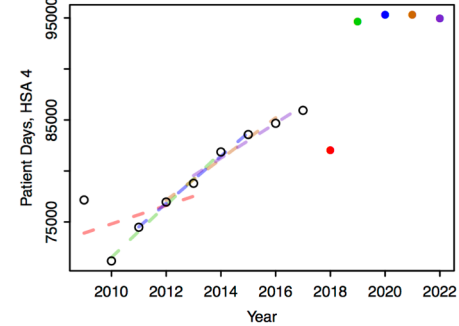
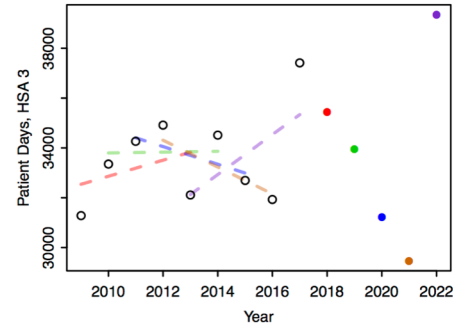
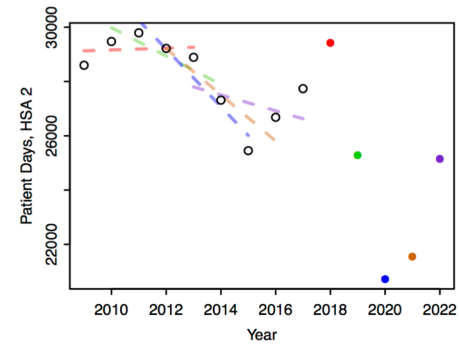
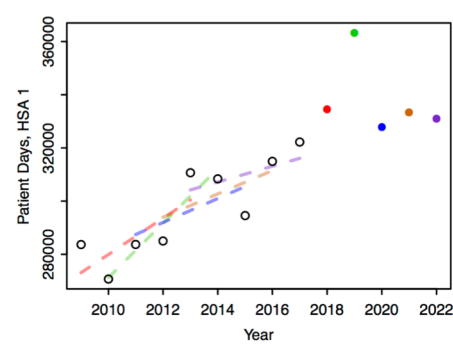
# Time-series Approach (HSA)

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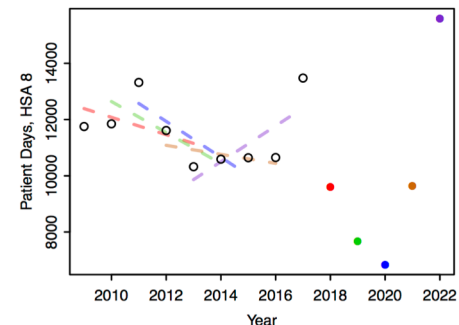
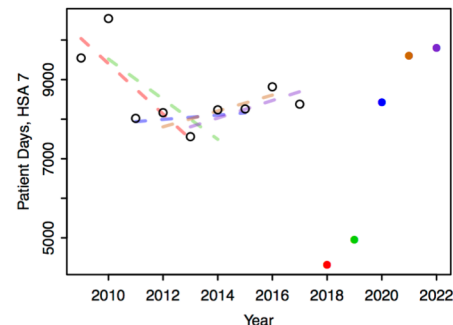
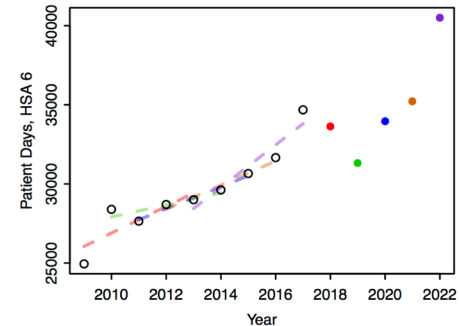
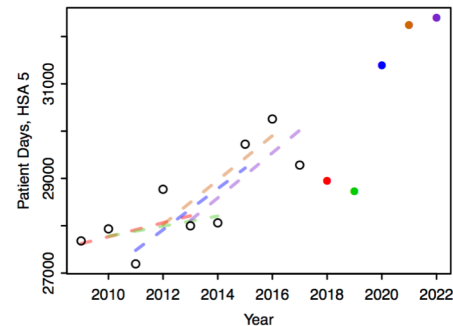
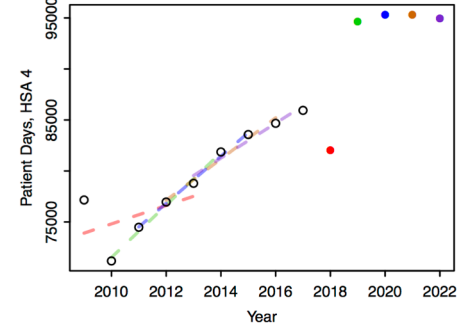
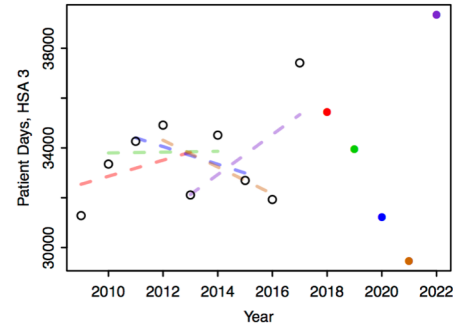
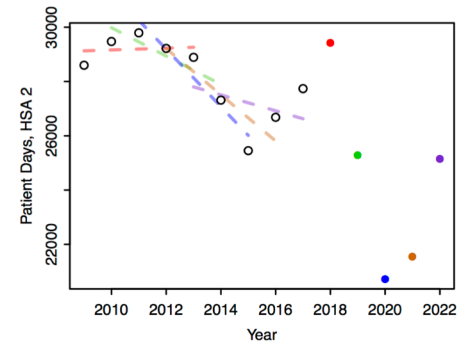
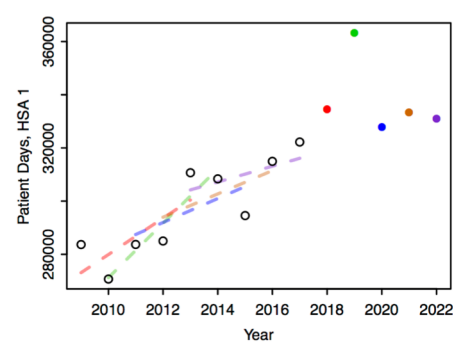
- Pros
  - Extends observable trends into the future
  - Does not require a mechanism to “allocate” patient days from state-level to the HSAs
  - Requires only utilization data



# Time-series Approach (HSA)

- Cons

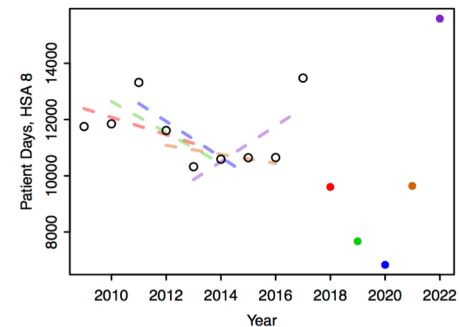
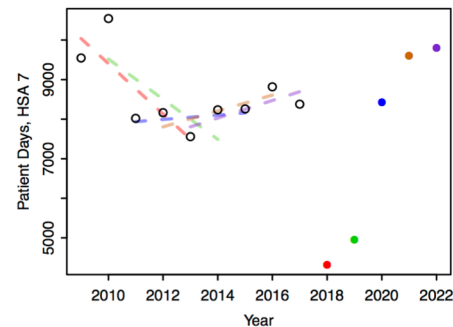
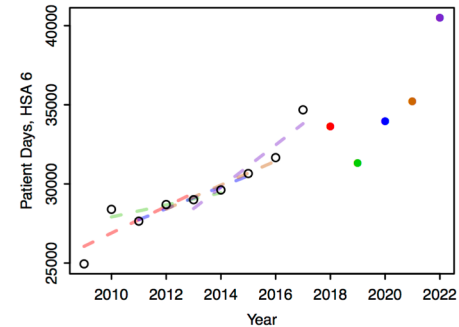
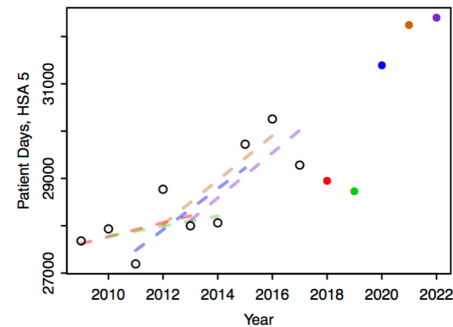
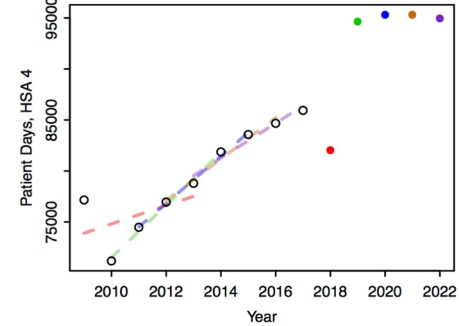
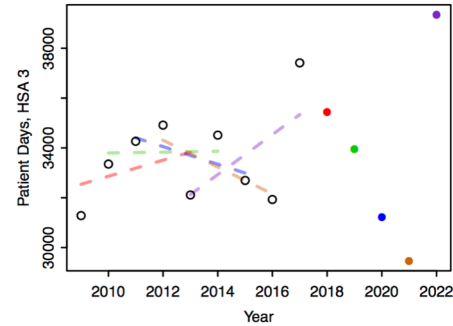
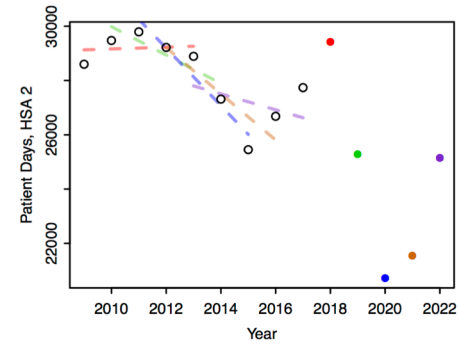
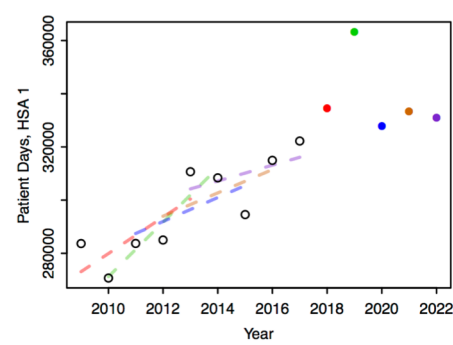
- Many HSAs are very unstable (year-to-year variation)
  - Predictions “bounce” around
- Will not capture shifts or deviations from “linear” change
- What if there’s no strong trend?
- Only works for adult (because some HSAs have no facilities for pediatric)



# Time-series Approach (HSA)

- At the HSA, use temporal trends to predict patient day utilization in the future
  - Suggestion, five years of recent data to predict five years into the future

**Opinion:**  
**Is not a suitable replacement**



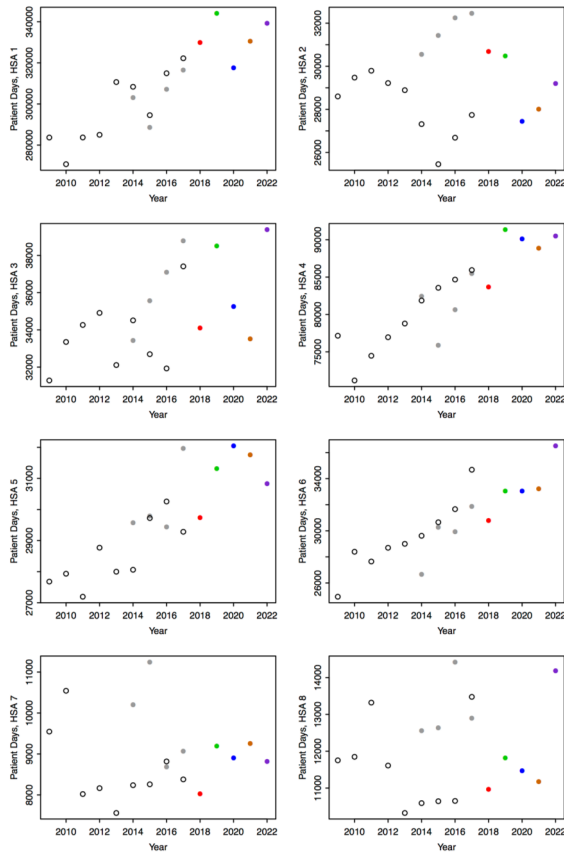
# Relative Allocation to HSAs

- Given a statewide prediction of patient days (e.g., State-level time-series), use the proportion of use among HSAs to allocate future patient days to the HSAs
  - E.g., if HSA 1 provided 50% of all statewide patient days in 2017, we would expect HSA 1 to provide 50% of all patient days in 2022
- Three tests for allocation
  - Most recent year of data, Three-year average, Five-year average

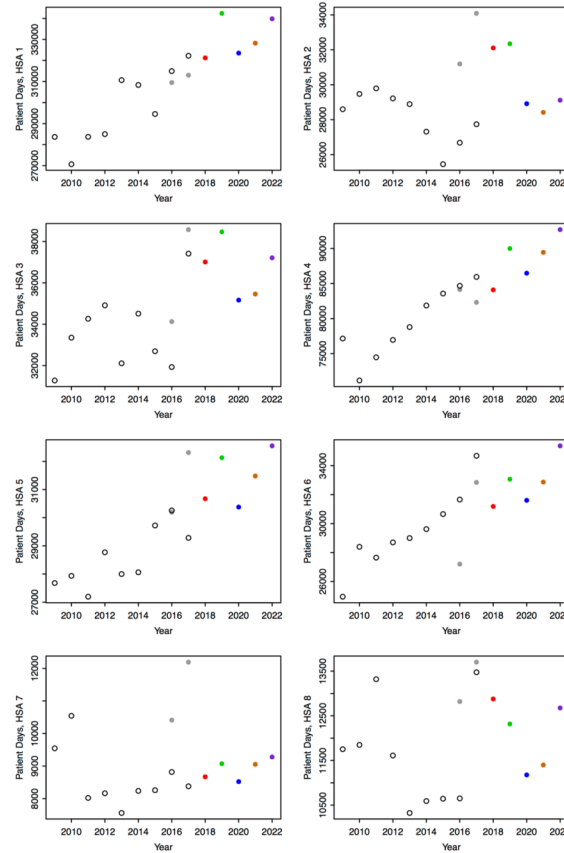


# Relative Allocation to HSAs

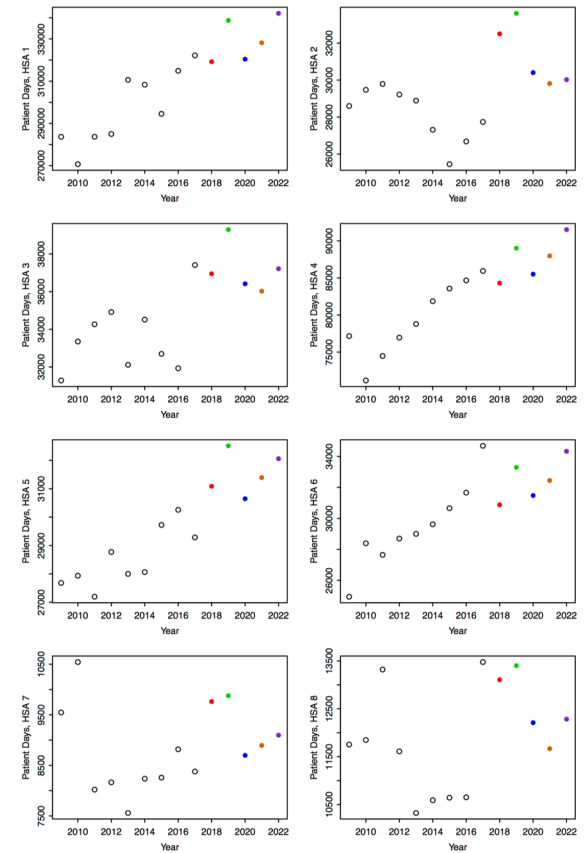
One Year



Three-Year average



Five-Year average



# Relative Allocation to HSAs

- Three tests for allocation
  - Most recent year of data, Three-year average, Five-year average
- Take away from tests
  - Each appear to provide reasonable results
  - The more years used, the more stable the predictions appeared to be
    - Smooths out the year-to-year fluctuations

# Relative Allocation to HSAs

- Pros
  - Appears to provide reasonable results
    - Predictions seem to be better than attempting to predict at the HSA-level
  - Requires only utilization data
- Cons
  - Requires a method to provide state-level patient day predictions (e.g., time series)
  - Cannot be used for pediatric methodology
    - HSAs without facilities
  - Use of average data may “deemphasize” current status
  - Reinforces potential “misdistribution” of resources
    - Based on HSA of where service is used, not on the need of the populations residing in each HSA

# Relative Allocation to HSAs

- Given a statewide prediction of patient days (e.g., State-level time-series), use the proportion of use among HSAs to allocate future patient days to the HSAs

**Opinion:**

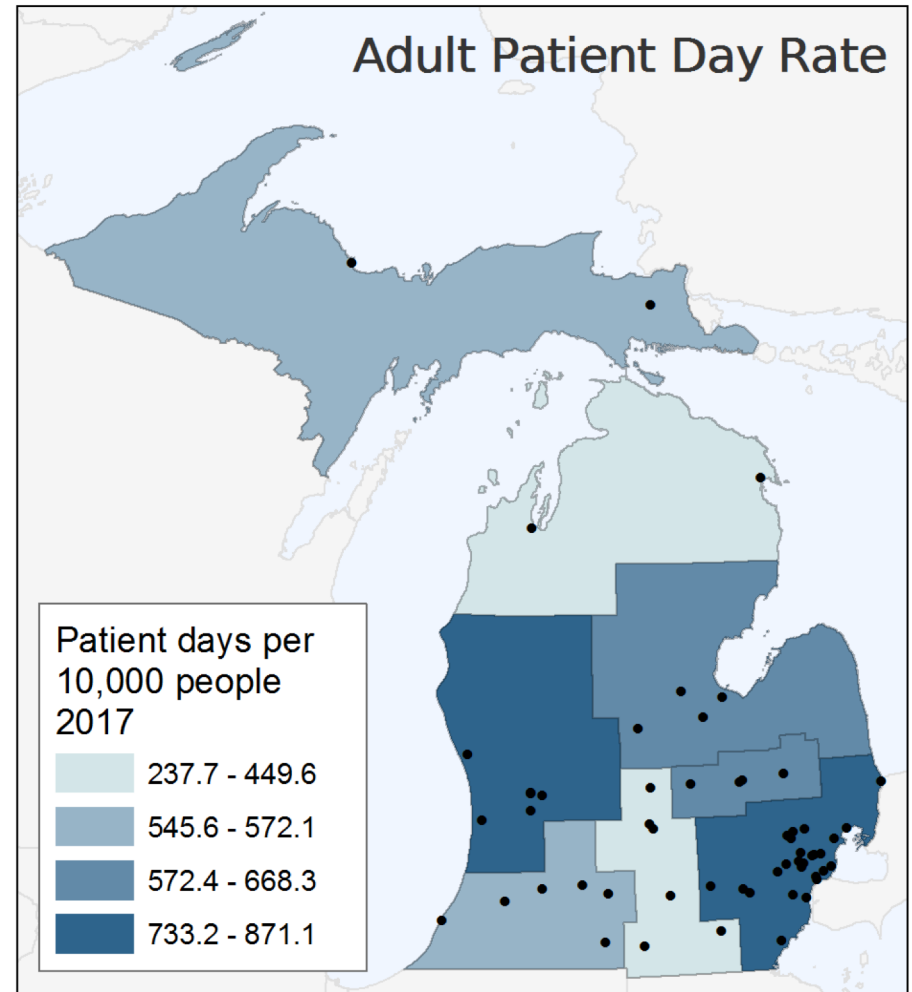
**Is a potentially suitable replacement**

# Normative Approach

- Annual survey data only has facility of use, not resident location
  - Preliminary analysis and working group discussion suggests that there is much “cross” HSA travel and utilization
- Previous approaches are all facility-based and will reinforce misdistribution of resources
  - E.g., if facilities in HSA 1 are providing services for a large and increasing population that does not reside in HSA 1, the previous methods will simply continue to allocate beds to facilities in HSA to meet the increase in need
  - Can be considered a misdistribution of resources

# Misdistribution

- Manifests in patient day utilization rates
  - Calculated by dividing patient days provided by facilities in each HSA by population of each HSA
    - Massive differences
  - Subgroup agreement that these are not due to differences in the underlying need of the population



# Normative Approach

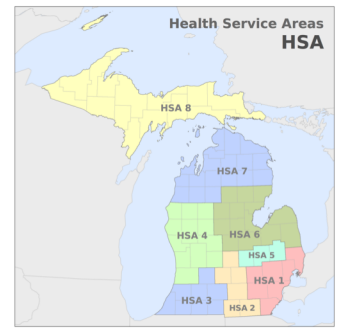
- Assume that the underlying “need” for inpatient psychiatric services is the same from region to region
  - Expressed via patient day utilization rates
  - Currently implemented in pediatric methodology
- Summary of approach
  - Calculate state-level utilization rate (per person)
    - Divide total patient days by total population
  - Multiply utilization rate by future population in each HSA
    - Provides an estimate of the patient days needed by residents of each region (thus, the need for each region’s facilities)

# Normative Approach

- Example to show differences in 2017 utilization data

	Actual Util 2017	Expected Util 2017	Diff Util
HSA1	322,231	265,655	56,576
HSA2	27,739	44,307	-16,568
HSA3	37,413	46,962	-9,549
HSA4	85,939	84,179	1,760
HSA5	29,283	31,470	-2,187
HSA6	34,683	43,518	-8,835
HSA7	8,379	25,312	-16,933
HSA8	13,476	17,739	-4,263



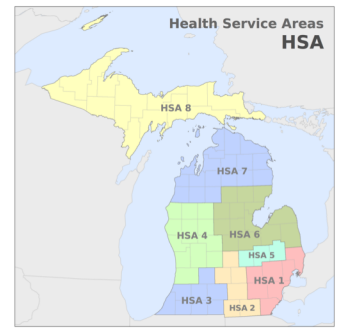


# Normative Approach

- Example to show differences in 2017 utilization data

Higher utilization than expected in HSA facilities given normative utilization of HSA residents

	Actual Util 2017	Expected Util 2017	Diff Util
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# Normative Approach

- Example to show differences in 2017 utilization data

**Lower utilization than expected in HSA facilities given normative utilization of HSA residents**

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# Normative Approach

- Pros

- Bed need is population-based (needs of the resident population, not facilities in region)
  - Attempts to correct “misdistribution” of resources
- Can be used for both adult and pediatric methodologies
  - A similar methodology already in place in pediatric methodology
- Only requires a prediction of state-level utilization data
  - But, requires population predictions at HSA level

- Cons

- Requires a method to determine state-level patient day utilization rates in the future
  - Thus, requires predicted utilization and population data
- Invariant need from place to place is a very strong, and likely erroneous, assumption (better than alternatives?)
- No need will likely reported in HSAs serving a large proportion of people from outside the HSA

# Normative Approach

- Assume that the underlying “need” for inpatient psychiatric services is the same from region to region
  - Expressed via patient day utilization rates
  - Currently implemented in pediatric methodology

**Opinion:**

**Is a potentially suitable replacement**

# Normative Approach (adjusted)

- Assume that Public (Medicaid / Healthy MI Program) and Privately insured patients have different underlying needs for inpatient psychiatric services... but, this is the same from region to region
  - Expressed via patient day utilization rates
- Summary of approach
  - Calculate Public state-level utilization rate (per person)
  - Calculate Private state-level utilization rate (per person)
    - Divide total patient days by total population
  - Multiply utilization rates by future populations (Public/Private) in each HSA, then sum
    - Provides an estimate of the patient days needed by residents of each region (thus, the need for each region's facilities), while accounting for known differences in need among people and differences in population composition among HSAs

# Normative Approach (adjusted)

- Calculated for years 2013 - 2017

YEAR	POPULATION (18+)			PATIENT DAYS (18+)			PATIENT DAYS (18+)		
	TOTAL	PUB INS	PRIV INS	TOTAL	PUB INS	PRIV INS	TOTAL	PUB INS	PRIV INS
2013	7,653,501	1,298,297.2	6,355,203.8	525,333	242,403	282,930	0.069	0.187	0.045
2014	7,688,464	1,456,837.2	6,231,626.8	528,558	194,452	334,106	0.069	0.133	0.054
2015	7,712,554	1,698,560.3	6,013,993.7	515,517	214,845	300,672	0.067	0.126	0.050
2016	7,743,940	1,748,325.2	5,995,614.8	539,606	250,627	288,979	0.070	0.143	0.048
2017	7,785,662	1,801,863.7	5,983,798.3	559,143	251,865	307,278	0.072	0.140	0.051

# Normative Approach (adjusted)

- Calculated for years 2013 - 2017

PERCENT OF POPULATION (MEDICAID & HMP)					
HSA	2013	2014	2015	2016	2017
1	20.76%	23.46%	27.82%	28.91%	30.04%
2	18.82%	21.15%	24.80%	25.49%	26.23%
3	22.75%	25.19%	28.87%	29.48%	30.14%
4	20.22%	22.19%	24.94%	25.42%	25.90%
5	25.46%	29.17%	34.31%	34.93%	35.88%
6	23.13%	26.11%	30.48%	31.45%	32.43%
7	21.65%	24.41%	28.40%	29.42%	30.48%
8	19.08%	21.90%	26.06%	27.44%	28.35%

# Normative Approach (adjusted)

- Example to show differences in 2017 utilization data

	Actual Util 2017	Expected Util 2017	Diff Util
HSA1	322,231	289,596	32,635
HSA2	27,739	43,395	-15,656
HSA3	37,413	44,409	-6,996
HSA4	85,939	79,692	6,247
HSA5	29,283	33,309	-4,026
HSA6	34,683	47,874	-13,191
HSA7	8,379	24,998	-16,619
HSA8	13,476	16,295	-2,819



# Normative Approach (adjusted)

- Example to show differences in 2017 utilization data

Higher utilization than expected in HSA facilities given normative utilization and public/private population composition of HSA residents

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# Comparison (Normative, adj)

		<b>NORMALIZED</b>	<b>NORMALIZED (Adj)</b>
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- Requires a method to determine state-level patient day utilization rates in the future, for both Public and Private
  - Thus, requires predicted utilization and population data
- Requires a prediction of Public/Private population
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**Opinion:**

**Is a potentially suitable replacement**

# Population- vs. Facility-based

- Big picture question
- Should the output of bed need methodology be...
  - Facility-based?
    - Predict the number of beds for facilities in each HSA regardless of the population served by those facilities
    - *Example: relative distribution approach*
    - *Current adult methodology*
  - Population-based?
    - Predict the number of beds for facilities in each HSA to serve the population of the HSA
    - *Example: normative approaches*
    - *Current pediatric methodology*

# Next Steps

- Subgroup to continue working and propose new methodologies (in full) at Feb 7 meeting
  - If working group decides to continue
- Implement methods discussed here with predicted population data
- Distribute findings prior to Feb 7, so entire group has time to evaluate
  - So Feb 7 meeting can potentially be a simple discussion and decision