Our Charge

- Use the Medi-Cal billing database to analyze and map disparities in service **access** and **delivery** at the local level (census tracts within counties) across the state for various subgroups:
  - Age
  - Gender
  - Race
  - Ethnicity
Focus on SMI and SED

- From the Federal Register:
  
  "... adults with a serious mental illness are persons 18 years and older who, at any time during a given year, had a diagnosable mental, behavioral, or emotional disorder that met the criteria of DSM-III-R and ... that has resulted in functional impairment which substantially interferes with or limits one or more major life activities."

- Serious emotional disability (SED) refers to children under the age of 18.

Access to Care

- Penetration rate: a common measure reflecting the proportion of individuals in a given population (like a health plan) that use specialty mental health services in a year.

  \[
  \text{No. of Medi-Cal Mental Health Patients}^* \\
  \text{Total Medi-Cal Beneficiaries}
  \]

* Includes managed care, fee for service and Short Doyle. Mental health patients have an ICD-9 code consistent with Serious Mental Illness or Serious Emotional Disability.
Delivery and Utilization

- We characterized service delivery via the utilization rate:
  - Total number of mental visits per mental health Medi-Cal beneficiary
  - Used outpatient visits only
Distribution of Mental Health Services

- **Classification by Quantiles**
  - 5 categories with 20% of the observations in each category
  - Nice, even color distribution in the map
  - But ranges vary widely in the map (especially the highest range).
    - Misleading (CT with 10% not equivalent to one with 60%)
    - Maps are not comparable
    - Cannot easily see patterns in the data
Distribution of Mental Health Services

**Issues:**
- The eye has difficulty discerning multiple colors
- Most census tracts are too small to see clearly
- Our eye is drawn to the bigger/darker census tracts – leads to bias

**Hot Spot Analysis**

- It's a method for testing the statistically significant clusters of a variable (such as the penetration rate)
- There is a difference between an outlier and a hot/cold spot
- The analysis value (penetration rate) in a census tract is compared to a designated set of neighboring census tracts defined by distance and/or the number of neighbors (creating a local mean)
- The local mean is compared to the overall mean for the dataset (in this case, California)
- Areas of intense clustering of high values are hot spots and areas of intense clustering of low values are cold spots
Why are we using Hot Spot Analysis?

- It answers the right question...
  - Where is the access to mental health care in California greater or lesser than expected, given the overall Medi-Cal beneficiary population?
- Maps are more comparable
- There is less concern about missing important information in small census tracts
  - We can now see important patterns in the data
- Statistical significance provides meaningful information

Is this census tract a hot spot?
The penetration rates for all census tracts within a distance of the target tract create a local mean.

The local mean is compared to the global (statewide) mean.
Result for Penetration Rates

3-year penetration rate for adults aged 20-44 with Serious Mental Illness (SMI) by census tract

Mean penetration rate = 7.4%
Standard deviation = 5.6%

High and Low Clusters of Access to Mental Health Care Services

- Much less access (p<0.01)
- Less access (p<0.01)
- Equivalent to the state mean
- More access (p<0.01)
- Much more access (p<0.01)

Result for Utilization Rates

High and Low Clusters of Utilization to Mental Health Care Services

- Much less utilization (p<0.01)
- Less utilization (p<0.01)
- Equivalent to mean
- More utilization (p<0.01)
- Much more utilization (p<0.01)
Interpretation

- there are no data for the specified population
- access and utilization are equivalent to the state mean
- access is equivalent to the state mean, but utilization is high
- access is equivalent to the state mean, but utilization is low
- access is high, but utilization is equivalent to the state mean
- access is low, but utilization is equivalent to the state mean
- access and utilization are high (potential overuse of services)
- access is high and utilization is low
- access is low and utilization is high (potentially sicker individuals)
- access and utilization are low (more services may be needed)

* Numbers inside boxes indicate the percentage of census tracts of that color

Map Comparisons

[Table with data]
Next Steps

- Understanding service access without understanding mental health need only tells a part of the story
- Need can be determined in CA using data from the California Health Interview Survey (CHIS)
  - UCD and UCLA collaboration to create an assessment of need*
  - Kessler-6 is a tested and robust indicator of severe psychological stress
  - Sheehan Disability Scale captures impairment due to emotional or mental health
  - There is potential to map the CHIS data for CA


Summary

- Hot spot analysis provides an opportunity to see statistically significant patterns in large datasets which may help guide resource allocation and track change over time
- Access to care and utilization could be refined to show how the population receiving services compares to the population in need
Questions?