The Impact of Liver Redistricting Access Consequences for Minorities & Income Restricted Candidates

A Perspective from South Carolina

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Goals of the Talk

• LSAM Modeling Data on Ethnicity
• South Carolina (Population, Substantially Rural)
  – Racial disparity
  – Lower social economic status
  – Higher death rates from liver disease –
    • In hospital pre-transplant listing
  – Higher death rates from the transplant waiting list
LSAM Modeling on Ethnicity

<table>
<thead>
<tr>
<th></th>
<th>% white</th>
<th>% black</th>
<th>% hispanic</th>
<th>% other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share 35</td>
<td>69.2%</td>
<td>10.9%</td>
<td>14.0%</td>
<td>5.9%</td>
</tr>
<tr>
<td>Regional</td>
<td>69.0%</td>
<td>10.9%</td>
<td>14.0%</td>
<td>6.1%</td>
</tr>
<tr>
<td>8 district</td>
<td>68.0%</td>
<td>11.1%</td>
<td>14.5%</td>
<td>6.3%</td>
</tr>
<tr>
<td>4 district</td>
<td>67.6%</td>
<td>11.4%</td>
<td>14.7%</td>
<td>6.3%</td>
</tr>
</tbody>
</table>

- Absence of significant change for blacks (p=.28), or for other cohorts (p=0.08)
- Percent of transplanted candidates who are white will decrease (p<0.001) while the percentage of hispanic candidates who are transplanted will increase (p=0.02)
LSAM Modeling interpretation

• There are many optimized maps suggesting significant reductions to the variance in median MELD scores at transplant, with concomitant reductions in deaths from those on waitlists.

• Minority candidates are predicted to have equivalent or increased rates of transplantation using optimized maps.

• Implementing one of these redistricting maps will significantly improve geographic equity compared with either local-first allocation or regional sharing with the existing regions.
Medical University of South Carolina (MUSC)

- First Kidney Transplant performed 1968
- First Liver Transplant performed 1991
- All Solid organs now performed at MUSC
- Over 1200 Liver Transplants since inception
- Only Transplant Center serving the citizens of South Carolina
South Carolina

• Rural state with population of 4.8 million
• Blacks make up 27.9 % of our population while only 13.2 % for the USA
• Per capita income $23,906 vs. $28,251
Health Status in South Carolina:

• Life expectancy of a South Carolinian is 76.6 years; which is two full years lower than the national expectancy of 78.6.⁴
• The infant mortality rate in SC is 7.1 per 1000 live births, compared to a national average of 6.4.³
• Only 66.7% of pregnant women in SC receive prenatal care in the first trimester compared to 82.3% nationally, which probably contributes to the fact that 14.3% of births in 2008 were pre-term, compared to 12.3% nationally.⁴
• Overall, 10.7% of SC adults have been told by a doctor that they have diabetes, compared to 8.7% across the US.⁴
• The rate of death caused by stroke or other cerebrovascular diseases per 100,000 was 53.4 among South Carolinians in 2007, compared to a rate of 42.2 nationally.⁴
Life Expectancy in South Carolina
Health Status in South Carolina:

Data Source: Kaiser Family Foundation, State Health Facts.org website  
Rankings: larger numbers = poorer access
Racial Disparities in Unadjusted In-Hospital Mortality Rates Among Patients with Liver Disease in all South Carolina Hospitals: 2007-2009

Crude In-Hospital Mortality Rate

Age Group

0 to 29
(n=46) (n=86)

30 to 49
(n=510) (n=1273)

50 to 69
(n=992) (n=2769)

70+
(n=176) (n=894)

(Denominators are listed in parentheses below the bars.)

(p=0.007)

(p=0.015)

SC Hospital Association
Racial Disparities in Unadjusted In-Hospital Mortality Rates Among Patients with Liver Disease in all South Carolina Hospitals: 2007-2009

p = 0.0002 comparing blacks and whites, adjusting for age and gender

(Denominators are listed in parentheses below the bars.)
2013 SRTR Data: Mortality per Year on the Wait List

16 of the 30 (53%) centers in the bottom quartile for wait list mortality are from the Southern Regions.
2013 SRTR Data: Wait List O/E Mortality

16 of the 30 (53%) centers in the bottom quartile for wait list mortality are from the Southern Regions
Summary

• **LSAM Modeling Data on Ethnicity**
  – Fails to reflect the whole picture of *inequity*
• South Carolina – represents similar states of the south east
  – Racial disparity and Low social economic status are widely present
  – Higher in hospital death rates from liver disease (this includes pre-listed and patients on the waiting list)
• Despite Lower MELDS at Transplant, SC and programs with similar racial and economic demographics are in the lowest quartile in SRTR wait list mortality
Conclusions

• Redistricting will further aggravate and increase disparities amongst minorities with respect to access to healthcare resulting in increase deaths from liver disease while patients await transplant.

• Redistricting will threaten programs which serve minority and under represented populations thereby increasing disadvantages amongst this group of patients.
George E. P. Box FRC

• The father of statistical Modeling

• His name is associated with results in statistics such as: **Box–Jenkins models, Box–Cox transformations, Box–Behnken designs, and others**

• Box wrote in his book on response surface methodology with Norman R. Draper "essentially, all models are wrong, but some are useful"
Are we using the appropriate metrics to model when the guru (Dr. Box) suggests Modeling is only a tool?

Modeling operates by changing one variable and all other factors staying the same.
Final Question

• If we, as a transplant community, have an unlimited number of organs to transplant, would we distribute them all over the country or would we first use them locally?