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A Private University with a Public Mission
Disclosure

I have no conflicts of interest to disclose
Overview

• What do we know about diabetes disparities in LA County?
• What are Preventable Diabetes-Related Hospitalizations (PDRHs)?
• Racial/Ethnic Disparities
• Geographic Disparities
• Diabetes-Related Lower Extremity Amputations
• Race vs Place
• Hospital Charges and Costs
• Potential Remedies
What do we know about diabetes disparities in LA County?
# Diabetes Disparities by SPA

## 2015 *

### Overweight and Obesity
- Percent of adults who are obese (BMI ≥ 30.0)
- Percent of adults who are overweight (25.0 ≤ BMI < 30.0)

<table>
<thead>
<tr>
<th></th>
<th>HP 2020</th>
<th>National</th>
<th>LA County</th>
<th>Antelope Valley</th>
<th>San Fernando</th>
<th>San Gabriel</th>
<th>Metro</th>
<th>West</th>
<th>South</th>
<th>East</th>
<th>South Bay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overweight and Obesity</td>
<td>30.5sq</td>
<td>28.9m</td>
<td>23.5</td>
<td>29.6</td>
<td>19.8</td>
<td>23.8</td>
<td>22.1</td>
<td>10.3</td>
<td>34.1</td>
<td>28.0</td>
<td>24.1</td>
</tr>
<tr>
<td></td>
<td>N/A</td>
<td>35.2m</td>
<td>35.9</td>
<td>37.0</td>
<td>37.0</td>
<td>35.0</td>
<td>34.4</td>
<td>31.1</td>
<td>33.4</td>
<td>39.1</td>
<td>37.2</td>
</tr>
</tbody>
</table>

### Diabetes
- Percent of adults ever diagnosed with diabetes
- Diabetes death rate (age-adjusted per 100,000 population)

<table>
<thead>
<tr>
<th></th>
<th>HP 2020</th>
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<th>East</th>
<th>South Bay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>N/A</td>
<td>9.3m</td>
<td>9.8</td>
<td>13.9</td>
<td>8.2</td>
<td>9.1</td>
<td>11.6</td>
<td>4.5</td>
<td>12.3</td>
<td>11.2</td>
<td>10.4</td>
</tr>
<tr>
<td></td>
<td>66.6</td>
<td>21.2m</td>
<td>21.9</td>
<td>32.0</td>
<td>17.7</td>
<td>22.8</td>
<td>23.5</td>
<td>7.5</td>
<td>37.6</td>
<td>25.7</td>
<td>20.1</td>
</tr>
</tbody>
</table>

* Source: County of Los Angeles Department of Public Health, Office of Planning, Evaluation, and Development. *Key Indicators of Health by Service Planning Area*; January 2017
# Diabetes Disparities by SPA

### 2015 *

<table>
<thead>
<tr>
<th>Diabetes</th>
<th>HP 2010</th>
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<th>South</th>
<th>East</th>
<th>South Bay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of adults ever diagnosed with diabetes</td>
<td>N/A</td>
<td>9.3</td>
<td>9.8</td>
<td>13.9</td>
<td>8.2</td>
<td>9.1</td>
<td>11.6</td>
<td>4.5</td>
<td>12.3</td>
<td>11.2</td>
<td>10.4</td>
</tr>
<tr>
<td>Diabetes death rate (age-adjusted per 100,000 population)</td>
<td>66.6</td>
<td>21.2</td>
<td>21.9</td>
<td>32.0</td>
<td>17.7</td>
<td>22.8</td>
<td>23.5</td>
<td>7.5</td>
<td>37.6</td>
<td>25.7</td>
<td>20.1</td>
</tr>
</tbody>
</table>

### 2011 **

<table>
<thead>
<tr>
<th>Diabetes</th>
<th>HP 2010</th>
<th>National</th>
<th>LA County</th>
<th>Antelope Valley</th>
<th>San Fernando</th>
<th>San Gabriel</th>
<th>Metro</th>
<th>West</th>
<th>South</th>
<th>East</th>
<th>South Bay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percent of adults ever diagnosed with diabetes</td>
<td>N/A</td>
<td>9.0</td>
<td>9.5</td>
<td>10.7</td>
<td>9.3</td>
<td>7.7</td>
<td>7.3</td>
<td>5.5</td>
<td>10.1</td>
<td>15.1</td>
<td>9.8</td>
</tr>
<tr>
<td>Diabetes death rate (age-adjusted per 100,000 population)</td>
<td>N/A</td>
<td>20.9</td>
<td>20.2</td>
<td>40.6</td>
<td>15.7</td>
<td>19.8</td>
<td>18.1</td>
<td>9.3</td>
<td>34.1</td>
<td>27.5</td>
<td>18.3</td>
</tr>
</tbody>
</table>

* Source: County of Los Angeles Department of Public Health, Office of Planning, Evaluation, and Development. *Key Indicators of Health by Service Planning Area;* January 2017

** Source: County of Los Angeles Department of Public Health, Office of Planning, Evaluation, and Development. *Key Indicators of Health by Service Planning Area;* March 2013
What are Preventable Diabetes-Related Hospitalizations (PDRHs)?
What are PDRHs?

Hospitalizations for diabetes-related issues which could have been avoided by closer oversight in an outpatient setting
Why are PDRHs significant?

• They cause unnecessary hardship for individuals and families

• They are a major waste of resources

• They represent a fixable problem
Study data

• Source: OSHPD inpatient discharge dataset (with identifiers)
• Timeframe: 2013, 2014, 2015
• Population: Los Angeles County residents age 18+
• Included:
  - Unscheduled hospitalizations for: long-term complications of type 2 diabetes; uncontrolled type 2 diabetes; or type 2 diabetes-related lower extremity amputations (DRLEAs)
• Excluded:
  - Scheduled hospitalizations
  - Type 1 diabetes
  - Hospitalizations for short-term complications
  - Preventable hospitalizations related to other conditions for people with diabetes
Racial/Ethnic Disparities
Racial/ethnic distribution of PDRHs in LA County

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>White</th>
<th>Black</th>
<th>Asian</th>
<th>Hispanic</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>18,194</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>2014</td>
<td>17,763</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>2015</td>
<td>17,109</td>
<td>100%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>
Unadjusted PDRH rates for adults in LA County, by race/ethnicity (2013-2015)
Unadjusted odds of PDRH (compared to Whites) for adults in LA County (2013-2015)
Age-adjusted PDRH rates for adults in LA County, by race/ethnicity (2013-2015)
Age-adjusted odds of PDRH (compared to Whites) for Adults in LA County (2013-2015)
Geographic Disparities
## Geographic Distribution of PDRHs in LA County

<table>
<thead>
<tr>
<th>SPA</th>
<th>Adult Pop.* (%)</th>
<th>PDRH Count† (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPA 1</td>
<td>281,475</td>
<td>704</td>
</tr>
<tr>
<td>SPA 2</td>
<td>1,695,511</td>
<td>3,436</td>
</tr>
<tr>
<td>SPA 3</td>
<td>1,386,653</td>
<td>3,250</td>
</tr>
<tr>
<td>SPA 4</td>
<td>912,594</td>
<td>2,059</td>
</tr>
<tr>
<td>SPA 5</td>
<td>543,086</td>
<td>671</td>
</tr>
<tr>
<td>SPA 6</td>
<td>721,055</td>
<td>2,816</td>
</tr>
<tr>
<td>SPA 7</td>
<td>955,850</td>
<td>2,906</td>
</tr>
<tr>
<td>SPA 8</td>
<td>1,178,150</td>
<td>2,812</td>
</tr>
<tr>
<td>Total</td>
<td>7,674,373</td>
<td>18,654</td>
</tr>
</tbody>
</table>

† Number of qualifying hospitalizations for adults during calendar year

*Source: LA County ISD*
Age-adjusted PDRH rates for adults in LA County by SPA (2013-2015)
Comparison of PDRH rates in SPAs 5 and 6, 2013-2015
Comparison of PDRH rates in SPAs 5 and 6, 2013-2015

Hospitalization rate per 100,000 adults

- **SPA 5**: 88.09 (2013), 76.70 (2014), 78.57 (2015)

SPA 5 is 4.18x higher than SPA 6 in 2013,
SPA 6 is 4.43x higher than SPA 5 in 2014,
SPA 6 is 4.08x higher than SPA 5 in 2015.
PDRH rates by zip code - 2015
Diabetes-Related Lower Extremity Amputations (DRLEAs)
DRLEA counts for adults in LA County, by race/ethnicity

2013 2014 2015

White Hispanic Asian/Pacific Islander Black

2,040 2,174 2,194
Age-adjusted rates of hospitalization for DRLEA for adults in LA County, by race/ethnicity
Age-adjusted odds (compared to Whites) of hospitalization for DRLEA among adults in LA County (2013-2015)

<table>
<thead>
<tr>
<th>Year</th>
<th>White</th>
<th>Hispanic</th>
<th>Asian/Pacific Islander</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>3.06</td>
<td>2.85</td>
<td>2.41</td>
<td>2.62</td>
</tr>
<tr>
<td>2014</td>
<td>2.64</td>
<td>2.67</td>
<td>0.38</td>
<td>0.36</td>
</tr>
<tr>
<td>2015</td>
<td>2.62</td>
<td>2.64</td>
<td>0.38</td>
<td>0.38</td>
</tr>
</tbody>
</table>
Age-adjusted rates of hospitalization for DRLEA among adults in LA County, by SPA (2013-2015)
Comparison of DRLEA rates in SPAs 5 and 6, 2013-2015
Comparison of DRLEA rates in SPAs 5 and 6, 2013-2015

Hospitalization rate per 100,000 adults


SPA 6 is 8.05x higher than SPA 5 in 2013, 8.47x higher in 2014, and 8.38x higher in 2015.
Race vs Place
Unadjusted PDRH rates by race/ethnicity within SPAs, 2015

[Bar chart showing hospitalization rates per 100,000 adults by race/ethnicity for different SPAs.]

SPA 1: White - 170, Hispanic - 52, Asian/Pacific Islander - 107, Black - 167
SPA 2: White - 189, Hispanic - 86, Asian/Pacific Islander - 107, Black - 167
SPA 3: White - 307, Hispanic - 229, Asian/Pacific Islander - 224, Black - 224
SPA 4: White - 363, Hispanic - 156, Asian/Pacific Islander - 155, Black - 155
SPA 5: White - 363, Hispanic - 86, Asian/Pacific Islander - 51, Black - 51
SPA 6: White - 910, Hispanic - 575, Asian/Pacific Islander - 332, Black - 332
SPA 7: White - 375, Hispanic - 149, Asian/Pacific Islander - 204, Black - 308
SPA 8: White - 341, Hispanic - 147, Asian/Pacific Islander - 220, Black - 147
Unadjusted DRLEA rates by race/ethnicity within SPAs, 2015
Hospital Charges and Costs
Costs vs. Charges

• Costs are actual expenses incurred during the provision of medical care including wages, supplies, and utilities
• Charges are the amount hospitals bill patients or insurers for providing services
• There is often little correlation between the two
Cost Charge Ratios (CCRs)

- Individual values for all licensed facilities that provide inpatient care
- \( \text{CCR} = \frac{\text{Estimated direct medical costs}}{\text{Amount charged by hospital}} \)
- Both values can be found in CMS Healthcare Cost Reporting Information System reports
- Masterfiles containing data for most states are publicly available from AHRQ/HCUP
- CA stopped sharing in 2012
# Charges and costs associated with PDRHs

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Charges</td>
<td>$1,006,655,043</td>
<td>$1,026,230,189</td>
<td>$1,078,250,537</td>
</tr>
</tbody>
</table>
Payers (percent share within SPAs, 2015)
Payers (percent share by race/ethnicity, 2015)

- **White**:
  - Medicare: 63.8%
  - Medi-Cal: 17.5%
  - Asian/Pacific Islander: 16.5%
  - Black: 1.9%

- **Hispanic**:
  - Medicare: 42.0%
  - Medi-Cal: 41.7%
  - Asian/Pacific Islander: 3.0%
  - Black: 2.2%

- **Asian/Pacific Islander**:
  - Medicare: 64.4%
  - Medi-Cal: 18.3%
  - Other: 14.8%
  - Black: 2.6%

- **Black**:
  - Medicare: 52.6%
  - Medi-Cal: 31.8%
  - Other: 13.6%
  - Asian/Pacific Islander: 1.9%
Potential Remedies

Meaningful Change

Status Quo
Potential Remedies

• Community health workers

• Technology

• Mobile clinics

• Teams dedicated exclusively to follow-up

• Thinking outside the medical model
Summary
Summary

• Overall PDRH outcomes are improving, but large disparities still exist
• For DRLEAs, those disparities grew
• Race and place both play a role
• High rates for African Americans should be a major concern, but so should the large volume of Hispanic patients with unmet needs
• SPA 6 is the area most in need of new approaches to prevention
• Hundreds of millions of dollars are spent unnecessarily on these hospitalizations
Questions?

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