Presenters

Jeff Powell, MD, MPH
- Pediatrician
- Community Health Division, Shiprock SU
- Principal Investigator, SEARCH

Jill Moses, MD, MPH
- Pediatrician
- Public Health Director, Chinle Service Unit
- Acting Navajo Area Diabetes Consultant
HELP US KNOW WHO YOU ARE...
Why The Focus on Childhood?
Obesity and Diabetes

- What is Obesity?
- Risk factors for developing diabetes
- Childhood diabetes epidemiology
- Impact of early development of diabetes
What is Child Obesity?

- AAP → Use BMI 2 years old +; categorize BMI percentile:
  - > 85th % for age and gender: Overweight
  - > 95th % for age and gender: Obese

- Severe Obesity (BMI over 120th % for age and gender)
Diagnosis – Specify Severity

Severe Obesity
BMI >120\%ile, >35

Very Severe
(Proposed Class III) Obesity
BMI over 140\%ile, >40
### Severity Matters - Diabetes Risk

<table>
<thead>
<tr>
<th>Obesity Category</th>
<th>Percent of Cohort</th>
<th>Percent with “At Risk” Range HbA1c</th>
</tr>
</thead>
<tbody>
<tr>
<td>class I (BMI ≥95th percentile to &lt;120% of the 95th percentile)</td>
<td>36.4%</td>
<td>3</td>
</tr>
<tr>
<td>class II (BMI ≥120% to &lt;140% of the 95th percentile, or BMI ≥35)</td>
<td>11.9%</td>
<td>6</td>
</tr>
<tr>
<td>class III (BMI ≥140% of the 95th percentile, or BMI ≥40)</td>
<td>4.8%</td>
<td>13</td>
</tr>
<tr>
<td>Ages 12-19</td>
<td>N = 8579</td>
<td>(Hb A1c &gt; 5.7)</td>
</tr>
</tbody>
</table>

Improving Obesity Also Matters

Change in metabolic per unit change in BMI or weight. Abbreviations: HDL, high-density lipoprotein; SBP, systolic blood pressure; TG, triglyceride
What is Causing Youth to develop DM? (1 of 4)

Relationship between Insulin Secretion and Insulin Sensitivity

- Obese, insulin resistant with compensatory hyperinsulinemia
- Disposition Index (DI) = Insulin sensitivity × 1st phase insulin
- Normal Glucose Tolerance
- Impaired Glucose Tolerance
- Prediabetes
- Type 2 Diabetes
- Lean, insulin sensitive

First Phase INSULIN SECRETION

Low Insulin Sensitivity to High Insulin Sensitivity

What is Causing Youth to Develop DM? (2 of 4)
What is Causing Youth to Develop DM? (3 of 4)

Relationship between Insulin Secretion and Insulin Sensitivity

- GENETICS / EPigenetics
- Modifiable Risk Factors
  - OBESITY
  - Diet / Physical Activity
  - Education / Poverty
  - Environmental Triggers?
  - Chronic Stress?

What is Causing Youth to Develop DM? (4 of 4)
SEARCH STUDY 2017 – Youth onset T2DM linked with remarkably high rates of early complications.

- 72% of T2D youth with one or more complication
- 32% of T1D youth with one or more complication
- Excess may relate to obesity/obesity comorbidities (72% of T2D youth were obese, vs 14% of T1D youth)

Rate of New Cases of Type 1 and Type 2 Diabetes
Among People Younger than 20 years, by Age and Race/Ethnicity, 2008–2009

Source: SEARCH for Diabetes in Youth Study. NHW=non-Hispanic whites; NHB=non-Hispanic blacks; H=Hispanics; API=Asians/Pacific Islanders; AIAN=American Indians/Alaska Natives
Trends in Obesity
Age Adjusted Prevalence of Obesity and Diagnosed Diabetes Among U.S. Adults


Childhood Obesity Trends


National Center for Health Statistics, July 2016
Childhood Obesity Rates

Prevalence of Obesity Among WIC participants aged 2-4 years, overall and by race/ethnicity – United States, 2000-2014

Morbidity and Mortality Weekly Report, November 18, 2016
Childhood Obesity (2-5 years) by Area

Percent of IHS active clinical users 2-5 years of age with BMI >95th%

- Alaska
- Albuquerque
- Bemidji
- Billings
- California
- Great Plains
- Nashville
- Navajo
- Oklahoma
- Phoenix
- Portland
- Tucson

6/26/2017

Indian Health Service GPRA Performance Results, FY2016
GPRA: Childhood Obesity (2-5yrs)

Percent of IHS active clinical users 2-5 years of age with BMI>95th%
Understanding Obesity
Determinants of Health
Determinants of Obesity

- Genetics – specific genetic syndromes
- Individual and family practices
  - Diet and eating practices
  - Physical activity
  - Coping strategies
- School and community
  - Safe places to exercise
  - School wellness policies
- Environment
  - Food and water insecurity
Why are Rates Increasing?
Child Food Insecurity: Feeding America: Map the Meal

Counties with majority AI/AN have some of the highest food-insecurity rates in the U.S.
Life Course Perspective

- Parent weight
- Maternal health during pregnancy
- Birthweight
- Parenting and feeding practices
- Epigenetics
- Adverse Childhood Experiences
Epigenetics (1 of 2)

- Refers to “chemical signatures” on top of gene – not the genetic code itself
- Influence gene expression – turns gene on or off
Epigenetics (2 of 2)

- Impacts cells in organs like the brain, heart or kidney.
- Can be modified in certain periods of development, especially early in life.
- Chemicals, nutrition, stress can modify epigenetics.
- Changes may be reversible...
Lifespan of Impact of ACEs

Source: Family Policy Council, 2012
Limited Resilience

Support

Stress

Resilience

Propensity for Illness
Resilience

Support → Resilience = Less Propensity for Illness

Stress
Managing Obesity
Obesity Guidelines 2017

- No One Size Fits All
- Tiered Approaches
- Primary Prevention → Secondary Prevention → Intervention → Primary Care → Tertiary Care
Obesity Guidelines – Screening

- Pediatric Endocrine Society Obesity Guidelines 2017

Specific Weight Loss Goals

The GOOD News:

“CVD outcomes for obese children who become nonobese adults seem to normalize.”
Frontiers of Child Obesity Care (1 of 2)

- Medication

- Bariatric Surgery


J Clin Endocrinol Metab, March 2017, 102(3):709-757
Frontiers of Child Obesity Care (2 of 2)

- MUST engage tertiary care resources for support
- How can we ensure AI/AN Youth experience best possible outcomes?


J Clin Endocrinol Metab, March 2017, 102(3):709–757
What can we do?
Building a system for success

- Early intervention programs to support parents
- Trauma-informed primary care
- Coordination with behavioral health
- Culturally-based lifestyle modification interventions in communities and schools
- Partnership with tertiary care centers for very severe obesity or obesity with co-morbidities
What can we do in clinic?

1. First, do no harm
2. Measure the BMI - Tell the family and child what the BMI is, and graph at every well child visit
3. Assess contributing factors like IDM, ACE, food and water insecurity, depression
4. Age specific approach
5. Use motivational interviewing - Assess readiness to change, goal setting
6. Identify resources for families in your practice, online, at your referral sites, in your community
7. Follow up
What can you do?

- Offer training for staff
  - Motivational interviewing
  - Trauma informed care
  - Childhood obesity management
- Provide educational material for clinics
- Develop health coach positions to provide lifestyle interventions

- Prioritize pregnancy and early childhood services
  - Family Spirit or other home visiting programs
- Explore partnerships with tertiary care institutions for the medical and surgical management of obesity
The best time to plant a tree is twenty years ago.

The second best time is right now.

-- Chinese proverb
Resources

- Motivational Interviewing
  [http://www.motivationalinterviewing.org/motivational-interviewing-training](http://www.motivationalinterviewing.org/motivational-interviewing-training)

- Trauma Informed Care – Pediatric Integrated Care Collaborative - slarson@jhsph.edu


- AAP pediatric obesity resources (5210)
Additional Resources

- Health coach training – UCSF Center for Excellence in Primary Care [http://cepc.ucsf.edu/health-coaching](http://cepc.ucsf.edu/health-coaching)
- Early Intervention Programs: