A Population Health Approach to Diabetes in the Young

Jeff Powell
Jill Moses
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...
COUNTERTHINK

FINISH YOUR DESSERT! THERE ARE CHILDREN STARVING IN CHINA!

DON'T EAT THE WHOLE CAKE! THERE ARE CHILDREN WITH DIABETES IN AMERICA.

CONCEPT: MIKE ADAMS ART: DAN BERGER

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www.NaturalNews.com
Diabetes in Youth (Focus T2D)

- Population health approach: what is it?
- Prevalence of youth T2D
- Risk factors for developing diabetes in childhood?
- Interventions for preventing diabetes
- Managing diabetes in youth
What is a population health approach?
Population health in health care aims to keep individuals healthy by learning from, protecting, and improving the health of specific populations to which they belong.
Institute for Healthcare Improvement:
http://www.ihi.org/Engage/Initiatives/TripleAim/
Population Health Approach

- Use data to understand your population
- Risk stratification
- Develop interventions targeting high risk/high cost populations
- Use data to track change

- Kids with T2D
- Kids with prediabetes
- Kids with obesity or other risk factors
- Healthy kids
What does the data tell us?
Obesity Prevalence Trends


(Accessed 4/2017)
Roughly Double US Overall
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.
North American Youth T2D Trends Context
Risk Factors for Developing Diabetes
Type 2 diabetes in adolescents: a severe phenotype posing major clinical challenges and public health burden

Russell Viner, Billy White, Deborah Christie

Presentation

97% overweight or obese

Symptomatic at presentation
Symptoms of hyperglycaemia in 67%
DKA in 6–11%
HSS in 2%

86% with acanthosis nigricans
Type 2 diabetes in adolescents: a severe phenotype posing major clinical challenges and public health burden

Russell Viner, Billy White, Deborah Christie

Characteristics
65–70% are female in all cohorts; ethnic minorities are predominantly affected, although ethnic groups vary by country

Sex

Ethnicity (TODAY cohort, USA)
- Asian (2%)
- Other (6%)
- White (20%)
- Hispanic (41%)
- Black (31%)

Ethnicity (NPDA cohort, USA)
- Mixed (8%)
- Black (9%)
- Other (5%)

Family history of type 2 diabetes in 90%

Type 2 diabetes in nuclear family (60%)
Type 2 diabetes in grandparents (30%)

Lancet 2017; 389: 2252–60
So what is causing youth to develop diabetes?
Relationship Between Insulin Secretion and Insulin Sensitivity

- Genetics / Epigenetics
- Modifiable Risk Factors
  - Obesity
  - Diet / Physical Activity
  - Education / Poverty
  - Environmental Triggers?
  - Chronic Stress?

Emerging Focus – Importance of Sleep

REVIEW
Inadequate sleep as a contributor to type 2 diabetes in children and adolescents

C Dutil and J-P Chaput

Nutrition & Diabetes (2017) 7, e266; doi:10.1038/nutd.2017.19;
published online 8 May 2017
Sleep – a proxy for other stress?

Nutrition & Diabetes (2017) 7, e266; doi:10.1038/nutd.2017.19; published online 8 May 2017
Lifespan Impacts of ACEs

Critical & Sensitive Developmental Periods

Adverse Childhood Experience
MORE CATEGORIES – GREATER IMPACT
Physical Abuse, Sexual Abuse
Emotional Abuse, Neglect
Witnessing Domestic Violence
Depression/Mental Illness in Home
Incarcerated Family Member
Substance Abuse in Home
Loss of a Parent

Genetics
Experience triggers gene expression (Epigenetics)

Brain Development
Electrical, Chemical, Cellular Mass

Chronic Disease
Psychiatric Disorders
Impaired Cognition
Work/School Attendance, Behavior, Performance
Obesity
Alcohol, Tobacco, Drugs
Risky Sex
Crime
Poverty

Adaptation
Hard-Wired Into Biology

Intergenerational Transmission, Disparity

Source: Family Policy Council, 2012
Preventing Diabetes in Kids
eat right. LET’S MOVE!
Diabetes and the Determinants of Health

- 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
The Life Course and Diabetes

- Maternal diabetes in pregnancy
- Birthweight
- Epigenetics
- Adverse Childhood Experiences
- Prediabetes and metabolic syndrome
Building a system for success

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

- First do no harm
- Assess for risk factors: family hx, BMI, acanthosis, IDM, ACE, food and water insecurity
- Screen high risk patients
- Assess for co-morbidities like HTN, depression, lipids, OSA
- Age specific approach
- Use motivational interviewing - Assess readiness to change, goal setting
- Identify resources for families in your practice, on line, at your referral sites, in your community
- Follow up for increased risk
Managing Diabetes in Kids

Challenges with Clinical Management and Effective Systems of Care
What's Puberty?

I don't know. It's probably not important.
### Youth Onset T2D – Select Challenges

<table>
<thead>
<tr>
<th>Challenge</th>
<th>Implication for Treatment</th>
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<td>Social determinants of health – high risk</td>
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<td>Majority female of reproductive age</td>
<td>Preconception counseling is a MUST</td>
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Youth Onset T2D – Select Challenges

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<td>Rapid progression to beta cell failure</td>
<td>metformin monotherapy is unlikely to succeed</td>
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<tr>
<td>Dysglycemia appears to be dominated by Beta Cell failure (vs Insulin Resistance)</td>
<td>Must move quickly to insulin (?? other??) treatments</td>
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<td>High rates of comorbidities at diagnosis</td>
<td>Focus on lifetime risk reduction</td>
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<tr>
<td>Early development of diabetes complications</td>
<td>Importance of early diagnosis and treatment</td>
</tr>
<tr>
<td>Greater lifetime risk of diabetes complications, early death</td>
<td>Hope vs hopelessness? Urgency of intervention? Amount of resources to invest?</td>
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72% have 1 or more early complication
### Youth Onset T2D – Select Challenges

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<td>Beyond Metformin &amp; Insulin?</td>
<td>Need to build capacity for subspecialty care approaches</td>
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Frontiers of Care

- Youth Obesity Guidelines
- Medication Options
- Bariatric Surgery?
### Back to the Population Health Approach

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<th>What we’ve learned from caring for adults with T2D</th>
<th>Applying in Pediatric Care</th>
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<tr>
<td>Identification of high-risk patients</td>
<td>All pediatric and young adult patients (&lt;40yrs) with T2D are high risk and need intensive care management.</td>
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<tr>
<td>Coordination of care</td>
<td>Care team may need training on diabetes standards of care and self-management support; include school-based clinics or nurse office as part of care team.</td>
</tr>
<tr>
<td>Patient engagement</td>
<td>Patient and <strong>family</strong> engagement; consider developmental stage of patient.</td>
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<tr>
<td>Measure quality of care</td>
<td>May need to adjust for age – BMI%, BP</td>
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What can we do?
What can you do?

- Offer training for staff
  - Motivational interviewing
  - Trauma informed care
  - Childhood obesity/diabetes management
- Provide educational material for clinics
- Develop health coach positions to provide lifestyle interventions
- Diabetes education for school staff
- Prioritize preconception, 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 and diabetes
- Explore telehealth opportunities
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
- Trauma Informed Care – Pediatric Integrated Care Collaborative - slarson@jhsph.edu
- Childhood and Adolescent Weight Management Certification
  https://www.cdrnet.org/weight-management-childhood-adolescent-program
- AAP pediatric obesity resources (5210)
- International Society for Pediatric and Adolescent Diabetes
  http://www.ispad.org/
- KidsHealth.org
Additional Resources

• Health coach training – UCSF Center for Excellence in Primary Care
  http://cepc.ucsf.edu/health-coaching

• Early Intervention Programs:
  • Johns Hopkins Family Spirit http://www.jhsph.edu/research/affiliated-programs/family-spirit/
  • Triple P Positive Parenting Program http://www.triplep.net/glo-en/home/

• TODAY study educational material (print and give to patients):
  https://portal.bsc.gwu.edu/web/today/tsdematerials