Changing Native American Nutrition

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The Question

How do history and diet affect the health of Indian Country today?
Metabolic Disease: Diabetes and Obesity

- 2.2 times higher risk of diabetes than the Caucasian population (American Diabetes Association)

- Linked to many other health problems (NHLBI, APA)
  - heart disease, respiratory problems, high blood pressure, depression and stress

Photo: bphnews.com, The Link Between Metabolic Syndrome and BPH.
Prevalence of Metabolic Disease

Photo: totsnsquats.com, “They are what you feed them!”
Indian Reservations and Starvation

The Dutch Famine: 1944-1945

• Studies of children born to undernourished mothers suffered higher risks of many chronic diseases (T. Roseboom, 2006)

  • Cardiovascular disease (R. Painter, 2006), metabolic disorders (S. de Rooij, 2006), and breast cancer (R. Painter, 2006).

  • Maternal malnutrition increases the child’s risk of dyslipidemia (T. J. Roseboom, 2000) and obesity (A. C. Ravelli, 1999) during the first trimester of pregnancy (R. Painter, 2006).
The Chinese Famine: 1958-1961

Stratified by later life dietary pattern

A1

B1

Prevalence of Metabolic Syndrome (\%)

Birth Cohorts

IN SEVERELY AFFECTED AREAS

IN LESS SEVERELY AFFECTED AREAS

Figure: Y. Li, 2011.
The Chinese Famine: 1958-1961

Figure: Y. Li, 2011.
Haudenosaunee Diet

Traditional Diet: Haudenosaunee

<table>
<thead>
<tr>
<th>Nutrition</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Fat (g)</td>
<td>8%</td>
</tr>
<tr>
<td>Saturated (g)</td>
<td>2%</td>
</tr>
<tr>
<td>Unsaturated (g)</td>
<td>4%</td>
</tr>
<tr>
<td>Carbohydrates (g)</td>
<td>12%</td>
</tr>
<tr>
<td>Fiber (g)</td>
<td>10%</td>
</tr>
<tr>
<td>Sugar (g)</td>
<td>2%</td>
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<tr>
<td>Protein (g)</td>
<td>16%</td>
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</table>
Traditional vs. Commodities
Starvation in Native America

Photo: en.Wikipedia.org, Native American reservation politics
Genetic modifications during starvation

• Sheep deprived of B vitamins and methionine during pregnancy (K. D. Sinclair, 2007)

  • Health implications in adult offspring: high blood pressure, higher fat levels, and insulin resistance

• Deprivation of specific nutrients could alter how our genes are expressed.
What Does This All Mean?

Are Native Americans doomed to poor health?

No!!!
Intervention during pregnancy

• Alterations to gene expression can be counteracted by appropriate nutrient supplementation (D. C. Dolinoy, 2007; G. L. Wolff, 1998).

• Specific nutrient supplementation in the maternal diet may prevent transgenerational obesity in mouse models (R. A. Waterland, 2008).

• A cohort study showed an association between high levels of vitamin B9 in maternal diets and lower risk of obesity in children (G. Wang, 2016).
Intervention during infancy

Figure: B. Sun, 2012.
Intervention childhood onward

• Critical periods of obesity and its complications (W. Dietz, 1994)
  • Gestation and early infancy
  • Between 5 and 7 y of age
  • Adolescence.

Changing Our Nutrition

Photo: twincities.com, Blending series: Minneapolis couple tackles healthy eating for all.