

How Does the Government Use Risk Assessment Tools?

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The findings and conclusions in this report have not been formally disseminated by the Centers for Disease Control and Prevention and should not be construed to represent any agency determination or policy.

Energy Imbalance

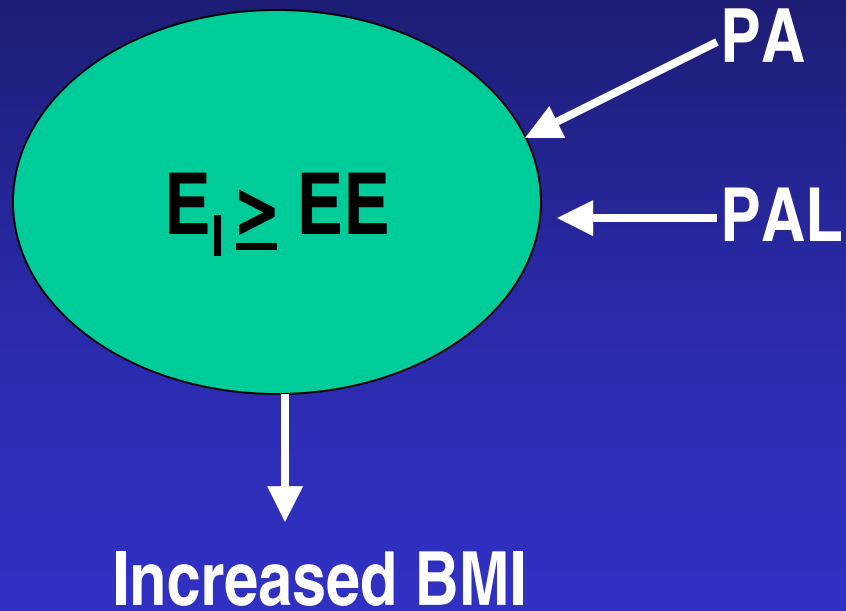
$$E_i \geq EE$$



Increased BMI

Energy Imbalance

Energy Expenditure



Differences in Observed Activity (hr/w) Between Overweight and Non-Overweight Girls

| <u>Activity</u> | <u>Non-overweight</u> | <u>Overweight</u> |
|-----------------|-----------------------|-------------------|
| Sleep | 63 \pm 6 | 61 \pm 5 |
| Sitting | 75 \pm 8* | 84 \pm 8 |
| Grooming | 10 \pm 2* | 7 \pm 2 |
| Active sports | 11 \pm 5* | 4 \pm 4 |

Johnson et al; AJCN 1956;4:37

Effects of Physical Activity on Weight Gain

Fogelholm M, Kukkonen-Harjula K. Does physical activity prevent weight gain. A systematic review. *Ob Rev* 2000;1:95

Energy Balance

$$E_i = TEE$$

$$TEE = E_{RMR} + E_{TEF} + E_A$$

$$NREE = TEE - E_{RMR}$$

$$PAL = TEE/RMR$$

Effects of Physical Activity on Change in BMI Z-score – Prospective Study

| <u>Baseline measure</u> | <u>Parent (-)</u> | <u>Parent (+)</u> |
|-------------------------|-------------------|-------------------|
| Adj TEE | p = 0.78 | p = 0.06 |
| Adj RMR | p = 0.91 | p = 0.65 |
| Adj NREE | p = 0.28 | p = .05 |
| Adj VO ₂ max | p = 0.02 | p = 0.45 |

Bandini LG et al. Am J Clin Nutr 2004;80:1262

Comparison of Energy Expenditure in Obese and Non-obese Adolescent Males

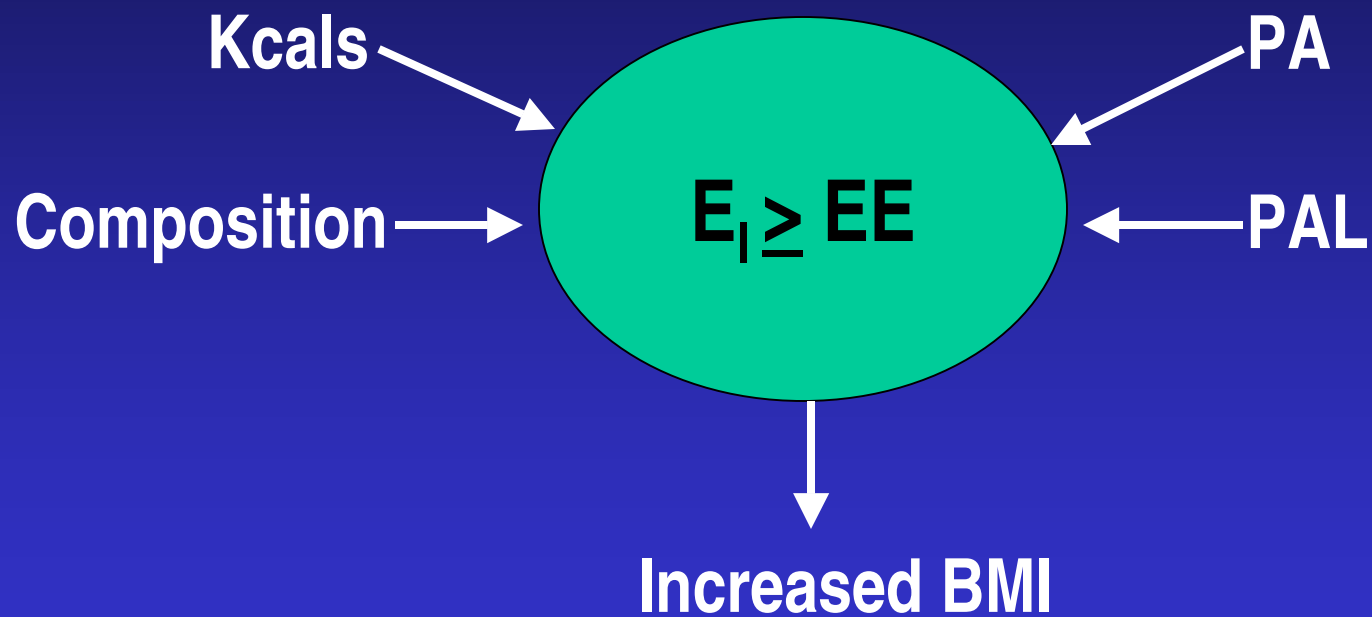
| | <u>Non-obese</u> | <u>Obese</u> |
|--------------|------------------|-----------------|
| BMR (Kcal/d) | 1742 \pm 183 | 2253 \pm 371* |
| TEE (Kcal/d) | 3109 \pm 506 | 3612 \pm 643* |
| TEE – BMR | 1374 \pm 393 | 1514 \pm 369 |
| PAL | 1.79 \pm 0.2 | 1.68 \pm 0.19 |

Bandini et al. Pediatr Res 1990;27:198-203

Energy Imbalance

Energy Intake

Energy Expenditure

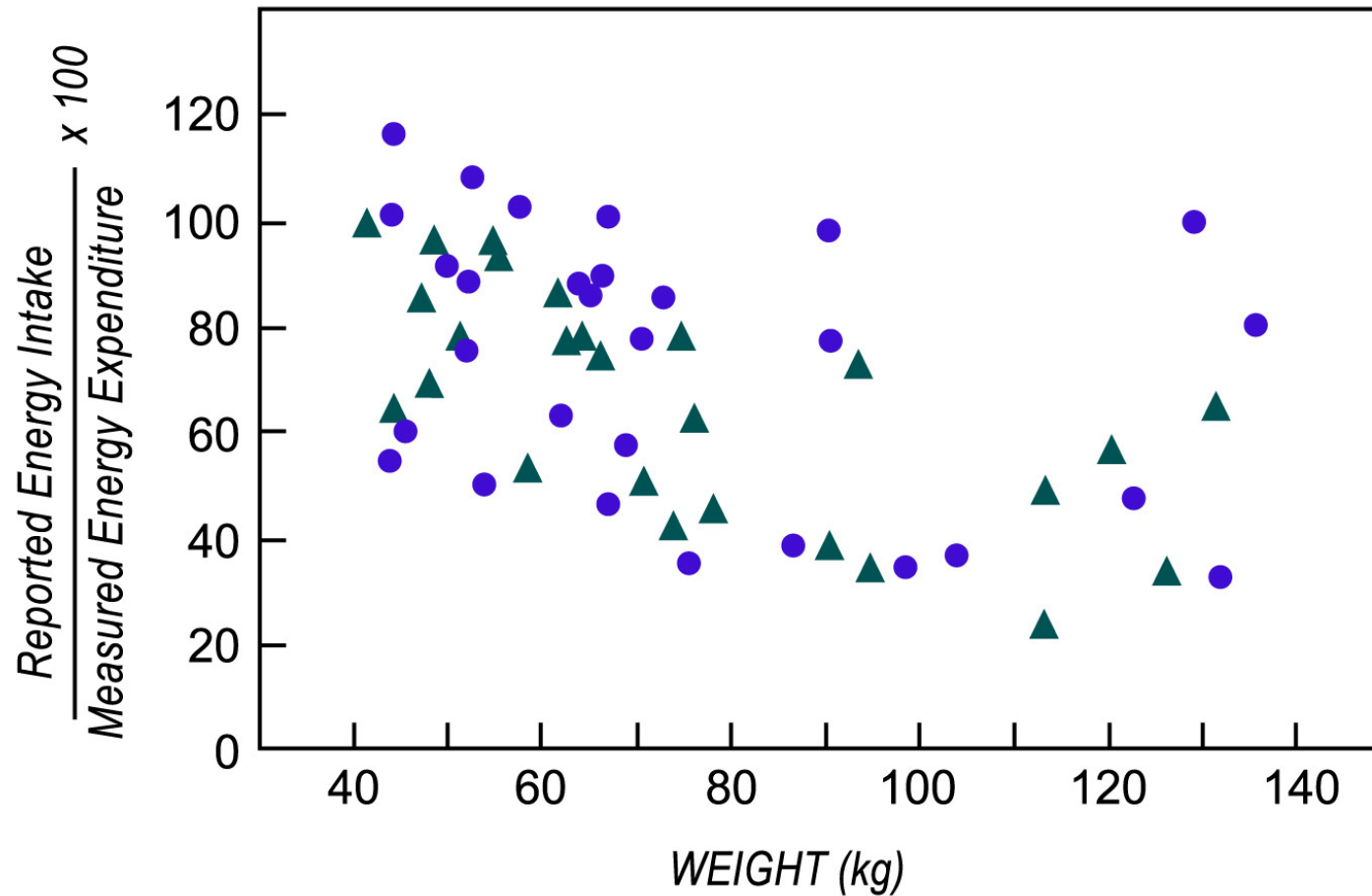


Reported Daily Metabolizable Energy Intake (ME) vs Measured Energy Expenditure (TEE) in Adolescents

| | <u>Nonobese</u> | <u>Obese</u> |
|----------------------|-----------------|----------------|
| Reported ME (Kcal/d) | 2193 \pm 618 | 1935 \pm 722 |
| Adjusted ME (Kcal/d) | 2152 \pm 596 | 1734 \pm 946 |
| TEE (Kcal/d) | 2755 \pm 600 | 3390 \pm 613 |
| Reported ME/TEE (%) | 80 \pm 19 | 59 \pm 24 |
| Adjusted ME/TEE (%) | 80 \pm 23 | 54 \pm 32 |

Bandini LG et al. Am J Clin Nutr 1990;52:421

Accuracy of Reported Caloric Intake in Adolescents



NHANES \geq 2002 Dietary Assessment

- **24-hour dietary recall (new USDA automated system)**
- **Second day recall on all persons (telephone)**
- **Food frequency (focused)**
- **General questions**
- **Supplements/medications (detailed)**
- **Food security**

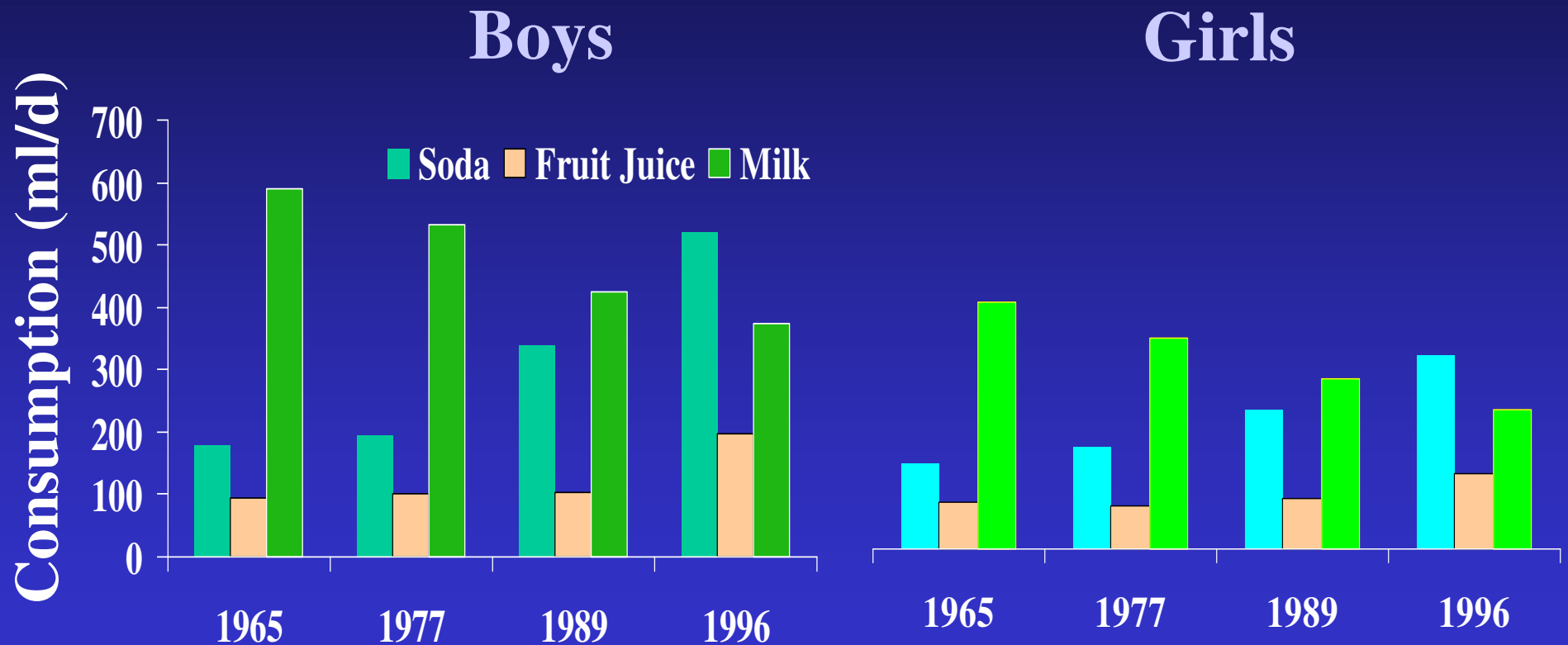
OPEN: Observing Protein and Energy Nutrition Study: Validation against Biomarkers (n=484)

Correlations FFQ vs. Multiple 24-r

| | | Men | Women |
|----------------|--------------------|-------------|--------------|
| Energy | 24-h Recall | 0.39 | 0.24 |
| | FFQ | 0.19 | 0.10 |
| Protein | 24-h Recall | 0.41 | 0.26 |
| | FFQ | 0.33 | 0.22 |

Subar et al. Am J Epid 2003;158:1-13

Trends in Beverage Consumption Among US Adolescents, USDA 1965-96



Cavadini et al. Arch Dis Child 2000

Fructose in the US Food Supply

| | $\% E_F$ | $\% \geq 10\% E_F$ | $\% F_{SSBs}$ |
|----------------|----------|--------------------|---------------|
| Males | | | |
| 6-11 yo | 5.3% | 9% | 43% |
| 12-18 yo | 6.5% | 18% | 58% |
| 19-29 yo | 6.1% | 15% | 55% |
| Females | | | |
| 6-11 yo | 5.5% | 12% | 40% |
| 12-18 yo | 6.7% | 21% | 54% |
| 19-29 yo | 6.1% | 18% | 47% |

Other Dietary Variables Potentially Related to Obesity

Energy density

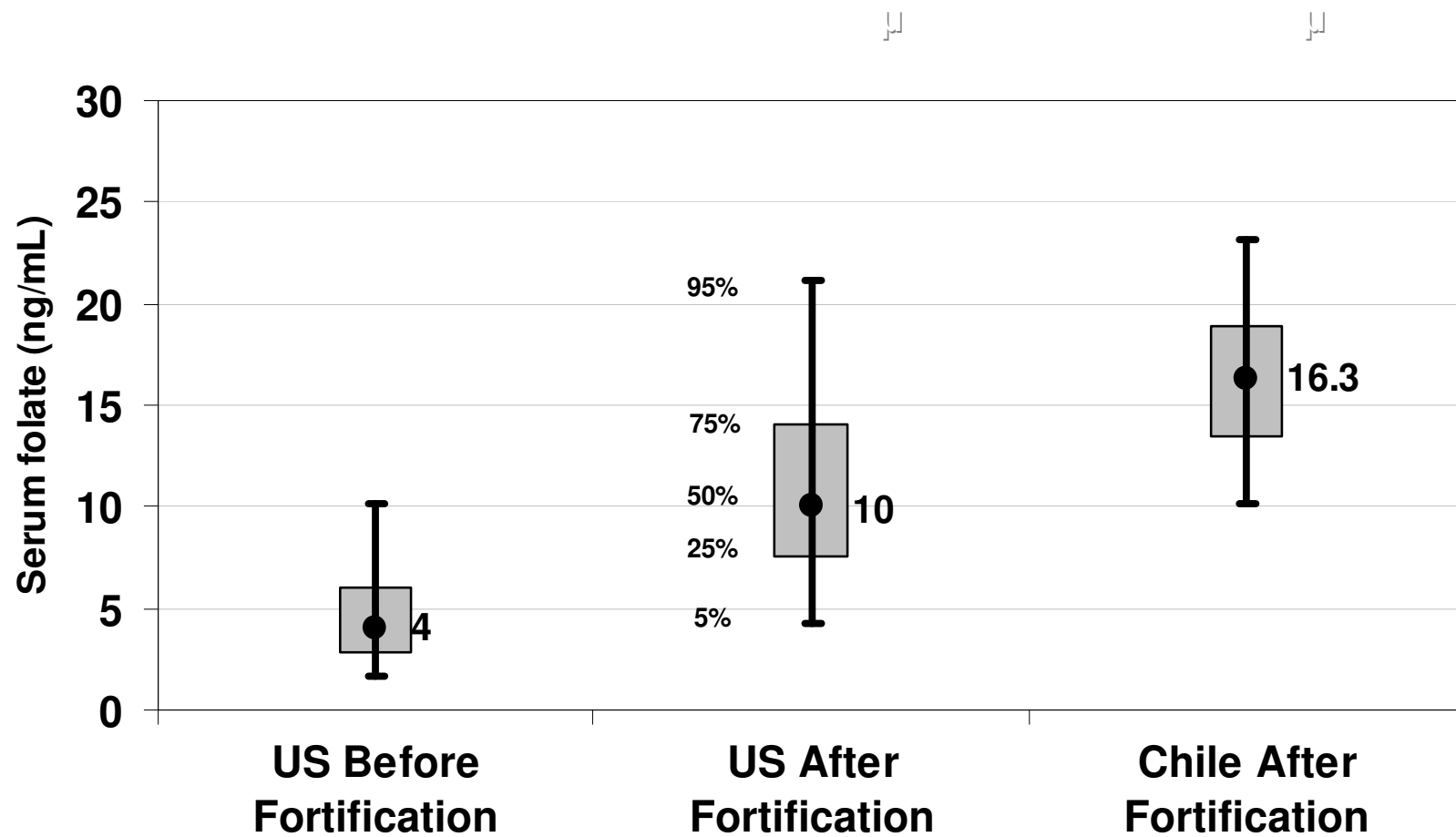
Portion size

Meal patterns

Binge eating

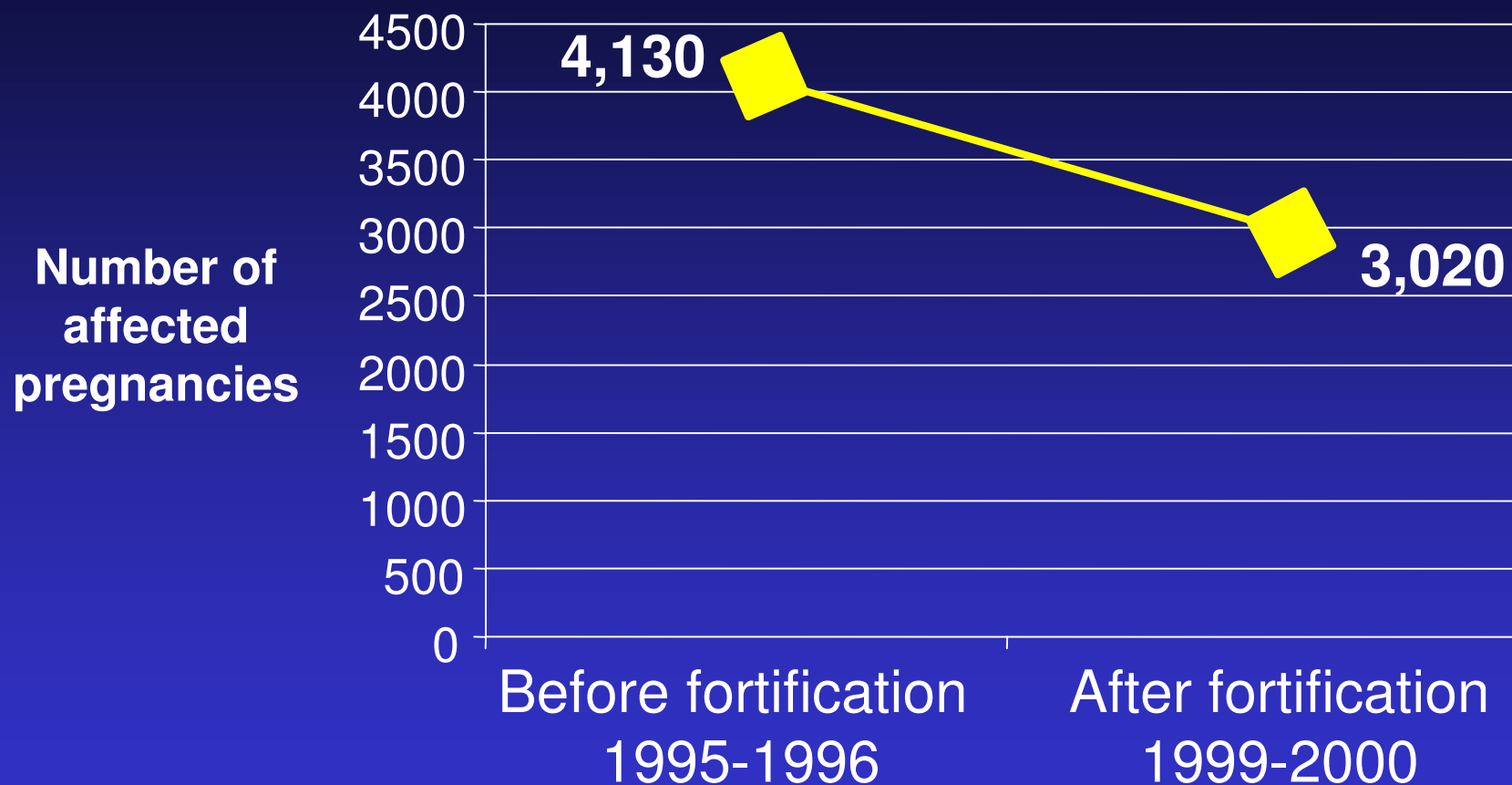
Night eating syndrome

Serum Folate among Non-pregnant Women of Reproductive Age before and after Fortification in the United States and after Fortification in Chile



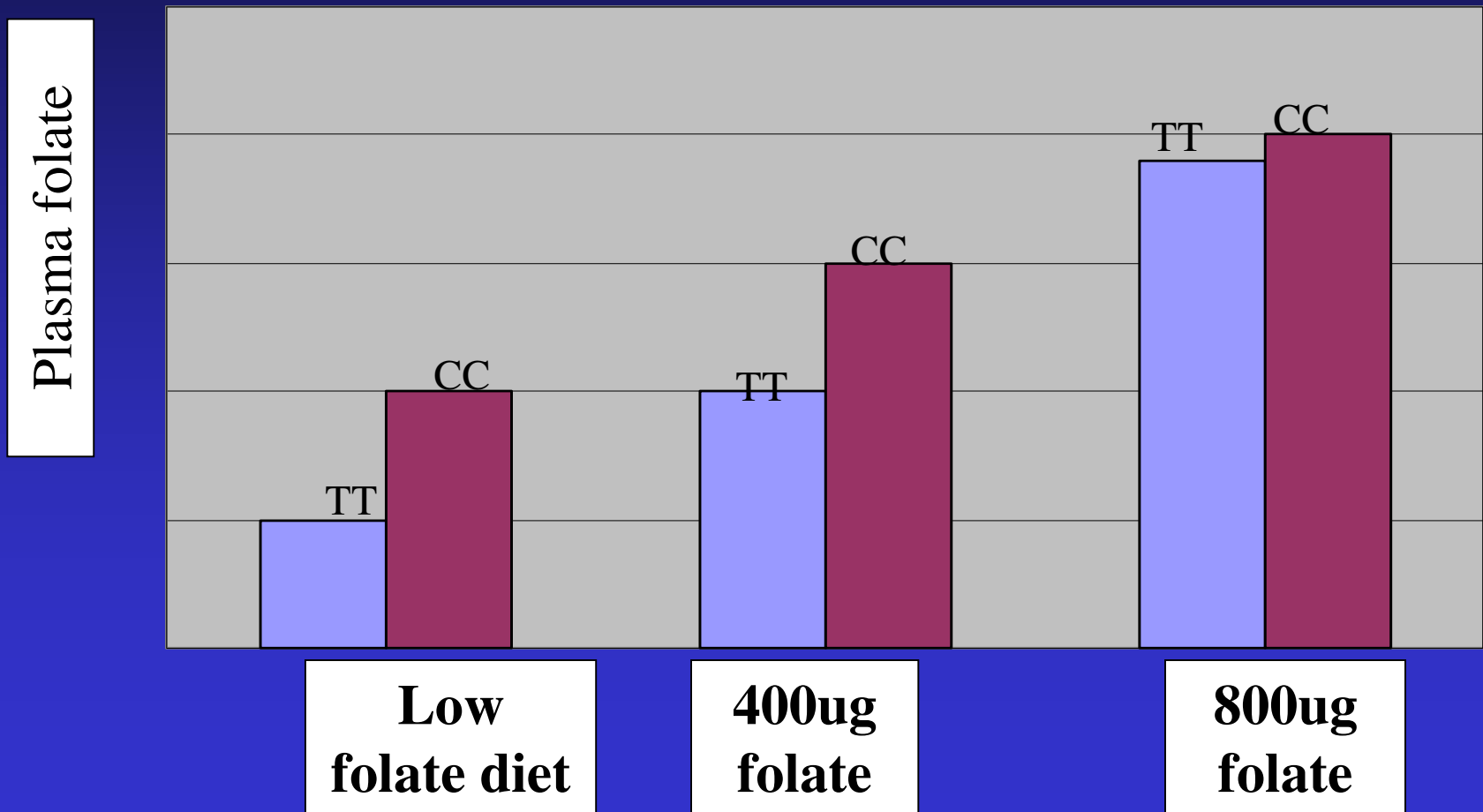
Number of NTD-affected Pregnancies

Before and after fortification, 1995-1996, 1999-2000



Source: National Birth Defects Prevention Network

Theoretical Influence of Increases in Folate Intake in TT and CC Genotypes for the MTHFR 677C->T Polymorphism



Potential Adverse Effects of Increased Folic Acid Intake

Interactions with other B Vitamins

Increase in cognitive decline with aging

Twinning

Cancer

Epigenetic effects

Seizure thresholds