**N–E–A–T**
Non-exercise Activity Thermogenesis

150 YEARS

\[ \text{NEAT} = 2000\text{kcal/day} \]

\[ \text{NEAT} = 700\text{kcal/day} \]

**Medical Costs, Risk and BMI**

- $7000/person/year

Risk Level:
- 0 risks
- +1 risk
- +2 risks
- +3 risks
- +4 risks

BMI:
- <25
- 25-29.9
- +30

Obesity is global
Effects every body organ
the mind, the spirit
Effects all aspects of society
high social cost

Obesity is the result of positive energy balance:
Energy intake IN EXCESS of expenditure

Medical progress

Obesity in China: Causes and solutions
James A. Levine

NEAT: Non-Exercise Activity Thermogenesis

Data: NHANES
NEAT: Non-Exercise Activity Thermogenesis

![Bar chart showing daily EE vs age]

- **Kcal/day**
  - Exercise
  - Non-exercise Activity
  - Thermogenesis (NEAT)

- **Basal metabolic rate**
- **Thermic effect of food**
- **Activity thermogenesis**

**Graphs:***
- NEAT: Non-Exercise Activity Thermogenesis
- Basal metabolic rate vs TEF (MJ)
- Scatter plot of TEF vs age (y)

**References:**
**NEAT variability: effect of work**

<table>
<thead>
<tr>
<th>Occupation-type</th>
<th>NEAT (kcal/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chair-bound</td>
<td>300</td>
</tr>
<tr>
<td>Seated work: no option of moving</td>
<td>700</td>
</tr>
<tr>
<td>Seated work: discretion &amp; requirement to move</td>
<td>1000</td>
</tr>
<tr>
<td>Standing work; e.g. homemaker, shop assistant</td>
<td>1400</td>
</tr>
<tr>
<td>Strenuous work; e.g. agriculture</td>
<td>2300</td>
</tr>
</tbody>
</table>

Data assuming BMR = 1600 kcal/day

Black, Eur J Clin Nutr 56:72

**NEAT variability: effect of play**

- **Kcal/hour**
  - Sitting: 5
  - Standing: 15
  - Gum Chewing: 20
  - Stair Climbing: 1 mph, 2 mph, 3 mph
  - Walking: 200, 150, 220

**NEAT: Non-Exercise Activity Thermogenesis**

The great variability in daily energy expenditure – is largely explained by NEAT

Because of variable work and leisure
**NEAT: Non-Exercise Activity Thermogenesis**

Overfeeding:
- low NEAT response = fat gain
- high NEAT response = stay thin
Orexin increases NEAT more in lean rats than obese rats.

Kiwaki AJP 2004, Novak AJP 2006

NEAT: Non-Exercise Activity Thermogenesis

NEAT driven in the brain

Body postures
Movements e.g. walking

Levine. Diabetes 57:548

Novak Obesity 2009
NEAT: Non-Exercise Activity Thermogenesis

NEAT low in obesity
NEAT high in the thin

Walk and burn: 100-150 kcal/hour

Lots of little walks count
NEAT is Non-Exercise Activity Thermogenesis.

NEAT can be accurately and precisely measured - in the laboratory and in free-living people.
Strategic partnerships……

150 kcal/hr

WHO Class 1 obesity

Levine 2007 Br J Sp Med

AN EXTRA 150 KCAL/HR
– without breaking a sweat

Radio host gets in spin and rides at work

Richard Rybalt

NO CHAIRS MAKE FOR SHORT MEETINGS

Subject
WHO Class 1 obesity

Levine 2007 Br J Sp Med
NEAT-ECG
Expert consult group

NEAT
Platinum programs:
Productivity
Health
Health cost containment

NEAT
Company wide programs:
Health care delivery & evaluations

NEAT-personalized support

55 U.S. corporations

Average weight loss:
10# / Month sustained.
Glucose, Lipids, BP
**Deployment planning platforms**

- Management, law +
- ROI (economics) +
- Health care systems +
- Quality of life
- Technology +
- Record systems +
- Mobile platform +
- E-presence

**Place of existence medicine (POEM)**

1. **Module #1**
   - 'My Health Concierge'
   - Secure web-based portal

2. **Module #2**
   - Weight, nutrition, activity: 'My Body'
   - Wearable micro-electronic device

3. **Module #3**
   - Pre-diabetes
4. **Module #4**
   - Diabetes
5. **Module #5**
   - Immunology

6. **Module #6**
   - Smoking
7. **Module #7**
   - Hyperlipidemia
8. **Module #8**
   - Hypertension
9. **Module #9**
   - Bone health

Wearable micro-electronic device linked to 'My Health Concierge'  
Scalable on-site provider  
Virtual Clinic eConsult  
On-site physician clinic

**School of the future?**
The device:

- N=7,433 Walk 'n play
  - 4 months: 7,543 users
  - 6 months: 28,000 users

The app:

- Levine BMJ 295: 369
  - 3 months: 3,500 users

- NEAT-o-Games
  - 3 months: 3,500 users

- FITTER.ME
  - 3 months: 3,500 users
The suit:
N–E–A–T
Non-exercise Activity
Thermogenesis

Move a little lose a lot
Week 1  Planting the seeds of change
Week 2  Dream it - do it
Week 3  Create and explore
Week 4  Mind your body
Week 5  Self-discovery
Week 6  Commitment
Week 7  Your world