“Attacking the Driver of Increased Stroke, Heart Disease, and Diabetes”

Invited Talk
Right Care Rotating University of Best Practices
UCSD
November 5, 2012

Dr. Larry Smarr
Director, California Institute for Telecommunications and Information Technology
Harry E. Gruber Professor,
Dept. of Computer Science and Engineering
Jacobs School of Engineering, UCSD
http://lsmarr.calit2.net
During the Last 15 Years, the Fraction of the Population That is Obese Has Greatly Increased

Source: Behavioral Risk Factor Surveillance System, CDC

(Obese is BMI ≥30, or ~ 30 lbs. overweight for 5’ 4” person)
Obesity-related conditions include heart disease, stroke, type 2 diabetes and certain types of cancer, some of the leading causes of preventable death.

--CDC

www.cdc.gov/obesity/data/adult.html
I Arrived in La Jolla in 2000 After 20 Years in the Midwest and Decided to Move Against the Obesity Trend

I Reversed My Body’s Decline By Altering Nutrition and Exercise
The Body’s Glucose-Insulin Cycle Is at the Heart of Why We Get Fat

“Carbohydrate is driving insulin is driving fat,” the late George Cahill, formerly at Harvard Medical School.

“Gary Taubes is a brave and bold science journalist who does not accept conventional wisdom.” —THE NEW YORK TIMES

GOOD CALORIES, BAD CALORIES
FATS, CARBS, AND THE CONTROVERSIAL SCIENCE OF DIET AND HEALTH
GARY TAUBES

WHY WE GET FAT
AND WHAT TO DO ABOUT IT
GARY TAUBES
AUTHOR OF GOOD CALORIES, BAD CALORIES

“Taubes stands the received wisdom about diet and exercise on its head.”
Is Government and Medical Advice Driving the Obesity Epidemic?

Avoid High Glycemic Carbs Which Spike Your Glucose-Insulin Cycle
Reversing the Consumption of High Glycemic Sweeteners is Key to Reducing Public Health Risks

Obesity and high fructose corn syrup

The number of Americans who are obese has quadrupled in recent years, a study shows. At the same time, high fructose corn syrup consumption has risen at parallel rates.

Pounds consumed: The graph traces average number of pounds of high fructose corn syrup consumed by Americans each year.

Obesity: Bars track the increased percentage of obese Americans age 20 years and older, for available years studied.

Source: Centers for Disease Control, American Obesity Association, Chronicle research
I modified my diet to reduce calories, sugar, and sodium, while increasing fiber.
But What About Fat?
Inflammation Is Driven By Omega-6 Fats

2004
Goal: Improve My Omega-3 Scores To Protect Against Future Heart Disease

If your Omega-3 Score is at least 7.2 and your DHA Score is at least 4.5, you are 32% less likely to develop heart disease.

If your EPA+DHA Score is at least 4.6, you are 70% less likely of dying from a heart attack.

I Lowered My Body’s Inflammation From Food
By Increasing Omega-3s and Reducing Omega-6s

“Silent Inflammation”

Chronically Ill American

Average “Healthy” American

Blood Ratio of Omega 6 to Omega 3

I take 6 Fish Oil Pills Per Day

Ideal Range

My Range

Range Source: Barry Sears
My Tests by www.yourfuturehealth.com
Lower Triglycerides by Increasing Omega-3 Intake and by Reducing Foods High in Refined Carbs

• TG
  – High Risk 200-500
  – Best <150

• TG/HDL
  – Ratio >4 Are Pre-Diabetic or Have Type 2 Diabetes
  – Average American Has a Ratio of ~3.3
  – My Ratio 0.6 Is Half What is Was in 2001

“The Ratio of Triglycerides to HDL Cholesterol (TG/HDL-C) is the Single Most Powerful Lipid Predictor of Extensive Coronary Disease.”
[Clinics 63, 427-432 (2008)]
Statins Do Change Your Cholesterol Levels By Lowering LDL, Thus Lowering Total Cholesterol

I am Currently on 5mg Crestor Daily
New Meta-Analysis Shows Why Low-Carb Diets Lower Heart Disease Risk

Effects of Low-Carbohydrate Diets Versus Low-Fat Diets on Metabolic Risk Factors: A Meta-Analysis of Randomized Controlled Clinical Trials

Tian Hu, et al., Tulane University School of Public Health and Tropical Medicine

“Compared with participants on low-fat diets, persons on low-carbohydrate diets experienced a slightly but statistically significantly lower reduction in total cholesterol, and LDL, but a greater increase in HDL and a greater decrease in triglycerides.”

TG Down, HDL Up → TG/HDL Much Lower
“Weight training was associated with a significantly lower risk of Type 2 Diabetes, independent of aerobic exercise. Combined weight training and aerobic exercise conferred a greater benefit.”
The Biofeedback of Monitoring Enables Me To Increase My Daily Caloric Burn

25 Week Average:
2473 Calories Burned/Day
1:19 hr Physical Activity/Day (>3 METs)
6887 Steps/Day (~3.4 Miles)

Now Using Fitbit
Average 8000 Steps/Day
FitBit Compares Your Steps to Population of Your Age and Sex

This week you walked **8028 steps**
15% more than the median for men 55 to 64 yrs who are normal or underweight

You are in the **60 percentile**
of all men 55 to 64 yrs who are normal or underweight
Goal: Use Strength Training to Raise My Rest Metabolic Rate

Source: Terry Martin, LS Trainer
## LS Resting Heart Rate

<table>
<thead>
<tr>
<th>Year</th>
<th>Resting Heart Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>60</td>
</tr>
<tr>
<td>2005</td>
<td>50</td>
</tr>
<tr>
<td>2010</td>
<td>45</td>
</tr>
<tr>
<td>2012</td>
<td>40</td>
</tr>
<tr>
<td>Year</td>
<td>Blood Pressure Drug</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------------</td>
</tr>
<tr>
<td>2010</td>
<td>Benecar 20mg</td>
</tr>
<tr>
<td>2012</td>
<td>Losartan 100mg</td>
</tr>
<tr>
<td>2012</td>
<td>Lotrel 5/10mg combo</td>
</tr>
</tbody>
</table>
Blood Pressure Home Monitoring Problem: Wide Scatter in Results Over Time

Blood Pressure Systolic

Blood Pressure Diastolic

LS Feb-March 2010
40mg Benicar Daily
Quantifying My Sleep Pattern Using a Zeo - Increased My Average to 8 Hours/Night

REM is Normally 20% of Sleep
Mine is Between 45-65% of Sleep

An Infant Typically Has 50% REM

Stroke risk increased by sleeping less than six hours a night -M. Ruiter, Sleep 2012
Challenge-Develop Standards to Enable MashUps of Personal Sensor Data Across Private Clouds

- Lose It—Calories Ingested
- Withing/iPhone—Blood Pressure
- Body Media—Calories Burned
- EM Wave PC—Stress
- Azumio—Heart Rate
- Zeo—Sleep

UCSD
UCIrvine
Quantifying your body: A how-to guide from a systems biology perspective

Larry Smarr

University of California, San Diego, CA, USA

Download Pdfs from my Portal:
http://lsmarr.calit2.net/repository/Biotech_J._LS_published_article.pdf
http://lsmarr.calit2.net/repository/Biotech_J._Supporting_Info_published.pdf
Work Group Questions

Attacking the driver of increased stroke, heart disease and diabetes:

What tools did you take away from Dr. Smarr’s presentation?

Does your medical group/practice have the discussion tools in place to activate or energize your patients to change their behaviors.

A. If so, what are they?

B. If not, what would or could they be?

C. What are the barriers?