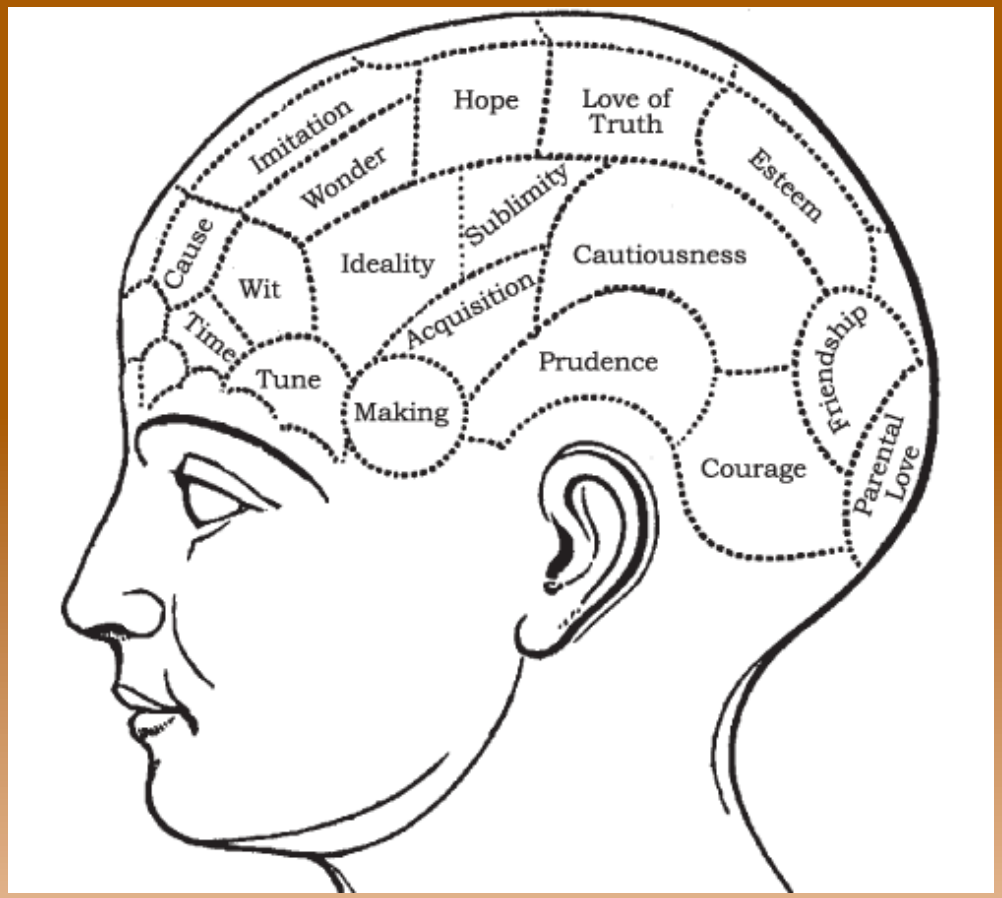
Can we predict Our Future from Phenotypic Observations ?

Cedric Notredame
CRG, Barcelona

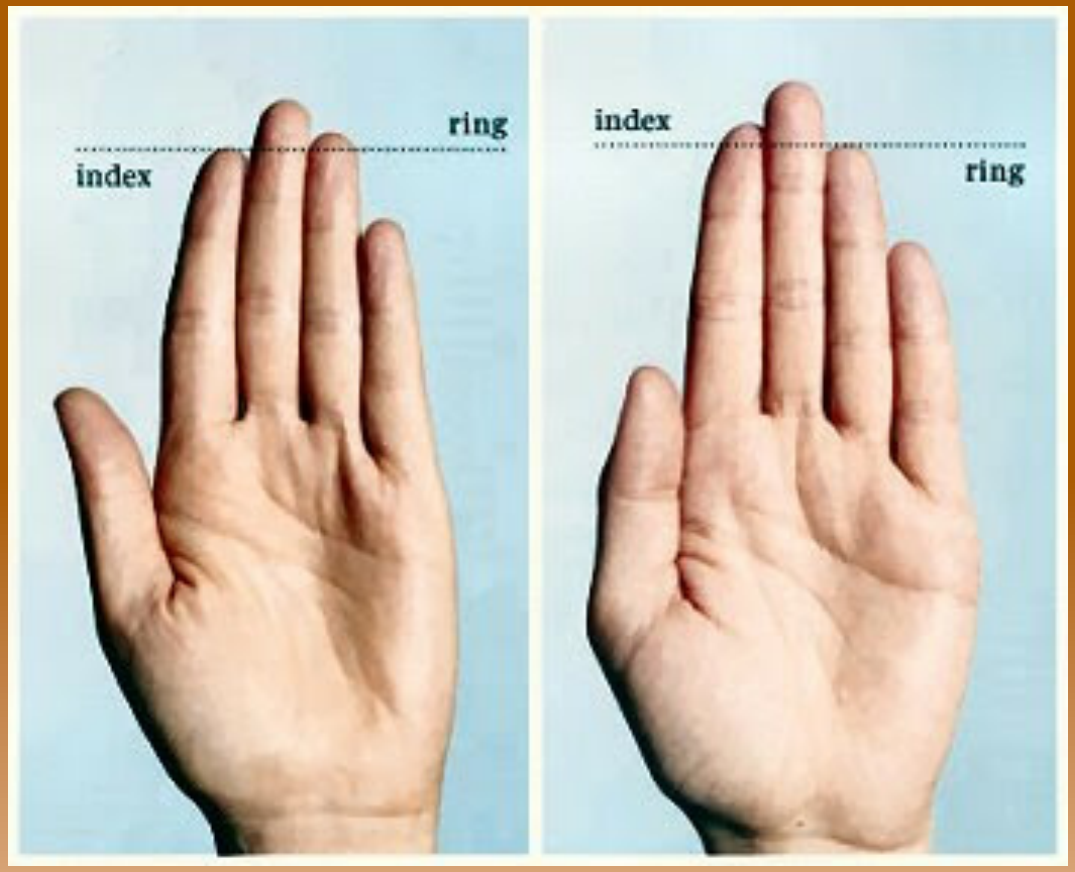
It started in the XIX Century with Phrenology



Did not work that great! But...

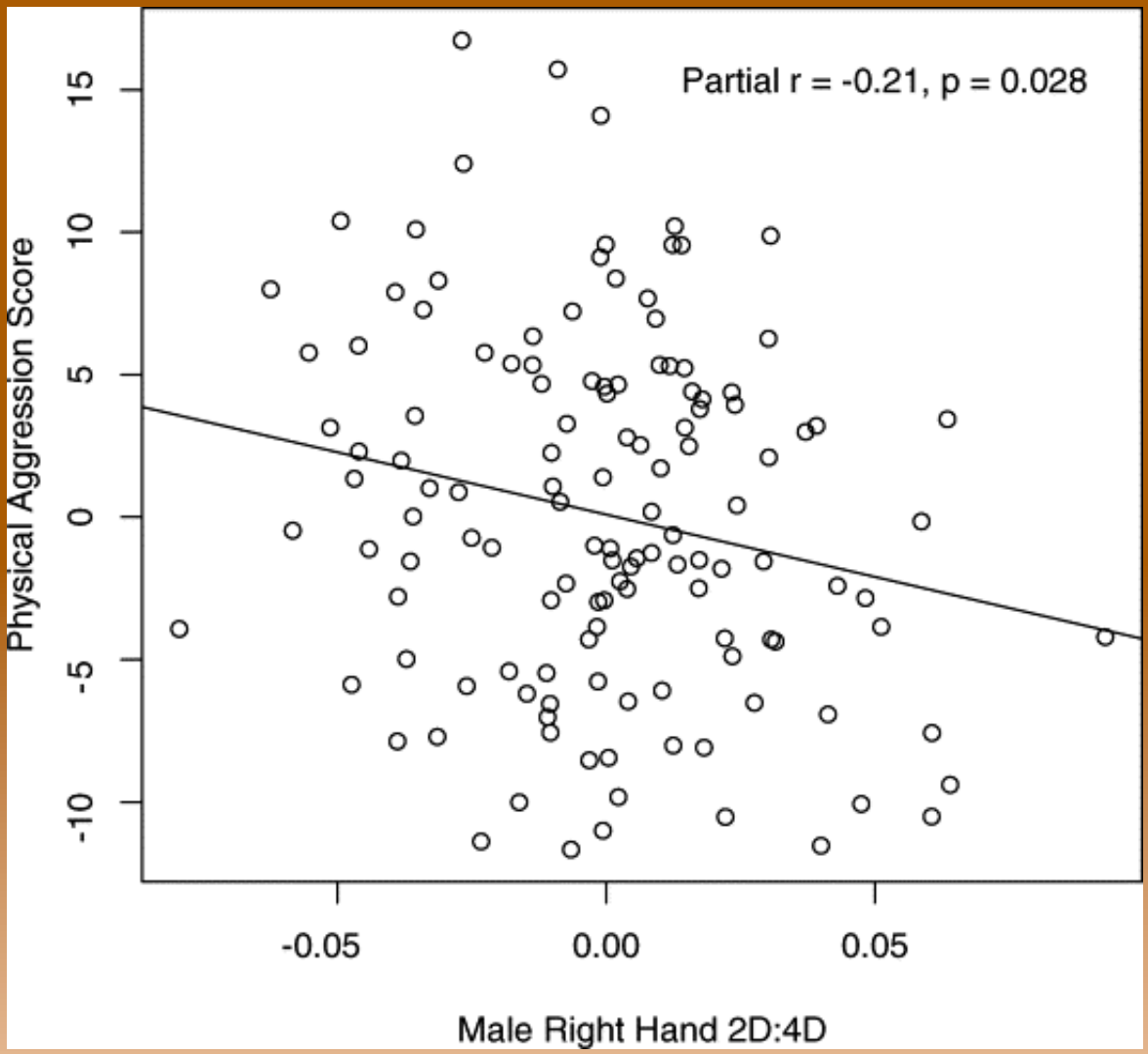
Science has not given up on the idea that simple measurements can predict a bit of your future

Latest avatar



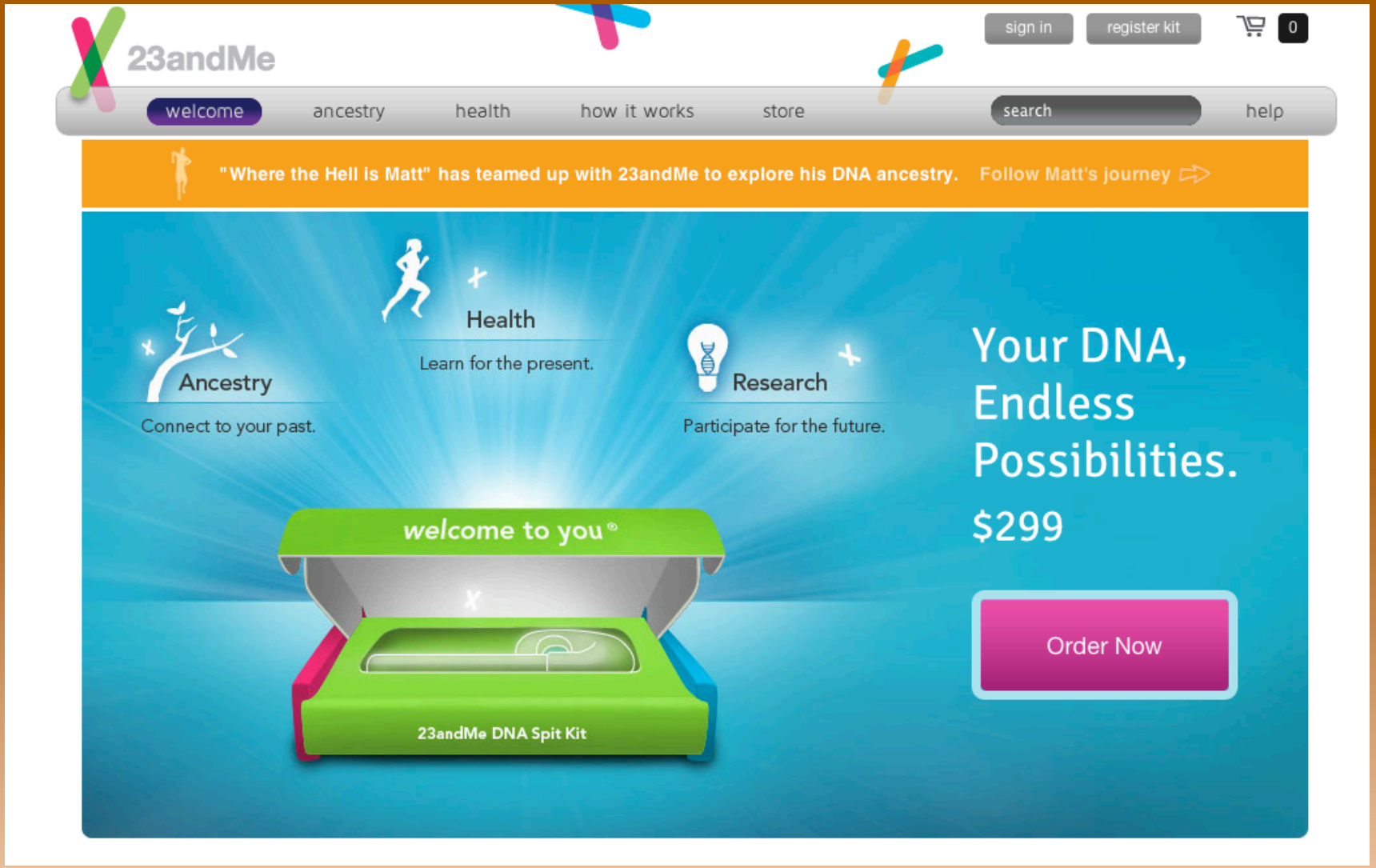
2D:4D Ratio can measure various Risks

Or Can it?



Alison and Hurd, Biol. Psych. 2005

Genetic Variation is one of the most sophisticated Traits we can now measure in Human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register kit
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welcome
ancestry
health
how it works
store
search
help
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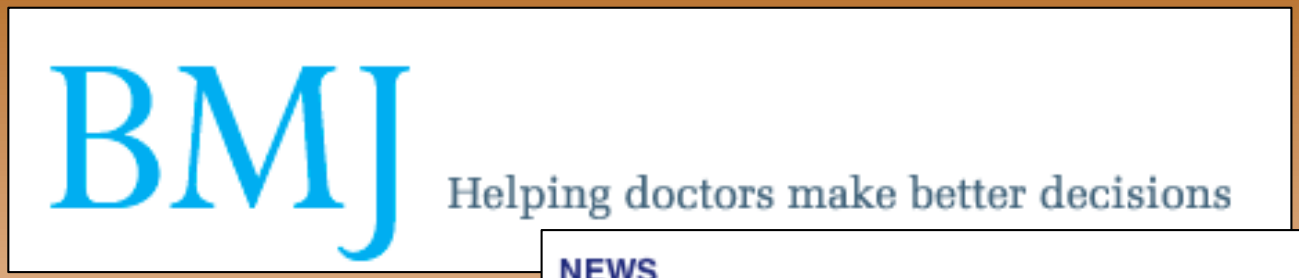
So far it Does Not Work Either...



NEWS

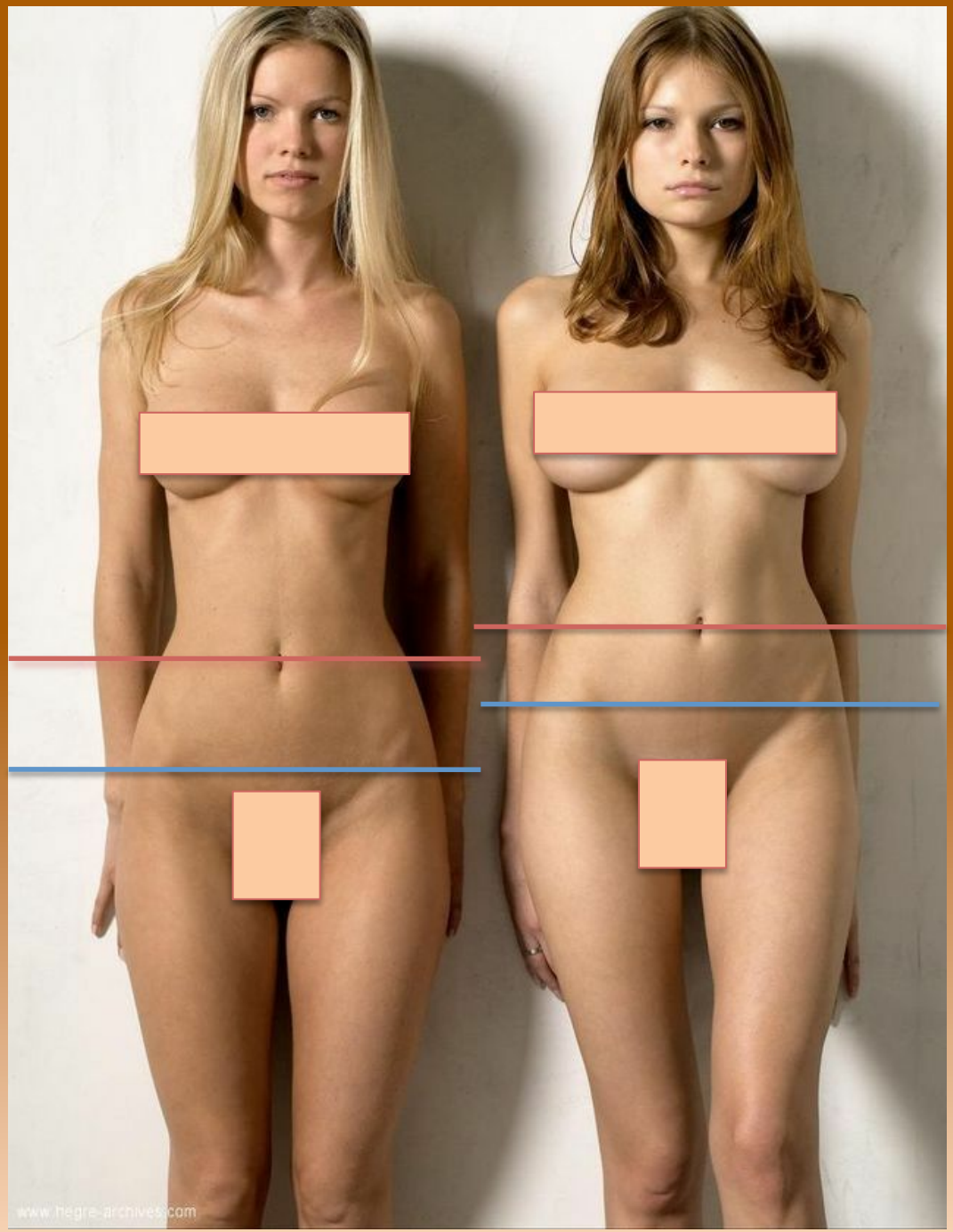
Whole genome sequencing fails to predict risk of most common diseases

BMJ 2012; 344 doi: 10.1136/bmj.e2535 (Published 3 April 2012)
Cite this as: *BMJ* 2012;344:e2535

Height of your relatives
You +/- 5 cm

Height from your genome
You +/- 30 cm…

Then again Height is only one number…


www.negre-archives.com

One Single Number is Not enough to Describe Such a variety

Height of Everybody:
10 Gigs ⇔1 USB key ⇔8 g

Height of Everybody:
10 Gigs ⇔1 USB key ⇔8 g

26 Height Genes of Everybody

10.000 USB Keys ⇔80 kg

We need More Informative Ways to Measure Phenotypes !

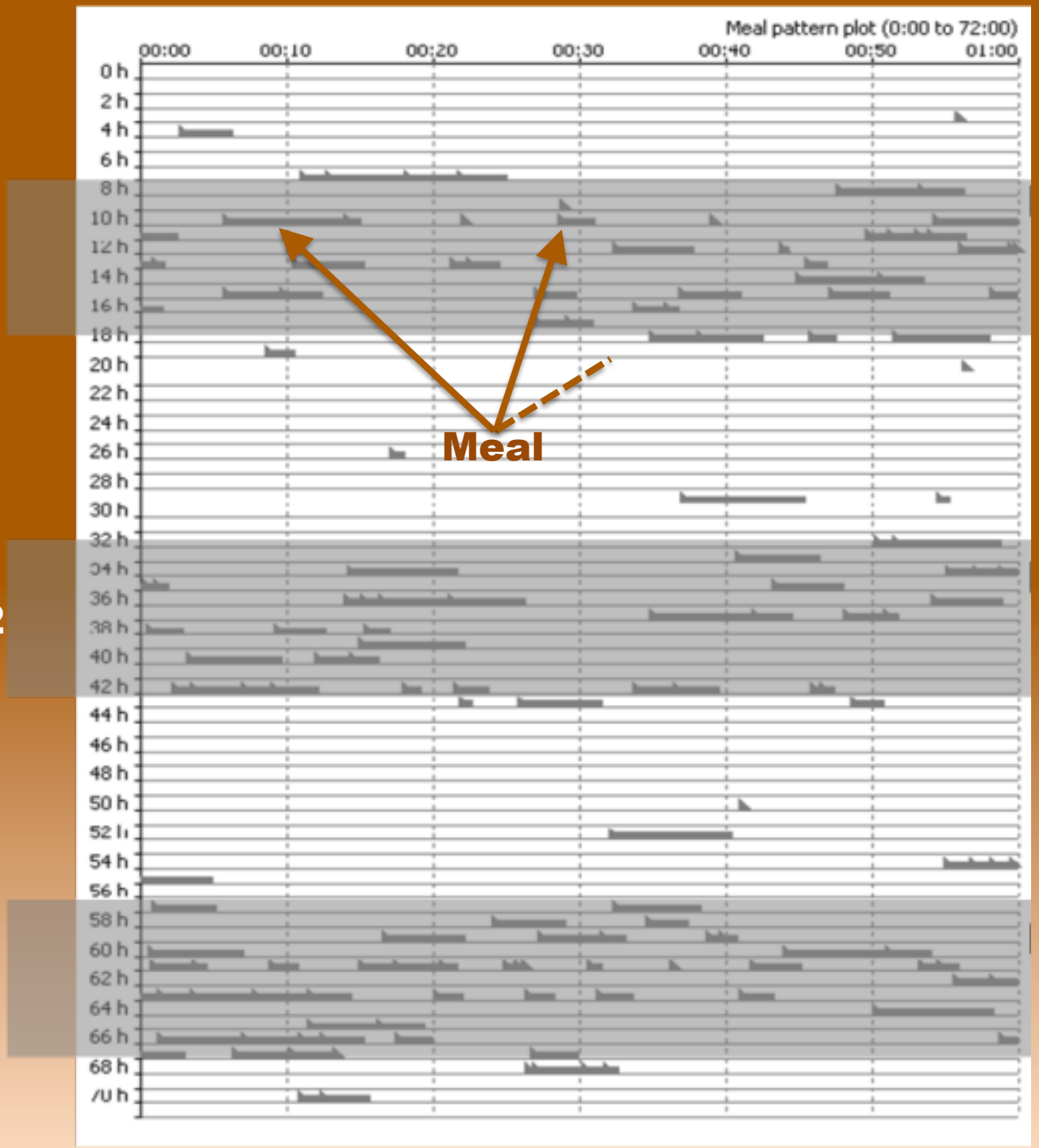
Longitudinal Recordings

How Will We Use it?

Modeling !

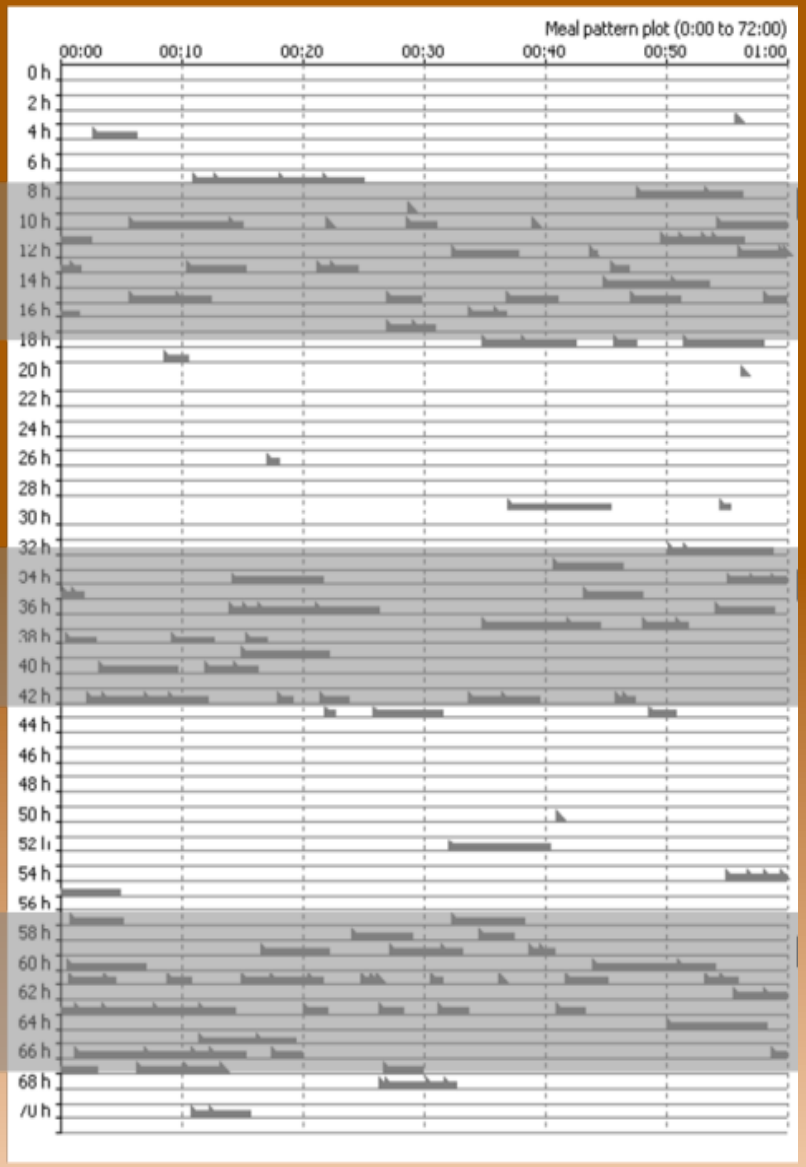

MULTITAKE CAGE LE 001 PH
A
B
C
D
MENU
Panlab

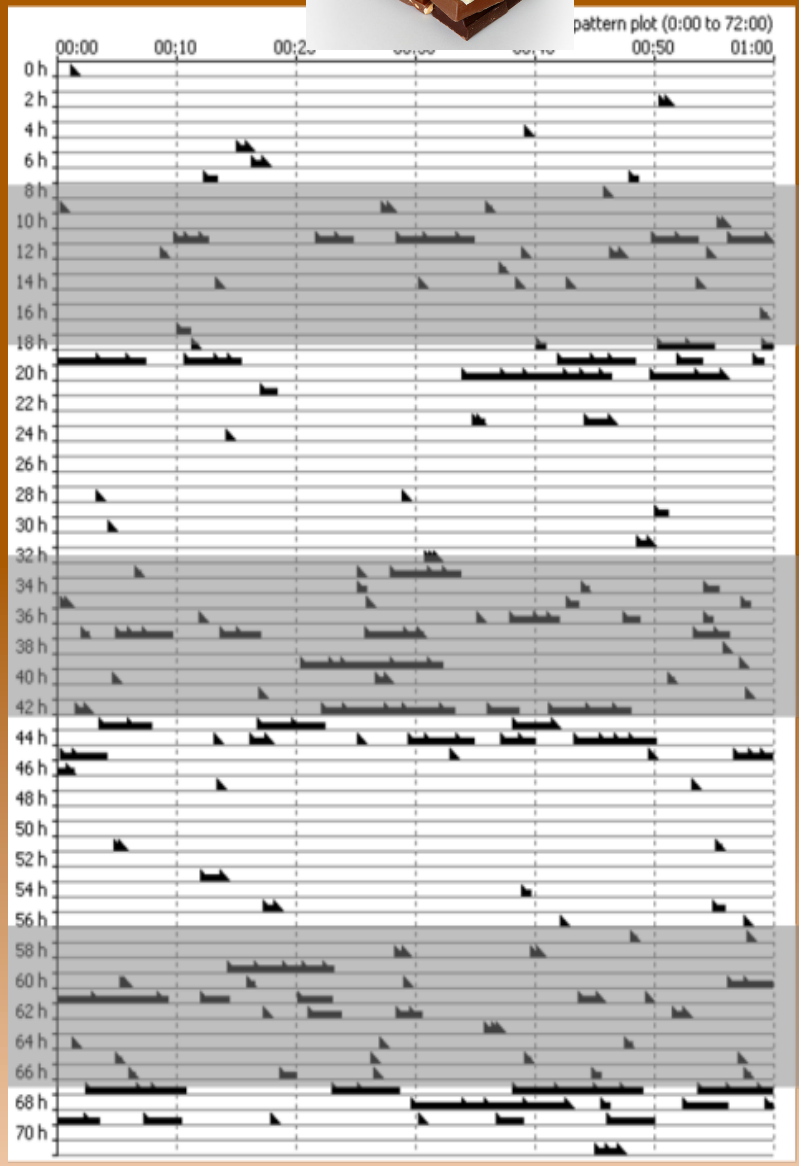
Data Mara Dierssen
CRG, Barcelona



Night 1

Night 2





Data Mara Dierssen, CRG, Barcelona

If we can Quantify How Fast Addiction is Happening

Maybe we can Prevent It!

Abnormal Meals

Normal Meals

Two mice in one

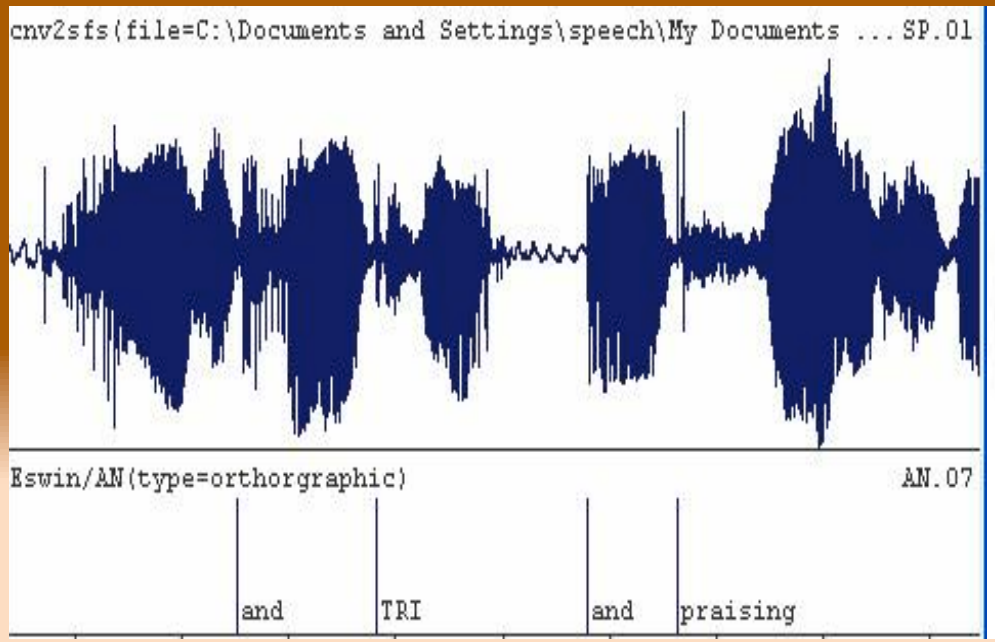
a Normal and a Compulsive

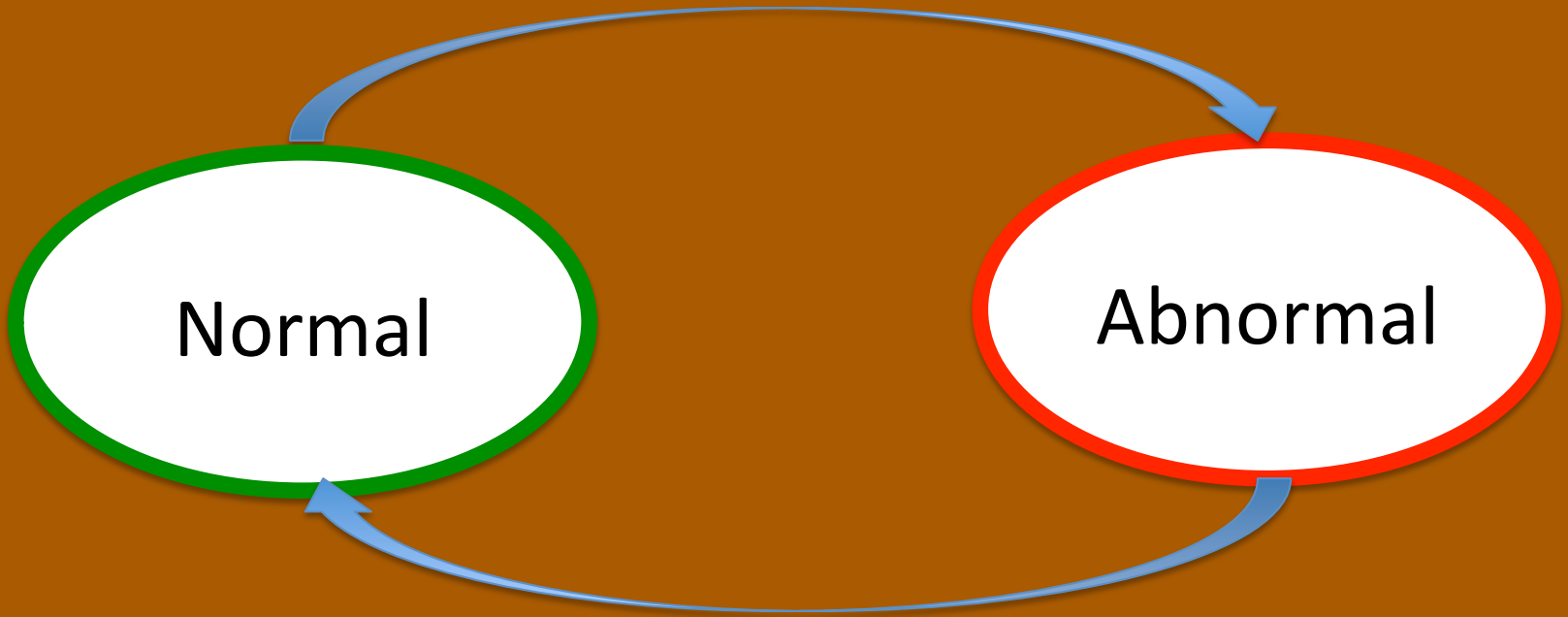
Who is Who is Hidden From us

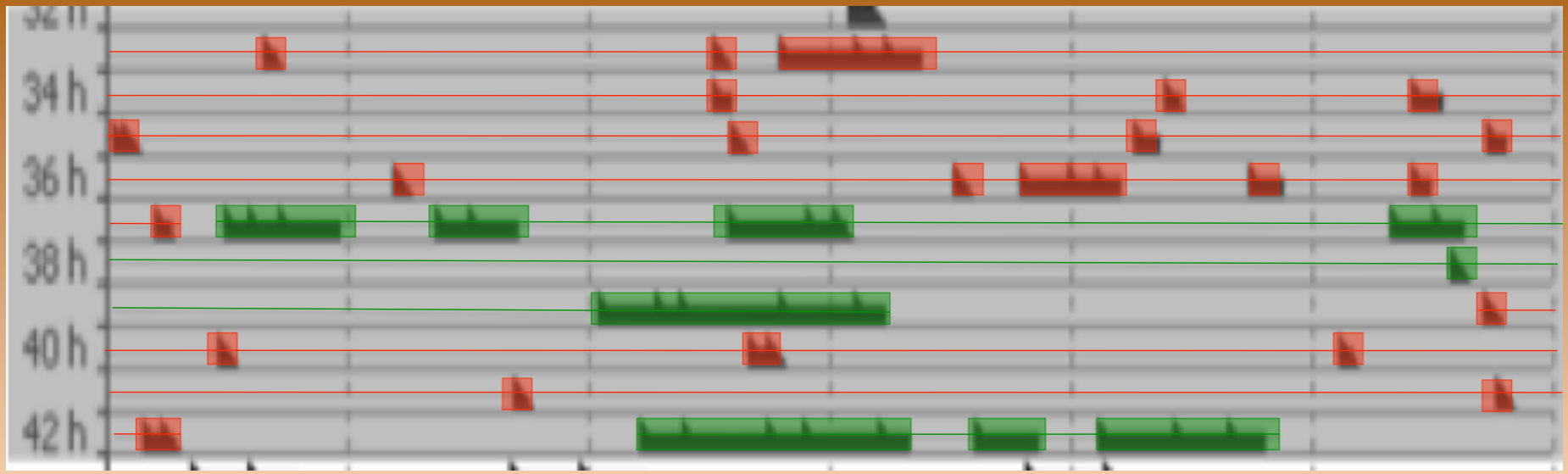
We Will Use Hidden Markov Models

Data
Sound

Hidden Models
Words




Normal
Abnormal


34 h
36 h
38 h
40 h
42 h

And Then?

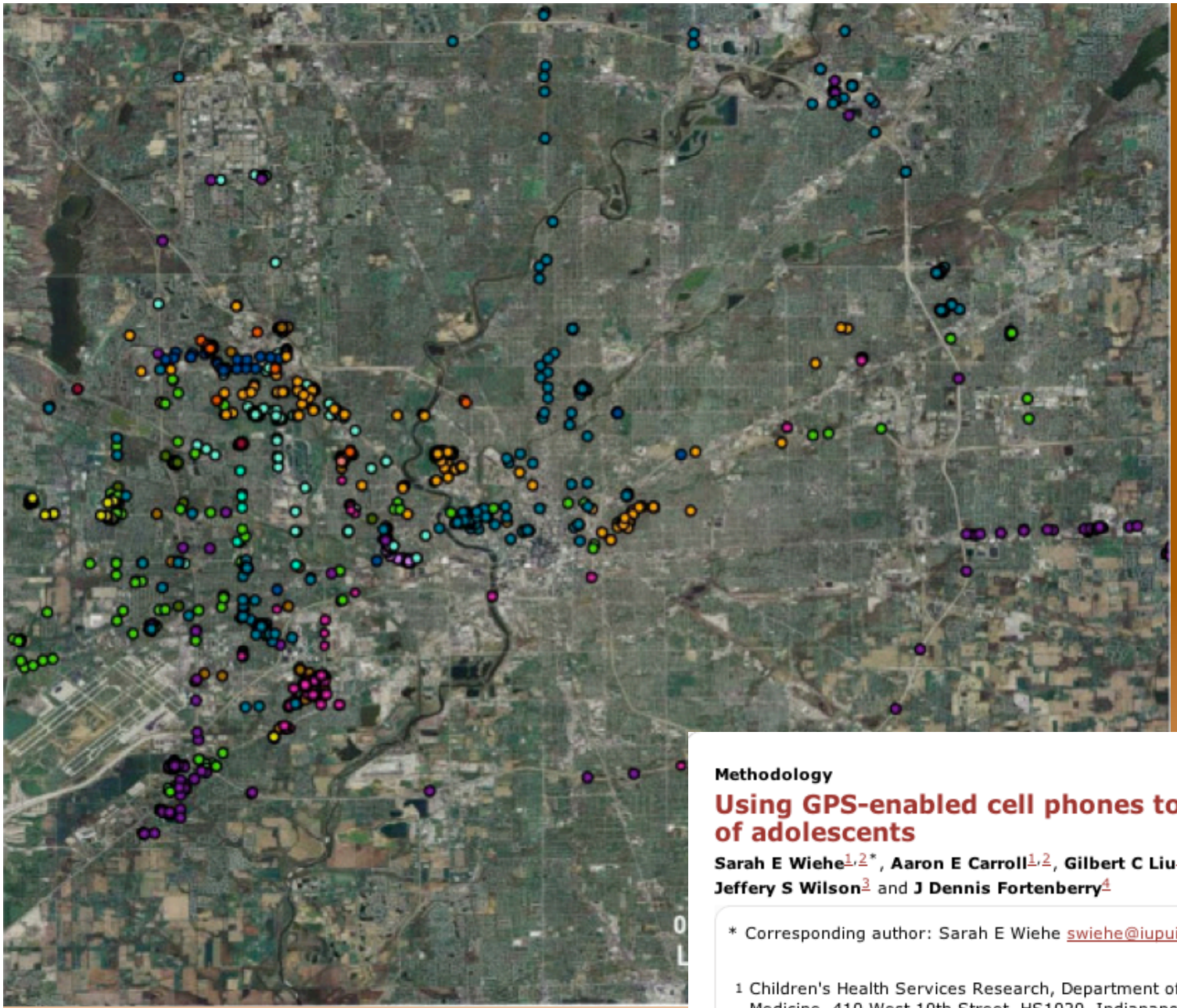
We can Now See The Emergence of "Abnormal" meal Patterns

Long before the animal is overweigh!

We can be predictive!
We can Prevent!
We can Correct in Time!

How Will We Obtain This Data in Human ?

GPS ⇔ Location, Movements
Sensors ⇔ Heart Beat, Blood Pressure, Temperature
Usage ⇔ Cognitive state



Methodology

Highly accessed Open Access

Using GPS-enabled cell phones to track the travel patterns of adolescents

Sarah E Wiehe[1,2*], **Aaron E Carroll**[1,2], **Gilbert C Liu**[1,2], **Kelly L Haberkorn**[1], **Shawn C Hoch**[1], **Jeffery S Wilson**[3] and **J Dennis Fortenberry**[4]

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For all author emails, please log on.

-Diagnose Your Diseases
-Monitor Complex Diseases
-Validate New Medicines
-Monitor Your Treatments
-Adapt Your Environment

-Monitor People...

Technological Novelty Is Always a Threat to Personal Liberties

To Keep the Benefits WE must protect our Liberties

This Process has a name

DEMOCRACY