

# Data Visualization

...

- Kiran Rao

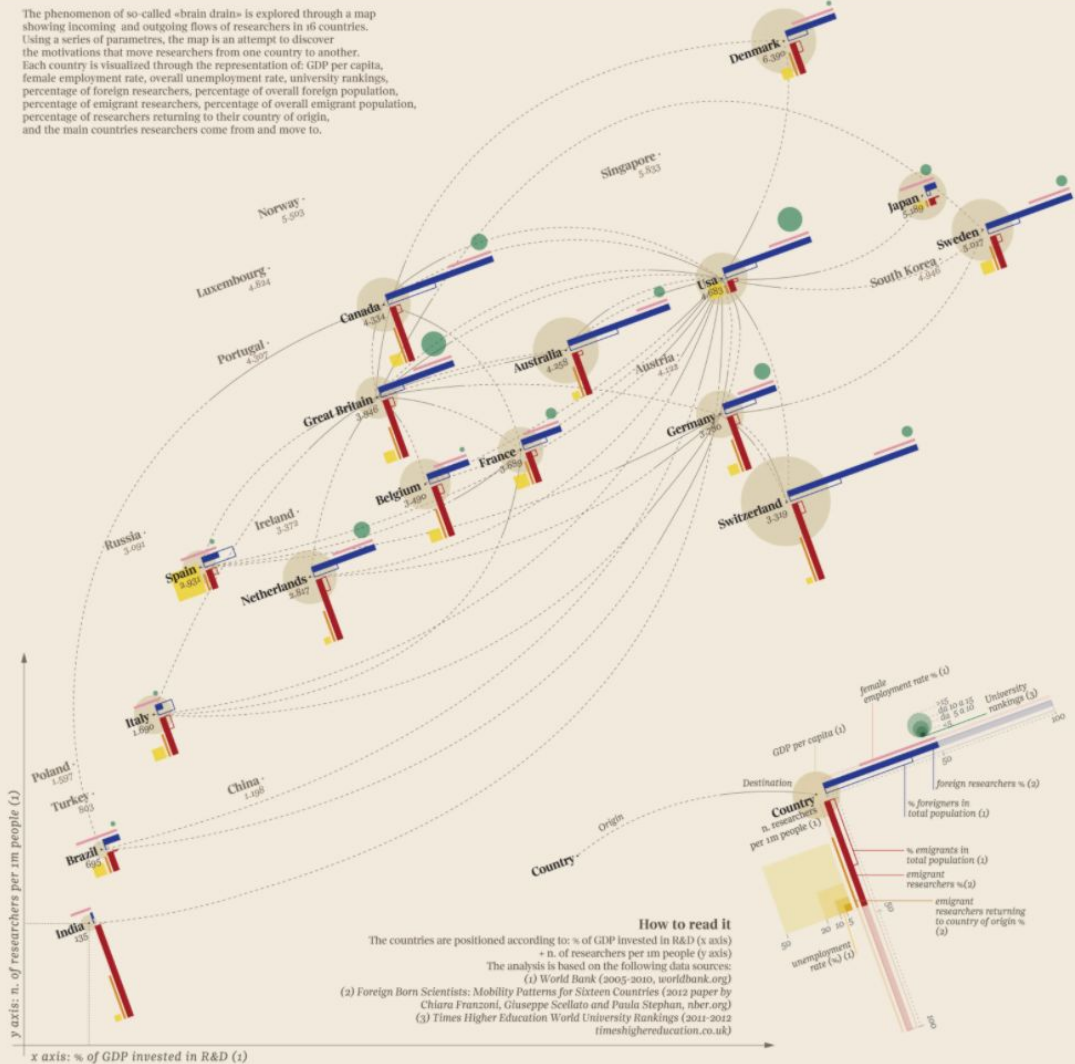
# Recommendation

- Do not obfuscate
  - Do not create something that is overly complex
  - Do not oversimplify, do not over complicate
- Be creative, but also be skeptical of creativity
  - Try to be extremely creative
  - Be careful with creativity

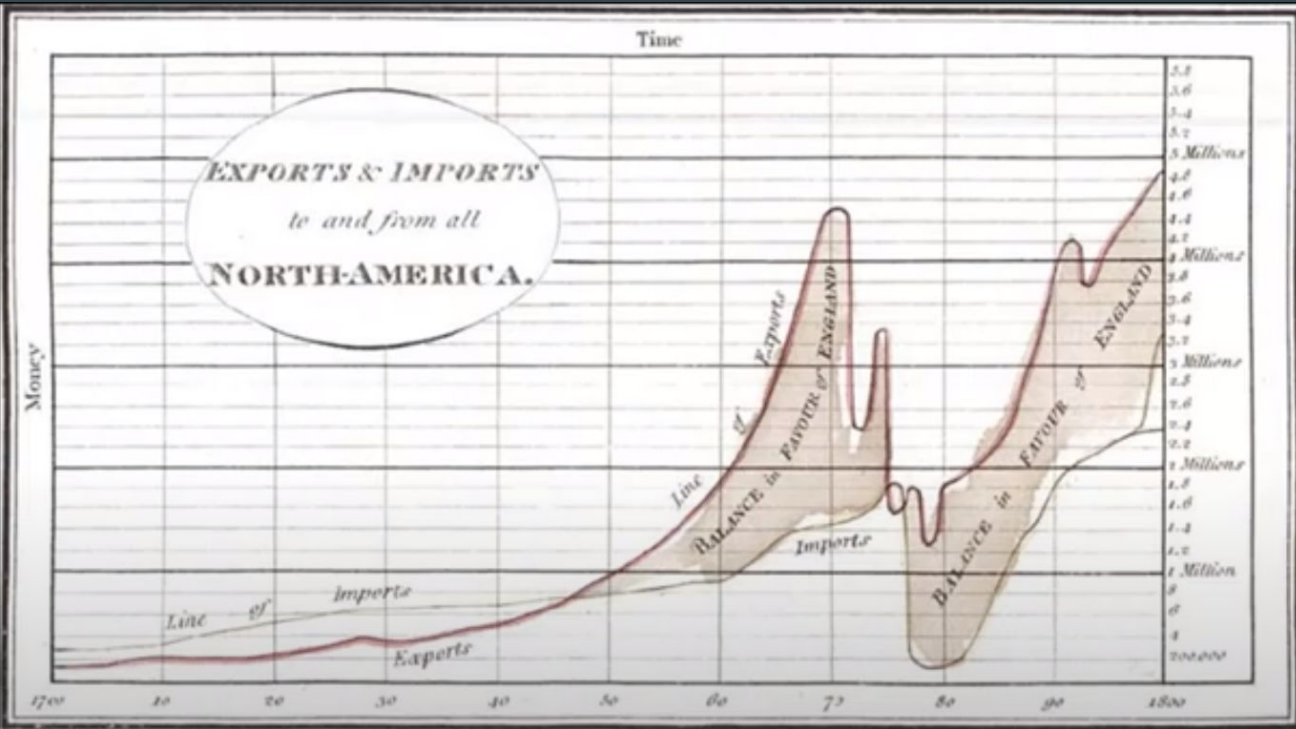
# Do not over complicate

## Brain Drain

- Can be extremely complex for a general reader
- Difficult to interpret information
- Being overly creative does not help in understanding the information
- Graphic forms used to represent the data should be less complicated
- Aesthetics are extremely dangerous in data visualization
- The visualization needs to be functional first



# Be creative, but also be skeptical of your creativity



- William Playfair invented statistical graphics
- Represent data like a map
- Use quantitative variables and cartesian coordinates
- Identify patterns and trends in data

## *are the winter olympics for the rich?*

By Kennedy Elliott and Ted Mellnik

Below are 165 of the world's countries that participated in the Summer and Winter Olympics at least one time between 1992 and 2012. Fewer countries participate in the Winter Olympics, and even fewer poor countries — none of the poorest — win medals.

- WON MEDALS
- RICHEST COUNTRIES
- POOREST COUNTRIES

1 2 **3** Next ▶

*Low-income countries are less likely to medal, especially in the Winter Olympics.*



# are the winter olympics for the rich?

By Kennedy Elliott and Ted Mellnik

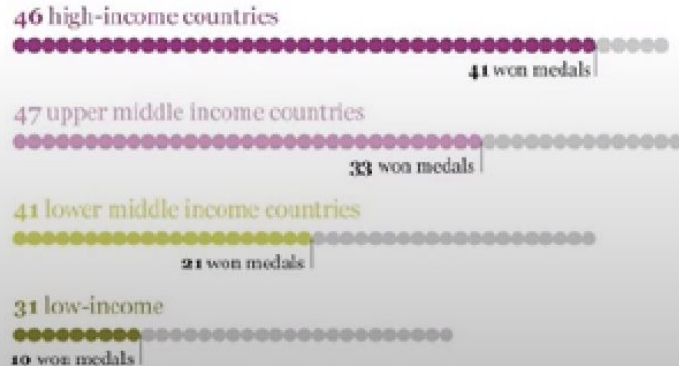
Below are 165 of the world's countries that participated in the Summer and Winter Olympics at least one time between 1992 and 2012. Fewer countries participate in the Winter Olympics, and even fewer poor countries — none of the poorest — win medals.

1 2 3 Next>

*Low-income countries are less likely to medal, especially in the Winter Olympics.*

## SUMMER

105 countries  
56,500 participants



## WINTER

86 countries  
12,500 participants



- Make your visualization a tool that can be used to extract information
- Make it as clear as possible for your readers
- Consider the task you want to facilitate while creating your visualization
- Only after the functionality is represented, the beauty is important

# Interaction between text and visualization

## Example 1

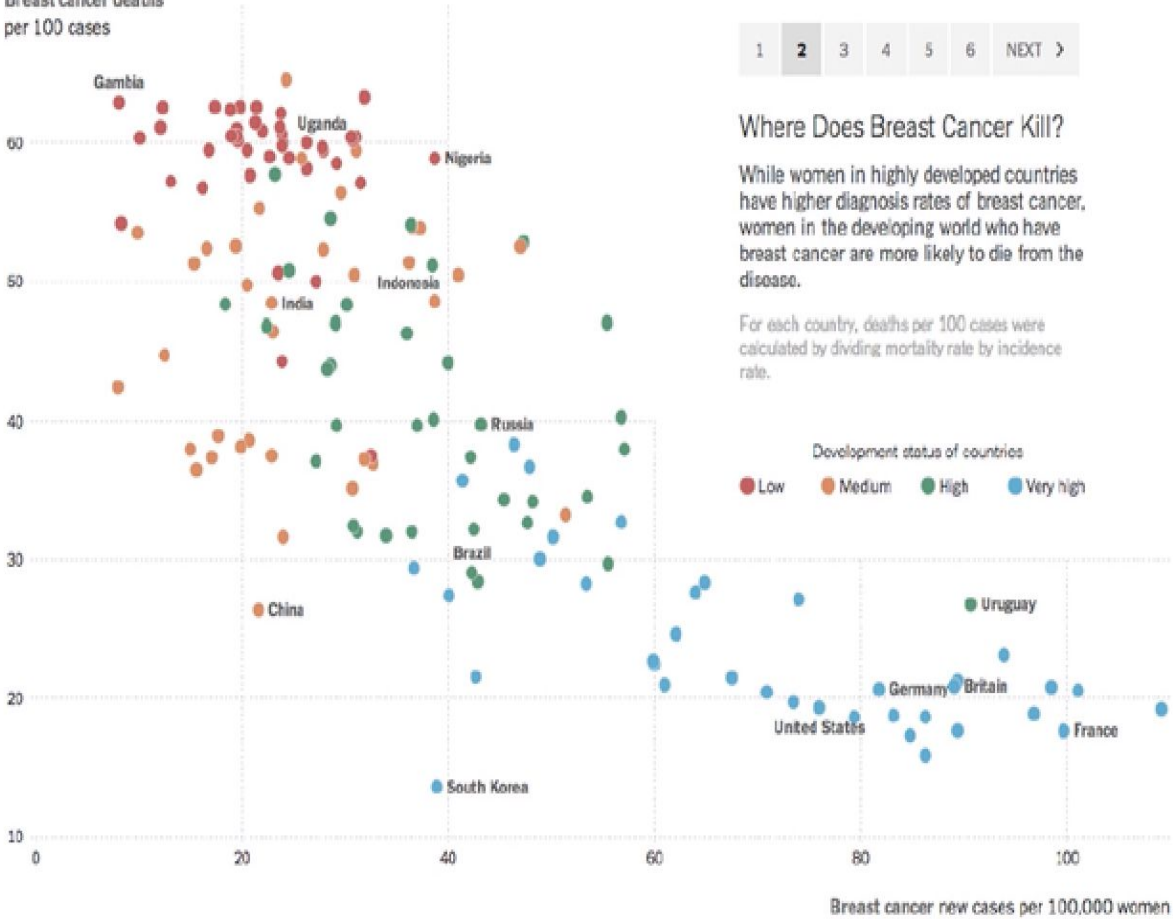


- Thousands of data points representing languages used on Twitter
- Missing notation
- Highlight exceptions, interesting stories in data
- Add context to your graphics



# Example 2

Breast cancer deaths per 100 cases

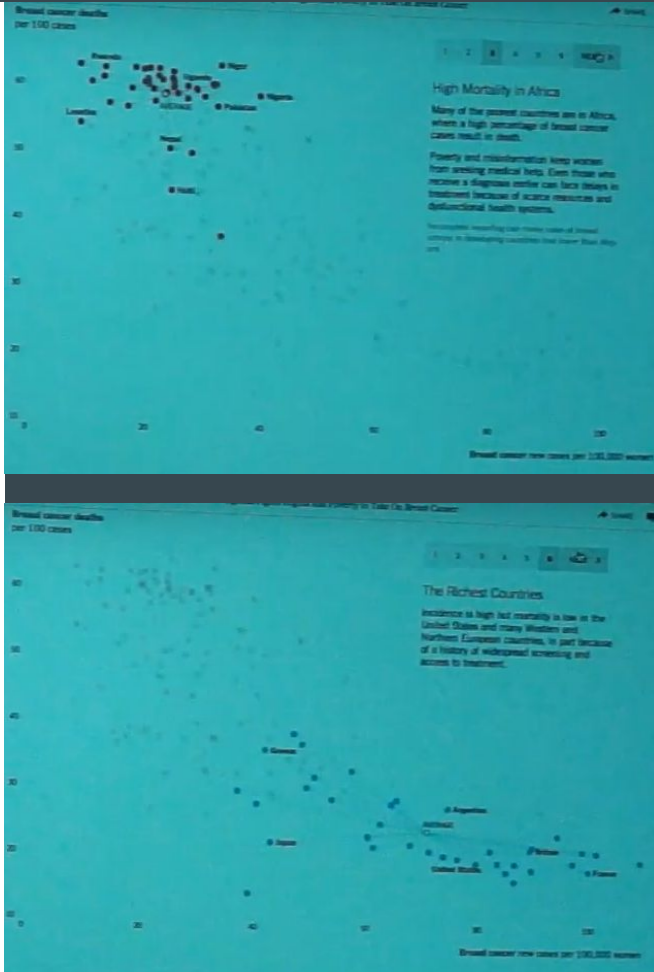


## Where Does Breast Cancer Kill?

While women in highly developed countries have higher diagnosis rates of breast cancer, women in the developing world who have breast cancer are more likely to die from the disease.

For each country, deaths per 100 cases were calculated by dividing mortality rate by incidence rate.

Development status of countries  
● Low ● Medium ● High ● Very high





# Represent your data more than once

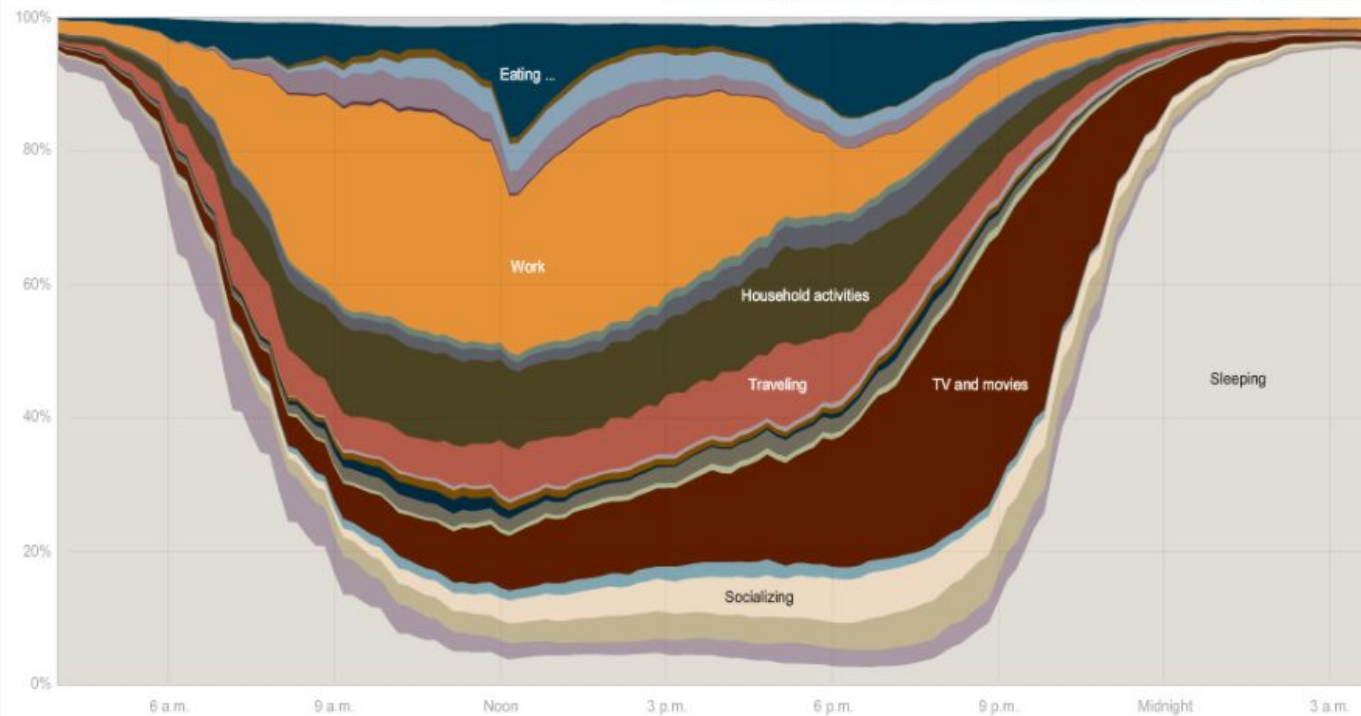
## How Different Groups Spend Their Day

The American Time Use Survey asks thousands of American residents to recall every minute of a day. Here is how people over age 15 spent their time in 2008. [Related article](#)

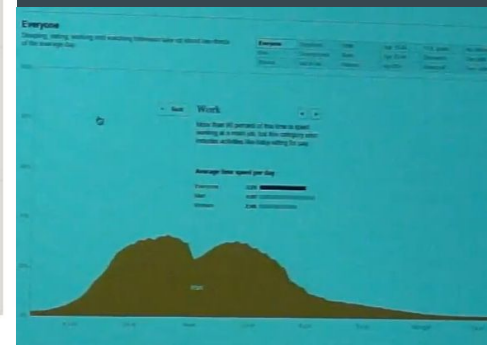
### Everyone

Sleeping, eating, working and watching television take up about two-thirds of the average day.

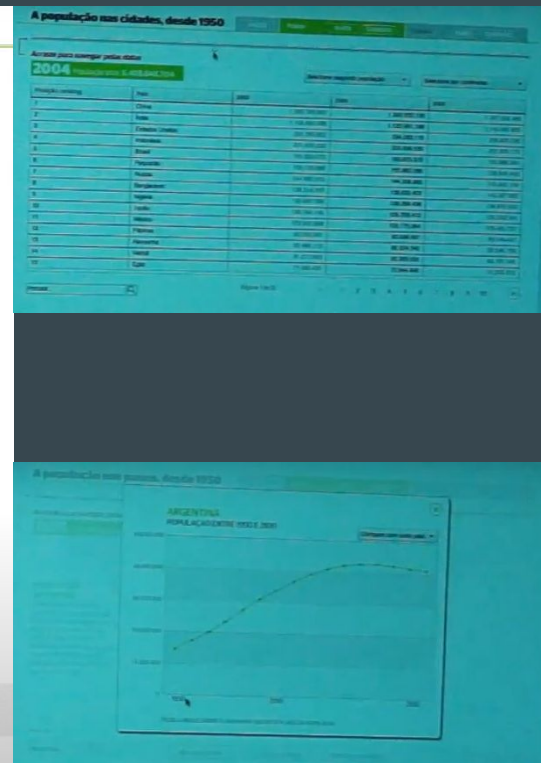
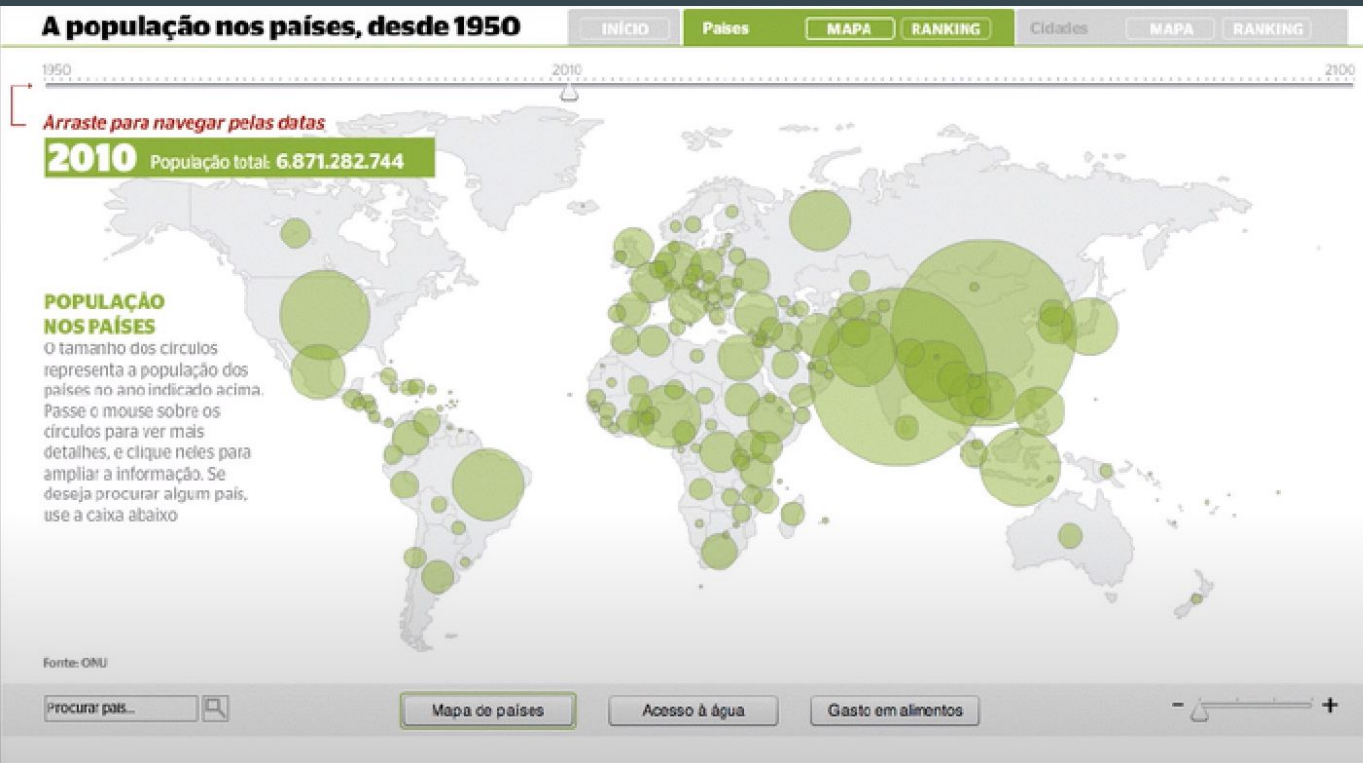
Everyone	Employed	White	Age 15-24	H.S. grads	No children
Men	Unemployed	Black	Age 25-64	Bachelor's	One child
Women	Not in lab...	Hispanic	Age 65+	Advanced	Two+ children



## Example 1



## Example 2



Population of different countries

- Do not stick to just one graphic form
- An effective visualization should give you the opportunity to explore data in different forms

# Recommendation: Focus on what matters

## Example 1



- Focus on visualizations that matter, are useful, and relevant

City Bike Rides: September 17th and 18th, 2013

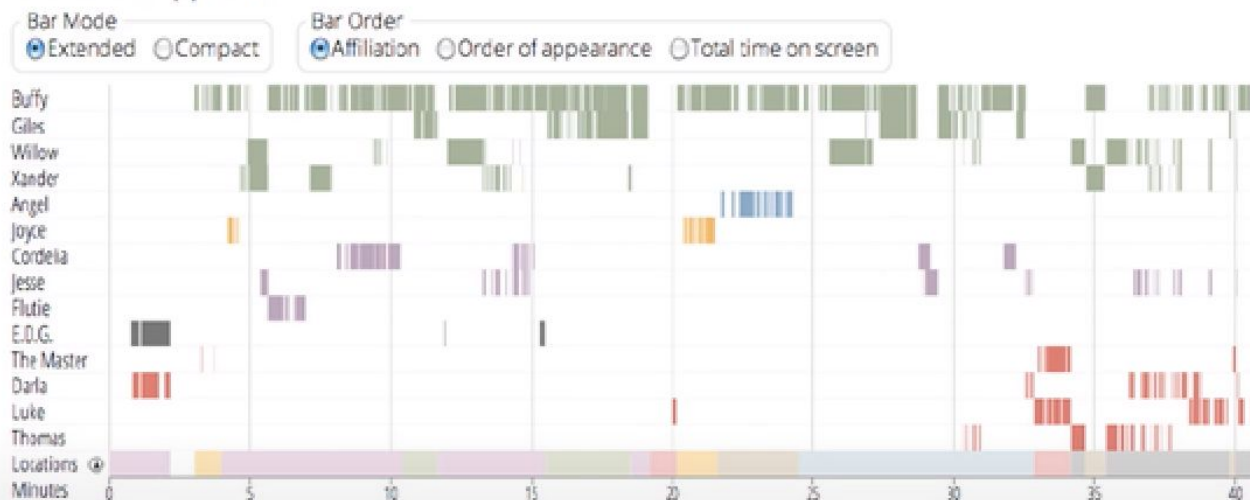
## Example 2

### 1x01 - Welcome to the Hellmouth

#### Synopsis:

Determined to have a fresh start, Buffy Summers moves to Sunnydale only to find out that it's located on a Hellmouth and that her slaying duties have just begun.

#### Character appearances



*To make you a vampire they have to suck your blood.  
And then you have to suck their blood. It's like a whole  
big sucking thing. Mostly they're just gonna kill you.*

**Buffy Summers**

#### Characters key

- Scooby Gang
- Ally
- Summers Family
- Sunnydale High
- Other
- Villain

#### Locations key

- Library
- Buffy's House
- Sunnydale High
- The Bronze
- Street
- Cemetery
- The Master's Lair

Visualizing Buffy

## Example 3

AGE  
30

PLAN TYPE  
Gold

STATE  
Florida

COUNTY  
Miami-Dade

OR ADDRESS

SEARCH

GO  
LOCATE

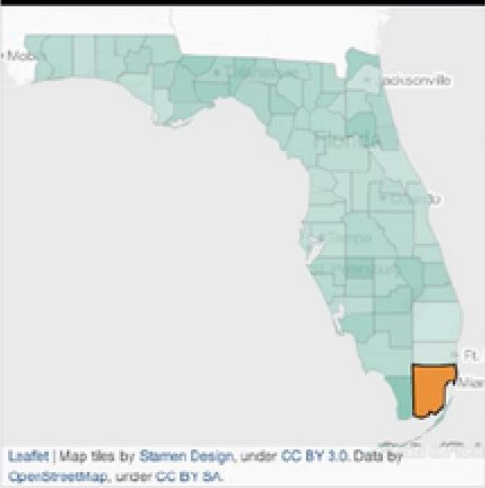
Range of prices for lowest-cost Gold plans on HealthCare.gov

\$168  
Pima, Ariz.

\$259  
Miami-Dade, Fla.

\$525  
Worth, Ga.

### Florida: Miami-Dade



Leaflet | Map tiles by Stamen Design, under CC BY 3.0. Data by OpenStreetMap, under CC BY SA.

### Results

Showing < 1 of 9 > [SHOW ALL](#)

**\$259** monthly premium

**Gold** [PLAN DETAILS »](#)  
AGE 30  
MIAMI-DADE, FLA.  
COVENTRYONE  
**Gold \$5 Copay HMO Carelink**

DEDUCTIBLE	\$1,750
OUT-OF-POCKET MAX	\$5,000
COST OF DOCTOR'S VISIT	\$5

**\$280** monthly premium

**Gold** [PLAN DETAILS »](#)  
AGE 30  
MIAMI-DADE, FLA.  
HUMANA MEDICAL PLAN, INC.  
**Humana Connect Gold 2500/3500 Plan**

### Your plans

Share your selected plans

**\$259** monthly premium [×](#)

**Gold** [PLAN DETAILS »](#)  
AGE 30  
MIAMI-DADE, FLA.  
COVENTRYONE  
**Gold \$5 Copay HMO Carelink**

DEDUCTIBLE	\$1,750
OUT-OF-POCKET MAX	\$5,000
COST OF DOCTOR'S VISIT	\$5

**\$280** monthly premium [×](#)

**Gold** [PLAN DETAILS »](#)  
AGE 30  
MIAMI-DADE, FLA.  
HUMANA MEDICAL PLAN, INC.  
**Humana Connect Gold 2500/3500 Plan**

### Which states can I explore?

Health-insurance premiums and plan details are available for the 36 states served by HealthCare.gov, the federally run marketplace. Data for 14 states and the District of Columbia, which are running their own marketplaces, are not available at this time.