

CS171 (E-64) Visualization

Project 2

Firearm Homicides in the United States

by Lauren Middleton and Joshua McElfresh

Initial Proposal

CS171
Project 2 Process Book
Lauren Middleton & Joshua McElfresh

Project title: Gun Crime and Ownership in the United States

Name, email, programming comfortability of each member of your group

Lauren Middleton, lmiddleton@fas.harvard.edu, most comfortable with HTML, CSS, JavaScript/JQuery; some additional experience with Java and PHP
Joshua McElfresh, jmcelfresh@fas.harvard.edu, comfortable with Javascript, PHP, HTML, CSS, SQL.

Research questions and hypotheses

Questions: How does gun ownership and gun crime correlate in the US? How does it correlate by state? What other crime statistics correlate to gun ownership? How have opinions about guns changed over time and how does this compare to gun ownership and gun crime? What are the chances of being the victim of a homicide w/ a firearm based on location, age, or other factors?

Hypotheses: The more gun owners there are in a place, the more crimes there will be committed with guns there.

Motivation: Explain why you are interested in your research question(s).

Gun ownership is a hot topic that is on many people's minds due to recent attacks.

Data: What data will you use to construct your visualization? How is it obtained? How is it relevant to your research questions? If appropriate, provide a link to your data source.

FBI datasets from crime data covering weapon types, victims, trends, etc.. Pew, Gallup and other polls covering opinions about guns. Polls about numbers of gun owners nationally and by state.

Data Sources

[Link to FBI crime data from 2008](#)

[About.com article](#) by state

[Nytimes poll](#) by political party

[Datamasher Visualization](#)

[Gallup Poll](#)

The FBI data can all be downloaded in Excel format.

[FBI - US Homicides by Weapon, 2007-2011](#)

...looks like these go back to 1995.

[FBI - US Homicides by Weapon and Age, 2007](#)

[FBI - US Homicides by Weapon and Age, 2008](#)

[FBI - US Homicides by Weapon and Age, 2009](#)

[FBI - US Homicides by Weapon and Age, 2010](#)

[FBI - US Homicides by Weapon and Age, 2011](#)

[FBI - US Homicides by Weapon by State 2009](#) - merge w/ state population data

[Pew Research Gun Opinions](#)

[Pew Visualization](#)

Visualization: How will you display your data? Provide some general ideas that you have for the visualization, broken down into *two tiers of priority*: those ideas that your project will aim to implement and those ideas that, given time, would ideally be implemented.

You will be asked to sketch some designs in the official project proposal submitted with HW5.

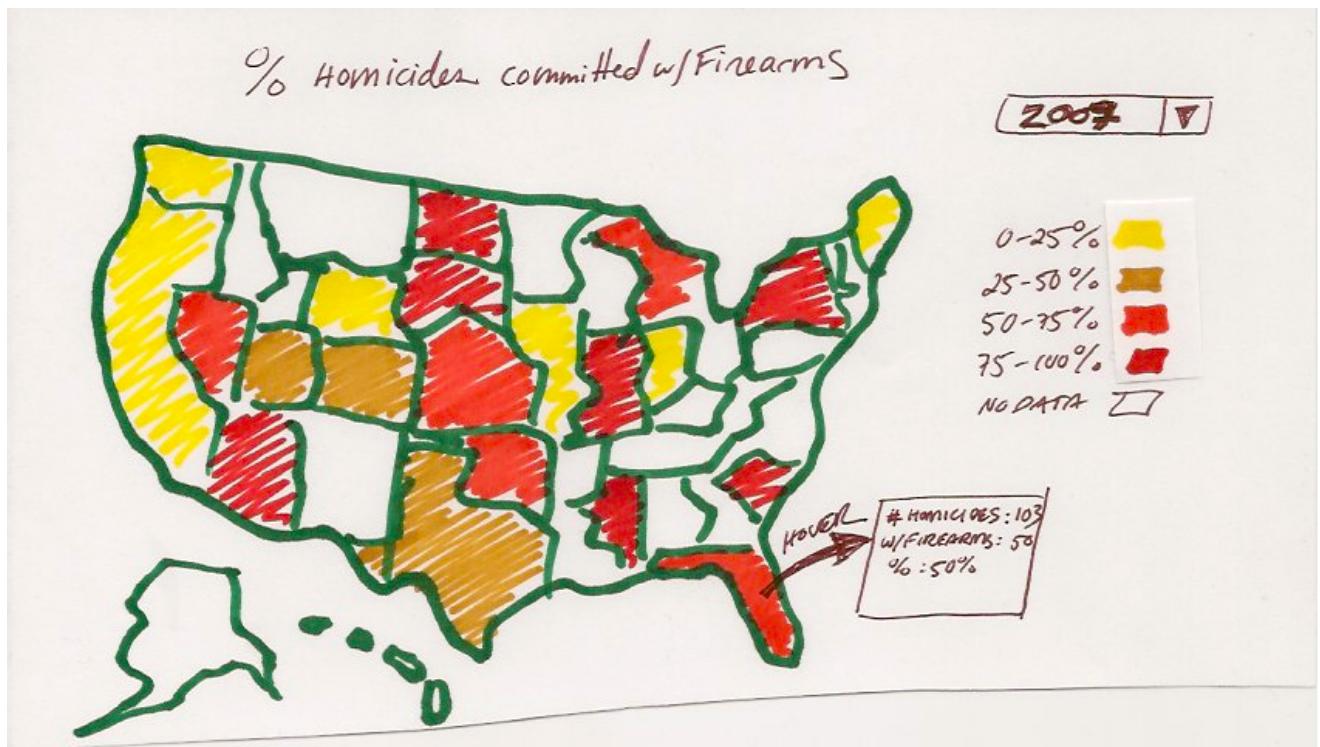
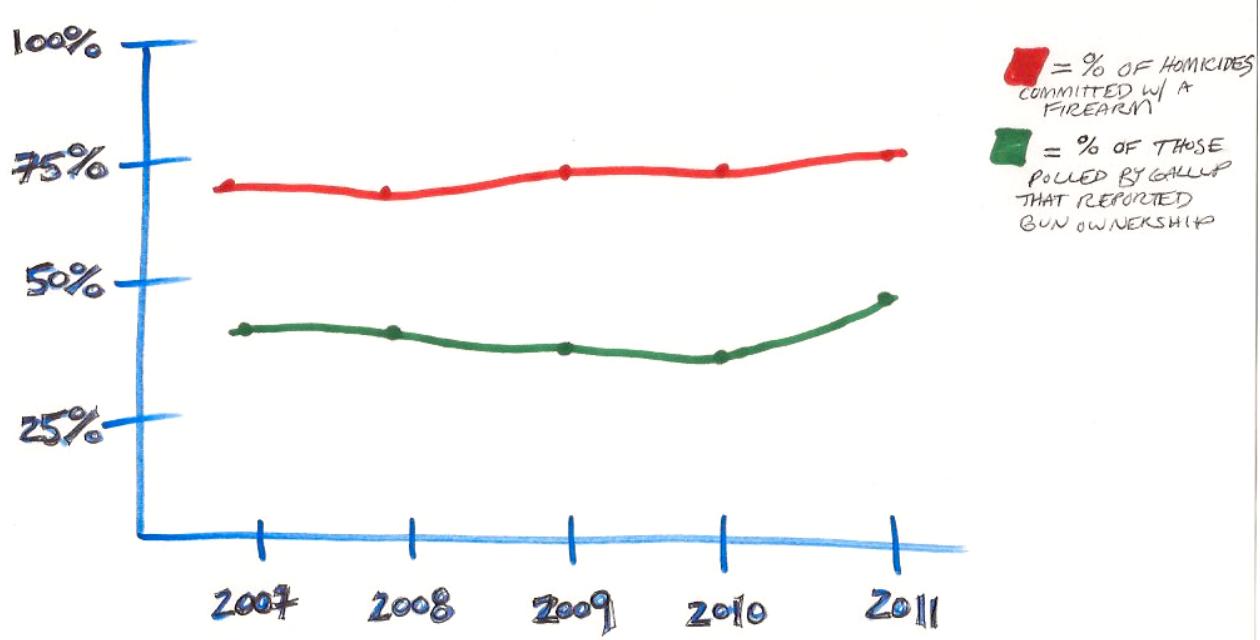
Aim to implement: Gun ownership vs. homicides w/ a firearm and age of victim, by year.

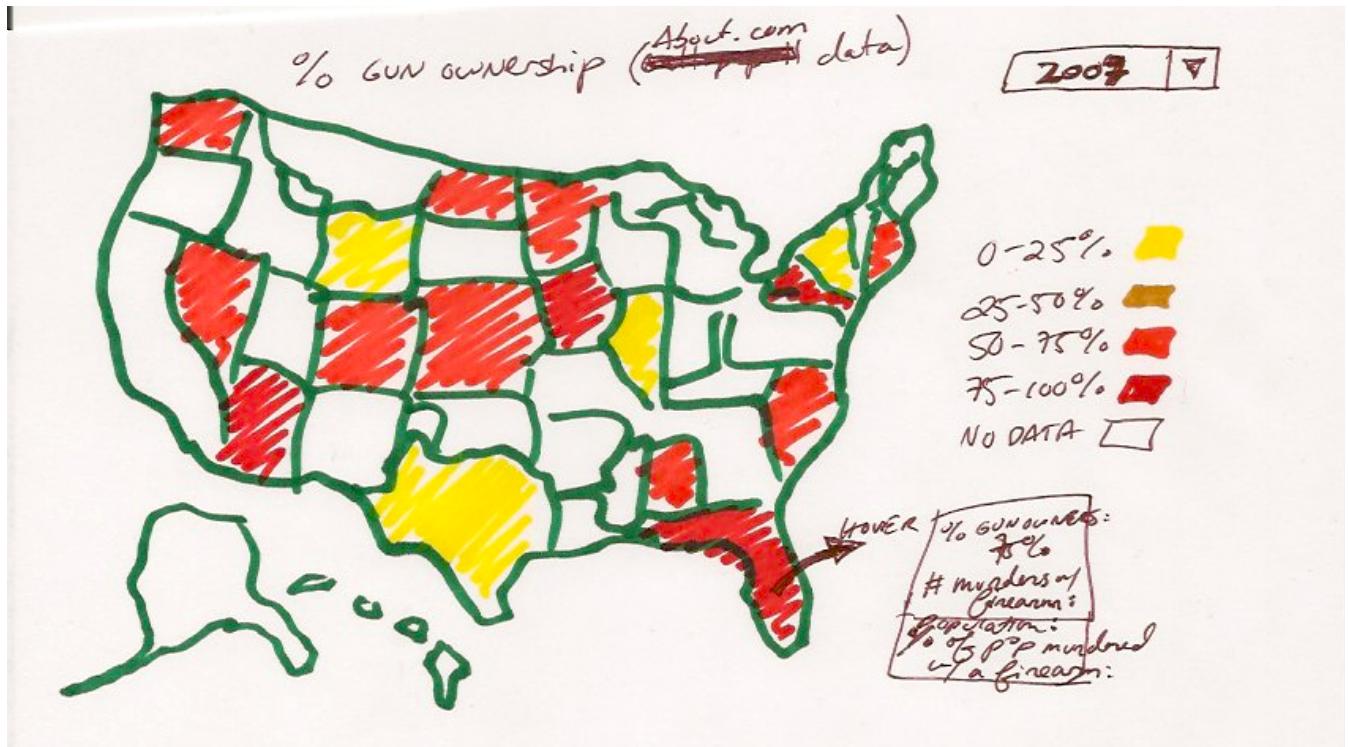
Ideally implement: Gun ownership vs. homicides w/ a firearm by state and year. Gun ownership and gun related crime by other factors, i.e. gender, race, income, etc. Chances of being a victim of a gun related crime based on these factors. Some measure of restrictions per state (might be difficult to quantify).

A possibility for display is using a US map with some kind of encoding (color or value?) to quickly identify states with a high gun ownership/gun crime correlation. Ideally hovering or clicking a state would reveal more information/actual data. If we can get data for more than one year, small multiples could be used, or line graphs could be appropriate to show changes over time.

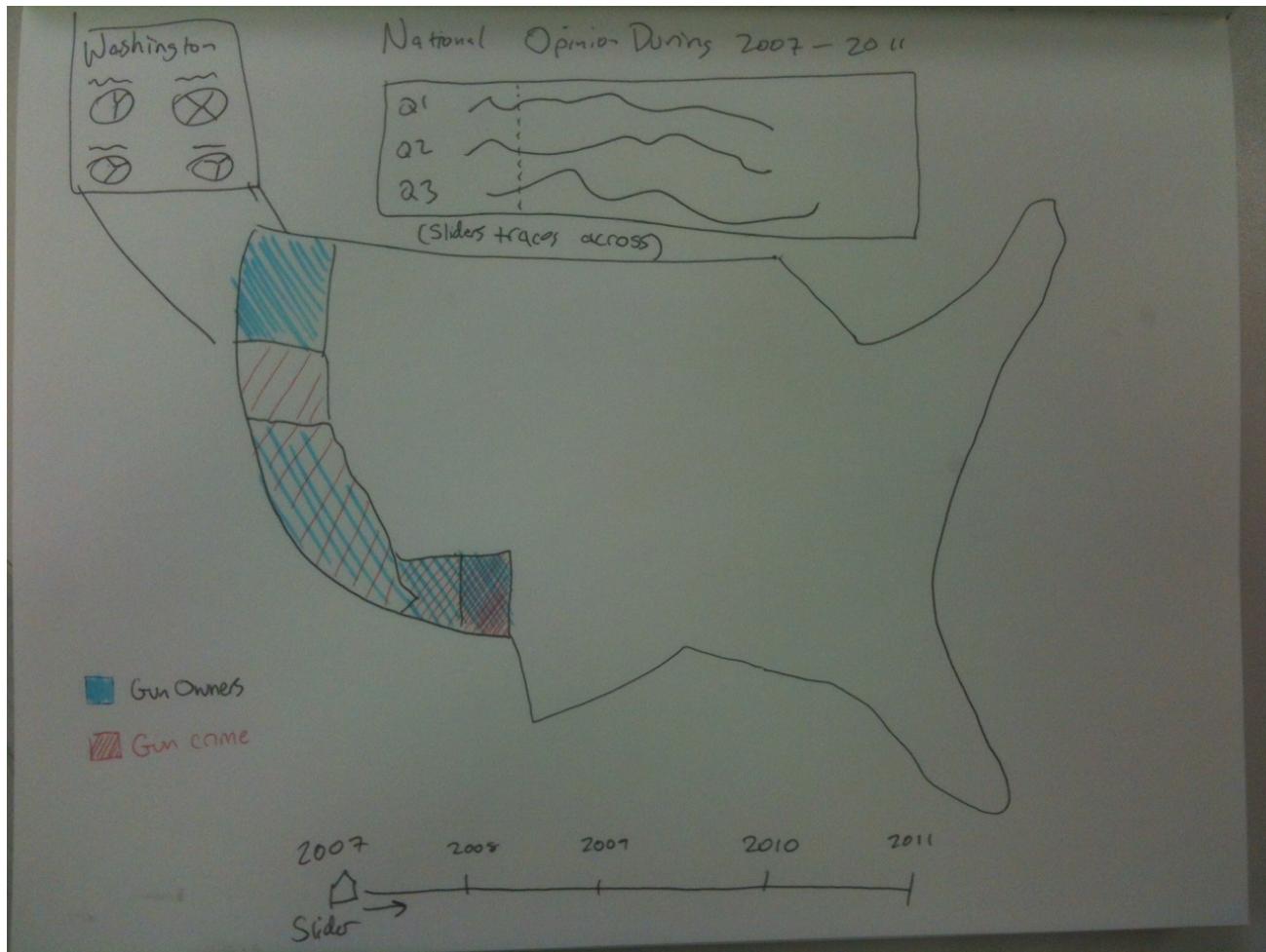
If we cannot get data by state, line or bar graphs to show the number of homicides w/ a firearm by age and year.

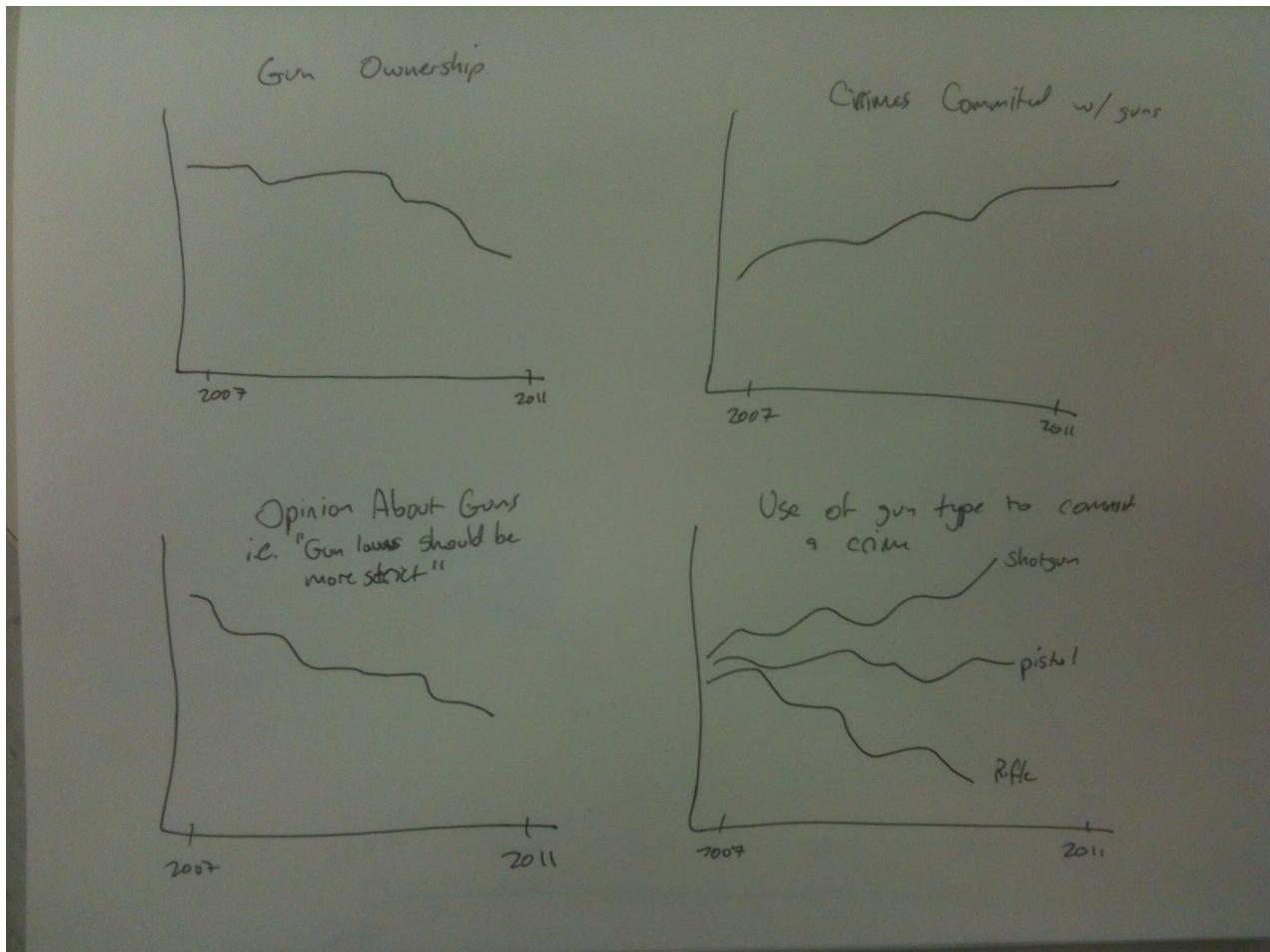
Sketches





**Please note the above maps are colored completely randomly, not on actual data. We would of course use more pleasing colors in our actual visualization. I did not include this in the drawing, but another idea is to click on a state and generate a small bar graph of the breakdown of gun homicides by age or other factors to the side.





For the map I had a similar idea to Lauren, click on a state and get a breakdown of gun crime in the state. The color coding aims to blend red for gun crime and blue for gun ownership together so dark purple would be high in both categories.

The second sketch is a combination of gun crime, ownership and opinion for comparison purposes. Very basic but if the data showed a trend it could be meaningful.

03/31/2013

We both did a lot of research on data sources, and determined that there is no real reliable data on gun ownership in the US available. This was disappointing, as our main goal was to correlate gun ownership in the states to firearm homicide rates. It was important to us not to use bad data though, so we decided to focus on just comparing the firearm homicide rates instead.

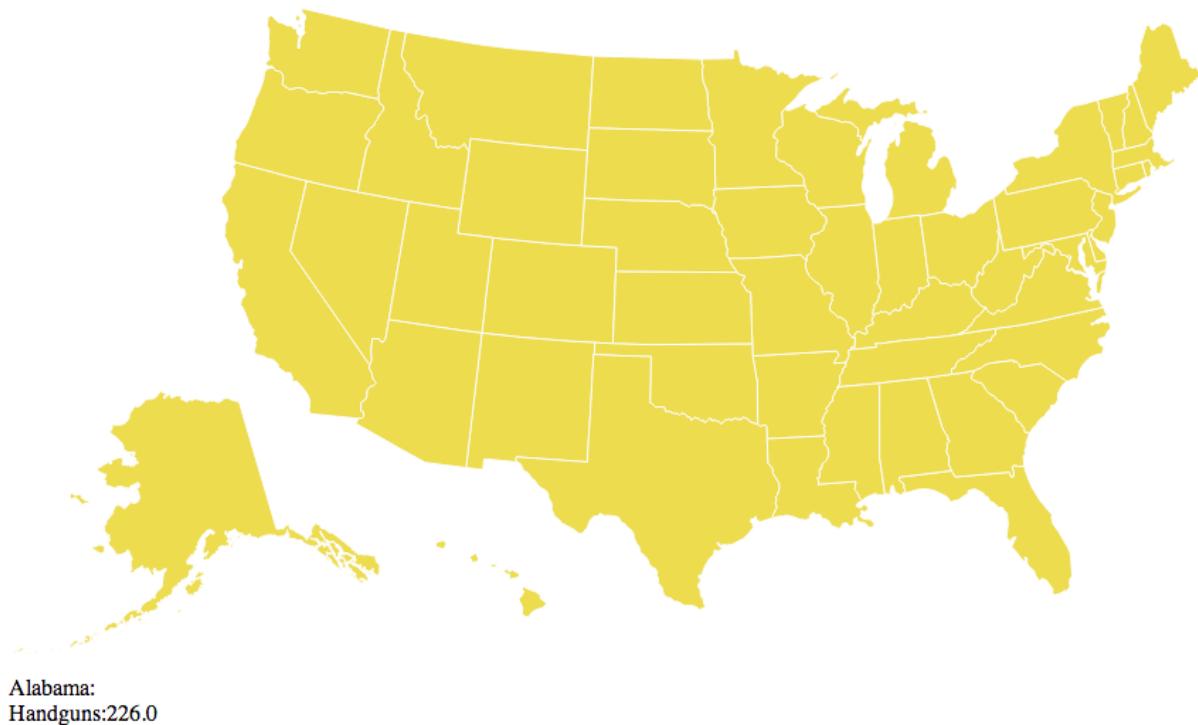
Lauren downloaded all the data from the FBI site (homicides by state by weapon for a series of years, and homicide victim age by weapon), as well as from the Census site (state population data), cleaned them up using Google Refine, and exported them as CSV.

04/01/2013

Lauren set up a map of the US in index.html. Attempted to read in the data using d3.csv and the local python server. Got the server running, but had a lot of trouble reading the data in in a format that could then be used with the Datamaps data property. Spent a lot of time trying to define “data” for the map dynamically so we wouldn’t have to hardcode everything (with little success at first).

04/02/2013

Josh wrote a script to convert our CSV data into a JSON object. We discovered it was much easier to work with than trying to access the CSV directly, so we decided to switch to this method. He also got a click function working to display data about the clicked state in a div (see below).



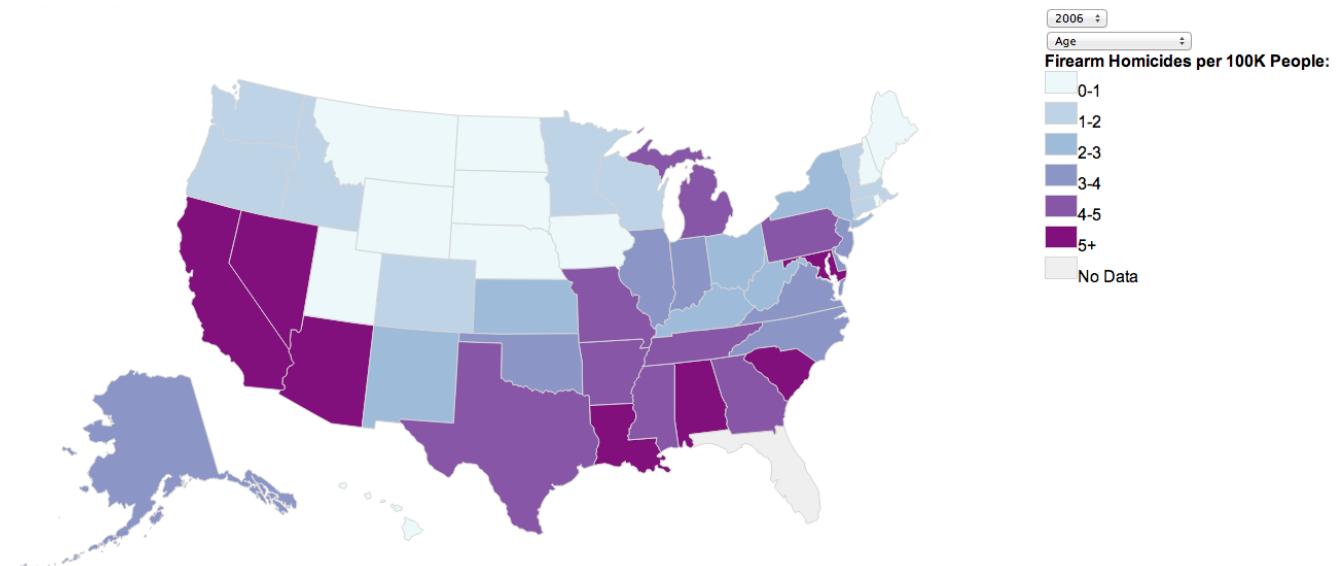
04/03/2013

The JSON object data is proving much easier to work with using datamaps. Lauren was able to pass the object in as a variable to the “data” property, and then access the object using

javascript to change the fill keys dynamically after the map is re-rendered. Need to resolve the issue of duplicated maps after re-rendering.

04/05/2013

Lauren encoded firearm homicides per 100k people with a ColorBrewer scheme (picked for sequential data, and color blindness). Also got the year filter working, so that the map redraws each time with the proper color encodings each time a year is selected. By clearing the container at the beginning of each redraw, we are now able to avoid duplicate maps. A tooltip appears on hover that shows actual numbers for the data. Now attempting to add another filter for type of firearm. Will probably abandon the age data at this point, since it is not broken down by state.



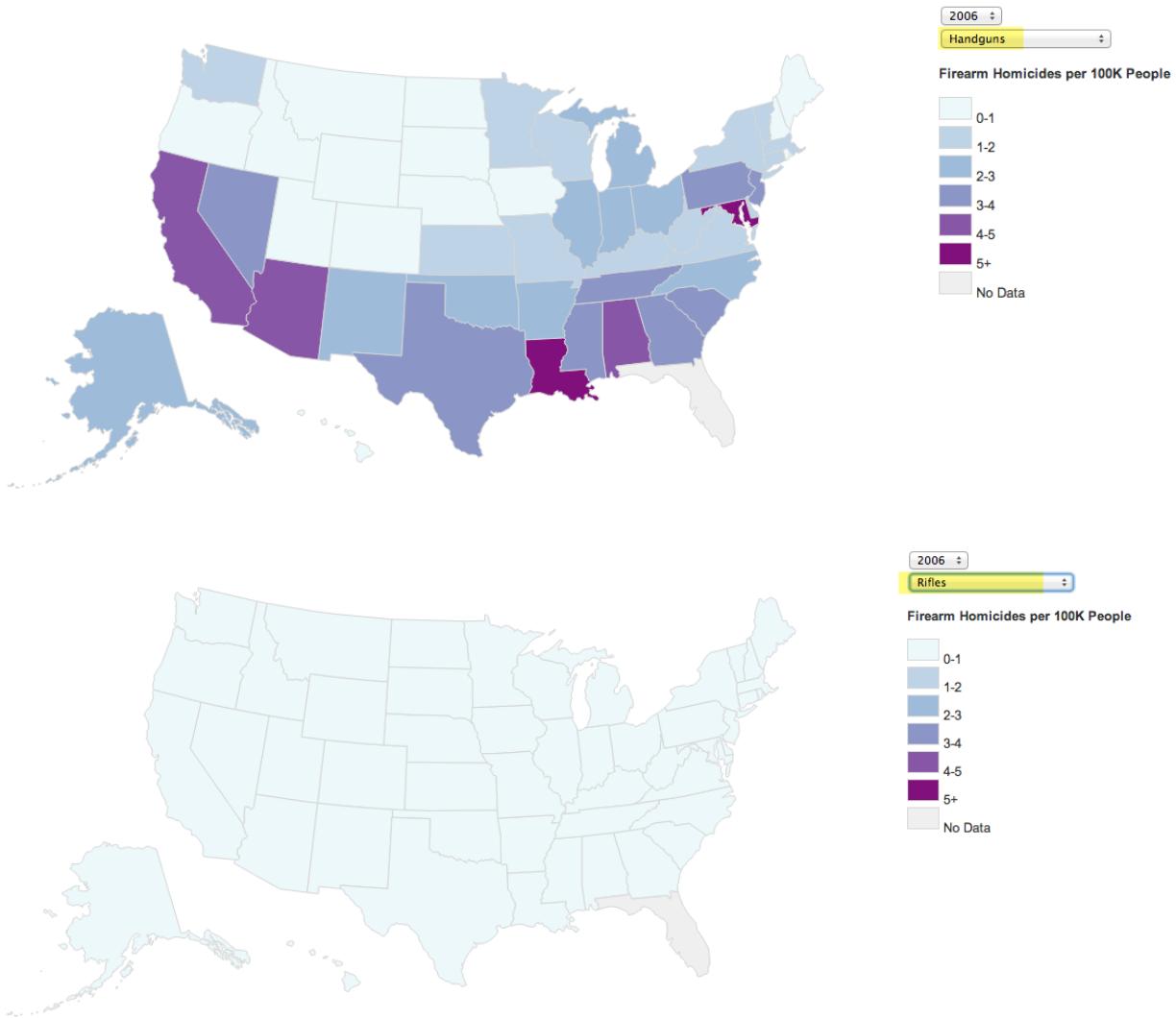
04/06/2013

Lauren was able to get the firearm type filter working as well. Now each time a new filter is selected, the map redraws based on both selections. Our plan is to replace the simple click we have now with a click handler that draws a line graph showing the data for that state over time.

Some interesting trends that are appearing in the data:

- The map as a whole gets lighter and lighter (meaning less homicides per 100K people) as the years progress. Louisiana is the exception to this; it stays in the 5+ homicides per 100K people range for all the years we have data for.
- When filtering by firearm type, it becomes evident that Rifles and Shotguns are much

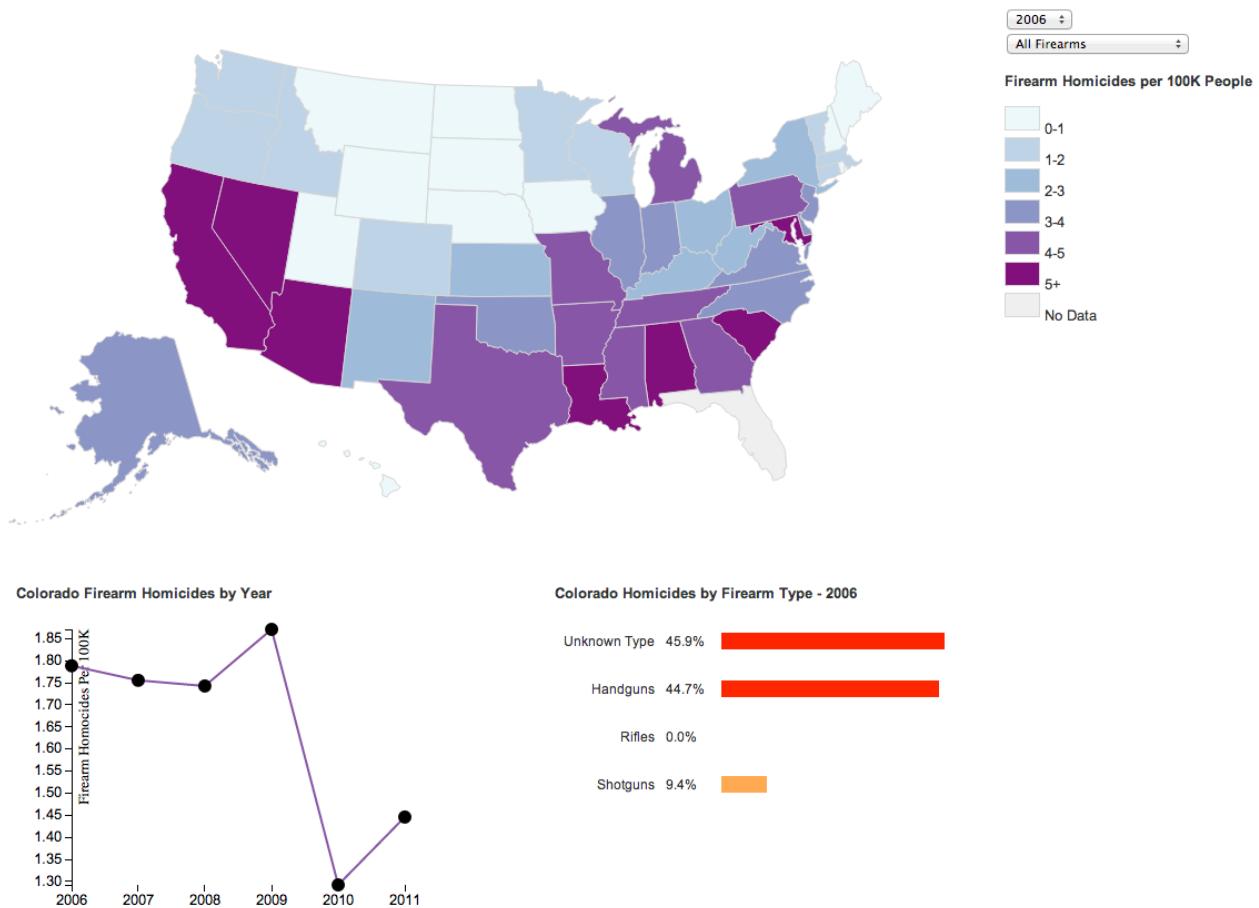
less linked to homicides than Handguns, which are responsible for the majority of firearm homicides in many of the states. The difference between the maps for these firearm types are striking. See example below:



- We have no homicide data for Florida. We realized after setting up the map that it's missing from all the tables that show homicide by state by weapon.

04/07/2013

Josh got the line graph on click going, as well as a bar graph that appears when a point in the line graph is hovered over. We discussed some stylistic choices and decided to use a different color scheme for the bar graph so it wasn't confused with our key for the map color encoding.

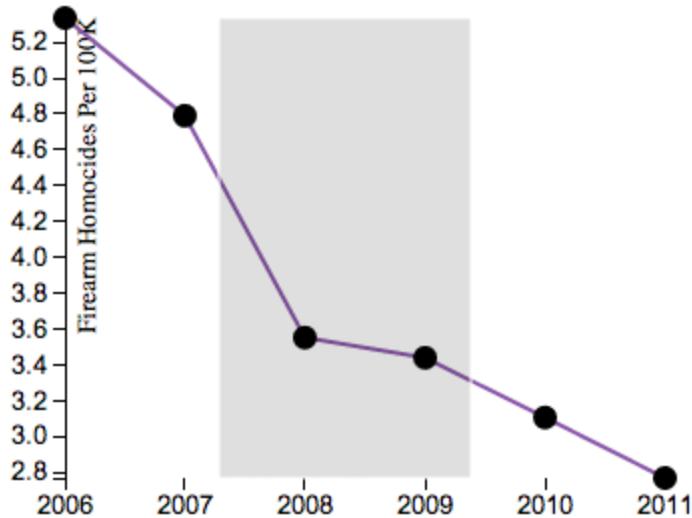


Lauren spent some time trying to get the clicked state to have a different border or fill color to show it was the state the two bottom graphs pertained to. Was able to isolate the particular path that represented the clicked state by using jQuery to find the state path with the hover stroke color on click- however, it is proving difficult to implement changing this stroke color on click, as Datamaps seems to have a built in mouseout function that returns the state back to its default fill and stroke once the cursor moves away. Changes to the fill and stroke appear temporarily but will not stick. Have tried a variety of approaches, including using a timeout to try to get the change to fire after Datamaps' mouseout. Still working on solving this. We also implemented captions for the bottom graphs that display the clicked state's name in case we can't get the map to visually show which state was clicked.

04/08/2013

Our last major implementation was brushing. We realized that the design we came up with did not particularly lend itself to brushing; however, we decided that a useful feature might be to enable the viewer to click and drag to select an area of the line graph, and then have the bar graph update based on the years included in the selection:

Nevada Firearm Homicides by Year



Lauren was able to look at some examples (noted in our chart.js code) and craft a brush that would select sections of the line graph's x-axis, and figure out the extent of the selection and which year points it included. Josh modified our drawBars function to take parameters for more than one year.

We ran into one issue we were not able to resolve, which is that in order to have the brushing work, a rect element is created that sits on top of the circles, often hiding many of the middle ones and making them unable to be hovered over. We tried various things to remedy this, such as changing the stack order of our circle points, but ultimately determined these two functionalities can't really exist simultaneously. You can get the hover on a hidden point to work if you mouse-down over it while dragging, or you can just brush over that one year to see the same info as if you were hovering. This is something we can work on making more elegant in Project 3.