RShiny + Firearm Data

WCHD
2024-02-28

Agenda

- RShiny - the Basics
- Discussion of Data Sets
- Discussion of Goals (i.e. What do we want to use the dashboard to be able to answer?)
- “The Process”
  - Sketches
  - Initial code testing
  - Implementation into Rshiny code
- Final set-up pieces
  - System for data updating, data file creation, etc.
  - Hosting/implementation of the dashboard

RShiny is a system for building web applications in R

For RShiny info, broadly: https://shiny.posit.co/

You've likely used an Rshiny app on the internet:

- The WEL Wastewater Data: https://um.wastewatermonitoring.dataepi.org/
- https://appsilon.com/r-shiny-in-government-examples/
- https://appsilon.com/r-shiny-in-life-sciences-examples/

Available Data Sets:

- Main:
  - Gun Lock Event Distributions
  - Firearm Deaths
  - Firearm Injuries
- Accessory:
  - Zip Code shape files
  - Zip Code populations

Gun lock event distributions

- Event_date: Date of the event in %m/%d/%Y format
- Event_name: Name of the event as advertised
- Event_address: Address where the event was held (street number and street name)
- Event_city: City where the event was held
- Event_state: State where the event was held
- Event_zip: Zip code where the event was held
- Event_type: Classification of the event (either “Clinical” or “Outreach”)
- Number_distributed: Count of the number of gun locks that were distributed at the event
- Population_served: Description of the age/demographics of the population served at the event (“all ages”, “Infants/children”, etc.)
- Event_advertisement: Method of how word about the event was distributed (“email”, “website”, etc.)

Firearm deaths

- Date: date the event occurred on, in %m/%d/%Y format
- Death_Zip: zip code region where the death event occurred
- Manner_of_death: category of the death event, either “Homicide” or “Suicide”
- Age: Age of the individual who died

Firearm injuries

- Date: date the event occurred on, in %m/%d/%Y format
- Incident.Zip: zip code region where the event occurred
- Syndrome: category of the injury event, either “Firearm Injury - Intentional” or “Firearm Injury - Unintentional”
- Age: Age of the individual who was injured

Zip code shape files

Source: https://www.census.gov/geographies/mapping-files/time-series/geo/carto-boundary-file.html

- Zip code area shape file (2018)
- Variables:

ZCTA5CE10	AFFGEOID10	GEOID10	ALAND10	AWATER10	geometry
36083	8600000US36083	36083	659750662	5522919	MULTIPOLYGON (((-85.63225 3...
35441	8600000US35441	35441	172850429	8749105	MULTIPOLYGON (((-87.83287 3...
35051	8600000US35051	35051	280236456	5427285	MULTIPOLYGON (((-86.74384 3...
35121	8600000US35121	35121	372736030	5349303	MULTIPOLYGON (((-86.58527 3...
35058	8600000US35058	35058	178039922	3109259	MULTIPOLYGON (((-86.87884 3...
35619	8600000US35619	35619	337059534	1410483	MULTIPOLYGON (((-87.28511 3...

Zip code populations

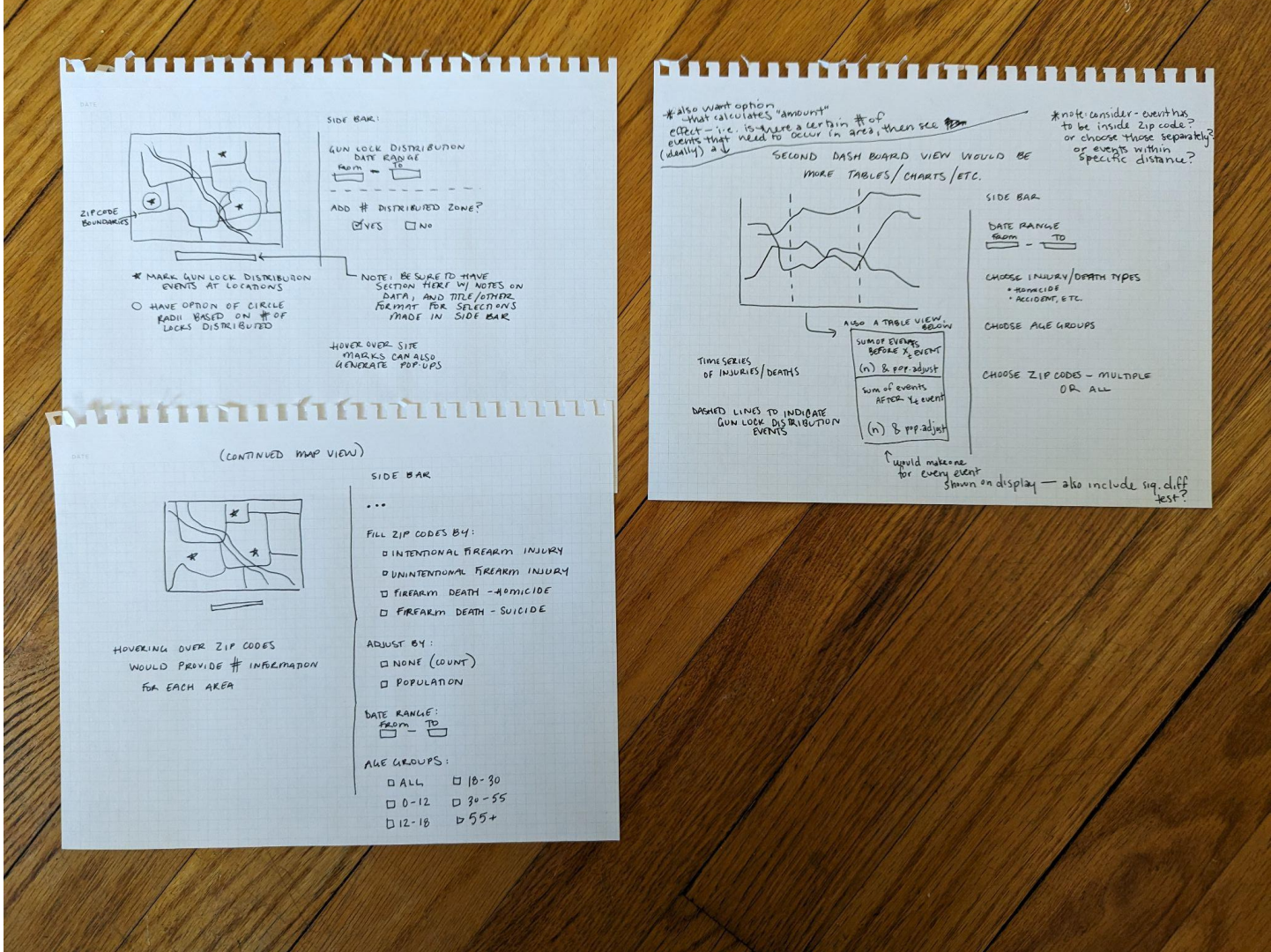
Source: https://data.census.gov/table/ACSDP5Y2022.DP05?q=DP05&g=040XX00US26$8600000

- ACS 2022 5-year estimates at zip code level
- Variables
  - GEO_ID: Zip code long FIPS style code
  - NAME: Zip code with “ZCTA”
  - Then 300+ other options of age, race, ethnicity, gender options for population counts, with margin of error estimates

Goals! What do you want the dashboard to accomplish?

- Some things I thought of:
  - Visual representation of gun lock distribution events: Where were events held? How many were there? How many locks were distributed?
  - Measure the impact of the gun lock distribution events: Do firearm-related deaths/injuries decrease as more gun lock events are held? As more gun locks are distributed?
    - Consider impact of age (hypothesis: gun lock distributions are most likely to impact firearm-related deaths/injuries in children)
    - Consider impact of type of firearm-related deaths/injuries (hypothesis: gun lock distributions are most likely to impact accidental deaths/injuries, though it's not impossible to consider that all firearm-related deaths/injuries might decrease with more programming discussing the situation)
  - Balance of geography and "regular" graphs/tables

Starting with some drawings/ideas



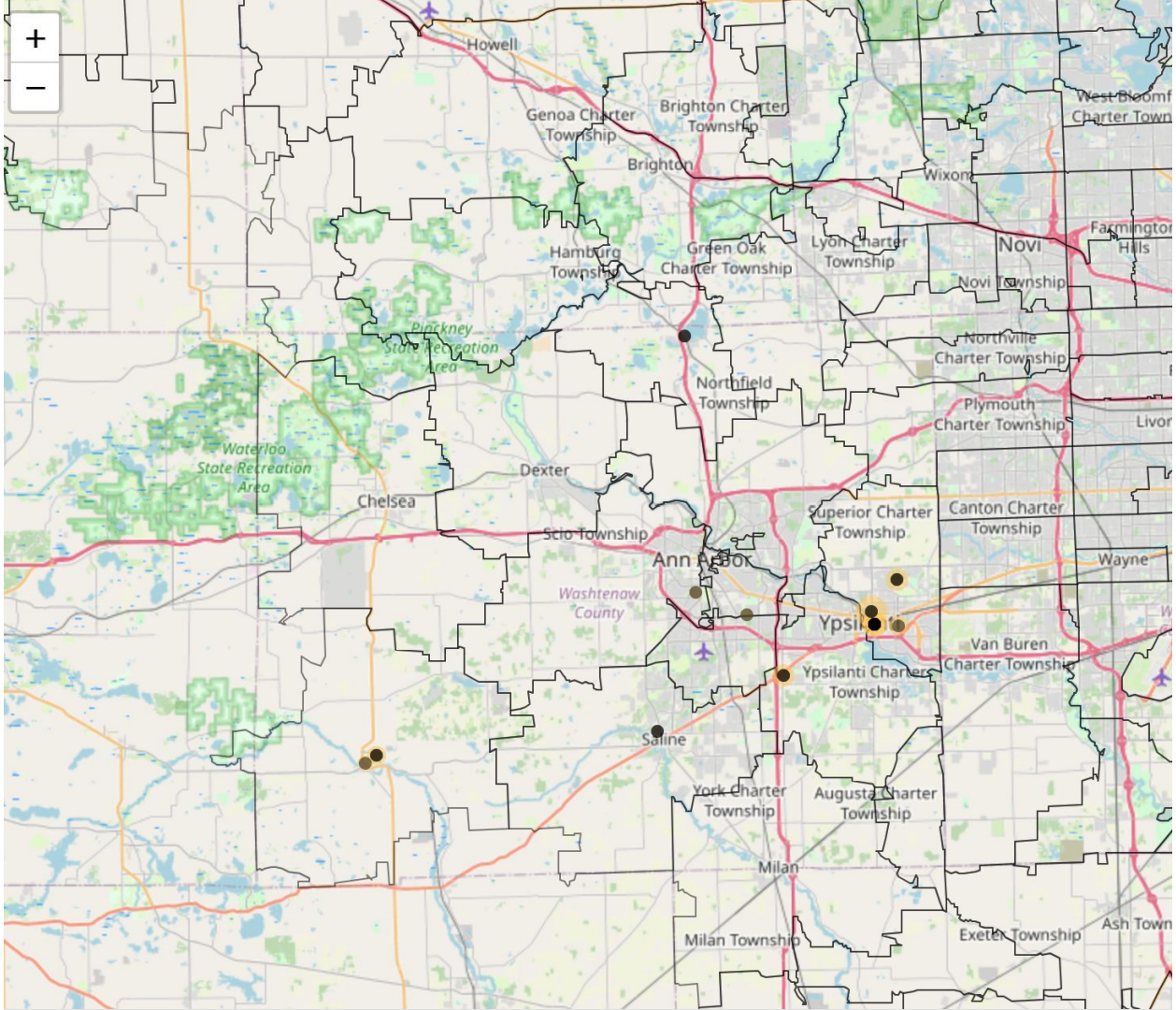
Charts to Make Today

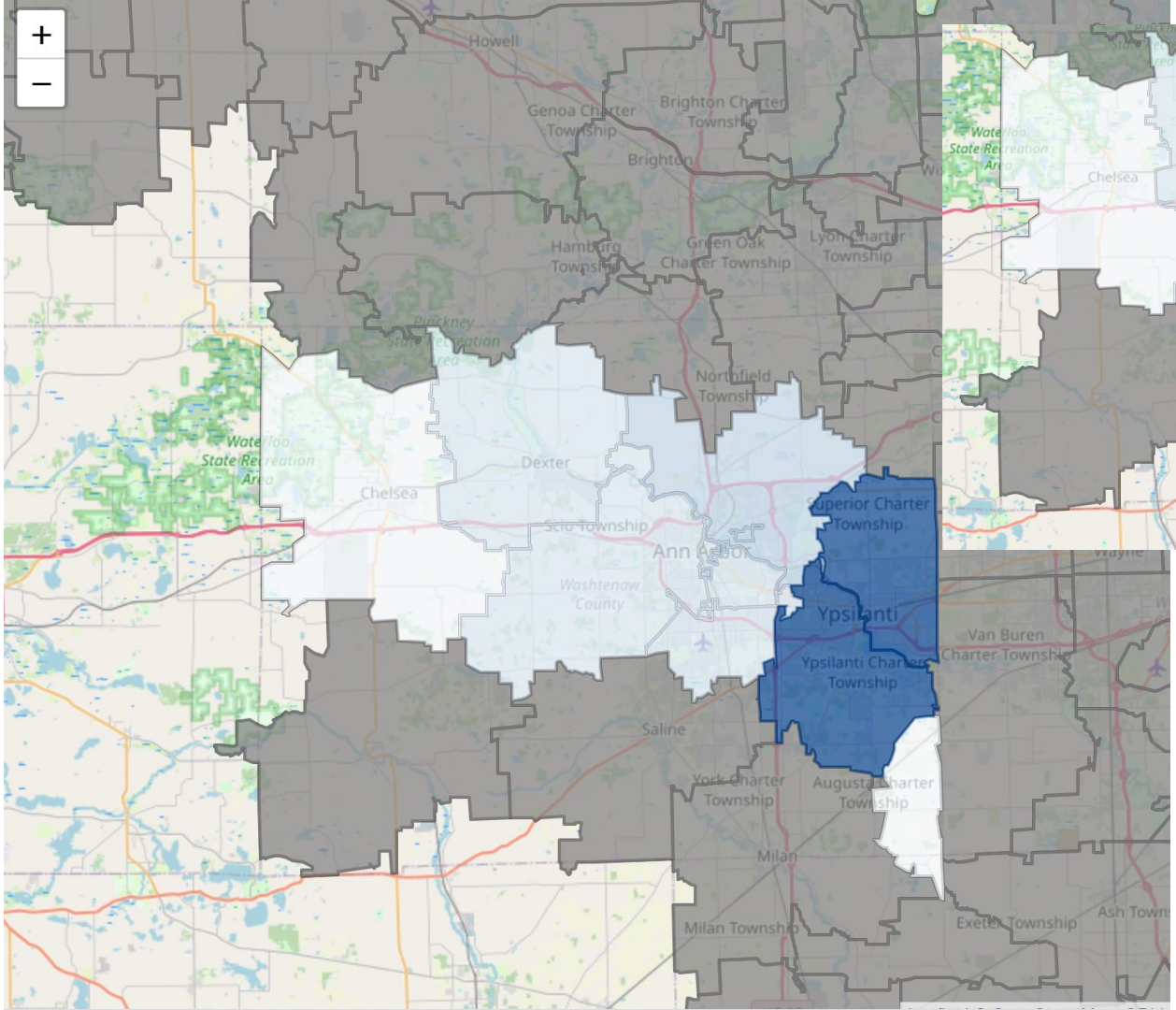
- Map with circles on it
  - Zip code areas colored
- Rolling one + cumulative (lines for events) with bars for (bad things)
- Gun lock events as vertical lines
  - Maybe make the lines colorable by features of the event (size, etc)
- Table with number/fact kinds of things
- All filterable, all stratify-able

Next: Prep some code snippets

The idea is to practice making some of the charts and tables you're interested in having as part of the app. This just helps:

- Clarify what is possible, and what is actually useful/helpful
- Limit coding errors
- Better familiarity with the data file structure, and what edits need to be made to make the data useful (date formatting, new variables to create)
- Conceptualize which variables you want to be able to adjust or not


Howell
Genoa Charter Township
Brighton Charter Township
Brighton
Hamburg Township
Green Oak Charter Township
Lyon Charter Township
Novi
Novi Township
Northville Charter Township
Pinckney State Recreation Area
Northfield Township
Plymouth Charter Township
Waterloo State Recreation Area
Dexter
Chelsea
Scio Township
Superior Charter Township
Canton Charter Township
Ann Arbor
Wayne
Washtenaw County
Ypsilanti
Van Buren Charter Township
Ypsilanti Charter Township
Saline
York Charter Township
Augusta Charter Township
Milan
Milan Township
Exeter Township


Howell
Genoa Charter Township
Brighton Charter Township
Brighton
Hamburg Township
Green Oak Charter Township
Lyon Charter Township
Northfield Township
Waterloo State Recreation Area
Dexter
Chelsea
Scio Township
Ann Arbor
Washtenaw County
Superior Charter Township
Ypsilanti
Ypsilanti Charter Township
Saline
York Charter Township
Augusta Charter Township
Milan
Milan Township
Van Buren Charter Township
Exeter Township
Ash Township
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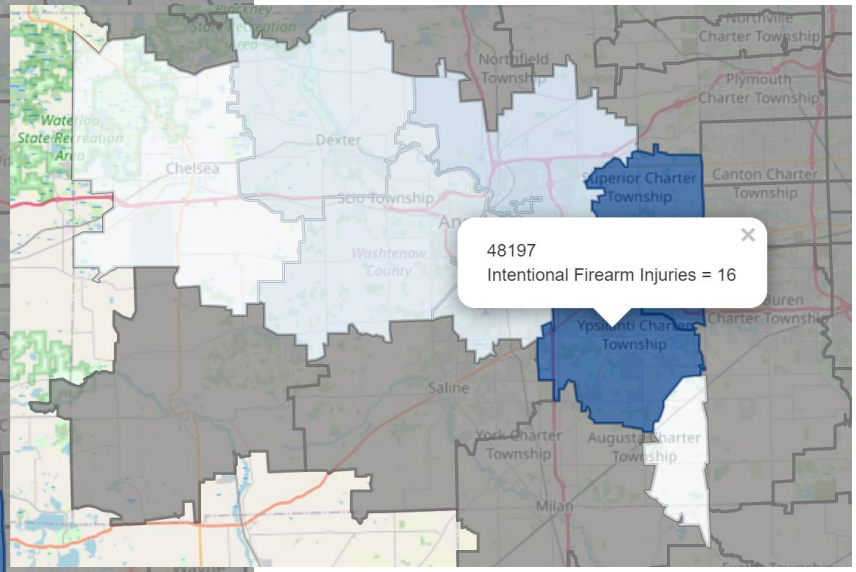
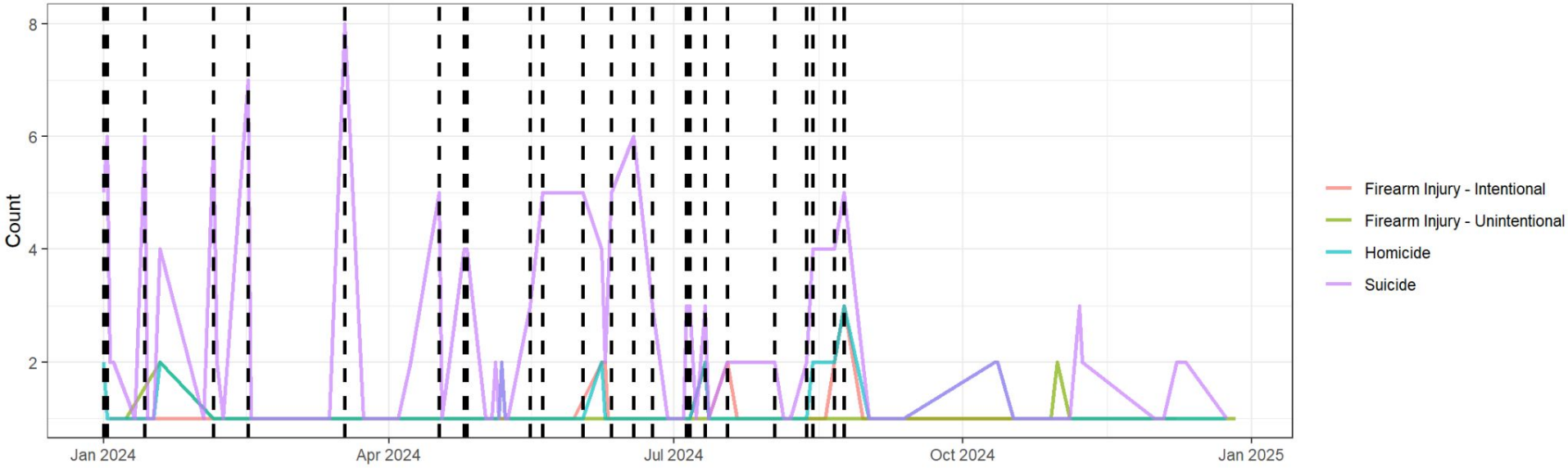
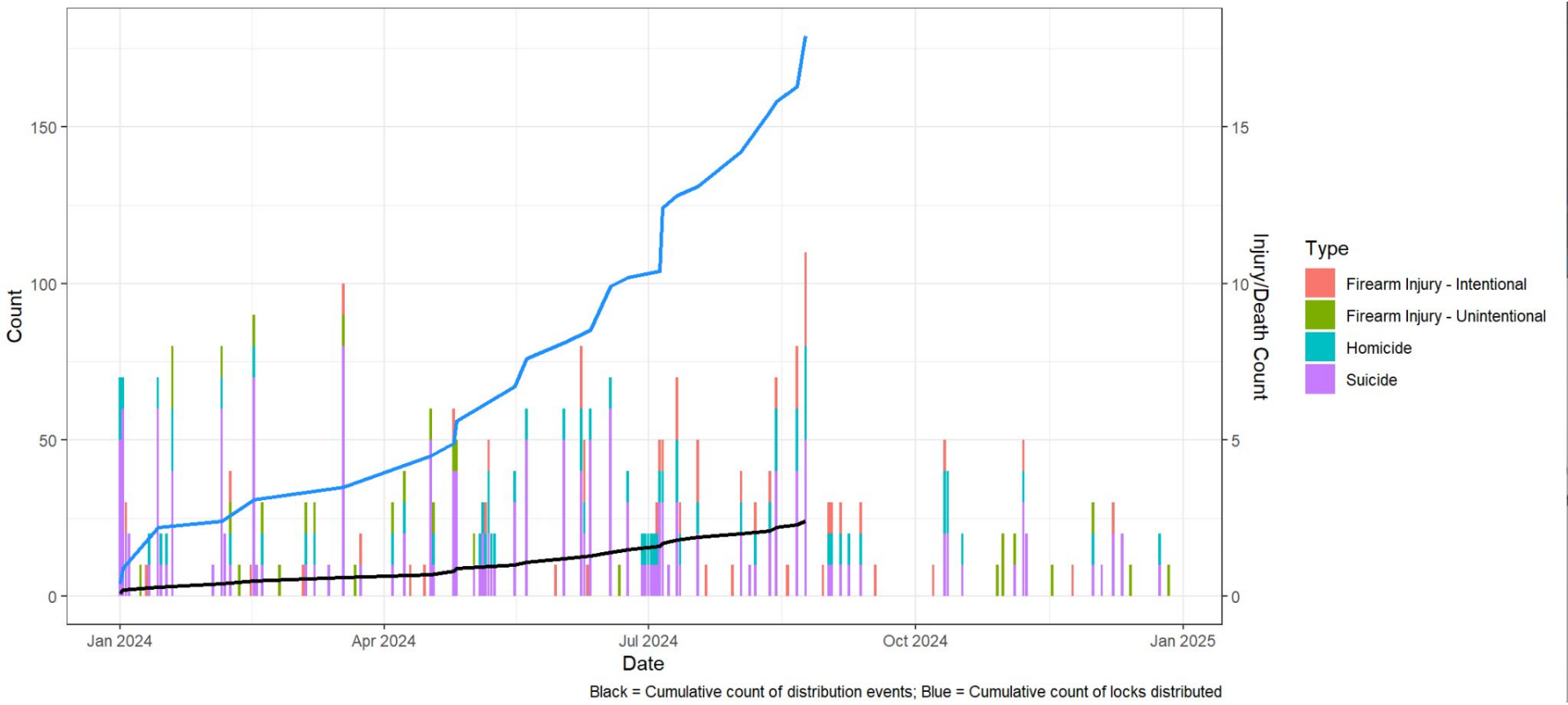
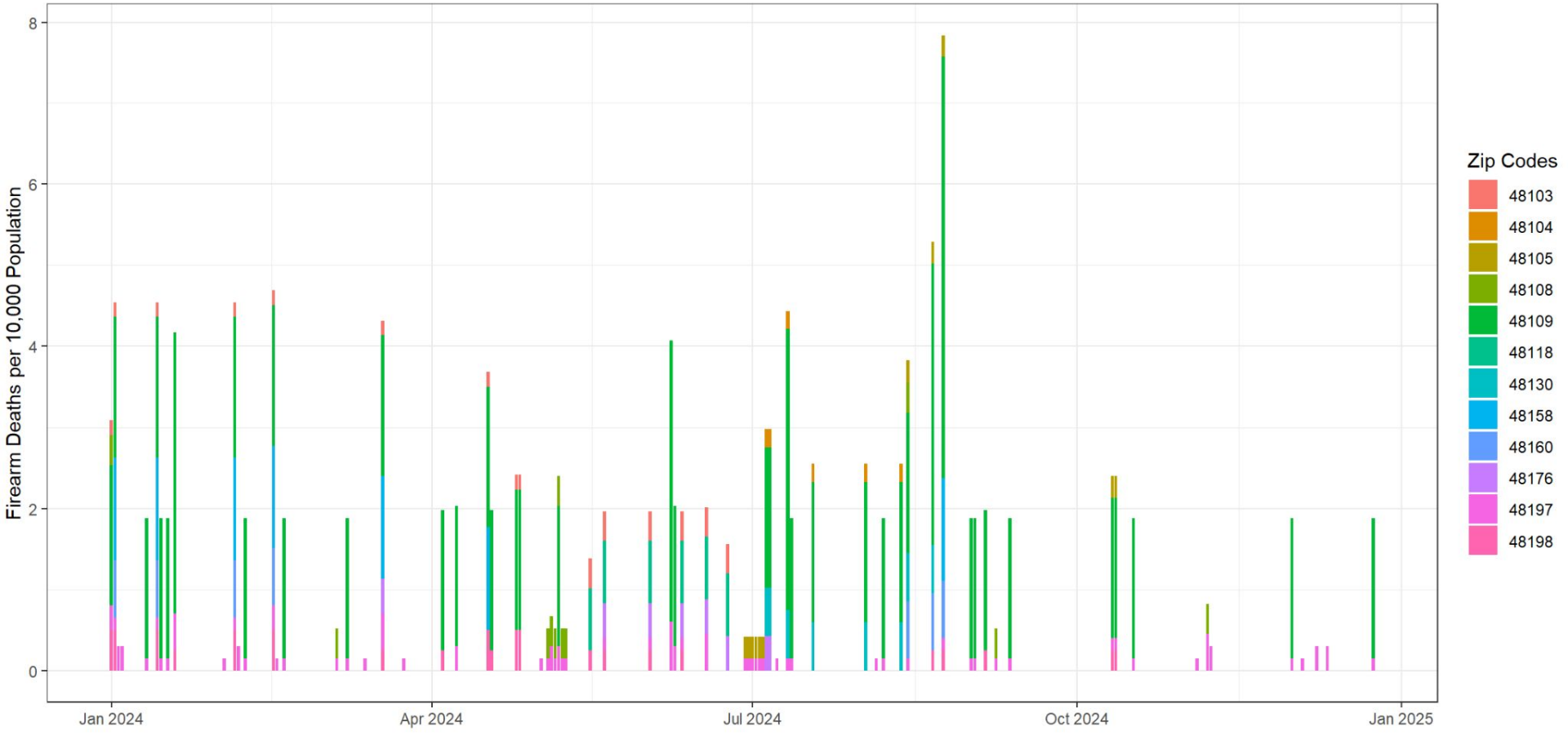

Northfield Township
Northville Charter Township
Plymouth Charter Township
Waterloo State Recreation Area
Dexter
Chelsea
Scio Township
Superior Charter Township
Canton Charter Township
Washtenaw County
48197
Intentional Firearm Injuries = 16
Ypsilanti Charter Township
Saline
York Charter Township
Augusta Charter Township
Milan
Van Buren Charter Township


Count
8
6
4
2
Jan 2024
Apr 2024
Jul 2024
Oct 2024
Jan 2025
Firearm Injury - Intentional
Firearm Injury - Unintentional
Homicide
Suicide


Count
150
100
50
0
Jan 2024
Apr 2024
Jul 2024
Oct 2024
Jan 2025
Date
15
10
5
0
Injury/Death Count
Type
Firearm Injury - Intentional
Firearm Injury - Unintentional
Homicide
Suicide
Black = Cumulative count of distribution events; Blue = Cumulative count of locks distributed


Firearm Deaths per 10,000 Population
8
6
4
2
0
Jan 2024
Apr 2024
Jul 2024
Oct 2024
Jan 2025
Zip Codes
48103
48104
48105
48108
48109
48118
48130
48158
48160
48176
48197
48198

Firearm Death Events Before and After Gun Lock Distribution Event		
Distribution Event on 2024-06-11		
Event Count Prior To This Event	Deaths Prior	Deaths After
12	135	107

Now

Build some things in R!

After: Data Updating, Data File Creation, etc.

- Usually, there's a set of code that "preps" all the data the application needs
- Also, need to know how often new data would be available to set update schedule/expectations of app users
    - If the app is just going to be used locally without being formally "hosted", different things to think about.