

Intersection of social vulnerability, hurricanes, and COVID-19 outcomes

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John M. Drake, Eric Marty, Kamal J.K. Gandhi, Meredith Welch-Devine,
Brian Bledsoe, Marshall Shepherd, Lynne Seymour, Christine C. Fortuin, Cristian Montes

Data and code prepared by Eric Marty.

```
# Dependencies:
# install.packages("here")
# install.packages("tidyverse")
# install.packages("sf")
# install.packages("stringr")

library(here)

## here() starts at /Users/ericmarty/Repositories/disasters-collide
library(tidyverse)

## -- Attaching packages ----- tidyverse 1.3.2 --
## v ggplot2 3.4.0      v purrr   0.3.5
## v tibble  3.1.8      v dplyr  1.0.10
## v tidyr   1.2.0      v stringr 1.4.0
## v readr   2.1.2      v forcats 0.5.1
## -- Conflicts ----- tidyverse_conflicts() --
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()    masks stats::lag()

library(sf)

## Linking to GEOS 3.10.2, GDAL 3.4.2, PROJ 8.2.1; sf_use_s2() is TRUE
library(stringr) # string substitutions
source(here::here("R/visualization.R"))

## Loading required package: grid
```

Data

```
# Load data

# COVID-19 outcomes, SoVI scores, BRIC scores by HSA
master_dataset_hsa_2020 <- read_rds(here::here('data/master_dataset_hsa_2020.Rds')) %>%
  dplyr::filter(HHS.region %in% c("04","06")) # restrict to HHS regions 4 and 6

# Hurricane Tracks
hurr_tracks.sf <- read_rds(here::here('data/hurr_tracks.sf.Rds'))
```

```

# Bounding box
bounding_box <- sf::st_bbox(master_dataset_hsa_2020)
bounding_box.sf <- bounding_box %>% sf::st_as_sfc()

# Tracks in bounding box
intersection <- sf::st_intersects(hurr_tracks.sf, bounding_box.sf)
hurr_tracks_study.sf <- hurr_tracks.sf[which(lengths(intersection) != 0), ]

# Filter hurricanes by date
hurr_tracks_study.sf <- hurr_tracks_study.sf %>%
  filter(date >= "201501010000" & date <= "202101010000")

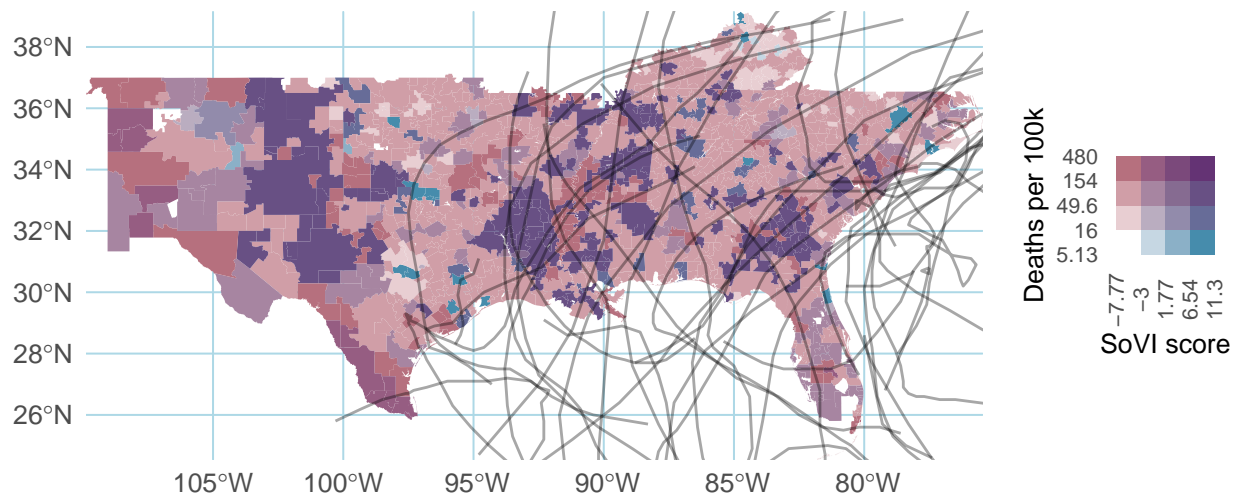
```

Map

```

bivariateChoropleth(data = master_dataset_hsa_2020,
  x = "sovi",
  y = "covid.cum.deaths.2020.per100k",
  nbins = 4,
  x.breaks = NULL,
  y.breaks = "log",
  x.label = "SoVI score",
  y.label = "Deaths per 100k",
  overlay = hurr_tracks_study.sf)

```



```

ggsave("covid_sovi_hurr.pdf", width = 150, height = 150/2.4, units = "mm", device = "pdf")
ggsave("covid_sovi_hurr.jpg", width = 150, height = 150/2.4, units = "mm", device = "jpg", bg = "white")

```