# Run App Analysis

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## Contents



## Overview

This notebook loads in data sources and functions used in app and applies to selected state and death cause so that all data used in the app at the time those variable are selected is available here.

## Libraries and Environment

## Function definitions

### Cache of UNORDERED mortality trend cluster label calculation.

- Currently hard-coded 4 clusters

```
mort.cluster.raw <- function() {
  # Variables:
  #   - county_fips
  #   - cluster

  cdc.data %>%
    cdc.mort.mat(input$state_choice, input$death_cause) %>%
    km.func(4)
}
```

### Cache of Weighed Avg by UNORDERED cluster

- The cluster labels are UNORDERED

```
mort.avg.cluster.raw <- function() {

  # Variables:
  #   - period
  #   - cluster
  #   - death_rate
  #   - count
  cdc.data %>%
    dplyr::filter(state_abbr == input$state_choice, death_cause == input$death_cause) %>%
    dplyr::right_join(mort.cluster.raw(), by = "county_fips") %>%
    dplyr::group_by(period, cluster) %>%
    dplyr::summarise(
      death_rate = sum(death_num) / sum(population) * 10^5,
      count = n()
    ) %>%
    dplyr::ungroup()
}
```

## Cache of MAPPING from UNORDERED mortality trend label to ORDERED mortality trend label

- This is a mapping from raw cluster label to ORDERED cluster.
- Row names are the original cluster and `ord` are the reordered cluster

```
mort.cluster.map <- function() {
  # Variables:
  #   - ord
  mort.avg.cluster.raw() %>%
    dplyr::filter(period == "2015-2017") %>%
    dplyr::arrange(death_rate) %>%
    dplyr::mutate(ord = as.character(1:n())) %>%
    dplyr::select(-c(period, death_rate)) %>%
    textshape::column_to_rownames("cluster")
}
```

## Cache of ORDERED mortality trend cluster label calculation

```
mort.cluster.ord <- function() {
  # Variables:
  #   - county_fips
  #   - cluster
  dplyr::mutate(mort.cluster.raw(), cluster = mort.cluster.map()[cluster, "ord"])
}
```

## Cache of Weighed Avg by ORDERED cluster

- The cluster labels are ORDERED

```
mort.avg.cluster.ord <- function() {
  # Variables:
  #   - period
  #   - cluster
  #   - death_rate
  #   - count
```

```
  dplyr::mutate(mort.avg.cluster.raw(), cluster = mort.cluster.map()[cluster, "ord"])
}
```

## Parameters

```
death.causes <- c("Despair","Cancer","Assault","Cardiovascular")
input <- list(state_choice = state.abb[1],
              death_cause = death.causes[1])
```

## Mortality Rate Trend Line Graph

```
plot_mort_line <- function() {
  ggplot(
    mort.avg.cluster.ord(),
    aes(
      x = period, y = death_rate,
      color = cluster, group = cluster
    )
  ) +
    geom_line(size = 1) +
    geom_point(color = "black", shape = 21, fill = "white") +
    labs.line.mort(input$state_choice, input$death_cause) +
    color.line.cluster() +
    theme.line.mort() +
    guides(
      color = guide_legend(reverse = T)
    )
}
#plot_mort_line()  <- Not sure how to run this
```

## Mortality Rate Table

```
get.cluster.table <- function() {
  rate.table <- mort.avg.cluster.ord() %>%
    dplyr::select(cluster, period, death_rate) %>%
    tidyr::spread(key = period, value = death_rate) %>%
    dplyr::select(cluster, `2000-2002`, `2015-2017`)

  count.table <- mort.avg.cluster.ord() %>%
    dplyr::select(cluster, count) %>%
    base::unique()

  dplyr::left_join(count.table, rate.table, by = "cluster") %>%
    dplyr::mutate(cluster = as.character(cluster)) %>%
    dplyr::arrange(desc(cluster)) %>%
    dplyr::rename(
      "Trend Grp." = "cluster",
      "Count" = "count"
    )
```

```
}
cluster.table <- get.cluster.table()
knitr::kable(cluster.table)
```

| Trend Grp. | Count | 2000-2002 | 2015-2017 |
|---|---|---|---|
| 4 | 14 | 31.426874 | 71.880717 |
| 3 | 7 | 7.893657 | 51.688491 |
| 2 | 33 | 24.049280 | 45.922425 |
| 1 | 13 | 6.254437 | 2.283795 |

```
kendall.cor <- kendall.func(mort.cluster.ord(), chr.data.2019)
knitr::kable(kendall.cor)
```

| chr_code | kendall_cor | kendall_p |
|---|---|---|
| health_outcomes | -0.2515312 | 0.0076259 |
| health_factors | -0.2658415 | 0.0048024 |
| health_behavior | -0.3318891 | 0.0004305 |
| clinical_care | -0.0699004 | 0.4583959 |
| socio_econ | -0.2537328 | 0.0071120 |
| physical_env | 0.0721020 | 0.4443640 |
| pct_fair_or_poor | -0.3428971 | 0.0002754 |
| physically_unhealthy_days | -0.3517034 | 0.0001909 |
| mentally_unhealthy_days | -0.2790511 | 0.0030751 |
| pct_lbw | -0.3054701 | 0.0011937 |
| pct_lbw_black | 0.1462940 | 0.1502145 |
| pct_lbw_white | 0.0689055 | 0.4866582 |
| pct_adult_smoking | -0.2482289 | 0.0084593 |
| pct_adult_obesity | -0.3203914 | 0.0007065 |
| food_environment_index | 0.4364228 | 0.0000047 |
| pct_physically_inactive | 0.0243222 | 0.7972130 |
| pct_with_access | 0.0743035 | 0.4305804 |
| pct_excessive_drinking | 0.2944622 | 0.0017865 |
| pct_alcohol_impaired | -0.2641182 | 0.0051595 |
| num_chlamydia_cases | 0.0330612 | 0.7260879 |
| chlamydia_rate | -0.3798596 | 0.0000561 |
| teen_birth_rate | 0.0952186 | 0.3124655 |
| teen_birth_rate_black | -0.0128883 | 0.8983038 |
| teen_birth_rate_hispanic | 0.0859888 | 0.5462555 |
| teen_birth_rate_white | 0.1566080 | 0.1170661 |
| num_uninsured | 0.2785637 | 0.0031336 |
| pct_uninsured | 0.1304440 | 0.1664421 |
| num_primary_care_physicians | 0.2302249 | 0.0175514 |
| pcp_rate | 0.0826336 | 0.3894237 |
| pcp_ratio | -0.0826734 | 0.3894118 |
| num_dentists | 0.2253006 | 0.0208803 |
| dentist_rate | 0.1078257 | 0.2607338 |
| dentist_ratio | -0.1078257 | 0.2607338 |
| num_mental_health_providers | 0.1753598 | 0.0712245 |
| mhp_rate | 0.0885360 | 0.3564561 |
| mhp_ratio | -0.0885360 | 0.3564561 |
| preventable_hosp_rate | -0.0941178 | 0.3180926 |
| preventable_hosp_rate_black | -0.0090756 | 0.9251087 |

| chr_code | kendall_cor | kendall_p |
|---|---|---|
| preventable_hosp_rate_white | -0.0111862 | 0.9071008 |
| pct_screened | -0.0791060 | 0.4151092 |
| pct_screened_black | -0.0336438 | 0.7290792 |
| pct_screened_white | -0.1412335 | 0.1466314 |
| pct_vaccinated | 0.2238565 | 0.0204270 |
| pct_vaccinated_black | 0.0945739 | 0.3303661 |
| pct_vaccinated_white | 0.0745786 | 0.4444155 |
| cohort_size | 0.2378251 | 0.0116602 |
| graduation_rate | 0.1640553 | 0.0818773 |
| num_some_college | 0.2339185 | 0.0130880 |
| some_collage_population | 0.2433303 | 0.0098614 |
| pct_some_college | 0.0412797 | 0.6614673 |
| num_unemployed | 0.2086475 | 0.0269100 |
| labor_force | 0.2339185 | 0.0130880 |
| pct_unemployed | -0.2526320 | 0.0073649 |
| pct_children_in_poverty | -0.3606942 | 0.0001341 |
| pct_children_in_poverty_black | -0.2771750 | 0.0037909 |
| pct_children_in_poverty_hispanic | -0.0411926 | 0.7077790 |
| pct_children_in_poverty_white | -0.0529345 | 0.5776506 |
| 80th_percentile_income | 0.2592368 | 0.0059607 |
| 20th_percentile_income | 0.3583082 | 0.0001442 |
| income_ratio | -0.3473002 | 0.0002295 |
| num_single_parent_households | 0.1315448 | 0.1628941 |
| num_households | 0.2504304 | 0.0078951 |
| pct_single_parent_households | -0.3770217 | 0.0000635 |
| num_associations | 0.2330593 | 0.0137243 |
| association_rate | 0.0798075 | 0.3972271 |
| annual_average_violent_crimes | 0.1530942 | 0.1073224 |
| violent_crime_rate | -0.1388337 | 0.1441067 |
| average_daily_pm25 | 0.1277139 | 0.1841584 |
| presence_of_violation | -0.0455671 | 0.6905870 |
| pct_severe_housing_problems | -0.2801519 | 0.0029606 |
| severe_housing_cost_burden | -0.2801519 | 0.0029606 |
| overcrowding | -0.1128313 | 0.2313477 |
| inadequate_facilities | -0.1271416 | 0.1774347 |
| pct_drive_alone | 0.1667702 | 0.0768824 |
| pct_drive_alone_black | 0.0321249 | 0.7615402 |
| pct_drive_alone_white | 0.1326951 | 0.1960185 |
| num_workers_who_drive_alone | 0.2361201 | 0.0122548 |
| pct_long_commute_drives_alone | 0.0220308 | 0.8153355 |
| pct_frequent_physical_distress | -0.3450987 | 0.0002515 |
| pct_frequent_mental_distress | -0.3164780 | 0.0007875 |
| pct_diabetic | -0.2960858 | 0.0017474 |
| num_hiv_cases | 0.0193384 | 0.8380425 |
| hiv_prevalence_rate | -0.3428971 | 0.0002754 |
| num_food_insecure | 0.1376614 | 0.1443832 |
| pct_food_insecure | -0.4052753 | 0.0000177 |
| num_limited_access | -0.0423805 | 0.6530239 |
| pct_limited_access | -0.3021677 | 0.0013490 |
| pct_insufficient_sleep | -0.2889582 | 0.0021751 |
| num_uninsured_adults | 0.2768495 | 0.0033165 |
| pct_uninsured_adults | 0.1260408 | 0.1812165 |

| chr_code | kendall_cor | kendall_p |
|---|---|---|
| num_uninsured_children | 0.2808929 | 0.0029038 |
| pct_uninsured_children | 0.1601654 | 0.0893180 |
| other_pcp_rate | -0.0489853 | 0.6033233 |
| other_pcp_ratio | 0.0484459 | 0.6073955 |
| pct_disconnected_youth | -0.0048900 | 0.9688970 |
| household_income | 0.3351915 | 0.0003770 |
| household_income_black | 0.2516054 | 0.0080525 |
| household_income_hispanic | 0.0783352 | 0.5089459 |
| household_income_white | -0.0887480 | 0.3498487 |
| pct_free_or_reduced_lunch | -0.2900590 | 0.0020917 |
| seg_idx_black_or_white | 0.2922465 | 0.0020800 |
| seg_idx_non_white_or_white | 0.1810805 | 0.0547481 |
| homicide_rate | -0.2464284 | 0.0270171 |
| num_firearm_fatalities | 0.1746045 | 0.0744225 |
| firearm_fatalities_rate | 0.0062937 | 0.9486529 |
| num_homeowners | 0.2603376 | 0.0057516 |
| pct_homeowners | 0.2196082 | 0.0198291 |
| num_households_with_severe_cost_burden | 0.1513591 | 0.1083640 |
| pct_severe_housing_cost_burden | -0.2823534 | 0.0027430 |
| population | 0.2482289 | 0.0084593 |
| pct_less_18 | 0.0632956 | 0.5019475 |
| pct_65_and_over | -0.0610940 | 0.5169367 |
| num_african_american | -0.1392503 | 0.1396373 |
| pct_african_american | -0.3968359 | 0.0000256 |
| num_american_indian_or_alaskan_native | 0.3781224 | 0.0000604 |
| pct_american_indian_or_alaskan_native | 0.3473002 | 0.0002295 |
| num_asian | 0.1222433 | 0.1949138 |
| pct_asian | -0.0423805 | 0.6530239 |
| num_native_hawaiian_or_other_pacific_islander | 0.1860737 | 0.0502384 |
| pct_native_hawaiian_or_other_pacific_islander | 0.1051971 | 0.2647626 |
| num_hispanic | 0.2504304 | 0.0078951 |
| pct_hispanic | 0.1799797 | 0.0562372 |
| num_non_hispanic_white | 0.3032685 | 0.0012953 |
| pct_non_hispanic_white | 0.3627113 | 0.0001193 |
| num_not_proficient_in_english | 0.1891285 | 0.0451910 |
| pct_not_proficient_in_english | 0.0738534 | 0.4339529 |
| pct_female | -0.3351915 | 0.0003770 |
| num_rural | 0.3506026 | 0.0001999 |
| pct_rural | -0.0543559 | 0.5697225 |