Health Risk and Worker Density

Nathan Seto

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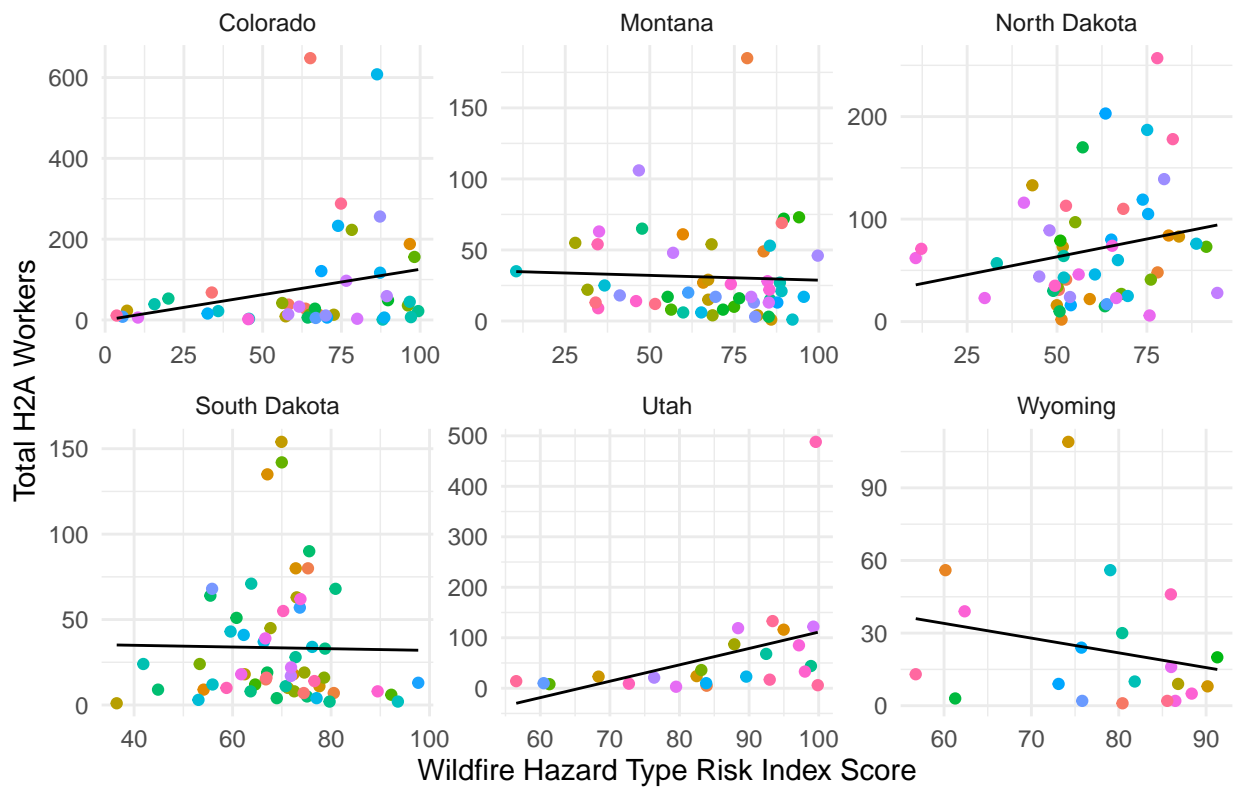
(1) What is the relationship between health risk factors and worker densities in the HICAHS area?

i. calculate unconditional correlations between worker concentrations (e.g., totals) and fire and heat environmental exposure scales (identified on website as capturing aspects of "human risk")
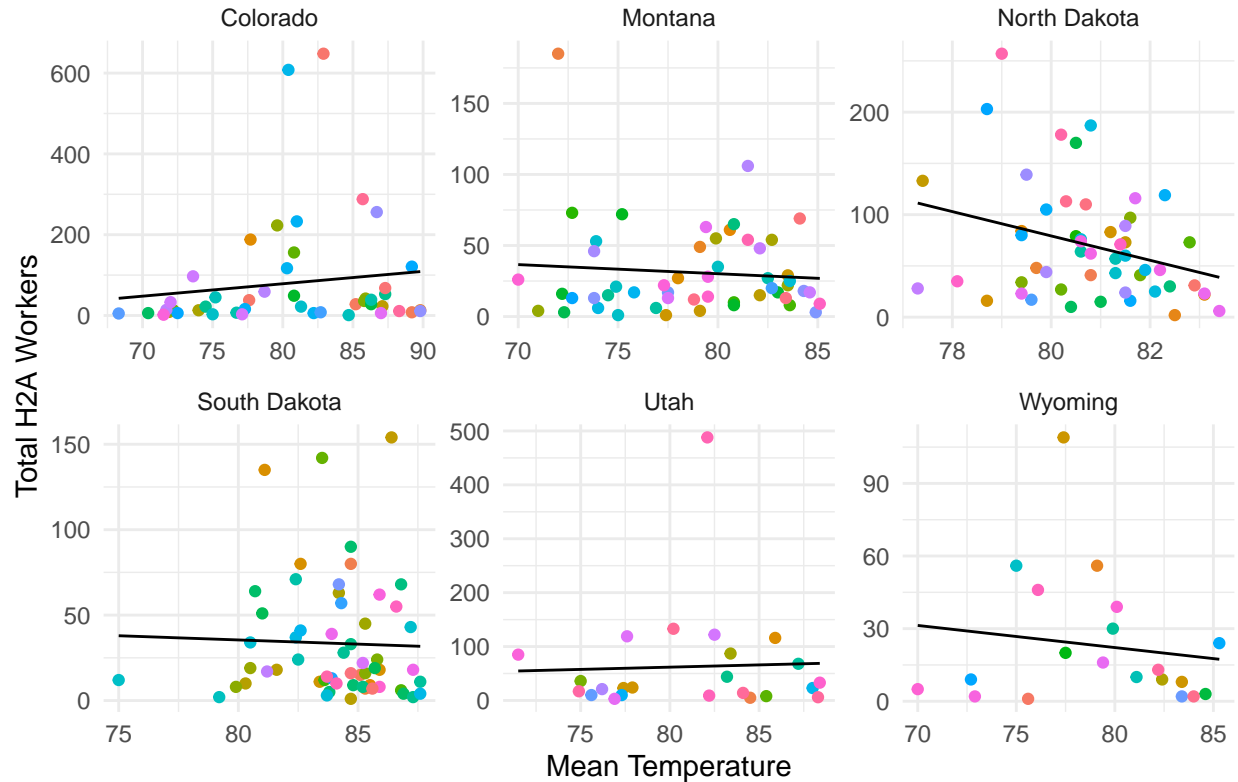
ii.similar correlations for other available indicators that may be of interest

iii. use county-level as the geo-observational unit

Wildfire Risk Score and Worker Totals

Average Temperature and Worker Totals

State	Multiple R-Sqr	Pearson Corr. Coef.
Colorado	0.017	0.130
Wyoming	0.019	-0.138
North Dakota	0.077	-0.277
South Dakota	0.008	-0.089
Utah	0.000	0.010

```
## Linear Model of Maximum Temperature and Worker Totals:
##
## Summary Statistics
## =================================================
##                          Dependent variable:
##                       ----------------------------
##                              total_workers
## -------------------------------------------------
## wildfire_exposure_total         0.000***
##                                  (0.000)
##
## Constant                        41.902***
##                                  (5.085)
##
## -------------------------------------------------
## Observations                      252
## R2                               0.080
## Adjusted R2                      0.076
```

```
## Residual Std. Error            74.599 (df = 250)
## F Statistic              21.704*** (df = 1; 250)
## =======================================================
## Note:                       *p<0.1; **p<0.05; ***p<0.01

##
## Linear Model of Wild Fire Hazard Index Score and Worker Totals:

##
## Summary Statistics of Coefficients
## ===================================================================
##                                              Dependent variable:
##                                           ---------------------------
##                                                 total_workers
## -------------------------------------------------------------------
## wildfire_hazard_type_risk_index_score            0.476*
##                                                  (0.246)
##
## Constant                                         18.508
##                                                  (17.431)
##
## -------------------------------------------------------------------
## Observations                                       252
## R2                                                0.015
## Adjusted R2                                       0.011
## Residual Std. Error                        77.192 (df = 250)
## F Statistic                             3.757* (df = 1; 250)
## ===================================================================
## Note:                             *p<0.1; **p<0.05; ***p<0.01

##
## Linear Model of Fire Exposure Total and Worker Totals:

##
## Summary Statistics of Coefficients
## =================================================
##                           Dependent variable:
##                       ---------------------------
##                              total_workers
## -------------------------------------------------
## wildfire_exposure_total        0.000***
##                                 (0.000)
##
## Constant                       41.902***
##                                 (5.085)
##
## -------------------------------------------------
## Observations                     252
## R2                              0.080
## Adjusted R2                     0.076
## Residual Std. Error        74.599 (df = 250)
## F Statistic             21.704*** (df = 1; 250)
## =================================================
## Note:                 *p<0.1; **p<0.05; ***p<0.01

## # A tibble: 35 x 2
```

```
##    column                                              correlation
##    <chr>                                                      <dbl>
##  1 agriculture_value_($)                                      0.359
##  2 expected_annual_loss_score_composite                       0.343
##  3 expected_annual_loss_total_composite                       0.343
##  4 national_risk_index_value_composite                        0.325
##  5 national_risk_index_score_composite                        0.325
##  6 expected_annual_loss_building_value_composite              0.324
##  7 wildfire_exposure_impacted_area_(sq_mi)                    0.302
##  8 building_value_($)                                         0.299
##  9 expected_annual_loss_state_percentile_composite            0.298
## 10 national_risk_index_state_percentile_composite             0.281
## 11 population_(2020)                                          0.234
## 12 wildfire_exposure_agriculture_value                        0.213
## 13 wildfire_exposure_building_value                           0.201
## 14 wildfire_exposure_total                                    0.149
## 15 wildfire_exposure_population                               0.146
## 16 wildfire_exposure_population_equivalence                   0.146
## 17 wildfire_historic_loss_ratio_agriculture                  0.0661
## 18 wildfire_expected_annual_loss_agriculture_value           0.0598
## 19 wildfire_expected_annual_loss_building_value              0.0434
## 20 wildfire_expected_annual_loss_total                       0.0424
## 21 wildfire_expected_annual_loss_score                       0.0424
## 22 wildfire_hazard_type_risk_index_value                     0.0208
## 23 wildfire_hazard_type_risk_index_score                     0.0208
## 24 area_(sq_mi)                                              0.0139
## 25 mean_temperature                                        -0.00785
## 26 maximum_temperature                                      -0.0584
## 27 wildfire_expected_annual_loss_population                  -0.0711
## 28 wildfire_expected_annual_loss_population_equivalence      -0.0712
## 29 wildfire_annualized_frequency                            -0.0935
## 30 wildfire_expected_annual_loss_rate_agriculture            -0.112
## 31 wildfire_historic_loss_ratio_population                   -0.143
## 32 wildfire_expected_annual_loss_rate_building               -0.197
## 33 wildfire_expected_annual_loss_rate_national_percentile    -0.203
## 34 wildfire_expected_annual_loss_rate_population             -0.241
## 35 wildfire_historic_loss_ratio_buildings                       NA
```

Correlation Plot