Health Risk and Worker Density

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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 The correlation between heat, fire, and worker concentrations (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 population_(2020)                                             0.380
##  2 building_value_($)                                            0.374
##  3 expected_annual_loss_score_composite                          0.350
```

```
##  4 national_risk_index_score_composite                          0.345
##  5 expected_annual_loss_total_composite                         0.304
##  6 expected_annual_loss_building_value_composite                0.302
##  7 national_risk_index_value_composite                          0.302
##  8 expected_annual_loss_state_percentile_composite              0.297
##  9 national_risk_index_state_percentile_composite               0.293
## 10 wildfire_exposure_population                                 0.283
## 11 wildfire_exposure_population_equivalence                     0.283
## 12 wildfire_exposure_total                                      0.283
## 13 agriculture_value_($)                                        0.260
## 14 wildfire_exposure_building_value                             0.256
## 15 wildfire_exposure_agriculture_value                          0.251
## 16 wildfire_expected_annual_loss_score                          0.138
## 17 wildfire_hazard_type_risk_index_score                        0.122
## 18 wildfire_expected_annual_loss_building_value                 0.121
## 19 wildfire_exposure_impacted_area_(sq_mi)                      0.120
## 20 wildfire_expected_annual_loss_total                          0.118
## 21 wildfire_hazard_type_risk_index_value                        0.0902
## 22 wildfire_expected_annual_loss_agriculture_value              0.0793
## 23 wildfire_annualized_frequency                                0.0621
## 24 mean_temperature                                             0.0334
## 25 area_(sq_mi)                                                 0.0214
## 26 maximum_temperature                                          0.0140
## 27 wildfire_expected_annual_loss_population                    -0.0119
## 28 wildfire_expected_annual_loss_population_equivalence        -0.0119
## 29 wildfire_expected_annual_loss_rate_population               -0.0545
## 30 wildfire_historic_loss_ratio_agriculture                    -0.0600
## 31 wildfire_expected_annual_loss_rate_building                 -0.0881
## 32 wildfire_expected_annual_loss_rate_agriculture              -0.0910
## 33 wildfire_expected_annual_loss_rate_national_percentile      -0.124
## 34 wildfire_historic_loss_ratio_population                     -0.173
## 35 wildfire_historic_loss_ratio_buildings                      NA
```

Correlation Plot