MortalityMinder Submission Video (Link)

https://www.youtube.com/watch?v=bjjcin7KXaA

MortalityMinder Video Transcript

Mortality rates are going up in the United States, and we need to figure out what to do about it. So, we built an app to help understand mortality and the factors behind it at the national, county, and state levels.

The app works by examining data from the Centers for Disease Control. Here, we're looking at deaths of despair. These are deaths due to suicide, overdose substance abuse, and poisoning, basically self-harm.

Nationwide View

Here, we're going to look at the deaths of despair mortality rates in the United States by county, and we can look through time. Here it's light. There's not too much of the deaths of despair initially. As we move through time, we can see it gets worse and worse and worse and worse until we get to 2015-2017. Here, we can see that there are large areas of the United States that are experiencing high rates of mortality. If we look over here, we can see a curve that shows the mortality rate in the nation through time, and we can see that it has risen over 90% in less than 20 years.

MortalityMinder is an interactive presentation, so we can dig down into details of why this is happening by moving to the next page.

State View

Here, we can see that we can divide the counties into different risk groups, so we have six different risk groups. These curves represent those risk groups. We can see that some counties are doing extremely well while other counties have increased risk, with these dramatically bad ones here having the highest rates. Then, we can look at which socioeconomic factors are associated with these dramatic increases in mortality. Here we can see the top factors for deaths of despair in the United States are being mentally unhealthy, having frequent mental distress, being physically unhealthy, and being unemployed. To further understand, we can examine and what's happening at the state level.

You can select states that you're interested in. I'm going to go to the state of Ohio. Here we can see in Ohio that we have high-risk areas in the Ohio Valley and better risk up here. You can see here that the best areas in Ohio were actually much better than the state and the national average, which is shown in blue. But, we have these counties that have had almost a three-fold increase in deaths of despair. So, we can again look at the factors determining them, and here we can see that single-parent households is a top contributing factor while homeownership is protective. MortalityMinder enables an individualized view from a state's perspective. So let's look at another state, California.

If we look at California, we can see that there are different risk groups. If we look at a county here, like Los Angeles, we can see that it's in this low-risk group, and that line is actually Los Angeles's deaths of despair mortality rate. It's very, very good and flat.

We can look at a high-risk group county like Humboldt County up here, and we can see that it's mortality rate is much, much higher. This blue line is the national average. Much of California is doing better, but some places are doing very poorly. If we ask why, we can look at the associated social and economic factors. We see that having food insecurity, being rural, being a non-Hispanic white, and being mentally unhealthy all contributed to deaths of despair, and having good access to food helps.

If we want to drill down into more detail on these factors, we can either swipe to the next page, hit the carrot, or pick one of these factors.

Factor View

Then, we get the definition of the factor and its source. This one's source is Map the Meal Gap, and we got this originally from County Health Rankings. We can see the correlation and significance of the factor. We can also look at individual counties. If we look here, we can see individual counties plotted, and you can see they're colored by their risk group. This axis is the mortality rate, and this axis is food insecurity. You can see this is a clear upward trend. This is also represented with box plots that show the distribution for low, medium, and high-risk counties. This entire analysis can be repeated for other causes of death.

Project Overview

If we move to the next page, we get a full description of what's going on here, including the ability to download the source data and download the current results.

This app is an open-source app written in R. It's available on GitHub, and there is a Wiki that fully documents all features of the app. MortalityMinder was created by students in the Health Analytics Challenge Lab and Rensselaer Polytechnic Institute with generous support from the United Health Foundation, and the Rensselaer IDEA. Our hope is that this app will enable healthcare organizations and policymakers to understand the determinants of mortality to improve longevity in the United States.