Health Spending and Life Expectancy in Eighteen OECD Countries

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2024-08-21

## Introduction

I want to produce a version of a figure I first saw in Kenworthy (2014, 51). Versions of it have appeared elsewhere, too. To make it we’ll need to get data from the OECD and then write some code to draw the graph.

library(tidyverse)  
my\_colors <- c("grey50", "firebrick")

## The Data

We’re working in this little project, so our local data files and our output is defined with respect to where the project is on our computer. In R, the here package helps us stay disciplined about this.

library(here)

here() starts at /Users/kjhealy/Documents/courses/mptc\_oecd

We set things up by getting the data from a file in the project. It’s a comma-separated values or CSV file. To do our work we’ll put it in a thing named df.

## The data are generated by R/make\_oecd\_df.R  
df <- read\_csv(  
 here("data", "oecd\_health\_lifexp.csv"),  
 col\_types = cols(  
 country = col\_character(),  
 iso3 = col\_character(),  
 year = col\_integer(),  
 life\_exp = col\_double(),  
 health\_ppp = col\_double()  
 )  
)  
  
df

# A tibble: 2,238 × 5  
 country iso3 year life\_exp health\_ppp  
 <chr> <chr> <int> <dbl> <dbl>  
 1 Australia AUS 1962 71 NA   
 2 Australia AUS 1967 70.8 NA   
 3 Australia AUS 1971 NA 999.  
 4 Australia AUS 1972 NA 1027.  
 5 Australia AUS 1973 NA 1080.  
 6 Australia AUS 1974 NA 1199.  
 7 Australia AUS 1975 NA 1351.  
 8 Australia AUS 1976 72.8 1387.  
 9 Australia AUS 1977 NA 1444.  
10 Australia AUS 1978 NA 1451.  
# ℹ 2,228 more rows

There’s more data here than we are interested in. We’ll look at these countries only:

my\_countries <- c("AUT", "AUS", "BEL", "CAN", "DEU", "DNK", "ESP", "FIN", "FRA",  
 "GBR", "GRC", "IRL", "ITA", "JPN", "NLD", "NOR", "NZL",  
 "SWE", "USA")

We’re also just interested in 1970 and after. And in particular we want to draw a figure that contrasts the US and all the other countries. For that we’ll make an indicator or flag or dummy variable that picks out the US from all the other countries. Finally, we’ll smooth the trends a little by calculating a three-year moving average for each country.

df\_plot <- df |>  
 filter(iso3 %in% my\_countries, year > 1969) |>  
 drop\_na() |>  
 arrange(country, year) |>  
 group\_by(country) |>  
 mutate(  
 us\_flag = ifelse(iso3 == "USA", "United States", "Eighteen OECD Countries"),  
 avg\_spend = slider::slide\_dbl(health\_ppp, mean, .before = 2, .after = 2)  
 )  
  
df\_plot

# A tibble: 909 × 7  
# Groups: country [19]  
 country iso3 year life\_exp health\_ppp us\_flag avg\_spend  
 <chr> <chr> <int> <dbl> <dbl> <chr> <dbl>  
 1 Australia AUS 1976 72.8 1387. Eighteen OECD Countries 1480.  
 2 Australia AUS 1981 74.8 1527. Eighteen OECD Countries 1503.  
 3 Australia AUS 1982 74.6 1526. Eighteen OECD Countries 1523.  
 4 Australia AUS 1983 75.4 1572. Eighteen OECD Countries 1576.  
 5 Australia AUS 1984 75.7 1606. Eighteen OECD Countries 1612.  
 6 Australia AUS 1985 75.5 1649. Eighteen OECD Countries 1655.  
 7 Australia AUS 1986 76 1706. Eighteen OECD Countries 1702.  
 8 Australia AUS 1987 76.2 1741. Eighteen OECD Countries 1751.  
 9 Australia AUS 1988 76.2 1809. Eighteen OECD Countries 1798.  
10 Australia AUS 1989 76.4 1850. Eighteen OECD Countries 1842.  
# ℹ 899 more rows

## The Figure and some Tables

Now we write some code to draw the plot we want. The results are shown in [Figure 1](#fig-health).

df\_plot |>  
 ggplot(aes(  
 x = avg\_spend,  
 y = life\_exp,  
 group = country,  
 color = us\_flag  
 )) +  
 geom\_line() +  
 scale\_color\_manual(values = my\_colors) +  
 scale\_x\_continuous(labels = scales::label\_dollar()) +  
 labs(  
 color = NULL,  
 title = "Health Spending and Life Expectancy, 1970-2023",  
 x = "Heath Spending (Per capita, constant prices, constant PPPs, five year rolling average)",  
 y = "Life Expectancy",  
 caption = "Data: OECD. Graph: @kjhealy"  
 ) +  
 theme\_bw() +  
 guides(color = guide\_legend(nrow = 1)) +  
 theme(legend.position = "top", legend.text.position = "top")

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| --- |
| Figure 1: The figure we were trying to draw |

Let’s also make summary table or two while we are here. First, a table of the average life expectancy at birth for every country. This is shown in [Table 1](#tbl-countrymeans).

df\_plot |>  
 summarize(`Mean` = round(mean(life\_exp), 1)) |>  
 rename(Country = country) |>  
 kableExtra::kable()

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| Table 1: Average Life Expectancy at Birth, in years, 1970-2023   | Country | Mean | | --- | --- | | Australia | 79.3 | | Austria | 77.0 | | Belgium | 77.0 | | Canada | 79.2 | | Denmark | 77.0 | | Finland | 76.9 | | France | 79.7 | | Germany | 76.9 | | Greece | 79.5 | | Ireland | 77.5 | | Italy | 80.7 | | Japan | 79.7 | | Netherlands | 78.3 | | New Zealand | 77.0 | | Norway | 78.5 | | Spain | 79.0 | | Sweden | 79.0 | | United Kingdom | 77.5 | | United States | 75.9 | |

And second, [Table 2](#tbl-ppp-yrmeans) summarizes spending on health each year across countries.

df\_plot |>  
 group\_by(year) |>  
 summarize(across(  
 health\_ppp,  
 list(  
 Min = \(x) min(x),  
 Mean = \(x) mean(x),  
 Median = \(x) median(x),  
 Max = \(x) max(x)  
 ),  
 .names = "{fn}"  
 )) |>  
 mutate(across(  
 starts\_with("M"),  
 \(x) scales::label\_currency(accuracy = 1, prefix = "")(x)  
 )) |>  
 filter(year %in% c(seq(1970, 2023, 5), 2023)) |>  
 rename(Year = year) |>  
 kableExtra::kable()

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| Table 2: Range of Spending across countries in Constant PPP per capita, selected years 1970-2023, rounded to the nearest dollar.   | Year | Min | Mean | Median | Max | | --- | --- | --- | --- | --- | | 1970 | 466 | 962 | 906 | 1,663 | | 1975 | 764 | 1,557 | 1,461 | 2,145 | | 1980 | 936 | 1,749 | 1,774 | 2,666 | | 1985 | 976 | 1,909 | 1,881 | 3,455 | | 1990 | 1,121 | 2,275 | 2,413 | 4,470 | | 1995 | 1,484 | 2,567 | 2,373 | 5,255 | | 2000 | 1,904 | 3,081 | 2,796 | 6,068 | | 2005 | 2,687 | 3,763 | 3,508 | 7,682 | | 2010 | 2,964 | 4,282 | 4,234 | 8,489 | | 2015 | 2,123 | 4,595 | 4,669 | 9,355 | | 2020 | 2,348 | 5,102 | 5,171 | 11,081 | | 2023 | 3,249 | 4,699 | 5,078 | 5,392 | |

## References

Kenworthy, Lane. 2014. *Social Democratic America*. New York: Oxford University Press.