

Daylight Savings Time (DST) & its Effects on Society.

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In late February 2022, the Energy and Commerce Committee announced that the Consumer Protection and Commerce Subcommittee would hold a hearing on March 9, 2022, to discuss Daylight Saving Time (DST); the hearing was entitled, “Changing Times: Revisiting Spring Forward, Fall Back.” (Release, 2022) The subcommittee Chair Jan Schakowsky (D-IL) stated in a press release the following:

“Twice a year, in the spring and fall, people across the nation adjust their clocks and modify their schedules to adjust to the new time,” Pallone and Schakowsky said. “Historians will provide all sorts of justifications for why we do this, but increasingly our changing of the clocks twice a year is getting harder to explain. Next week, the Subcommittee will hear from a panel of experts on the impacts of springing forward and falling back, and whether it still makes sense in our modern times.”

The subcommittee conducted this hearing to decide whether or not a bipartisan bill would move forward through government in order to ensure Americans would no longer have to change their clocks twice a year starting in 2023; eliminating standard time or the switch that occurs during winter months. (Why Do We Have Daylight Saving Time and How Did it Start?, 2022) However, this isn’t the first time in history our government has attempted to do away with the time change, so what can the data tell us about the arguments made around doing away with it*¹?

Background and History

DST was first adopted in 1916 during WWI by Germany as a method of conserving fuel, with the remainder of Europe following shortly after. The U.S. however, has historically had a back-and-forth relationship with DST over the years beginning in 1918 under a collection of various names. During the 1973 oil embargo, US Congress enacted a year-round DST period from 1974-1975 to analyze the effects of seasonal time change on energy consumption. However, studies showed that the change only resulted in a “moderate” energy savings, coupled with opposition from the public, standard time was returned during the winter months. Following the end of the energy crisis in 1976, the DST schedule continued to be amended several times before the Energy Policy Act of 2005 was created, which houses the current DST schedule followed since 2007. (Konstantin Bikos, n.d.)

Business Problem

¹ *Daylight Saving Time change

For years individuals involved in trying to rid of the time change have argued that DST negatively impacts the Economy, Health, Crime, Traffic, poses inconvenient general disruptions in day-to-day

If our justifications for changing of the clocks is getting harder to explain; why do we continue to do so?

activities, and more. An example of these negative effects could be noted in the opening statement provided by Chairman Frank Pallone, Jr., where he argued that studies have shown an increase in the rate of heart attacks and

stroke in the two days immediately following the time change (Chairman Frank Pallone, 2022); but is that increase directly correlated to DST? Does DST indeed have negative effects on society and individuals which would justify no longer doing the time change?

Impact of DST on Vehicular-related Fatalities

I first began looking at data for vehicular-related fatalities before and after DST*² under the assumption that we would see an increase in vehicular-related fatalities due to factors such as change in sleeping patterns and possible increased stress of adjusting to the time change in day-to-day routines. However, as

According to data from the Fatality Analysis Reporting System (FARS), DST is linked to a 6% increase in car accidents. Furthermore, the study found that DST is responsible for around 28 deaths each year.

Fatality Analysis Reporting System(FARS) (Do Car Accidents Increase in the Week Following Daylight Savings Time?, 2021)

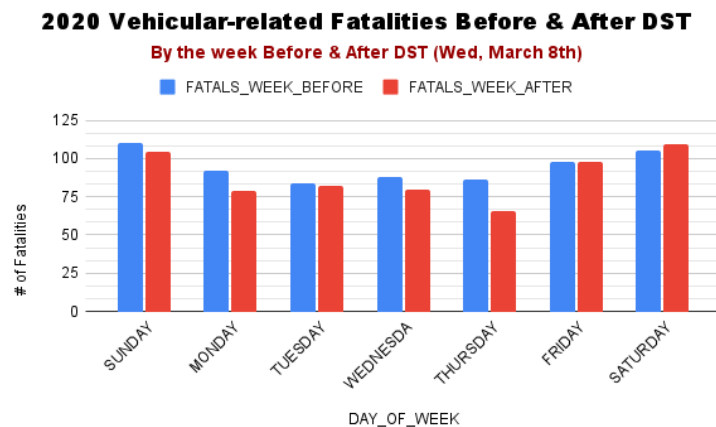


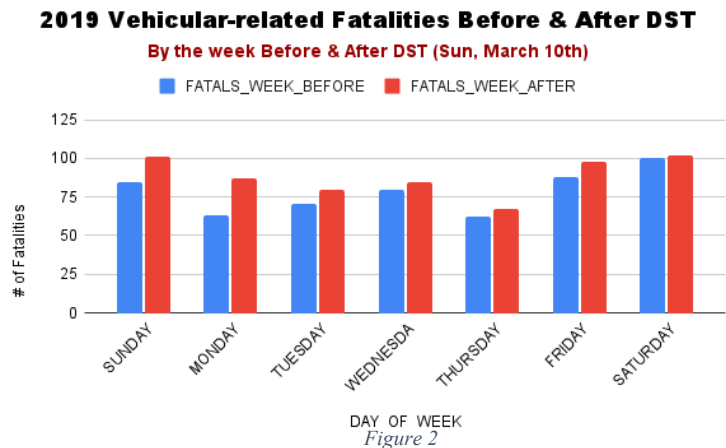
Figure 1

noted in Figure 1, immediately following DST (Wed, March 8, 2020) there was actually a decrease in vehicular-related fatalities; an increase wasn't observed until the weekend. Two considerations should be taken here: The first consideration being that this data is for

the year 2020, which was when pandemic lockdowns began. A [survey](#) conducted by the AAA Foundation for Traffic Safety along with Government Data showed that there was an estimated 42% decrease in driving trips made by Americans in April 2020, a slight increase, and then a second decrease of about

² *It's important to note that this initial dataset is for **2020** as this was the first dataset I identified as containing usable data. This note will become important later on in the analysis.

20% in the second half of 2020. The same data used in Figure 1 showed that an *estimated* 38,680 people died in vehicle-related accidents in 2020. Research conducted by the AAA foundation showed that despite a decrease in drivers, fatalities continued to surge; the drivers that continued on the road (about 4%) engaged in riskier driving habits (AAA: Foundation For Traffic Safety, 2021). This is to say that we must consider where or not this data is truly accurate since there was a significant decrease in individuals on the road due to pandemic lockdown. The second consideration is that from the data used for Figure 1., we cannot accurately determine that the increase in fatalities was directly associated with the time change; we must acknowledge the possibility of risky driving habits associated with the weekend such as driving while impaired.



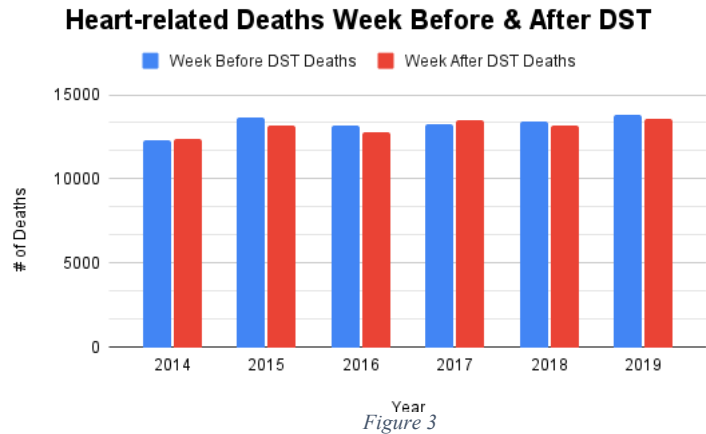
In an effort to address the first consideration of the 2020 pandemic year, I conducted the same analysis using the same data source but for the 2019 year (observed in Figure 2). In Figure 2, we observe that there was an increase in vehicular-related fatalities following the DST change. This data supports the theory that the DST time change has an impact on an increased rate of vehicular-related fatalities, particularly as the largest increase in rate occurs on the actual day of DST (Sunday, March 10, 2019), as well as the following day (Monday, March 11, 2019).

Impact of DST on Health Rates

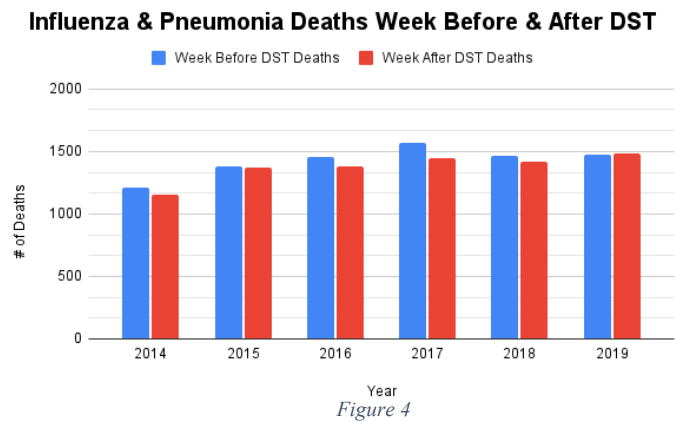
Studies have shown an increase in the rate of heart attacks and stroke in the two days immediately following the time change. – Chairman Frank Pallone, 2022

Because of the claims made by Chairman Frank Pallone I wanted to look at Heart-related deaths for the week before & after the DST

change. This data (Figure 3.) showed us that the rate of Heart-related deaths for this timeframe remained relatively consistent; I would even argue that any slight increase in rates are unable to be accurately attributed to the time change due to the fact that from this data there is no way to know what other contributing factors may have played a part in these heart-related deaths.

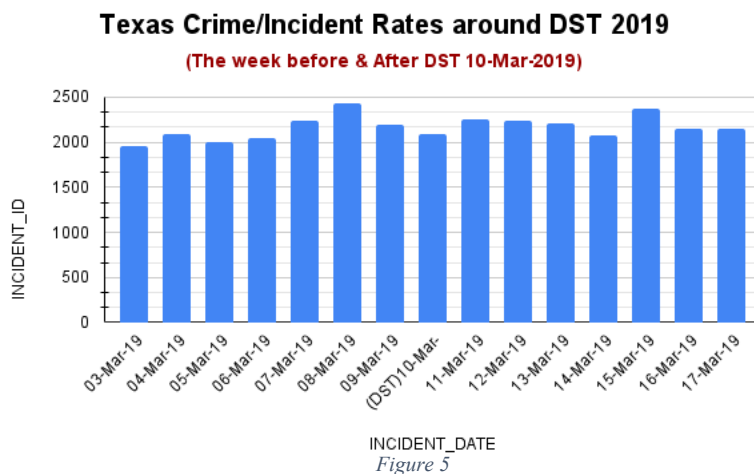


To ensure I wasn't having any bias, I selected at random another health category (Influenza & Pneumonia-related Deaths) to see what the data showed us for the same time frame (Figure 4.). I would argue that this data does not support the theory that the DST change has a negative impact on health-related deaths, as



both Figure 3 and 4 showed the highest rates during the week BEFORE the DST change.

Impact of DST on Crime Rates



To examine the claim that the DST change increases crime rates, I selected a state at random (*Texas*) in order to look at its crime and incident rates around the DST change for the year 2019. As observed in Figure 5., we did have a slight jump in crime and incident

rates the day immediately following the DST change, followed by a slow decline, and another surge on the Friday immediately following DST (15-Mar-19).

Conclusion

Although data may show rates which support the various arguments around the negative impacts of the DST change on areas of society such as Traffic, Health, and Crime; from these data sources we are unable to definitively determine that the change between Standard Time and Daylight-Saving Time (vice versa) is the direct cause. It would be more accurate to say it's possible that it's a *contributing factor*, but to say definitively that it's the reason for rate increases would be inaccurate.

Limitations, Challenges, and Ethical Considerations

During the course of this analysis a common challenge experienced was the lack of data sources which were originally collected in the necessary formats, particularly around date and time structures.

Additional limitations to be considered:

- Years of the COVID-19 pandemic may reflect numbers/rates that are not typical and therefore may skew the results of analysis.
- It would be inaccurate to make a definitive statement around findings for each of these topics by only analyzing a portion of data. For example by only looking at Texas Crime Rates, it would be inaccurate for me to say those results reflect the rest of the country.

Throughout my searches for supporting datasets, I noticed that although there are countless articles and whitepapers dedicated to analyzing this very topic, very few have made the data used to conduct their analysis accessible. I would argue that this is a noteworthy ethical consideration because if one is going to make claims that may directly impact others, there is a responsibility to be able to provide credible evidence supporting your arguments.

A third limitation and ethical consideration noted, is the limitation of what the data may be able to tell me; although I may see an increase in crime rate following the time change, depending on the data, I may not be able to say that this rate increase is directly correlated or attributed to the time change. This is similar to how during his opening statements Chairman Pallone noted that “**studies have shown people simply**

are not as productive at work in the days following the time-change – spending more time on their computer on non-work related activities; a side effect that hurts our economy.” (Chairman Frank Pallone, 2022); I would argue that there is really no way to confirm that this “decrease in productivity” is directly attributed to the time change and that implying there is a definitive correlation or that it is the root cause, leaves room for negative consequences depending on the situation.

Recommendations

My recommendation is that in order to definitively say that the DST change is the causing factor for increased rates in the above-mentioned topics, surveys or assessments must be constructed to a level of such granular detail to remove any potential risk for outliers or other possible contributing factors.

Methodology

When getting started with my analysis, one thing I needed to do was remove outliers; this led to me removing Arizona and Hawaii from the datasets I was using as they do not observe DST and didn’t want them to skew my results. I was looking to analyze rates for each topic by comparing the week before and week after DST to identify if there was indeed an increase in rates around this time, supporting the arguments by stakeholders vested in this topic.

Appendix: Data Sources

Section	Data Sources
Impact of DST on Vehicular-related Fatalities	<p>The data used for this section was obtained by the National Center for Statistics and Analysis (NCSA), an office of the National Highway Traffic Safety Administration, which provides analytical and statistical support for the National Highway Traffic Safety Administration (NHTSA) and the highway safety community at large for over 45 years.</p> <ul style="list-style-type: none"> ▪ https://www.nhtsa.gov/file-downloads?p=nhtsa/downloads/FARS/2020/National/ ▪ FARS2020NationalCSV.zip ▪ https://www.nhtsa.gov/file-downloads?p=nhtsa/downloads/FARS/2019/National/ ▪ FARS2019NationalCSV.zip

Impact of DST on Health Rates	<p>The data used for this section was obtained from the CDC WONDER database, which provides access to a wide array of publicly available health information.</p> <ul style="list-style-type: none"> ▪ https://wonder.cdc.gov/controller/datarequest/D76;jsessionid=F6F0B47B90916521843A879B2D48 ▪ Weekly_Counts_of_Deaths_by_State_and_Select_Causes_2014-2019.csv
Impact of DST on Crime Rate	<p>The data used for this section was obtained from the National Incident-Based Reporting System (NIBRS) Series which is a component part of the Uniform Crime Reporting Program (UCR), a nationwide view of crime administered by the Federal Bureau of Investigation (FBI), based on the submission of crime information by participating law enforcement agencies.</p> <ul style="list-style-type: none"> ▪ https://ucr.fbi.gov/crime-in-the-u.s/2019/crime-in-the-u.s.-2019/additional-publications/nibrs ▪ NIBRS_incident.csv

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