

United States mass shootings triggered by serotonin spikes from annual seasonal pollen level drops.

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Humans like all life are sensitive to their environment. Mentally ill or mentally unstable individuals can be triggered into impulsive and violent activities from spikes in serum serotonin. Serum histamine level is directly proportional to environmental allergen levels producing the obvious and dreaded seasonal allergic reaction symptoms. But serum serotonin level, or the control of the level, is inversely proportional to serum histamine levels and male humans have 52% more serotonin than females. Data appears to show a clear association between the date of violent acts from mentally ill individuals and dramatic decreases in environmental pollen allergen levels (especially when the allergen or pollen level decreases to zero overnight) indicating a possible precursor or triggering relationship. This knowledge could be used as a potential predictor for law enforcement and medical agencies for a given city. Mental health professionals would be advised to lower serotonin boosting meds and even supplement sedative medications to male patients in the timeframes of mid-February and March for spring tree pollen and from October to early-November for fall ragweed pollen.

Serotonin: ...serotonergic neurons ... play an important part in a variety of psychiatric conditions from anxiety disorders to schizophrenia as well as behavioral impulse-related disorders (violence, substance abuse, obsessive control, etc...)

Humans, like all life, are sensitive to their environment. Mentally ill or mentally unstable individuals can be triggered into impulsive and violent activities from spikes in serum serotonin (Cetin et. al., 2017). Serum histamine level is directly proportional to environmental allergen levels producing the obvious and dreaded seasonal allergic reaction symptoms. But serum serotonin level, or the control of the level, is inversely proportional to serum histamine levels (Hough, 1999, and Munari et. al., 2015, and Ryo et. al., 2006). Male humans have 52% more serotonin than females (Nishizawa et. al., 1997).

Data from public online webpages like pollen.com and weather.com of pollen levels in given cities or zip codes, when compared to the dates of gun “mass shootings” by mentally ill human males, appears to show a clear association between the date of violent acts and dramatic decreases in environmental pollen allergen levels (especially when the allergen or pollen level decreases to zero overnight) indicating a possible precursor or triggering relationship. This knowledge could be used as a potential predictor for law enforcement and medical agencies with modern technology that can track near real-time levels per a given city or zip code. Mental health professionals would be advised to lower serotonin boosting meds and even supplement short-term sedative medications to male patients in the timeframes of mid-February and March for spring tree pollen and from October to early-November for fall ragweed pollen. This treatment can even be tailored closer depending on the latitude versus time of year and pollen tracking applications.

A scientific motto, often demonstrated to be true, is that “biology drives psychology.” The advent of near real-time tracking of allergen levels in given cities has led to a possible predictive model from known human serum biochemistry of histamine and serotonin interactions versus observed year-over-year acts of violence from mentally unstable individuals. This model can be useful, if not critical, for law enforcement, general public awareness, and public safety. Knowing the heightened level of risk during the annual time of year that major allergen or pollen levels drop to zero in a given city, can theoretically help save lives. Law enforcement, emergency services (911) staff, medical staff, as well as mentally ill patients themselves, knowing the factors in play, can take actions or be in a heightened state of awareness for the noted small window of time and literally track it on simple and public websites like <https://weather.com/> and www.pollen.com. “Normal” individuals may even be able to observe, track, or understand simple impulsive behaviors from similar, albeit manageable, increases in blood serum serotonin levels leading to excess confidence and risk taking from the biochemistry of the associated crash in airborne allergens of pollen that thus lowers serum histamine levels. Those behaviors can include individuals getting anxious, angry, gambling, buying stocks or even spikes in suicide.

There is a remarkable “pattern match” where mentally unstable individuals almost always (especially relative to those that had already been planning or staging an act of violence or terror or gun

violence) will be triggered, i.e., they “cannot resist the impulse,” to act during the surge in blood (brain) serotonin levels due to a sudden and large drop in environmental allergen levels, that crashes serum histamine, causing the aforementioned spike in blood (brain) serotonin. During the peak of histamine or pollen levels serotonin will be very low in individuals. This alone can lead to changes in behavior making some individuals very anxious and others angry but this lasts for only a day or two and is not the model being discussed. The key scenarios for the model of this paper occur during the final “drop-off point to zero” pollen of annual spring tree pollen (especially juniper) and fall weed (especially ragweed) pollen and from large drops (a sharp drop in pollen level crossing over at last two levels in the pollen.com history graph e.g. from Medium to Low-Medium to Low) or drops and then spikes of pollen (some even rainstorm induced), where we find the times of highest risk perfectly matching violent events especially single shooter male gun violence or mass shootings. The end of season “drop to zero” pollen reaction makes logical sense, and the acts almost always occur at nearly exactly that same day if not hour. The best analogy for the sudden drop scenario to the brain reaction is to that of riding a bicycle very fast and hitting a large bump. The rider does not crash immediately here and after a few seconds most people can stabilize but not always. Likewise, if there is a large drop or even a drop and increase in pollen then within two, or at the most three, days then most minds can normalize regulation of serotonin, but unstable minds often cannot and thus two to three days after that massive pollen level drop they react in a violent way. The pollen.com website is a near perfect proxy to match the event to histamine level per given zip code showing these events.

Events matching this prediction - including the Las Vegas concert shooting 10/1/17, the Southerland Springs Texas Church shootings 11/5/17, the Parkland, Florida school shooting 2/14/18, the Pittsburgh, Pennsylvania Synagogue shooting 10/27/18, the 3/17/21 Acworth (Atlanta) Georgia Asian spa shooting, the 3/22/21 Boulder Colorado King store shooting, and possibly even the 9/11/2001 terrorist attacks known as nine-eleven - all appear to match this model with extreme precision understanding the obvious limitation of this small sample size versus actual regression analysis using larger data sample sizes.

Large public events during fall ragweed pollen, and especially spring tree pollen dates of final pollen level decline, can be monitored with increased awareness noting that airborne pollen levels will peak and decline following temperature drops and increases (as winter temperatures approaches in the fall they will drop especially from frost (**Fig. 1.a**) and as summer temperatures approach in the spring after tree pollen peak usually in March (**Fig. 1.b**), moving from North to South in the fall and from South to North in the spring i.e., moving down and up latitudes of the continental United States (**Fig. 2**).

We can see a unique pattern (blue line) comparing the locations of spring 2021 mass shootings from a CNN and New York Times map to a map of average pollen level activity on March 30. We can see a unique pattern where the locations of the cities of the mass shooting follows the border of northern-headed pollen blooms (border of orange and red colored zones on the pollen.com pollen map). Note how the pattern of the location of shootings does not match that of US population (NASA nighttime photo) which has significant population all along the Mississippi River up to Minnesota (too far north for long pollen season if any) and on the West Coast up to Seattle. We do not see the mass shooting locations following population locations but, rather, the border of the pollen activity with particular attention to the downward “dip” in the center of the country that closely matches the pollen activity (**Fig. 3.a**). We also can see the progression of the mass shootings following the pollen activity in time in spring as the latitude of the locations increases (moves north) using maps of an early March, late March, and mid-April example pollen activity map (**Fig. 3.b**). Thus, we see how the Las Vegas event precedes the Texas shooting in the fall as ragweed weed pollen levels have yet to finish further south in the United States where temperatures are still warm enough.

On late Sunday night October 1, 2017 in Las Vegas a psychopathic male shooter killed scores of individuals at a concert with sniper type guns from a hotel window. One cannot debate the status of “mental illness” here, but the observation relates to why did he choose or act on the date of 10/1 versus another day? This model or theory suggests looking at the daily levels of allergens in that season (in this case ragweed levels) that, on 10/1/17 in Las Vegas, were plummeting and reached zero on 10/2/17 thus causing dramatic changes in brain serotonin (in any individual in that area) but perhaps setting off a chemical instigator or trigger in the shooter or any psychopathic individual in that city of Las Vegas at that time. It must also be noted that Las Vegas is one of the “brightest” or sunniest cities in the United States and mentally unstable individuals have even been known to have seizures from the excess blue light from the flood and intensity of light, so we have yet another possible factor to monitor.

On **March 16, 2021**, eight people were killed in spas in the **Acworth** suburb of Atlanta by a single young gunman who apparently had a sexual addiction. (**Fig. 4**).
<https://www.pollen.com/forecast/historic/pollen/30101>

On **March 22, 2021**, mass shooting at King Soopers supermarket in **Boulder** Colorado with a single gunman killing ten people. (**Fig. 5**). <https://www.pollen.com/forecast/historic/pollen/80301>

On **October 1, 2017**, 60 people were killed, 411 wounded by a single male shooter in the **Las Vegas** strip Mandalay Bay Hotel in Nevada targeting audience members of the Route 91 Harvest musical festival. (**Fig. 6**).

On **November 5, 2017**, twenty-six worshippers were murdered in a shooting from a mentally unstable individual in the First Baptist Church of **Southerland** Springs in Southerland Springs, Texas. Ragweed pollen crashed to zero that day. (**Fig. 7**).

On **February 14, 2018**, seventeen school kids were killed in **Parkland** Florida by a mass shooting from an expelled student. Tree pollen spiked that day and later in that day crashed. The shooting was at the end of the school day. (**Fig. 8**).

On **October 27, 2018**, eleven innocent worshippers were murdered in **Pittsburgh**, Pennsylvania in a synagogue shooting from a mentally insane shooter. Fall ragweed pollen crashed to zero that day. (**Fig. 9**).
<https://m.accuweather.com/en/us/parkland-fl/33067/weather-forecast/337605>
<https://weather.com/>

On **October 7, 2021**, an 18-year old injured four people in a shooting at Timberview High School in Arlington Texas. This is an example of the delayed reaction from sudden drops. At the beginning of the month pollen levels drop from High down to the lower level of Low-Medium or over 2.5 levels. (**Fig. 10**).

On **October 21, 2021**, a fired male employee returned to his office and shot three people killing two of them as pollen levels dropped to zero in Superior Nebraska. (**Fig. 11**).

On **October 10, 2021**, one person was killed and fourteen wounded in a shooting at a bar in St. Paul Minnesota as pollen level dropped to zero. (**Fig. 12**).

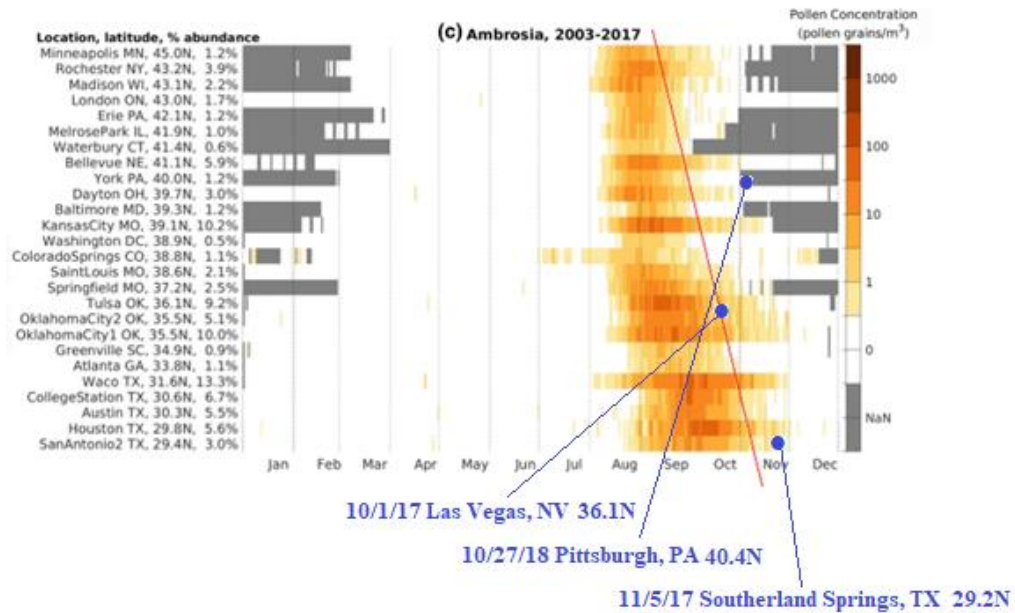
On **October 10, 2021**, University of North Carolina in Chapel Hill deals with two suicides over the weekend after pollen levels drop to zero on the 9th. (**Fig. 13**).

One can speculate that higher levels of pollen in the United States than the rest of the world, especially in the spring, and the increase in the number of frost-free days (possibly from global warming via climate change) is a possible cause of higher gun violence in the United States. Note that the near zero level of mass shootings in Canada thus also fits this model as they are too far north to have pollen seasons of any significant length and likely it is that fact and not legislative policies that is the cause of the difference.

This knowledge could be used as a potential predictor for law enforcement and medical agencies with modern technology that can track near real-time levels per a given city or zip code. Mental health professionals would be advised to lower serotonin boosting meds and even supplement sedative medications to male patients in the months of March and early April for spring tree pollen and from mid-September to the end of November for fall ragweed (depending on latitude).

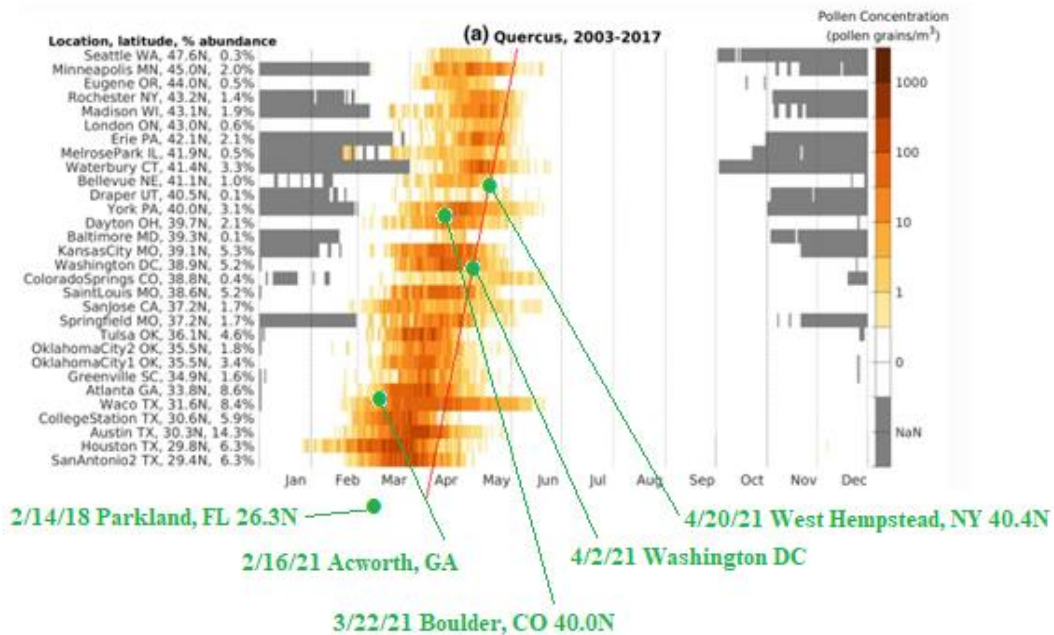
Figures

Fig 1.a. Fall ragweed pollen levels by city ranked by latitude.



Source: <https://link.springer.com/article/10.1007/s10453-019-09601-2>

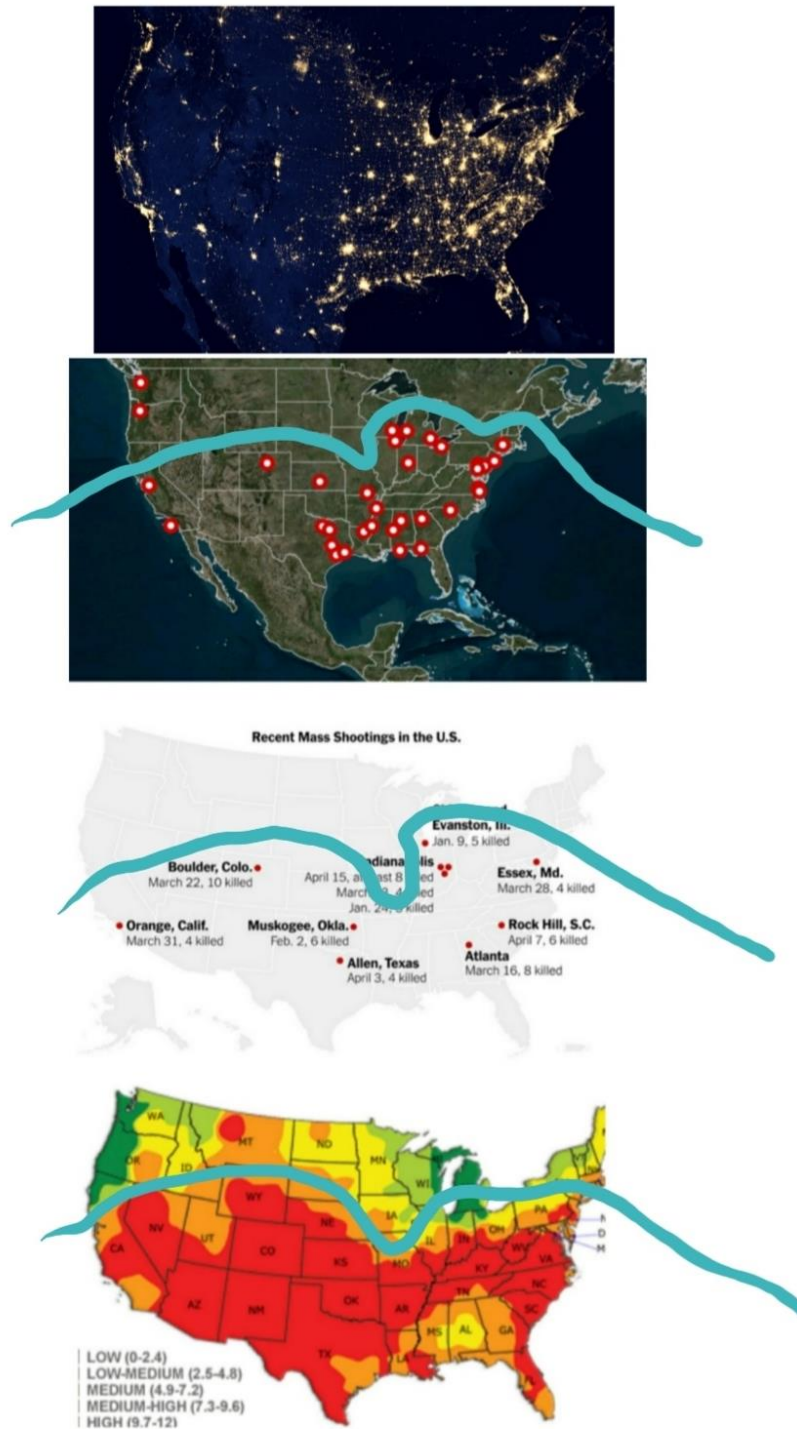
Fig. 1.b. Spring tree pollen levels by city ranked by latitude.



Source: <https://link.springer.com/article/10.1007/s10453-019-09601-2>

Fig 2.a.

U.S. cities with mass shootings versus avg spring pollen vs U.S. population.



Source:

NASA https://www.nasa.gov/mission_pages/NPP/news/earth-at-night.html

CNN <https://www.cnn.com/2021/04/16/us/mass-shootings-45-one-month/index.html?fbclid=IwAR2v1maSQRTYe-d0OyTfAIRY2gudKO3H6p8Bn6J3umJsnTi65XjCpXNzBXI>

NYTIMES https://www.nytimes.com/article/mass-shootings-2021.html?fbclid=IwAR3qTgF5a7uT_J9K0ivEVTsXqvcRqYdUPTkRDFw2yrf5iGdbSSrvpluV9yEg

www.pollen.com

Fig 2.b.

U.S. avg March 16, 22, and April 20 pollen vs 2021 mass shooting cities.

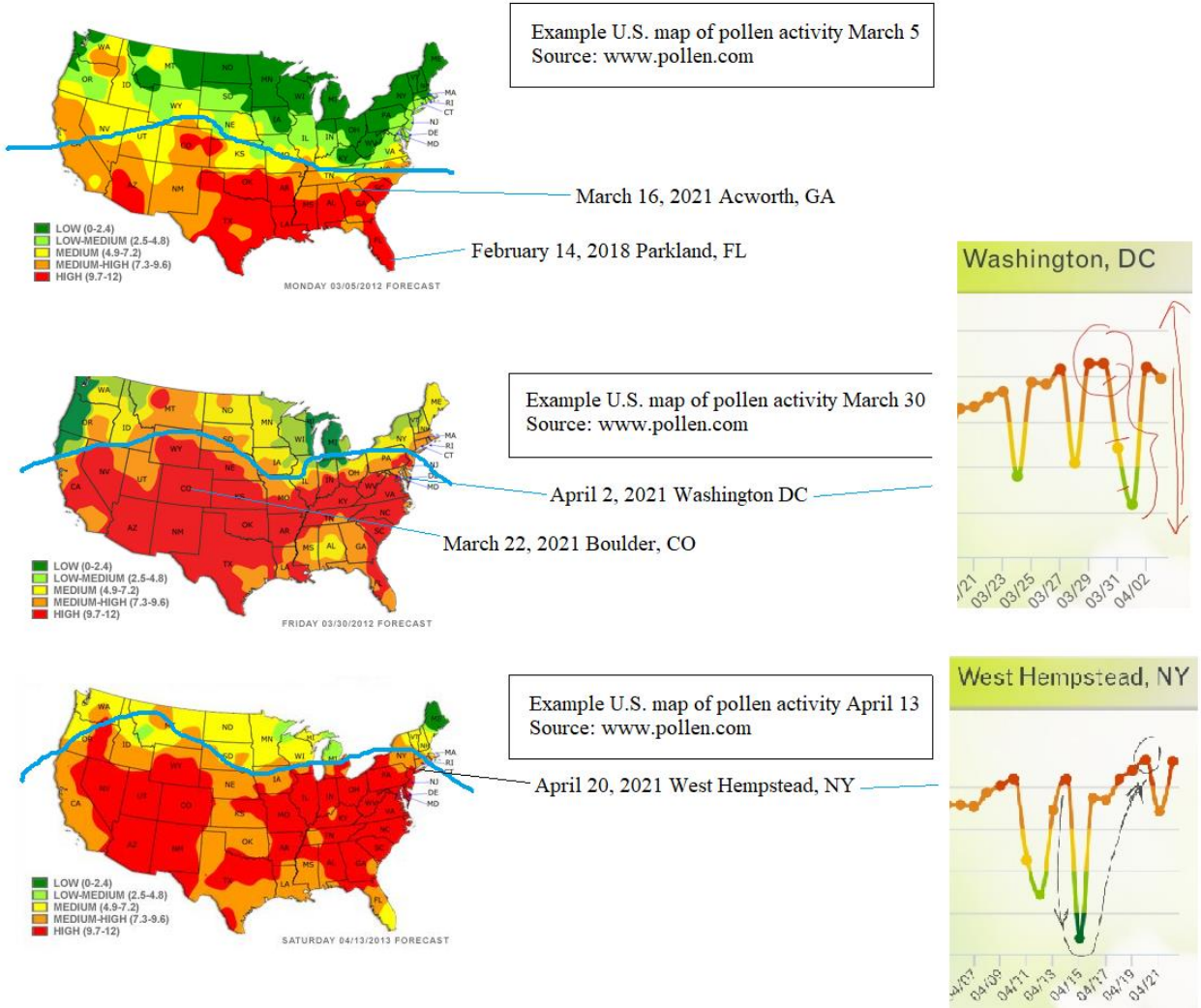


Fig. 3. United States recent mass shootings vs pollen season and city by latitude.

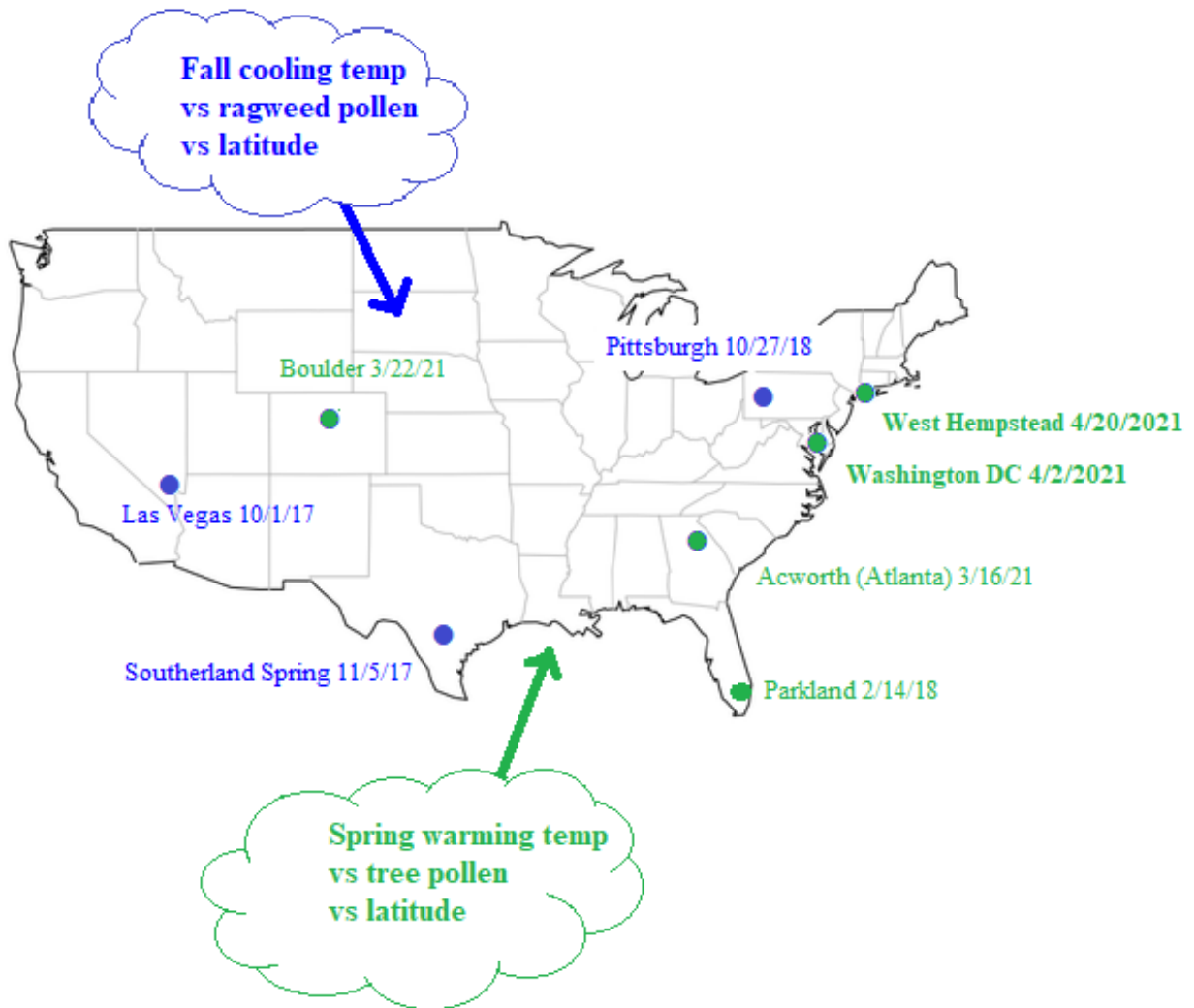


Fig. 4.

Acworth (Atlanta) Georgia Asian spa shooting 3/16/21 vs spring tree pollen level decline



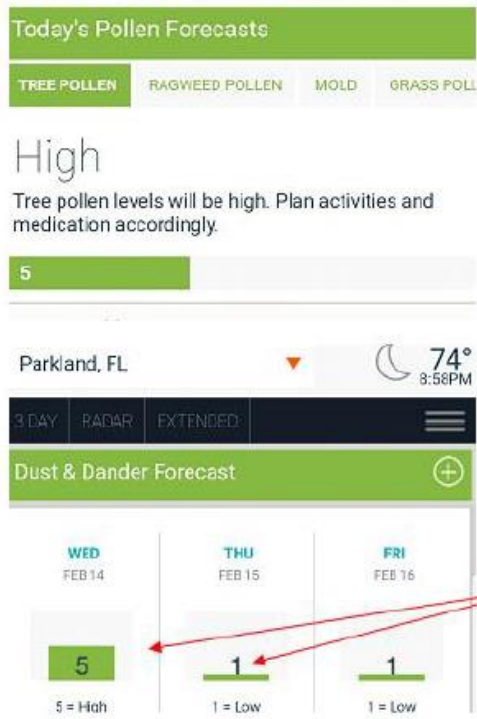
Fig. 5.

Boulder Colorado King store shooting 3/22/21 vs spring tree pollen level decline



Fig. 8.

<https://m.accuweather.com/en/us/parkland-fl/33067/weather-forecast/337605>



Parkland, Florida school shooting 2/14/18

Fig. 9.

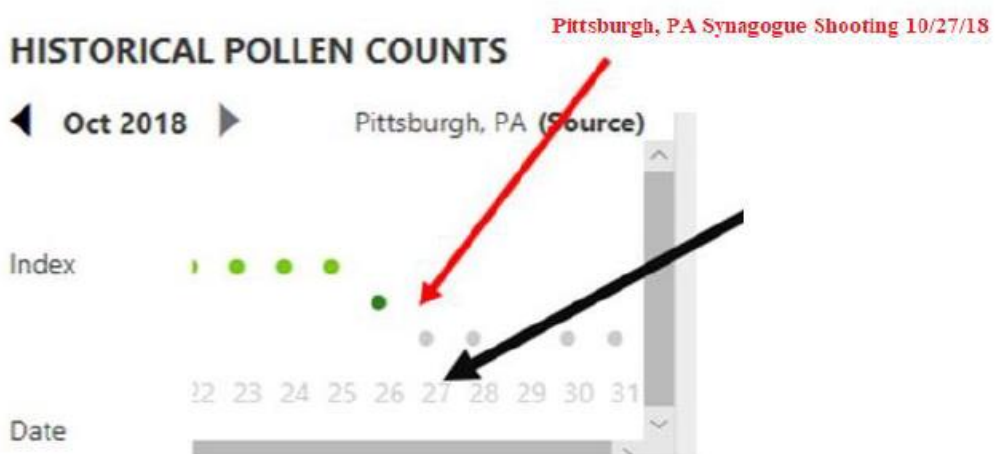
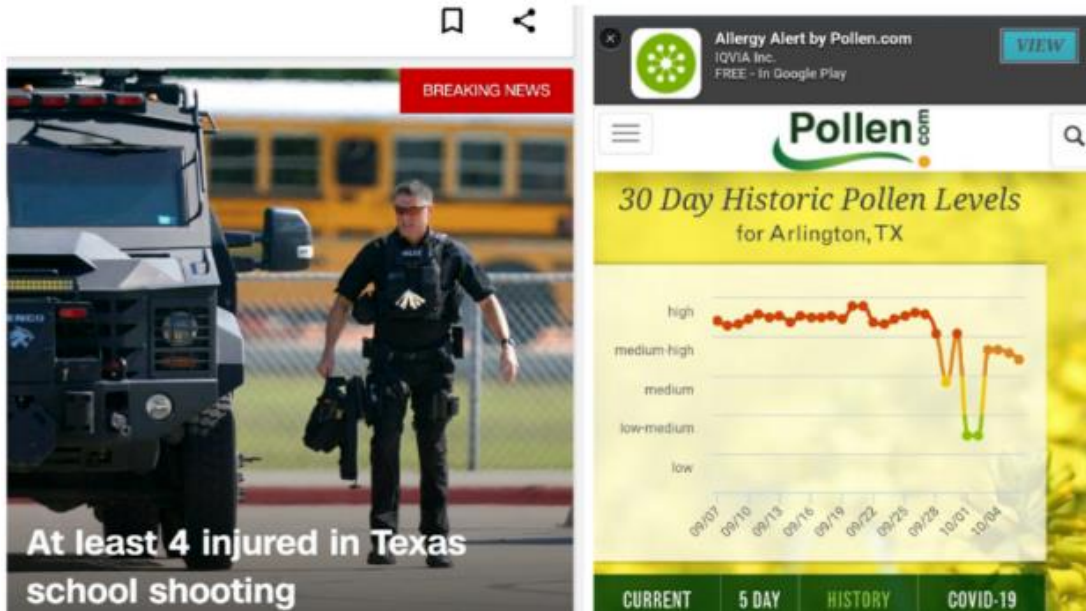
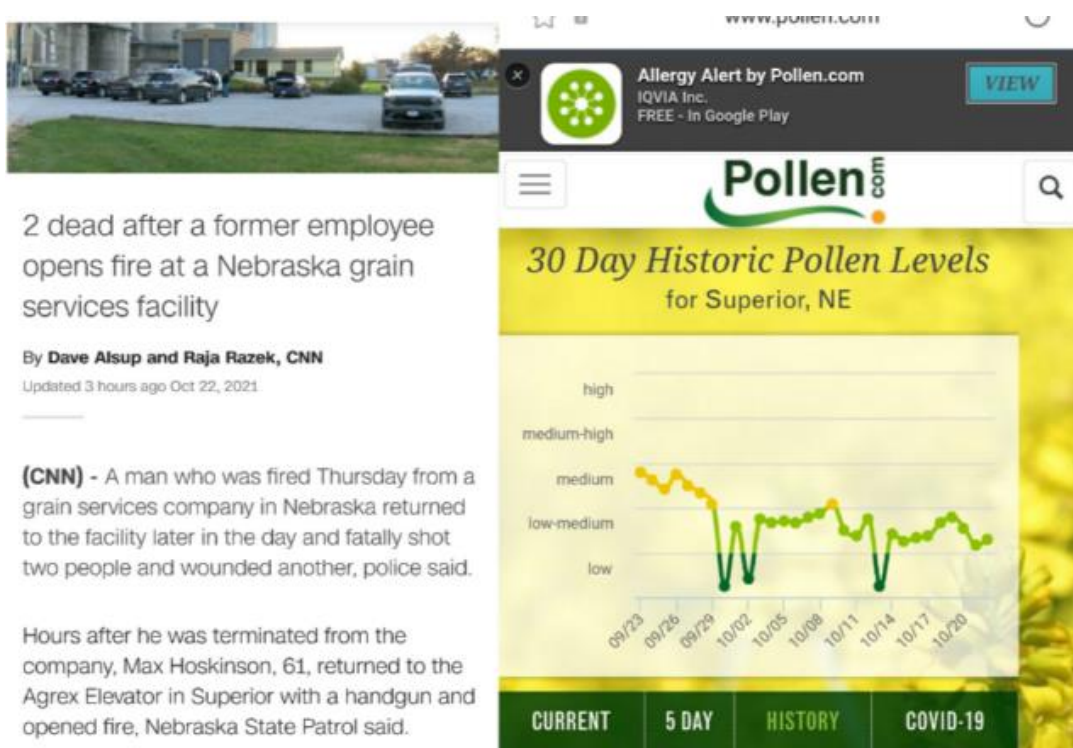


Fig. 10.



Source: cnn.com and pollen.com retrieved 10/07/2021.

Fig. 11.



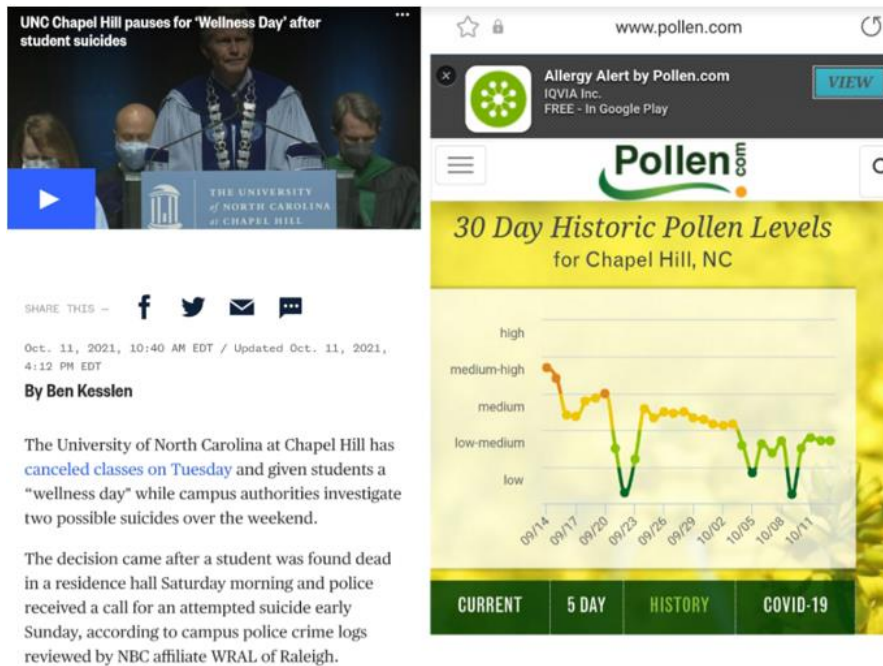
Source: cnn.com and pollen.com retrieved 10/22/2021.

Fig. 12.



Source: cnn.com and pollen.com retrieved 10/10/2021.

Fig. 13.



Source: cnn.com and pollen.com retrieved 10/13/2021.

References

- Fatih Hilmi Çetin, Yasemin Taş Torun and Esra Güney (July 26th, 2017). The Role of Serotonin in Aggression and Impulsiveness, Serotonin - A Chemical Messenger Between All Types of Living Cells, Kaneez Fatima Shad, IntechOpen, DOI: 10.5772/intechopen.68918. Retrieved from: <https://www.intechopen.com/books/serotonin-a-chemical-messenger-between-all-types-of-living-cells/the-role-of-serotonin-in-aggression-and-impulsiveness>
- Hough LB. Histamine Actions in the Central Nervous System. In: Siegel GJ, Agranoff BW, Albers RW, et al., editors. Basic Neurochemistry: Molecular, Cellular and Medical Aspects. 6th edition. Philadelphia: Lippincott-Raven; 1999. Retrieved from: <https://www.ncbi.nlm.nih.gov/books/NBK28245/>
- Leonardo Munari, PhD, Gustavo Provensi, PhD, Maria Beatrice Passani, PhD, Nicoletta Galeotti, PhD, Tommaso Cassano, PhD, Fernando Benetti, PhD, Renato Corradetti, MD, Patrizio Blandina, MD, Brain Histamine Is Crucial for Selective Serotonin Reuptake Inhibitors' Behavioral and Neurochemical Effects, International Journal of Neuropsychopharmacology, Volume 18, Issue 10, September 2015, pyv045, <https://doi.org/10.1093/ijnp/pyv045>. Retrieved from: <https://academic.oup.com/ijnp/article/18/10/pyv045/623738>
- Nishizawa, S., Benkelfat, C., Young, S. N., Leyton, M., Mzengeza, S., de Montigny, C., Blier, P., & Diksic, M. (1997). Differences between males and females in rates of serotonin synthesis in human brain. Proceedings of the National Academy of Sciences of the United States of America, 94(10), 5308–5313. <https://doi.org/10.1073/pnas.94.10.5308> Retrieved from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC24674/>
- Ryo Yoshimoto, Yasuhisa Miyamoto, Ken Shimamura, Akane Ishihara, Kazuhiko Takahashi, Hidehito Kotani, Airu S. Chen, Howard Y. Chen, Douglas J. MacNeil, Akio Kanatani, Shigeru Tokita. Therapeutic potential of histamine H3 receptor agonist for the treatment of obesity and diabetes mellitus. Proceedings of the National Academy of Sciences Sep 2006, 103 (37) 13866-13871; DOI: 10.1073/pnas.0506104103. Retrieved from: <https://www.pnas.org/content/103/37/13866>