



# The Summer Allergy & Asthma Season Outlook

Weather Trends 360 CEO Bill Kirk

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## Speaker

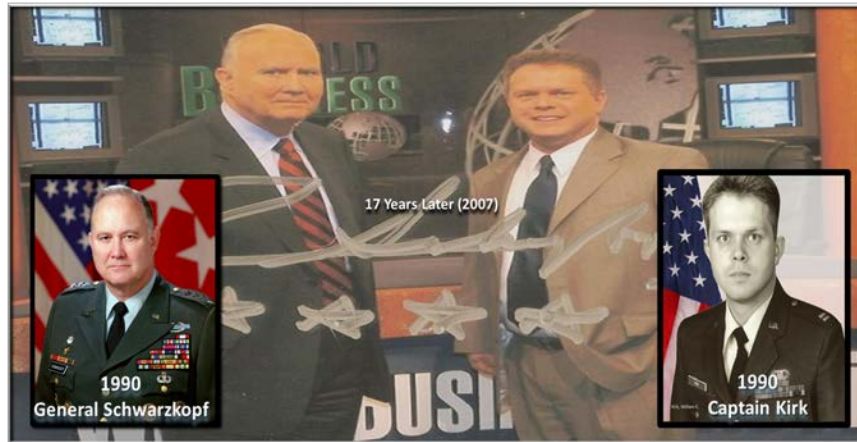
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### Bill Kirk

- Weather Trends 360 CEO
- 17-time award winning technology firm specializing in YEAR-AHEAD weather and sales forecasting for Fortune 500 companies and small businesses worldwide
- USAF Gulf War Veteran, Captain
- Bible Scholar

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## Inspiration for YEAR-AHEAD Forecasting (31 Years ago)



weathertrends360

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## Year-Ahead Savvy Customers (Weather & Sales Forecasting)



weathertrends360

- 143 Fortune 5,000 clients
- 18 years supporting pharma and many diseases for IQVIA, Pollen.com, Bayer, J&J...
- Thousands of farmers and small businesses
- 18 Years in business
- 17 Technology awards – Forbes 5<sup>th</sup> Most Promising Company
- Clients in 195 countries

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# How we do it...a YEAR-AHEAD

(Weather & Sales Forecasting)



- Traditional weather forecasting is physics-based that changes everyday. It struggles to get the week 2 forecast right.
- Weather Trends year-ahead forecast is more accurate than a week 2 forecast.
- It's trillions upon trillions of statistical calculations to generate year-ahead worldwide forecasts.



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# Traditional Meteorology & Physics

Not how we do it



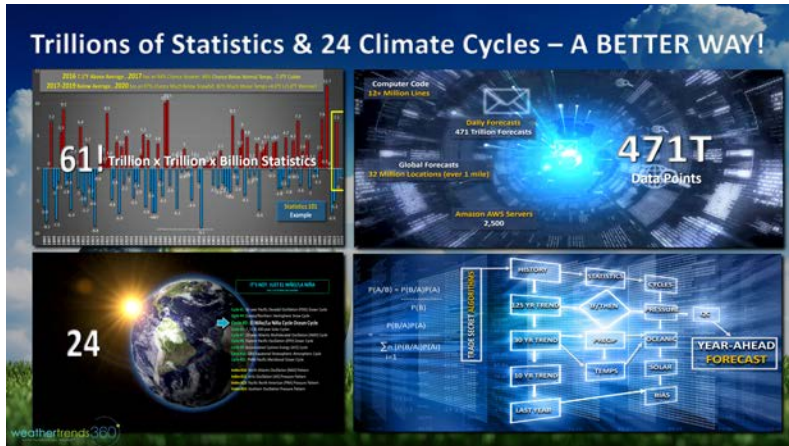
- Meteorology 101 is Physics based, a moving target with ever changing forecasts.
- If there was just one drop (one storm) that would be easy Physics highly accurate forecasting.
- But there are millions of interactions in the atmosphere (surface and aloft) making this a very challenging way to predict long term weather.
- Not how we do it!



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# Weather Trends, Statistics & Climate Cycles

A better way to plan a year ahead



- Trillions upon trillions of statistics and 24 climate cycle trends allow for much more accurate YEAR-AHEAD weather forecasting.
- If you can get the weather right, week-by-week, a YEAR-AHEAD, then it's also possible to predict seasonal sales and weather ailments that complicate human suffering, everywhere on Earth!
- PhD Academics at the University of Miami, West Point Military Academy, Penn State and others validated the approach is the best way to make very long lead forecasts that don't change once issued for PROACTIVE vs REACTIVE planning.



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# The Power of 1° Degree®

May 2021 will be a big sales & suffering month!



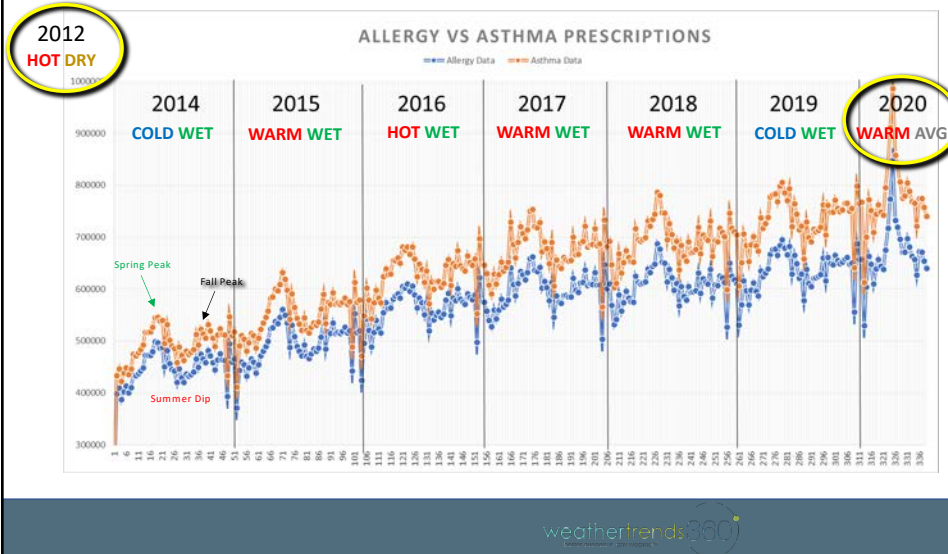
- Every 1°F warmer in Spring brings a 1% to 3% increase in allergy medication sales and 1% increase in Asthma patient visits to the doctor. Colder-Wetter Springs lower sales and suffering.
- March 2020 was 3<sup>rd</sup> warmest in 125 years and sales and suffering soared to near historic highs as COVID was just making headline news.
- Very unfavorable May weather last year (cold & snowy) suppressed sales but also curtailed Allergy and Asthma suffering.
- May 2021 will bring the biggest year-over-year change in decades with much warmer and drier weather right at the traditional peak for suffering.
- 9°F warmer during the peak Asthma & Allergy season with dry weather will result in a +9% to +27% increase in Allergy & Asthma medication sales.



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# Asthma & Allergy Medications

Dry weather anytime means more prescriptions and suffering



For 19 years, Weather Trends has been predicting year-ahead allergy sales and suffering for large retailers and manufacturers. The correlation between Allergy prescriptions filled and Asthma prescriptions is 94.8%, with both responding to warmer/drier weather in Spring and Fall.

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## Predictive Analytics Based on Big Data

Dry weather anytime means more suffering

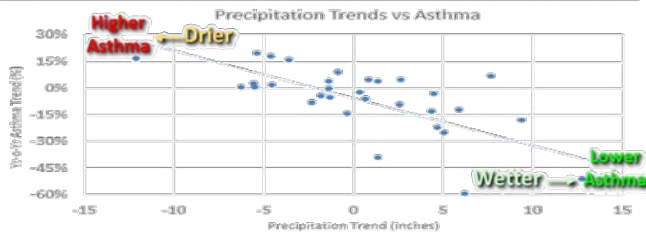
Regression Statistics	
Multiple R	0.69
R Square	0.72
Adjusted R Square	0.52
Standard Error	0.17
Observations	34

ANOVA					
	df	SS	MS	F	Significance F
Regression	2	0.8010191	0.4005096	13.9	4.852E-05
Residual	31	0.8918779	0.0287703		
Total	33	1.6928971			

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	-0.04	0.0297886	-1.463083	0.15	-0.104337	0.01712049
Temperature PO1	0.2%	0.0049059	0.4355311	0.67	-0.007869	0.012142395
Precipitation PO1	-2.7%	0.0052168	-5.20191	0.00	-0.037777	-0.01649727



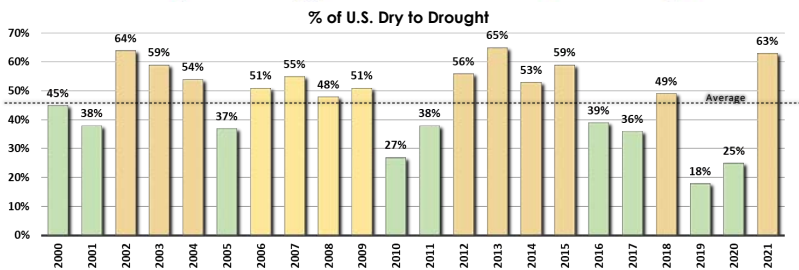
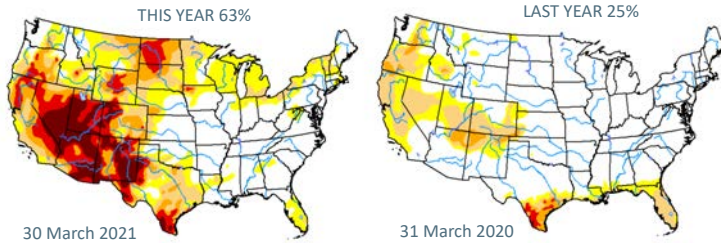
Weather Trends Power of 1 Degree<sup>®</sup> technology has analyzed IQVIA historical daily Asthma Index data by location, 3-Zip patient level data, EPA pollution by day, CDC Flu data, Allergy POS by week and Weather to develop short range and year-ahead Asthma & Allergy suffering models.

- Warm/Dry **Spring** more pollen, pollution in the air results in higher Asthma suffering
- Cool/Dry **Summer** slight increase in Asthma suffering
- Warm/Dry **Fall** Ragweed pollen & pollution result in higher Asthma suffering
- Cold/Dry **Winter** more pollution, lower humidity results in higher Asthma suffering

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# 63% of U.S. Dry Soil as of 30 March 2021

Most in 8 Years!



- Wet weather and wet soil conditions help to suppress pollen and pollutants and minimize dust from agricultural planting. 2019 record low.
- 2021 is already showing the highest dry to drought conditions in 8 years due in part to several climate cycles (La Nina, -PDO, +AMO, Solar Minimum) teaming up together, a 100 year event.
- Expect these drier trends to expand into the Central and Midwest regions through the Summer.

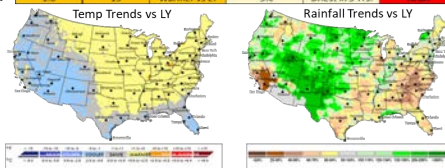


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# Top 25 Allergy Capitals – Severe Spring

April and May Spring Peak Season

2021 Rank	City	State	Score	Temp Change	36 Year Temp Rank	Spring (April - May) Forecast Temp Trends	Precip % Change vs LY	Precip Trend	Allergy Season Severity
1	Scranton	PA	100.0	7.1	14	Warmer vs LY	-14%	Driest in 6 Yrs.	MODERATE
2	Richmond	VA	98.8	2.5	16	Warmer vs LY	9%	Wetter vs LY	MODERATE
3	Wichita	KS	89.1	2.4	12	Warmest in 7 Yrs.	9%	Wetter vs LY	MODERATE
4	McAllen	TX	85.8	-0.7	13	Cooler vs LY	-31%	Drier vs LY	MODERATE
5	Pittsburgh	PA	85.6	4.5	12	Warmer vs LY	-11%	Driest in 8 Yrs.	VERY HIGH
6	Hartford	CT	85.4	3.6	8	Warmest in 8 Yrs.	-13%	Driest in 5 Yrs.	VERY HIGH
7	Springfield	MA	84.3	3.6	7	Warmest in 6 Yrs.	-9%	Driest in 5 Yrs.	VERY HIGH
8	New Haven	CT	83.6	1.8	16	Warmer vs LY	-11%	Driest in 6 Yrs.	VERY HIGH
9	Oklahoma City	OK	83.2	2.8	14	Warmest in 7 Yrs.	45%	Wetter vs LY	MODERATE
10	Bridgeport	CT	82.9	1.5	8	Warmest in 4 Yrs.	9%	Wetter vs LY	MODERATE
11	Albany	NV	82.4	1.4	11	Warmest in 4 Yrs.	37%	Wetter vs LY	MODERATE
12	Virginia Beach	VA	82.2	4.2	14	Warmer vs LY	-13%	Driest in 10 Yrs.	VERY HIGH
13	Buffalo	NY	82.2	4.0	9	Warmest in 6 Yrs.	-7%	Driest in 2 Yrs.	VERY HIGH
14	San Antonio	TX	81.0	0.1	13	Warmest in 8 Yrs.	-25%	Driest in 3 Yrs.	VERY HIGH
15	Dayton	OH	79.3	3.1	14	Warmer vs LY	-10%	Driest in 5 Yrs.	VERY HIGH
16	Riverside	CA	78.7	-0.8	26	Cooler vs LY	-76%	Driest in 3 Yrs.	MODERATE
17	Las Vegas	NV	77.6	-2.3	17	Cooler vs LY	-37%	Driest in 4 Yrs.	MODERATE
18	Memphis	TN	75.4	3.2	14	Warmer vs LY	40%	Wetter vs LY	MODERATE
19	Dallas	TX	74.7	1.8	11	Warmest in 4 Yrs.	-16%	Driest in 3 Yrs.	MODERATE
20	Louisville	KY	74.5	3.8	12	Warmer vs LY	-12%	Driest in 3 Yrs.	MODERATE
21	Tulsa	OK	73.5	2.6	15	Warmer vs LY	-7%	Driest in 3 Yrs.	MODERATE
22	Syracuse	NV	73.3	3.3	9	Warmest in 8 Yrs.	-16%	Driest in 3 Yrs.	MODERATE
23	Columbia	SC	72.7	3.1	10	Warmer vs LY	-35%	Drier vs LY	MODERATE
24	Grand Rapids	MI	71.6	4.5	8	Warmest in 9 Yrs.	-10%	Driest in 5 Yrs.	VERY HIGH
25	Allentown	PA	71.3	1.0	15	Warmer vs LY	-5%	Driest in 5 Yrs.	MODERATE

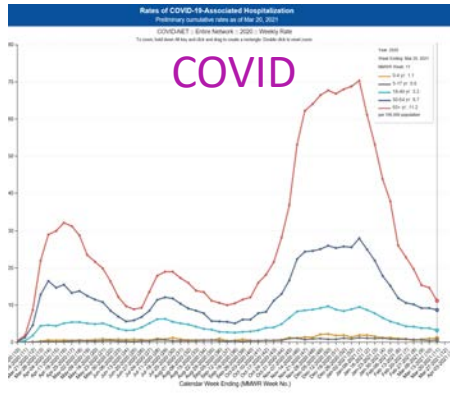
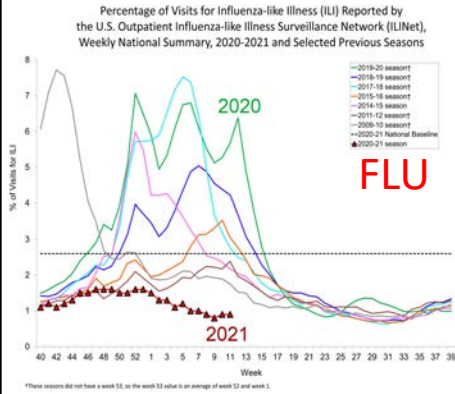


- An assessment of the Top 25 “Allergy Capitals” shows many will indeed have a severe allergy and asthma peak Spring season (April-May).
- 2020 Coldest April-May in 35+ Years. 2019 was the coldest in 9 years and wettest in over 35 years, weather suppressed suffering other than March 2020.
- 2021 will be polar opposite with a dramatic increase in suffering more similar to 2018, 2007 or 1987!

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# Flu & COVID Trends – Late March

Flu at historic lows



➤ This time last year we were battling both a 3<sup>rd</sup> near record spike in Flu and the first peak of COVID.

➤ This year Flu is at historic lows and COVID hospitalizations nearing pandemic lows similar to Fall last year.

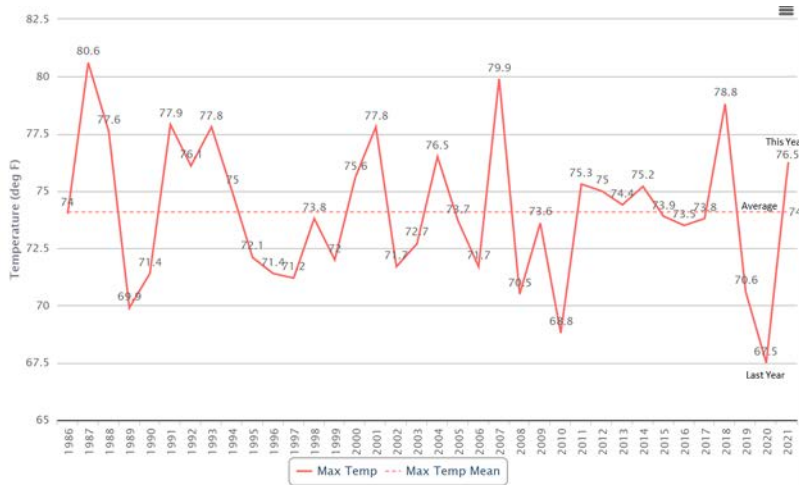
➤ With more of us eager to venture outdoors, with a much more intense allergy and pollen season, more allergy and asthma suffering is likely.



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# Peak Allergy & Asthma Week 1986-2021

Middle May peak = biggest change in decades!



➤ Last year (2020) coldest in over 35 years and snowy weather in May suppressed pollen, and COVID shutdowns reduced pollution to decade lows. This dramatically reduced allergy and asthma suffering and medication sales.

➤ 2019 was the coldest in 9 years but wettest in over 35 years, again suppressing suffering.

➤ 2021 will be polar opposite with a dramatic increase in suffering more similar to 2018, 2007 or 1987!



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# U.S. Regional High Risk Periods

## High Suffering Weeks (April – September 2021)

Favorable Periods for High Allergy & Asthma Suffering

Region	Apr 10	Apr 17	Apr 24	May 01	May 08	May 15	May 22	May 29	Jun 05	Jun 12	Jun 19	Jun 26	Jul 3	Jul 10	Jul 17	Jul 24	Jul 31	Aug 7	Aug 14	Aug 21	Aug 28	Sep 4	Sep 11	
U.S.		■			■	■	■											■						■
Northeast, United States		■			■	■	■												■					
Southeast, United States		■			■	■	■														■			
South Central, United States		■			■	■	■																	■
North Central, United States		■			■	■	■																	■
N. Rcky Mtn, United States		■			■	■	■																	■
S. Rcky Mtn, United States		■			■	■	■																	■
Southwest, United States		■			■	■	■																	■
Northwest, United States		■			■	■	■																	■

Weekending Saturday Dates

Peak Tree

Peak Grass

Peak Weeds

- Spring peak suffering periods (red shaded weeks) with warmer and drier weather will be middle March (start), middle April and especially middle May for a severe peak week! (tree pollen March-April, grass May-June, weeds July – September)
- The late Summer ragweed season doesn't appear as bad as last year with a start in early August and peak week 5-11 September with warmer/drier weather.



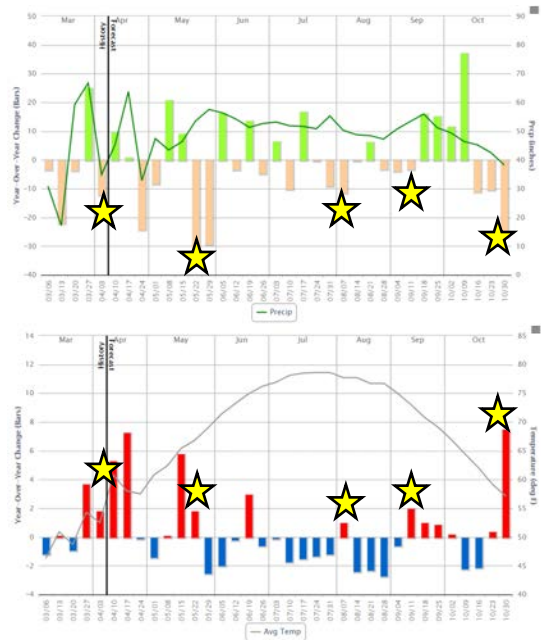
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# U.S. Weekly Weather Trends

## Drier Year Round = More Suffering

- Spring (March-May) Warmest in 4 Years and Driest in 9 Years will result in high allergy and asthma suffering with a much longer season than last year.
- Summer (June-August) is a bit cooler and slightly wetter than last year.
  - ❑ June warmest in 3 years, driest in 5 years = bad grass allergies during the peak season.
  - ❑ July coolest in 6 years, similarly wet = diminished suffering
  - ❑ August coolest in 4 years, driest in 6 years = increasing weeds
  - ❑ September warmer and wetter = quick end to weed season
  - ❑ October warmest in 4 years, driest in 7 = high pollution

★ Greatest increase in year-over-year Allergy & Asthma suffering.



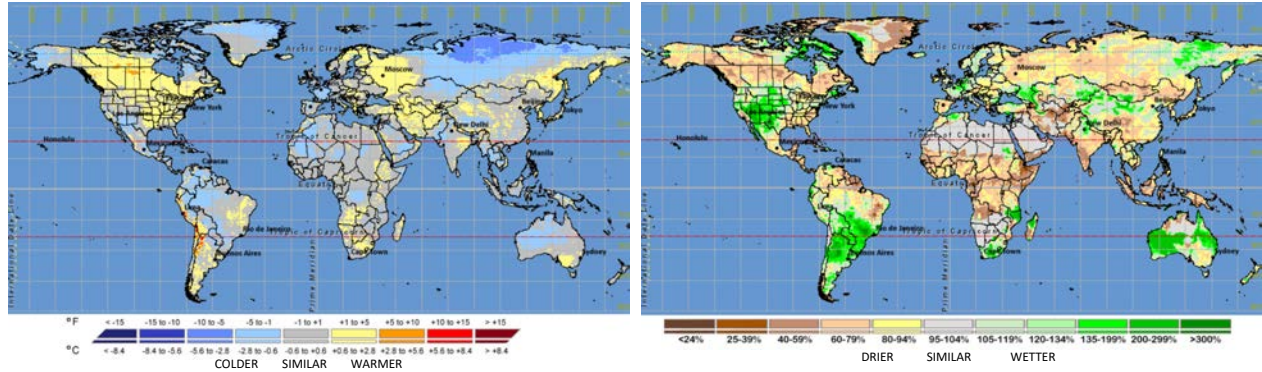
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## 2021 Season (April – September)

### Allergy & Asthma Suffering

Temperature & Precipitation Trends vs Last Year



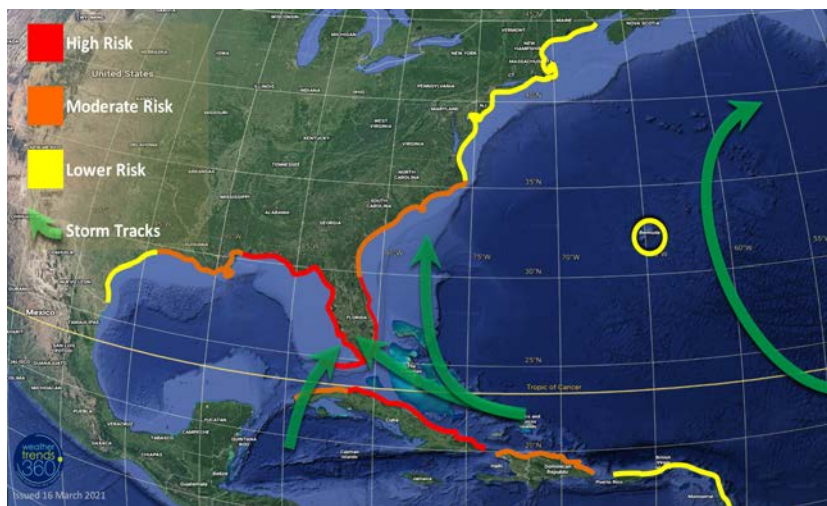
Higher suffering areas likely in the Eastern half of the U.S. Most of Canada, Southwest Russia, India and China.



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## U.S. 2021 Hurricane Season Outlook

3<sup>rd</sup> Most Active in 165 Years!



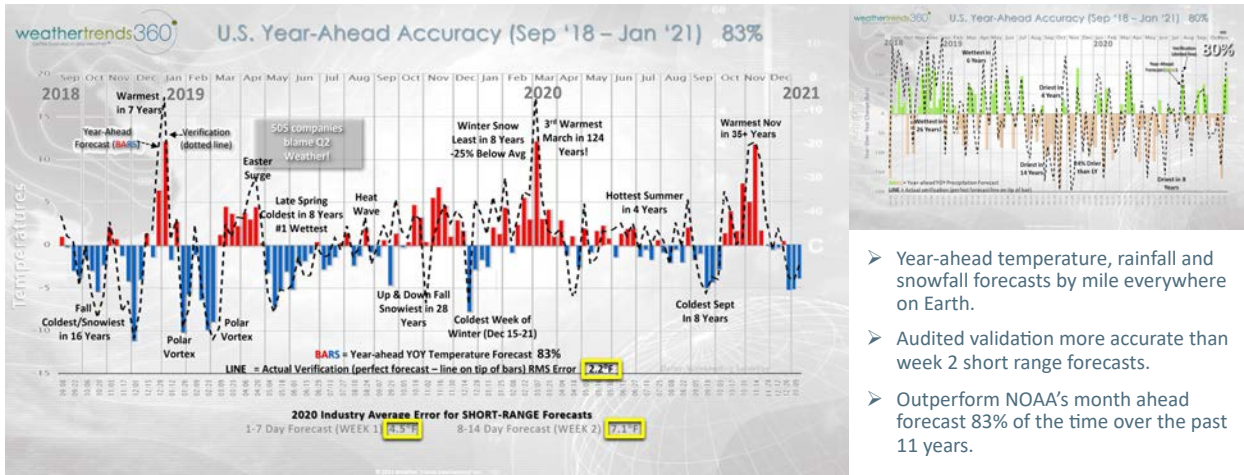
- Last Year was the most active season in 165 years of records with 30 named storms and Louisiana taking the brunt of the season with 5 landfalling systems including Major Hurricane Laura.
- This year at least 23 named storms with Florida the unfortunate target this year.
- You and your medications need to be ready to evacuate.



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# Year-Ahead Accuracy

Better than a week 2 (day 7-14) short range forecast

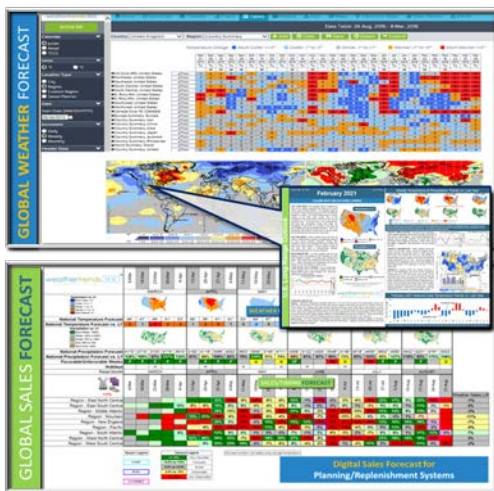


- Year-ahead temperature, rainfall and snowfall forecasts by mile everywhere on Earth.
- Audited validation more accurate than week 2 short range forecasts.
- Outperform NOAA's month ahead forecast 83% of the time over the past 11 years.

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# Business Solutions for the Medical Industry

weather and sales forecast everywhere on Earth



- Weather and sales forecasts by mile, by week A **YEAR-AHEAD** everywhere on Earth.
- **Power of 1° Degree Predictive Analytics** based on your drug/sales data, emergency room visits, any metric. Understand what weather is influencing your business.
- **Short range** tactical planning tools out 14 days.
- **Data feeds** to for your existing planning and forecasting systems.
- **Proactive not Reactive** planning.

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# Year-Ahead Hot Spot Outlooks for AAN

## Atlanta, Georgia Example

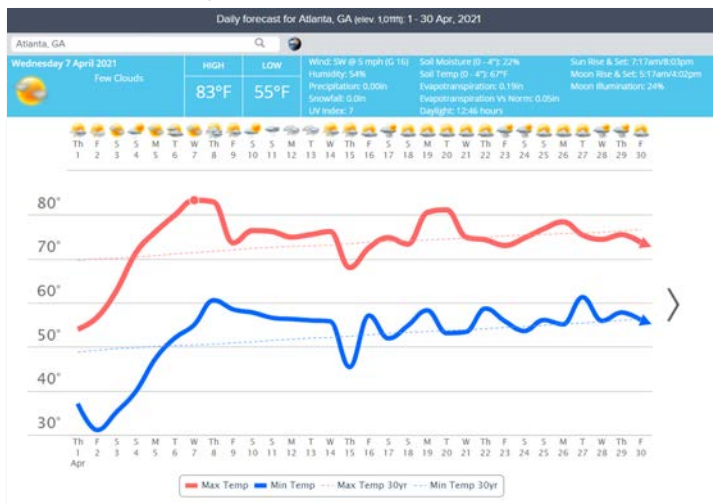
The left screenshot, titled "ATLANTA Weather Asthma & Allergy Outlook" for September 2020 - July 2021, features several charts. It includes a "Year Ahead Weather Forecast" bar chart, a "Forecast to the Fall" section with a line graph, and a "Winter 2020-2021" section with a bar chart. A "Spring 2021" section is also present. The right screenshot, titled "How Do We Know?" and "The Power of 1 Degree™ on Sales", shows a bar chart with sales increases of +3%, +3%, +2%, +2%, +10%, and +7% corresponding to different weather conditions. It also includes a "Success Stories" section with a list of clients and a "Year-Ahead Survey Clients" table.

- Weather Trends year-ahead forecasts cover every zip code in the U.S., every mile on Earth. We can help communities anywhere reduce suffering for 60 million people in the U.S. with proactive YEAR-AHEAD weather, sales and disease forecasting.
- Simple report identifies weather driven peak periods for Asthma, Allergy, Pollution and Flu conditions.
- Proactive, not reactive planning to hopefully save lives and reduce suffering.

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# Free Tools to Anticipate Suffering Ahead

## wt360 30-Day Trend Chart Forecasts

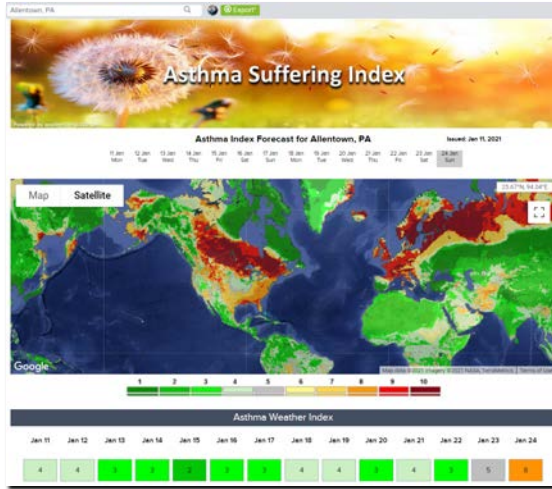


- These trend chart rolling 30-day forecasts are freely available every mile on Earth. They can help you anticipate when you're more likely to experience suffering.
- Warm/dry weather is a big trigger for higher suffering – look out Southeast in early April going from 30F to 83F with a drier pattern setting up.
- <https://www.weatherrends360.com/Charts/Consumer>

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# Free Tools to Anticipate Suffering Ahead

## 14-Day Short Range Asthma Suffering Index



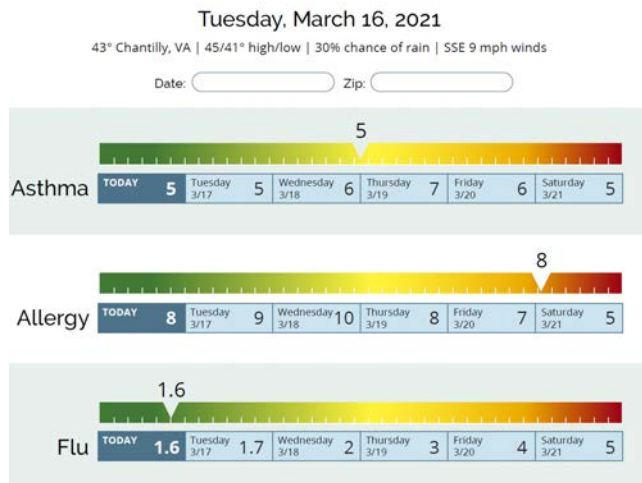
- We combined our research and validated it with Montclair State University modeling to prove that weather is one of the biggest contributing factors to allergy and asthma suffering over other factors.
- Our prototype 14-day Asthma Index forecast incorporates this research into a simple worldwide outlook in hopes of helping Asthma sufferers better plan ahead.
- [www.weather trends360.com/Asthma](http://www.weather trends360.com/Asthma)




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# Coming Soon on The Allergy & Asthma Network!

## 6-Day Short Range Asthma, Allergy and Flu Suffering Index



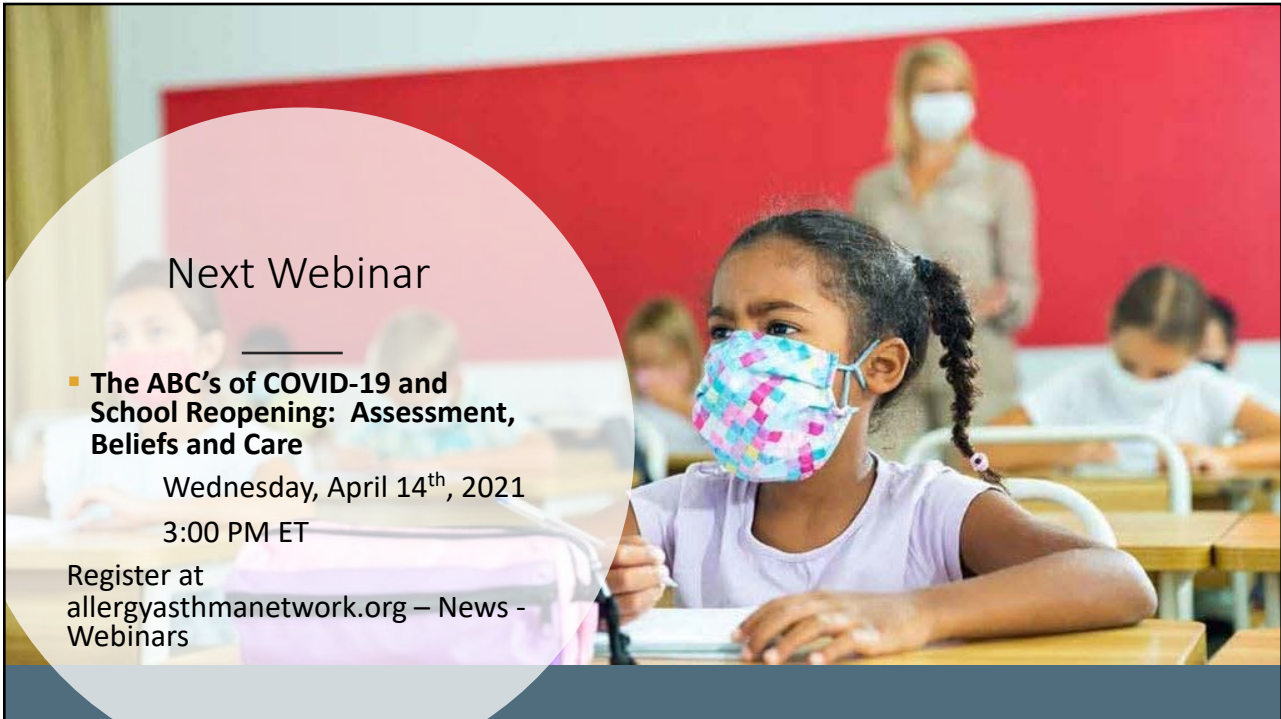
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# TIME FOR QUESTIONS

Record your questions in the question box  
We'll get to as many as we can!

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## Next Webinar

- **The ABC's of COVID-19 and School Reopening: Assessment, Beliefs and Care**  
Wednesday, April 14<sup>th</sup>, 2021  
3:00 PM ET

Register at [allergyasthmanetwork.org](http://allergyasthmanetwork.org) – News - Webinars

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# The Summer Allergy & Asthma Season Outlook

[Allergyasthmanetwork.org](http://Allergyasthmanetwork.org)