

# Creating a Weather Ready Nation for our Neurodiverse Communities

Presenter and Lead: JP Kalb, NWS Hanford, CA  
Collaborators: Felix Castro and Bill South,  
NWS Hanford, CA



**NATIONAL WEATHER SERVICE**

# Facts about NWS Hanford

- **Covers the southern San Joaquin Valley in California including Bakersfield, Fresno, Yosemite NP, and Sequoia and Kings Canyon NP.**
- **Around 50 percent of the population are of Hispanic origin.**
- **Triple digits normal between end of May and mid-September. 2022 had 48 to 68 days of triple digit heat including September 6th setting all time record high in Merced of 116 degrees. Average triple digit days between 23 and 38 with highest values in Hanford, Fresno, and Bakersfield.**
- **Major flooding in Spring of 2023 due to high snow totals in the Sierra Nevada during the Winter and early spring of 2022-23.**



# What is Neurodiversity?

Neurodiversity is a framework of a broad coalition of human cognition of different disabilities including Autism, ADHD, and Dyslexia, and an overlap and coexistence of multiple disabilities. However, in this presentation, Neurodiversity and Neurodiverse occasionally will be used interchangeably with the terms Autistic and Autism.

Autism is a developmental disability that causes significant social, communication, and behavior challenges. In 2023, the CDC estimated 1 in 36 eight year olds were diagnosed with Autism, however, the rates are likely to be higher due to changes in diagnosing and late or missed diagnosis. Of the two major criteria that needs to be met for Autism, the impacts from weather factors into the “behavior” aspect including being overwhelmed sensory wise and situationally by weather. Communication also is impacted by weather factors namely in how the message is communicated.



# Why adapt the messaging for Autistics?

**One of the major criteria for an Autism diagnosis is persistent deficits in social communication and interaction. Because of this, Autistics communicate differently and many will take the messaging more literally or may become more worried and unsure of what actions to take without more specific details. Also, Autistics and other Neurodiverse individuals also can and often face difficulties in communicating their needs or what they feel. It is important to take into consideration the two-way struggle in communication that many Autistics and Neurodiverse individuals face.**



# Why undertake this process?

Over the past few years, the NWS and the weather enterprise has made gains in doing outreach to impacted communities including the Hispanic communities, the Deaf and Hard of Hearing communities, and the Amish communities.

The only substantial work on Autism and weather was done by Bolton with a focus on the psychology aspect of how weather interacts with Autistics. Not a lot has been done on how to communicate the weather safety messaging during major events to the Autism/Neurodiverse community and their families including tips on being sensory prepared for the event.

In addition, there are a number of barriers that the Hispanic communities face with regards to Autism including language barrier in services and diagnosing and not enough understanding of Autism. These barriers add to the challenges already faced with weather by the Hispanic communities. Improvements in communicating weather hazards to the Hispanic communities that helps bring understanding to Autism are needed in comparison to the current messaging in the graphics.



# Current Weather Safety Messaging

## Heat Exhaustion

**ACT FAST**

- Move to a cooler area
- Loosen clothing
- Sip cool water
- Seek medical help if symptoms don't improve

Dizziness  
Thirst  
Heavy Sweating  
Nausea  
Weakness


## Heat Stroke

**ACT FAST**

**CALL 911**

- Move person to a cooler area
- Loosen clothing and remove extra layers
- Cool with water or ice



Confusion  
Dizziness  
Becomes Unconscious



*Heat exhaustion can lead to heat stroke.*

*Heat stroke can cause death or permanent disability if emergency treatment is not given.*

Stay Cool, Stay Hydrated, Stay Informed!



## Signos de Aviso de Hipotermia



Confusión    Temblor    Dificultad hablando    Somnolencia    Músculos rígidos

weather.gov/cold



NATIONAL WEATHER SERVICE

# Drawbacks from the current graphics

Many of the current infographics are good but a number of them do not take into consideration the sensory needs and communication style of Autistic individuals. Also, many of the graphics do not fully describe what precautions that can be taken by families of Autistics to stay safe in the weather including from the sensory side to prevent certain weather-related illnesses.

There also is not a lot of information that has been provided in the graphics of what to bring or do if families of Autistics have to go to a cooling center in extreme heat, if power is lost due to a non-severe thunderstorm, or have to travel on roadways during winter weather.

To test out better messaging towards the Autism and Neurodiverse communities, a graphic was designed and tested during the summer of 2023. The graphic was also manually translated into Spanish to reach the large Hispanic population in the San Joaquin Valley. Summer of 2023 experienced a normal summer pattern with increased flooding on rivers early on due to the snowfall from Winter 2022-23.





# The first Autistic Heat Graphics made at NWS Hanford

## Keeping Our Autistic and Neurodiverse Family and Friends safe during Hot Weather

According to the CDC in 2023, 1 in 36 children are diagnosed with Autism. Autistics can be over or under reactive to sensations, including feeling hot. Here are some ways to help keep Autistic family and friends safe this summer.



- Gently remind and encourage them to drink water to keep hydrated and cool.



- Autistics may prefer specific clothing items for their personal comfort. Encourage them to wear light colored clothes.



- If you go to a cooling center, bring sensory comfort items to help prevent overstimulation.



- Have spare batteries and portable chargers for electronic devices as you may lose power due to heat.



- Autistics often have additional health conditions which make them more susceptible to the symptoms of heat illnesses.



- Some autistics find being around water soothing. Drowning can occur quickly in cold water due to involuntary muscle reactions.

## Manteniendo nuestros amigos y familiares Autistas y Neurodiversos seguros durante tiempo caluroso.

De acuerdo con el Centro de Control de Enfermedades (CDC por sus siglas en inglés) en 2023, 1 de cada 36 niños serán diagnosticados con Autismo. Los Autistas pueden sentir sensaciones de más o de menos, incluyendo sentirse caliente. Aquí hay algunas maneras para mantener a nuestros amigos y familiares Autistas seguros durante este verano.



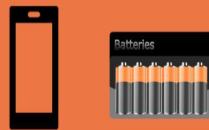
- Delicadamente, recuerde y animarle a beber agua y mantenerse hidratado y fresco.



- Los Autistas pudieran preferir vestimenta específica para su comodidad personal. Animelos a vestir vestimenta de colores suaves.



- Si usted va a un centro de enfriamiento, traiga consigo artículos sensoriales cómodos para ayudar a prevenir la sobreestimulación.



- Tenga baterías adicionales y cargadores portátiles para los equipos electrónicos por si falla la energía eléctrica debido al calor.



- Los Autistas generalmente tienen otras condiciones de salud lo cual los hacen más susceptibles a los síntomas relacionados con las enfermedades por calor.



- Algunos autistas se encuentran en aguas calmantes. Los ahogamientos pueden ocurrir rápidamente en aguas frías debido a las reacciones involuntarias de los músculos.



NATIONAL WEATHER SERVICE



# Results after the First graphic

Positive feedback was received after the first graphic including being shared by an Emergency Manager from a different part of the United States on social media. The Spanish translation of the graphic also gained the attention of Conexión con El Tiempo (Weather Channel En Español) which included a video interview of NWS Hanford's WCM Felix Castro about the graphic. One of the local Emergency Managers from Fresno County has been very supportive of the Autism initiatives at the office and invited the office to participate in a local Accessible Functional Needs group. However, some drawbacks included the color scheme and layout of the first graphics and some criticism of the word choice of Person-first vs Identity-first language. There was not much feedback or comments from the public with regards to the Spanish version of the heat graphic.

URL for Felix's Interview:

<https://www.youtube.com/watch?v=0OxgLwLO4NI&pp=ygUdQXV0aXNtbyB5IHByZXZlbnNpb24gZGUgY2Fsb3I%3D>



# Feedback from within the NWS

**Positive feedback was also received internally in the NWS as a number of forecasters from other offices reached out about future graphic designs and about Autism overall so that they can get a better understanding. In addition, positive feedback was received from the Western Region Director and Scientific and Technology Infusion Division Chief after its launch. The graphic also was shared in the NWS Insider weekly newsletter.**



# Feedback



**Ashley Morris** @MissAshes92 · Jul 25, 2023

Check out this Autistic/Neurodiverse Heat Awareness Graphic made by @NWSHanford and @wxjp2nyy and others.

Kudos to JP for bringing whole community efforts to NWS! #EMGTwitter

Story write-up is featured in July's @WRNAmbassadors AWARE newsletter: [weather.gov/publications/a...](https://weather.gov/publications/a...)



2

11

28

1.3K



# Current Developments

After the initial success of the Autism heat graphic, graphics for other major impacts including snow on the roadways was planned and prepared. Currently, some of the new graphics are going through the NWS AI Spanish translation to test the phrasing as a way to better serve the large Hispanic population in the San Joaquin Valley, however, they are still being worked on. In addition, some of these new graphics have been shared with the local Accessibility Functional Needs group in Fresno County and Emergency Managers to gauge feedback on improvements if needed before being tested and shared in the Public. The graphics that have been shared and tested are for thunderstorms and winter weather on the roads in English currently.



# Winter 2024 Roadway Graphic

## STUCK ON THE ROAD DURING A WINTER STORM?

Many people can be frustrated with being stuck on the roadway during a winter storm. However, some individuals can be overwhelmed situationally and sensory wise if stuck in the car.



**Layer with blankets and jackets** to stay warm and avoid hypothermia.



**Have comfort food and warm drinks in the car** as it may take a while to get to your destination or restaurants.



**Keep spare batteries and chargers in the car** for electronic devices and flashlights for communication and sensory purposes.



**Keep warming devices such as hand warmers and mittens in the car** to reduce the possibility of frostbite.



**Bring non-electric entertainment and sensory tools** to help pass time.



**KNOW BEFORE YOU GO!**  
Avoid being caught in a storm by checking the forecast and traffic reports before venturing out.



**NATIONAL WEATHER SERVICE**



**NWS Hanford**





# HNX Thunderstorm Graphic

## THUNDERSTORM SENSORY TIPS

Thunderstorms can be overwhelming both situationally and sensory wise for a number of people especially young children and the Neurodiverse community.



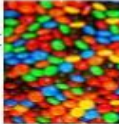
**Keep Sensory Comfort items close** such as noise-cancelling headphone and blackout curtains to prevent sensory overstimulation.



**Have non-electronic entertainment on hand** such as books and playing cards to wait out the storm.



**Have comfort food items handy** that do not require heating or water as power could be lost and electric shock may occur due to electric charges from lightning.



**Have batteries and portable chargers** for flashlights and communication devices as power can be lost.



NATIONAL WEATHER SERVICE

# Future work

**In the near future, there are some goals to build a better Weather Ready Nation for the Neurodiverse community:**

- **Collaborate with other offices across the NWS in expanding messaging to other weather hazards including for rip currents, tornadoes, and blizzards with regards to sensory and situational needs of Neurodiverse and Autism individuals.**
- **Expand the outreach to other languages for other offices to share in their communities including the expansion of the NWS AI translations.**
- **Work with local EM and broadcasters on the messaging of the impacts of weather on Autism.**
- **Make improvements to the graphics already made as information increases with feedback from the Autism and Neurodiverse communities.**





# Questions? Comments?

**JP Kalb's contact info:**

**NWS email:** [james.kalb@noaa.gov](mailto:james.kalb@noaa.gov)

**Contact info for WFO Hanford management:**

**Felix Castro, WCM WFO Hanford:** [felix.castro@noaa.gov](mailto:felix.castro@noaa.gov)

**Jerald Meadows, MIC, WFO Hanford:** [gerald.meadows@noaa.gov](mailto:gerald.meadows@noaa.gov)

**Kris Mattarochia, SOO, WFO Hanford:** [kristian.mattarochia@noaa.gov](mailto:kristian.mattarochia@noaa.gov)

**Social Media:**

**Twitter (X):** @NWSHanford

**Facebook:** US National Weather Service Hanford California

