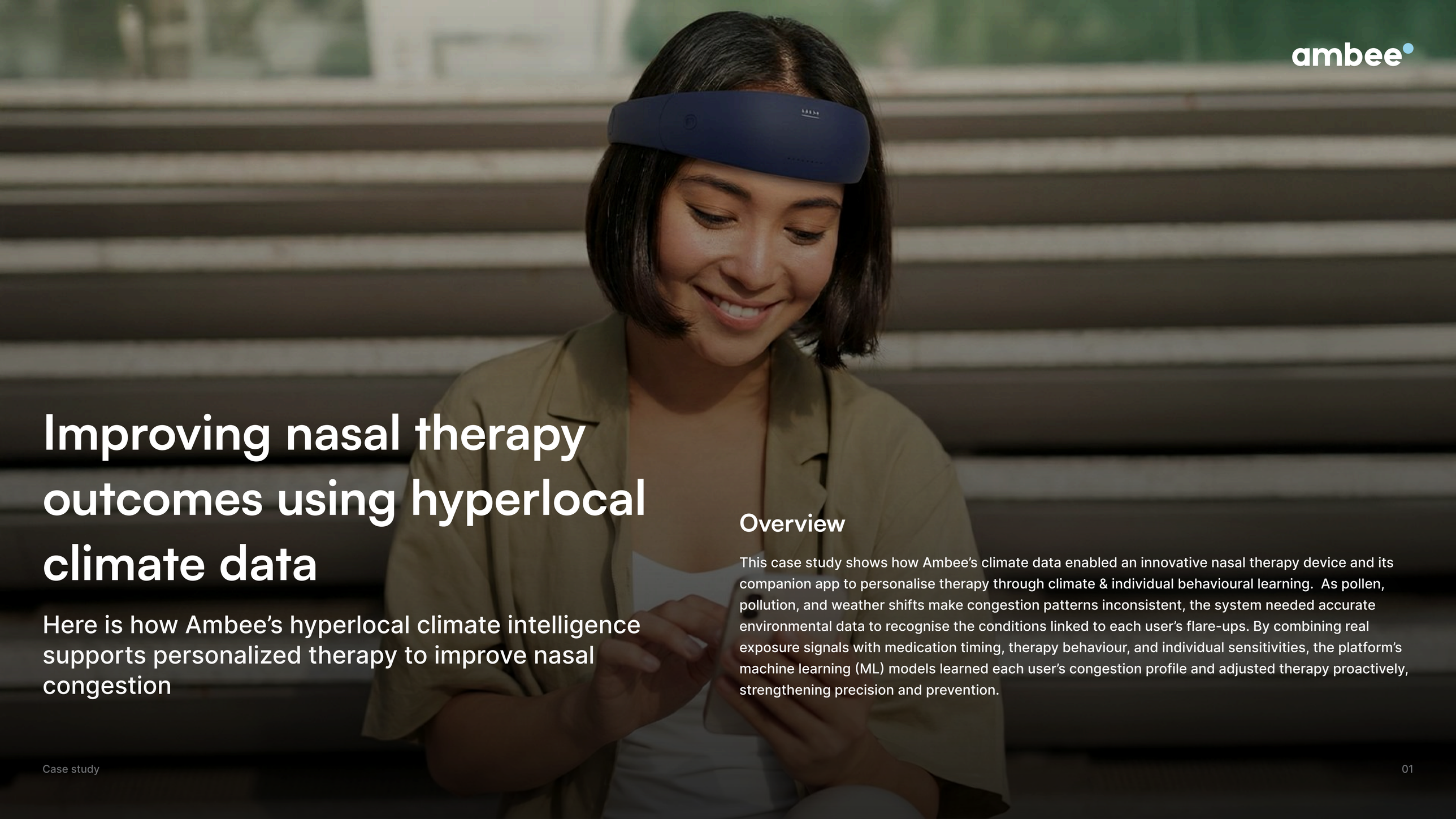


Improving nasal therapy outcomes using hyperlocal climate data

Here is how Ambee’s hyperlocal climate intelligence supports personalized therapy to improve nasal congestion

Overview

This case study shows how Ambee’s climate data enabled an innovative nasal therapy device and its companion app to personalise therapy through climate & individual behavioural learning. As pollen, pollution, and weather shifts make congestion patterns inconsistent, the system needed accurate environmental data to recognise the conditions linked to each user’s flare-ups. By combining real exposure signals with medication timing, therapy behaviour, and individual sensitivities, the platform’s machine learning (ML) models learned each user’s congestion profile and adjusted therapy proactively, strengthening precision and prevention.

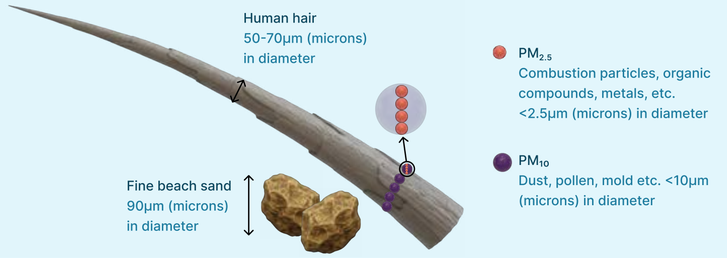
The challenge: Congestion rarely behaves the way people expect

Nasal congestion is the inflammation-driven swelling of the nasal passages that restricts airflow and disrupts normal breathing. For years, nasal congestion sat in the category of “seasonal discomfort.” People blamed spring pollen, winter infections, and a handful of polluted days. Climate & health research shows a very different picture. Climate volatility is now one of the primary forces shaping when congestion starts, how long it lasts, and how severe it becomes. Across major studies, the scientific evidence & signal remains consistent: **as climate shifts, nasal congestion rises**.

It’s no secret that the environment directly shapes when symptoms start, how long they last, and how severe they become. And because these climate triggers are unpredictable, they create equally unpredictable spikes in demand for congestion relief products, respiratory aids, and allergy care.

Did you know?

PM2.5 particles are far smaller than a human hair, PM10 is thinner than fine beach sand, and their tiny size makes it easy for them to enter the nose and sinuses.



Source: Johns Hopkins Medicine

How climate volatility impacts nasal congestion

Climate change is making pollen seasons longer and more intense, which directly increases allergic nasal congestion.

Pollen season is now an average of 20 days longer across North America compared to 1990.

Pollen seasons are starting 20 days earlier than they did in 1990, increasing early-season congestion symptoms.

Total pollen concentrations have increased by 21 percent from 1990 to 2018, worsening allergy-related nasal blockage.

Rising outdoor ozone levels are linked to nasal congestion and a runny nose, especially in allergic adolescents.

Total pollen emissions in the United States are projected to increase by 16 to 40 percent by the end of the century.

Climate change worsens air pollution, and higher ground-level ozone (O_3) increases the likelihood of congestion episodes.

Long-term exposure to PM2.5 is associated with chronic rhinosinusitis, a condition defined by persistent nasal congestion.

A personalization gap driven by missing environmental context

The company, a leader in respiratory health technologies, develops a non-invasive nasal therapy device designed for daily use, supported by a mobile application that enables consistent delivery and monitoring of therapy. The system is built around the idea that nasal congestion patterns differ widely among individuals and change with environmental exposure.

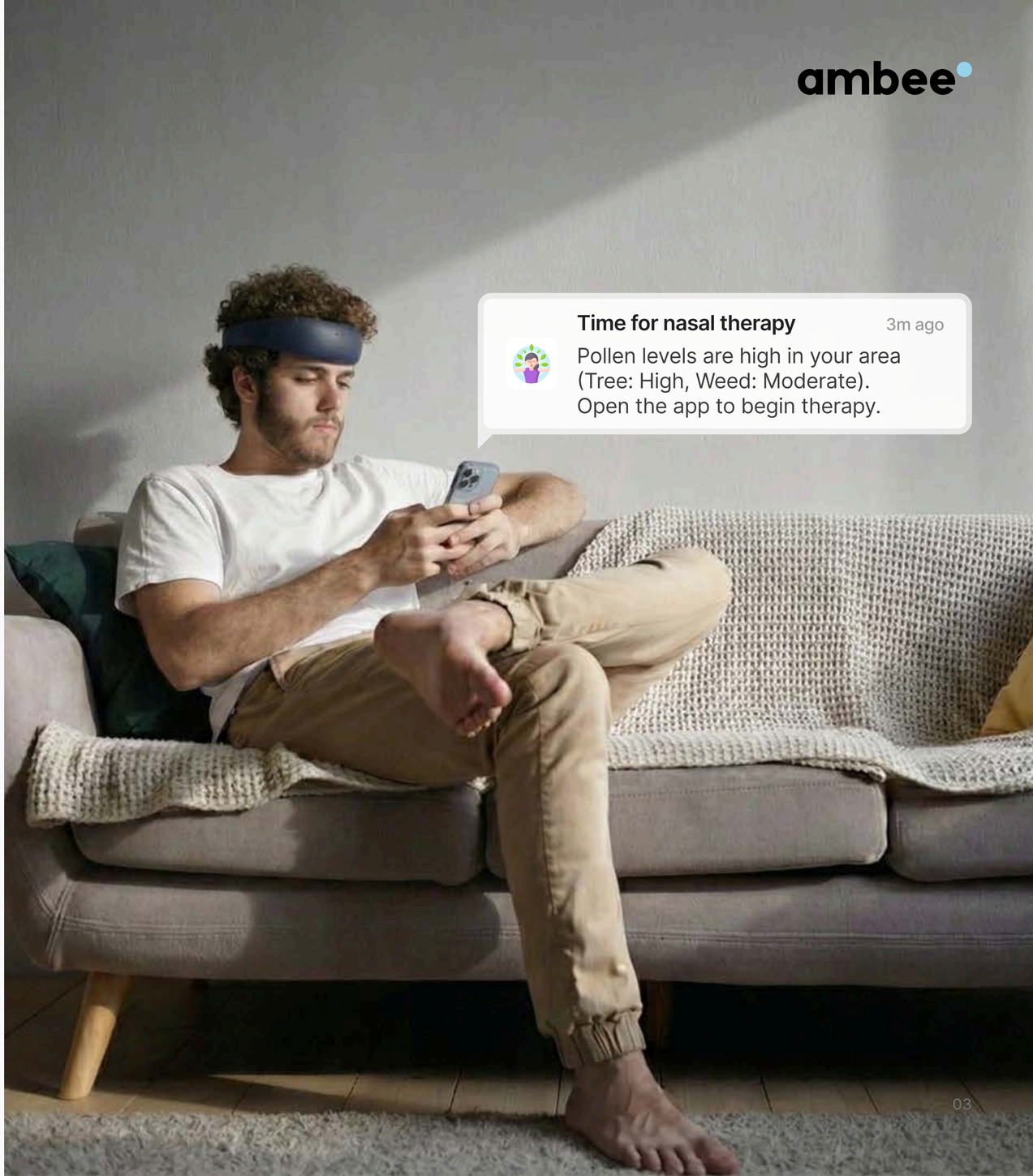
To support this approach, the platform uses machine learning (ML) models that learn from user behaviour, therapy usage, and external conditions to personalize therapy over time. Training these models required accurate, location-specific environmental data, allowing the system to recognize which climate factors directly influence congestion for each user.

This is the core challenge the nasal therapy brand faced:

Nasal congestion is no longer seasonal. It is environmental, volatile, and tightly tied to real-time climate behavior:

- But users had no visibility into these triggers.
- Their congestion felt random.
- And their therapy routine stayed reactive.

The brand needed a way to understand each user's environment, identify the exact triggers behind their congestion, and adjust therapy before symptoms appeared.



Why Ambee was the perfect fit

For the device to deliver personalized acoustic nasal therapy, it needed more than user inputs. Nasal congestion is heavily shaped by environmental exposure, and symptom patterns shift with pollen surges, pollution spikes, humidity changes, and rapid weather transitions. Without the right climate context, the system could not learn the conditions that triggered each user's congestion or adapt therapy at the right moment.

Ambee's climate intelligence provided the missing foundation by supplying precise signals on:

- Pollen species
- Particulate matter
- Ozone
- Humidity
- Temperature variation
- Incoming weather shifts

These variables directly influence nasal swelling and airway response, allowing the model and app to anticipate what the user's body is about to encounter and adjust therapy proactively rather than reacting after symptoms form.

How Ambee enables a shift from the reactive to the preventive

To operationalize personalized therapy, they combined Ambee's real-time climate data with each user's behavioral patterns. The system ingested hyperlocal pollen, AQI, humidity, temperature, and weather signals, then aligned them with medication timing, therapy usage, and individual sensitivities. A machine learning layer processed these combined inputs, identifying the environmental profiles that consistently preceded congestion episodes for each user. This allowed the platform to build a congestion fingerprint that was specific to the individual rather than a generalized model.

User environment

Triggers

Nasal congestion

Ingest combined inputs

Ambee's climate intelligence

Pollen
30+ sub-species

Weather
Temp., Humidity

AQI
6+ major pollutants

+

Brand's machine learning layer

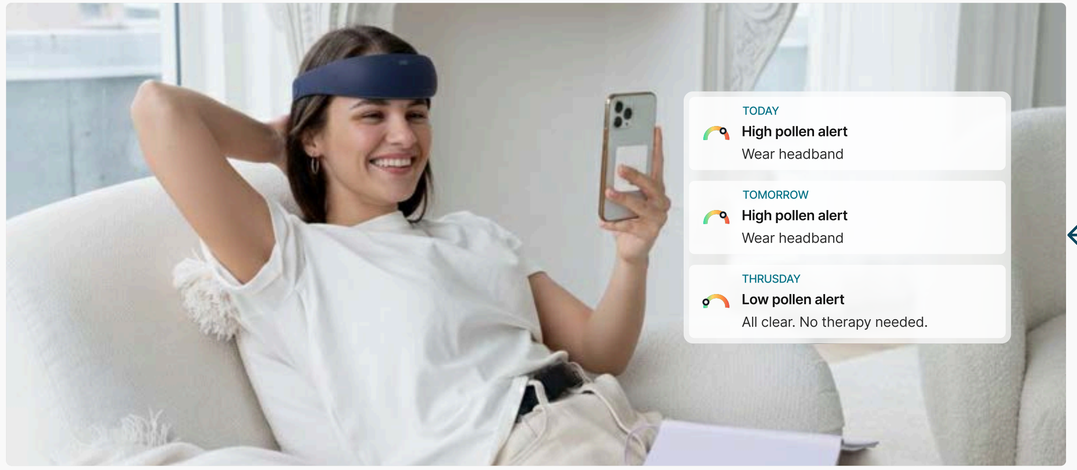
Congestion footprint

Medication timing

Individual sensitivities

User behavioral patterns

Result

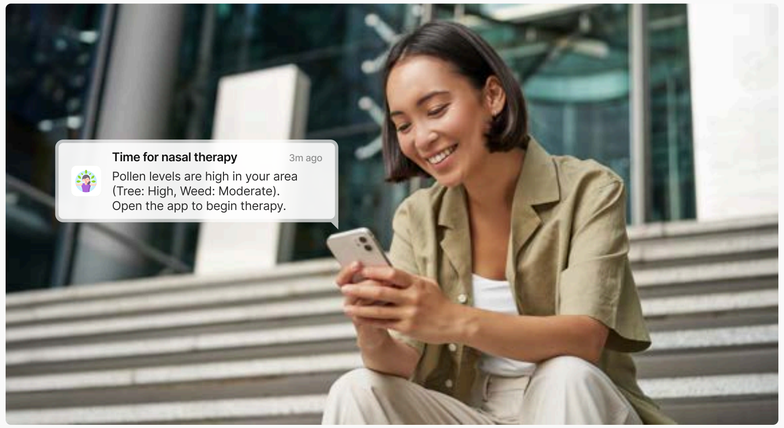


This enabled endless possibilities

With environmental intelligence embedded, the therapy system evolved from reactive symptom management to preventive personalization. By recognizing early environmental risk patterns linked to congestion, the platform adjusted therapy before symptoms emerged.

Lower medication dependence

Users reported up to a 50 percent reduction in reliance on steroids, inhalers, and oral congestion medications.



Automatic therapy adjustment

Therapy delivery is automatically adapted based on individual and identified environmental risk patterns.

Better outcomes for vocals

Vocalist users experienced smoother airflow and reduced vocal strain, particularly during high pollen and pollution periods.

Together, this created a more accurate, individualized, and preventive therapy experience.

Impact

The combined system delivered measurable improvements:

Fewer congestion episodes

2x improvement in congestion symptoms

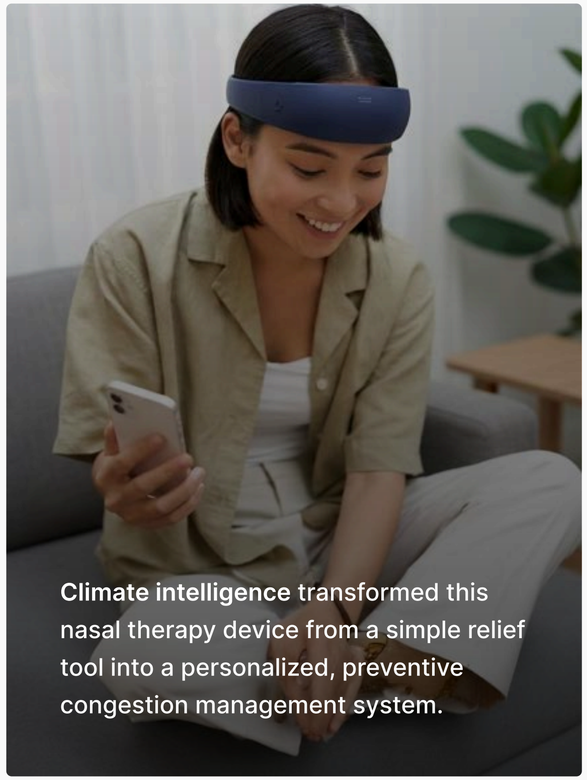
(reduced congestion symptoms)

More predictable breathing patterns

Clearer airflow for vocalists and performers

Greater control over symptoms

Early action instead of last-minute panic



Climate intelligence transformed this nasal therapy device from a simple relief tool into a personalized, preventive congestion management system.

ambee

Interested in bringing climate-driven innovation to your product strategy?

Write to us at sales@getambee.com

Connect with us: