

The background is a dark, atmospheric image featuring a grid of translucent cubes. Inside these cubes, there are vibrant, ethereal green and blue light patterns that resemble a digital or biological structure. The overall tone is futuristic and high-tech.

REVOLUTIONIZING PHARMA :

Why Must Pharma Embrace Climate Intelligence Now?

Executive summary



Rising global temperatures and environmental changes are increasing heat-related deaths, allergies, respiratory diseases, and mental health issues.



Consumers are becoming more proactive in managing their health, necessitating a shift in pharmaceutical approaches to meet evolving demands.



To address these challenges, pharmaceutical companies must adopt climate intelligence and innovate across research, inventory management, marketing, and consumer engagement.



The future of healthcare lies in personalized and holistic approaches, leveraging climate data to enhance treatment efficacy and consumer satisfaction.

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Climate change unleashes new problems for consumer health

July 2023: For the first time in history, WHO Europe declares the climate crisis a public health emergency.

While climate change is often regarded as an environmental or scientific issue, its human cost is becoming increasingly evident. Experts are calling it the greatest global health threat of our time and for good reasons.

Currently, the global temperature is 1.1°C (just 0.4°C short of the 1.5°C Paris Agreement limit) higher than pre-industrial levels. To underscore the danger that spells for human health, if it reaches 2°C by the end of the century, there can be a 370% increase in heat-related deaths. ^[1]

We wholeheartedly embrace that GPW 14 has climate change and health as one of the WHO strategic priorities and acknowledge the profound impact of climate change on global health

Dr Maria Neira
Director, Department of Environment,
Climate Change, and Health

[1] Lancet Countdown on Health and Climate Change, 2023]

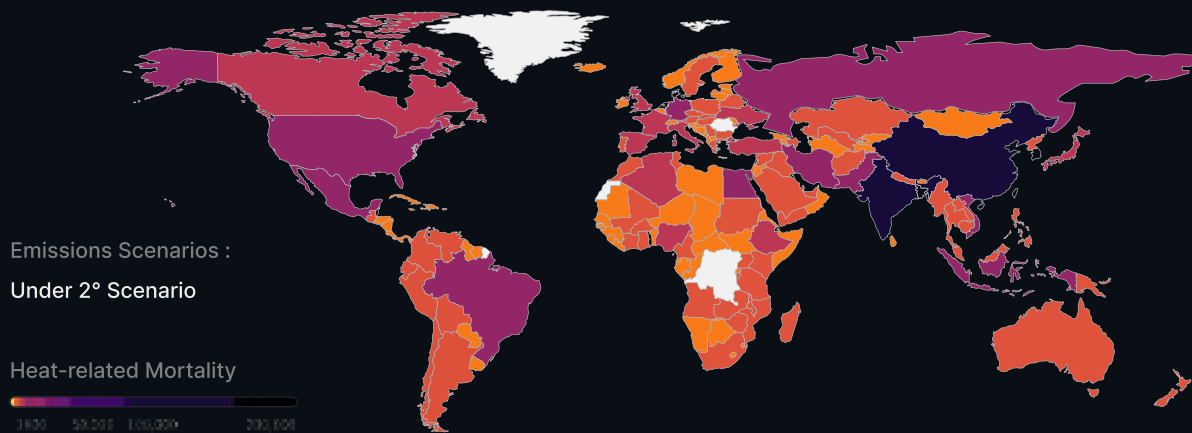


Fig 1: Heat-related mortality at mid-century (2041-2060) with respect to 1995-2004 baseline

This isn't just hyperbole. It is an undeniable reality that a warming planet directly affects the population—and consumers—who are more vulnerable to various diseases.

Climate change is creating a new normal for healthcare consumers as its widespread effects percolate into every aspect of human health – actively impacting everything from breathing to sleep patterns, putting virtually everyone in the world into a zone of risk.

Going forward, this will result in a paradigm shift in the way pharmaceuticals must address their consumers' needs.



“Earth has a fever”

-NASA

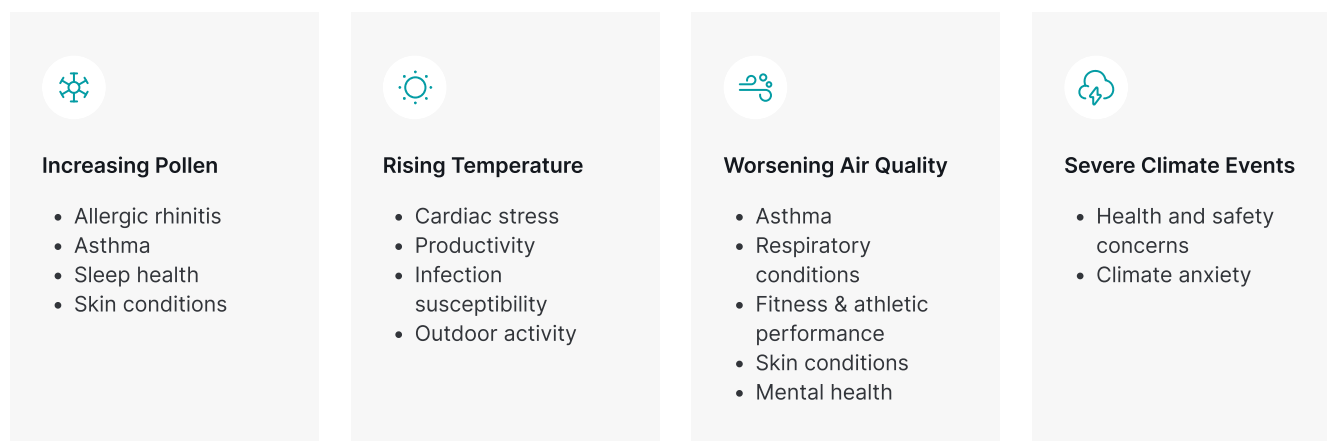


Fig 2: Health implications of climate change-induced extreme weather patterns

Firstly, higher pollen levels resulting from increased CO₂ and changing precipitation patterns are leading to more frequent and severe allergic reactions. This exacerbates conditions like allergic rhinitis and asthma, **disrupts sleep**, and causes various skin issues, thus diminishing quality of life and imposing additional healthcare costs and productivity losses.

Rising temperatures present another significant threat. As global temperatures climb, heat-related illnesses such as heatstroke become more prevalent, particularly when body temperatures exceed 40°C (104°F). The combination of heat and humidity overwhelms the body's natural cooling mechanisms, leading to cardiac stress, increased fatigue, and a higher susceptibility to infections. This severely limits outdoor activities and overall productivity, further impacting physical health and economic stability.

8%

of the total disease burden in 2021 was caused by particulate matter air pollution.

(IHME)

A study indicates that the average pollen season is now not only 20 days longer but also has a 21% increase in pollen concentration.

Poor air quality, aggravated by heatwaves and wildfires, compounds these health risks. Impaired lung function and exacerbated respiratory conditions like asthma and chronic obstructive pulmonary disease (COPD) are direct consequences. Additionally, skin health, fitness levels, and mental well-being suffer, contributing to a decline in overall quality of life.

Severe climate events, such as floods and natural disasters, introduce immediate physical dangers and long-lasting psychological impacts. Health and safety concerns become paramount for those in affected areas, while the trauma from these events often leads to climate

anxiety and post-traumatic stress disorder (PTSD).

The human health implications of climate change are far-reaching and increasingly urgent. With global temperatures on the rise, the direct impact on human health is becoming more pronounced, driving a shift in healthcare priorities and consumer needs. Pharmaceuticals, in particular, must adapt to these evolving demands.

In the face of these changes, there is an undeniable need for innovation in the pharmaceutical sector to meet the health needs of consumers.

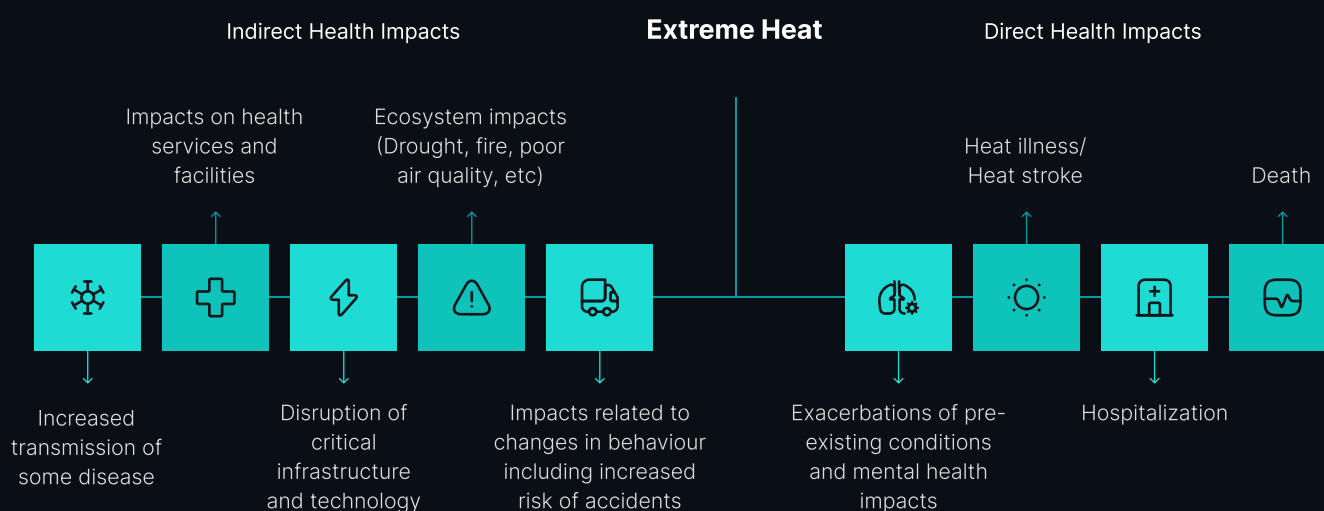


Fig 3: The escalating temperatures are bringing about many health challenges, affecting consumers' health on multiple levels.

CASE IN POINT

How juli eases mental health conditions with Ambee's climate data

Juli, a digital health firm, partnered with Ambee to integrate air quality and pollen data into their platform, fine-tuning health recommendations with hyperlocal environmental insights.

Results: Juli users gained more control over their physical and mental health, leading to significantly improved consumer engagement and app retention.

[Read full insight →](#)

AIR QUALITY

46 | Good AQI

POLLEN

6/m³ | Low weed pollen

NEW YORK

09:00 EDT | August 1, 2024

Pharmaceuticals must now innovate to meet changing consumer needs

Healthcare is a sector where innovation impacts the health and wellness of millions of people and the bottom lines of companies that provide it. Today, however, the landscape is shifting. When it comes to consumer-facing pharmaceuticals, most of the drive for innovation comes from the consumer and not the manufacturer ^[2]. The central need that pharmaceuticals must now fulfill is how they can cater to an audience that is becoming proactive instead of reactive when it comes to their health.

This change is driven by various factors, including the increasing number of people affected by climate change-related health issues. The rise in temperature and pollution levels is contributing to a surge in allergies, respiratory diseases, and other health

conditions. Consumers are not only growing in number but also facing a broadening spectrum of illnesses.

Moreover, with the increasing availability of health information online, consumers are becoming more informed and engaged in managing their own health. This shift towards ^[2] proactive, self-care approaches means that pharmaceutical companies must adapt to meet the evolving needs of these empowered consumers.

To thrive in this new environment, pharma companies need to adopt a more consumer-centric approach and deliver holistic, personalized healthcare solutions that align with the changing expectations and needs of their customers.



[2] Rise of the customer experience- Customer led transformation in pharma, PwC

1. Pharma consumers are growing in number and in illnesses

Climate change puts virtually the entire global population at risk of disease—even those who are relatively unaffected by it. If 400 million people suffer from some kind of allergy, there's an extra 40% of the world's population that is highly sensitive to developing allergies but is likely unaware of it, and increasing local temperatures or worsening air pollution will push them over the threshold.

Moreover, pollution produces three times more histamine in the body than allergies. At this rate, half of the world's population will suffer from some kind of allergy.

It doesn't stop at allergies— air pollution is a significant driver of cardiovascular and respiratory diseases. According to WHO, outdoor air pollution caused about **4.2 million premature deaths** worldwide—about 13 people every minute. Similarly, the burden of chronic diseases (diabetes) and **infectious diseases** such as malaria and dengue is soaring. The intensity and distribution of these diseases are highly sensitive to environmental conditions.

Consequently, **healthcare spending** on respiratory diseases is high. In fact, it is higher in the United States than in any other country.



The average American household spends around **\$5000** per month per person on healthcare.

Clearly, the industry is not ignoring this growth in patients and diseases. In 2020, six products switched from prescription (Rx) to OTC—primarily antihistamines, decongestants, and medicines to treat upper respiratory infections.

This growth was also represented by the fact that, as of 2023, the pharmaceutical industry has boosted its ad spending to 14%, making it the second-largest advertising spender after the tech sector. The industry will continue to undergo significant transformation, driven by a shift in focus from reactive symptom-based models to proactive prevention—and timely inventory will emerge crucial for that.



From 2018 to 2022, OTC product use for allergies, medicated skin conditions, and sleep issues increased by 7%, 3%, and 8%, respectively.

Implications for Pharma:

Pharma companies must adopt a more consumer-centric approach and optimize their supply chain to reach relevant markets at the right time. All stakeholders, including payors, benefit when consumers can easily access effective treatments for illness. Having OTC medication readily available in retail stores and online alleviates the burden of time and expense associated with prescription drugs for both consumers

and the healthcare system.

This can only happen when brands have enough medicines in stock at the relevant geographic location. Rising environmental threats make it difficult for pharmaceutical companies to optimize their inventory. They need robust strategies and data to manage their supply and inventory effectively and mitigate potential losses.

2. Pharma consumers are taking healthcare into their own hands

Consumer health has become synonymous with self-care as people show a growing willingness to manage their own well-being.

Today, consumers are accustomed to using the internet and mobile devices when making daily choices. The explosion of online health information is empowering patients to become well-informed about their health and well-being. In the last couple of years, the COVID-19 pandemic has accelerated this

change, prompting consumers to take a greater interest in their health.

To illustrate, several consumer segments, especially GenZ and Millennials, are now diligently involved in their health, sleep, nutrition, fitness, and more, all of which are directly impacted by climate change.

This widening circle of impact is **changing consumer behavior** and fuelling the demand for proactive and predictive care models.

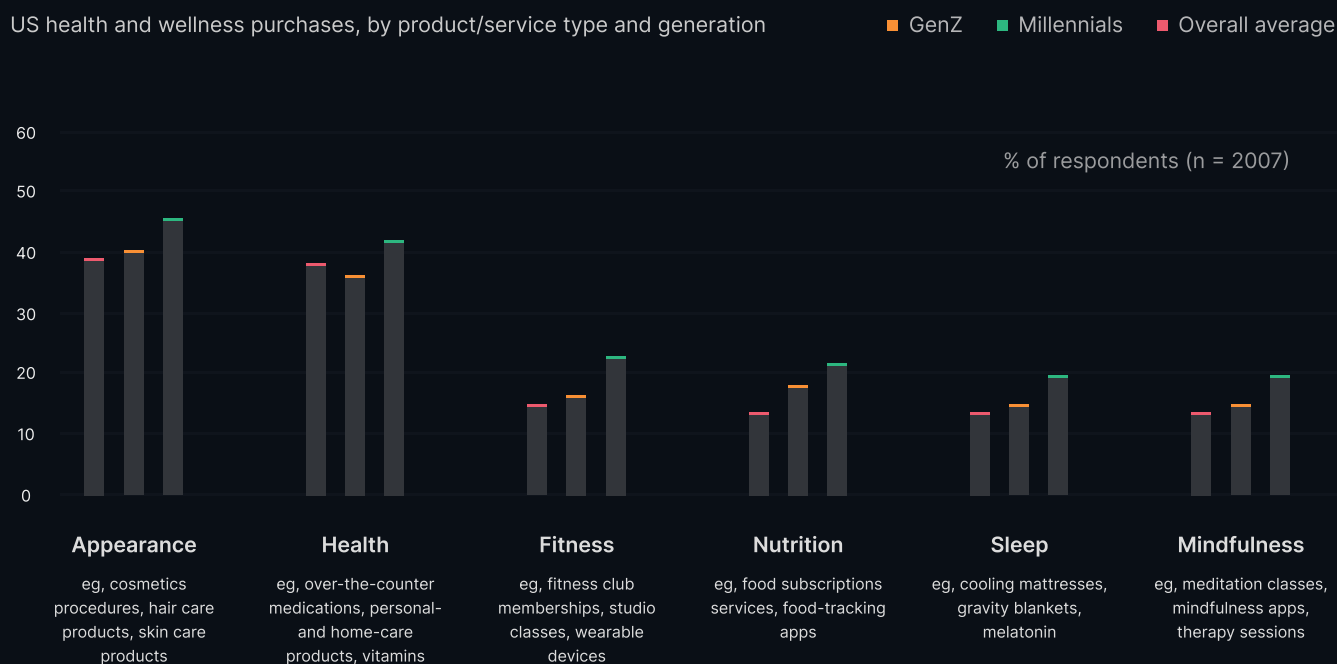


Fig 4: Gen Z and millennial consumers place a higher priority on wellness compared to older generations, showing the growing influence of younger consumers in shaping the wellness market.

Implications for Pharma:

The rise of actively involved and empowered consumers has exposed a significant disconnect between what consumers want and what pharmaceuticals offer. Pharma executives recognize the failure of the traditional one-size-fits-all marketing approach and understand that they cannot simply address it by reducing the size of the sales force.

Traditionally, pharmaceutical brands have had little interaction with end-users, but the growing access to information and technology has made consumers more involved in their health and well-being. As old methods fail, pharmaceutical companies need a new data-driven marketing strategy to differentiate and chart a path for growth.

3. Consumers want holistic and personalized healthcare solutions

Beyond self-care, the future of healthcare now lies in personalized and holistic approaches, and the rise of precision medicine ^[3] has only substantiated that. Traditional pharmaceutical marketing assumes efficacy alone attaches value to the product. The focus on individual products overlooks the holistic impact on a patient's life. However, consumers consider factors like quality of life and affordability alongside traditional metrics like efficacy. Even though safety and efficacy are crucial, they are not the only factors—consumers want to know when and how medicine can improve their symptoms and overall health.

85%

of consumers believe
personalized care is
important.

[CVS Health Survey](#)

[3] 84 percent of pharmaceuticals have it on their corporate agenda.
(source: [How pharmaceutical firms can shape the future of healthcare PwC](#))

Implications for Pharma:

Pharma brands can offer software-based health and wellness services to consumers. There is an opportunity to pair personalization offerings with data to deliver an end-to-end consumer experience, from preventative recommendations to early diagnosis and treatment.

Climate change and shifting consumer behavior present both challenges and opportunities to the healthcare sector, but the question is: Is the pharmaceutical

industry prepared?

While some of the pharmaceutical companies are embracing technology and data-driven decision-making, others are struggling to adapt. Even today, the consumer health market is fragmented, with no single dominant player. Given the rising demand for consumer health, this fragmentation is a unique advantage to the pharmaceutical industry to innovate across business functions



Climate intelligence allows pharma to address these challenges across its value chain

RESEARCH AND DEVELOPMENT

Accelerate the development of precision medicine

Climate data is a crucial asset in the advancement of precision medicine. Understanding how environmental factors influence health conditions allows pharmaceutical companies to create treatments tailored to specific populations. For instance, data on local climate conditions and their effects on allergy patterns can guide the development of more targeted and effective allergy medications. This approach not only improves patient outcomes but also enhances the efficacy and marketability of pharmaceutical products, aligning with the growing demand for personalized healthcare solutions. Following are some of the R&D opportunities for pharma with climate intelligence:



1 Improved drug efficacy

Identify environmental triggers like pollen or pollution to improve drug response for different populations.

2 Robust trial findings

Consider environmental factors and seasonal variations that may affect patient recruitment, retention, and outcomes.

3 Progress in precision medicine

Assess individual responses to environmental factors and guide the development of tailored medicine.

CASE IN POINT

Integrating Climate Data in Exposome Analysis

The concept of the exposome refers to the totality of environmental exposures that an individual encounters throughout their lifetime, which can significantly influence health outcomes, particularly in allergic and immunologic diseases. Climate data is a crucial component of exposome analysis, as it provides comprehensive insights into the environmental factors that impact allergic conditions. For example, climate data can help track changes in temperature, humidity, and precipitation patterns, affecting the distribution and concentration of airborne allergens such as pollen and mold spores. By integrating climate data with individual patient data, researchers and healthcare providers can identify correlations between environmental conditions and allergy exacerbations, allowing for more precise identification of allergic endotypes and their triggers.

Additionally, climate data can aid in predicting and modeling future exposure risks associated with climate change. Rising global temperatures and altered precipitation patterns are expected to extend pollen seasons, increase pollen production, and expand the geographic range of certain allergenic plants. This predictive capability enables healthcare providers to implement proactive measures, such as tailored patient education and targeted interventions, to mitigate allergy risks. By leveraging climate data in exposome analysis, we can enhance our understanding of the environmental determinants of allergic diseases and advance the field of precision medicine, ultimately leading to more effective, personalized treatment strategies for allergy sufferers.

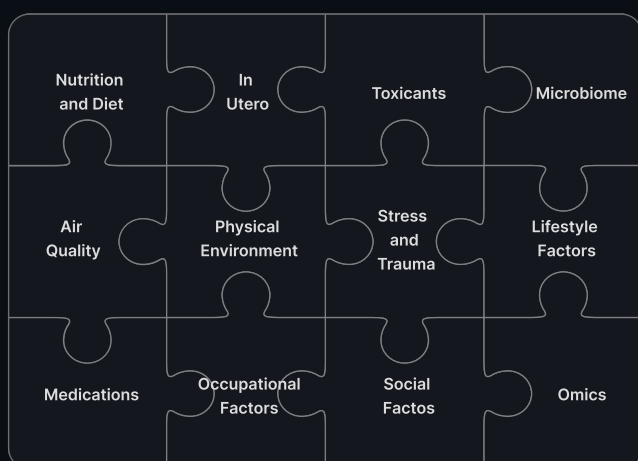


Fig 5: The exposome refers to all the environmental factors a person is exposed to over their lifetime. Each piece of this puzzle provides information that can help us understand how complex allergic diseases develop.

INVENTORY MANAGEMENT

Enable proactive consumer purchase behavior and avoid stock-outs

Effective inventory management is vital for ensuring that medications are available when and where they are needed, especially as climate change introduces new health challenges. Without leveraging climate intelligence, current pharma business planning remains reactionary, leading to stock-outs, missed sales, and ultimately not being able to reach the growing number of consumers at the right time.

Leveraging climate intelligence allows pharmaceutical companies to predict demand surges for specific medications based on seasonal and environmental changes. For example, anticipating increased demand for respiratory treatments during periods of heightened air pollution or heatwaves enables better stock management, reducing both shortages and excesses.

Such anticipation relies on climate-aware demand forecasts, which is an untapped opportunity in the current market. Our research has revealed a **73%** correlation between pollen peaks and sales of antihistamines in pharmacy outlets, revealing the strong relationship between environmental fluctuations and sales peaks. This predictive capability ensures the timely availability of essential drugs.

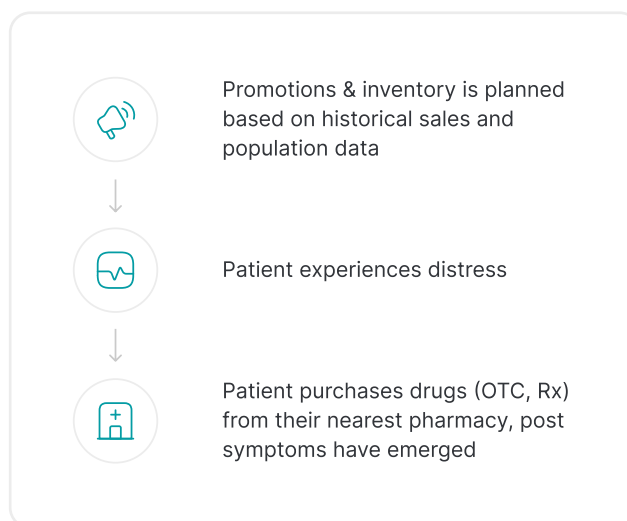
Status quo - reactive business planning

Fig 6: Current business planning follows a reactionary approach, which has the potential to transform into a proactive approach.

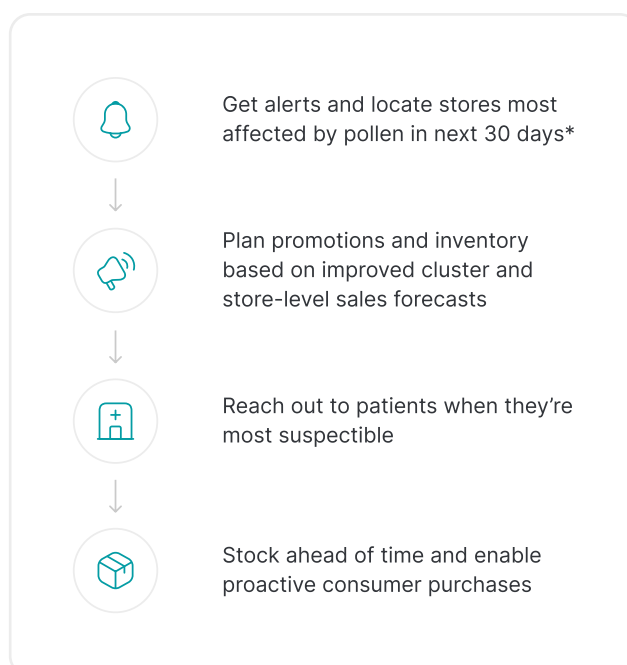
With Ambee's climate data - Proactive business planning

Fig 7: Long-term climate intelligence can enable a more proactive approach to inventory management

CASE IN POINT

Enhanced demand forecast accuracy with long-term pollen intelligence

Pollen-driven demand forecasting plays a crucial role in optimizing sales predictions for various selling units. By leveraging **historical pollen** and sales data from previous years, a proprietary forecasting model was developed to accurately project sales trends for the following year based on current pollen levels. Achieving a forecast accuracy of 90%, the model demonstrated high reliability, particularly in a regional cluster where a strong correlation (R^2 score of 90%) between pollen levels and sales was observed. This insight underscores the significance of pollen data in refining demand forecasts, especially where sales fluctuations are closely tied to seasonal allergen exposures.

Accurate pollen-driven demand forecasts are instrumental in mitigating both understocking and overstocking scenarios across different clusters. By integrating precise predictions derived from historical sales and pollen data, businesses can align their inventory levels more effectively with anticipated consumer demand. A precise forecast helps ensure that sufficient stock is maintained during peak pollen seasons, avoiding potential understock situations that could lead to missed sales opportunities.

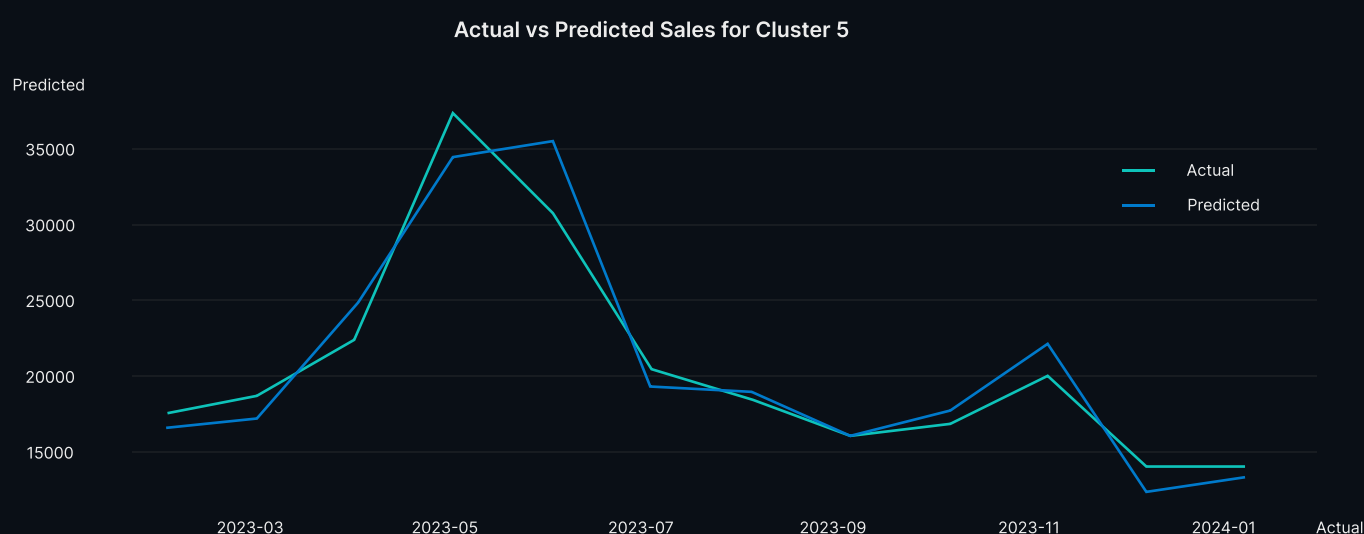


Fig 8: Comparison between actual and pollen-forecasted sales shows a strong correlation

PERSONALIZED MARKETING

Generate greater ROIs and ROAs with hyper-relevant advertisements.

Integrating climate intelligence into marketing strategies can significantly enhance their relevance and effectiveness. By understanding the health impacts of climate change, pharmaceutical companies can develop more targeted and engaging marketing campaigns. For example, directing marketing efforts towards regions experiencing high pollen levels with specific allergy medications can lead to

higher engagement and conversion rates. Personalized marketing that addresses the unique health challenges posed by climate change can build stronger relationships with consumers, fostering brand loyalty and increasing market share. This approach aligns with the shift towards more consumer-centric marketing strategies in the pharmaceutical industry.

CASE IN POINT

How Bayer doubled sales with climate-triggered programmatic ads

For two months, people in some of Egypt's most polluted cities saw a very unique ad campaign.

Whenever the local AQI spiked, they saw big ads pop up for Claritine—an allergy relief drug—showing the exact severity of their city's pollution levels. For a region with x12 higher PM concentrations than the WHO recommendation, Claritine emerged as the go-to solution.

This precision marketing campaign from Bayer, enabled by Ambee's [air quality API](#), was a game-changer.

The results?

There was a 59% surge in Claritine sales across Egypt and a 40% month-over-month increase in searches for the term 'Claritine'.

[Read full insight](#) →



HOLISTIC HEALTHCARE

Connect with consumers by offering comprehensive lifestyle solutions.

Climate intelligence also plays a critical role in enhancing engagement with both consumers and healthcare providers. Providing consumers with information on how climate change affects their health, along with tailored advice and products, empowers them to take proactive steps in managing their well-being. For healthcare providers, climate intelligence offers valuable insights into emerging health trends, enabling them to make more

informed decisions about treatment options and preventive measures. This dual approach to engagement not only improves patient care but also positions pharmaceutical companies as essential partners in the healthcare ecosystem. The trend towards greater consumer involvement in healthcare decisions, driven by increased access to information and technology, underscores the importance of this engagement.

CASE IN POINT

How Ambee helped Sanofi create the world's first navigation tool for allergy sufferers

Sanofi, partnered with Ambee, launched Allegra Airways, which provides real-time routes with less air and pollen pollution. With Ambee's Smart healthNav, we implemented a route planner showing users routes from A to B with the least pollen and pollution exposure.

With rising pollution and pollen levels, allergies are growing exponentially. Such innovation helps the public monitor or track their safe air routes and maintain their health and fitness. These environmental datasets empower users with real-time information to help them make informed decisions and enjoy a better quality of life.

Read full insight →



Climate integration into pharma operations is fast and effective



Ambee's cutting-edge climate technology seamlessly integrates with pharmaceutical operations, offering fast and effective solutions for data-driven decision-making. By leveraging Ambee's APIs, visualization tools, analytics, and other solutions, pharmaceutical companies can access real-time environmental data, including air quality, pollen levels, and weather conditions. This integration allows pharma companies to enhance their operational efficiency by incorporating climate data into their inventory and replenishment strategies, demand forecasting, and precision medicine efforts.

Ambee's services facilitate the seamless flow of this critical data into existing pharmaceutical ecosystems. This synergy enables pharma companies to optimize their supply chain management, ensuring that inventory levels are accurately maintained and regulatory compliance for drug trials is upheld. By integrating Ambee's comprehensive climate data into their operational frameworks, pharmaceutical companies can make more informed decisions, ultimately leading to enhanced operational efficiency and effectiveness.

To learn more about integrating climate data with pharma functions, you can contact our experts at contactus@getambee.com or [schedule a call](#) with them.

Key takeaways



Climate change significantly impacts human health, leading to increased heat-related illnesses, respiratory issues, and mental health disorders.

Consumers are increasingly proactive and informed about their health, driving demand for personalized and holistic healthcare solutions.

Embracing climate intelligence and consumer-centric approaches is essential for the pharmaceutical industry to address emerging health challenges and meet evolving consumer needs.

9 in 10

companies are increasing their overall technology budget over the next 12 months.

PwC's 2023 Emerging Technology Survey

Research & Development

Climate data can guide the development of precision medicine tailored to specific environmental conditions.

Inventory Management

Anticipating demand based on climate patterns can prevent stock-outs and optimize inventory.

Personalized Marketing

Climate-triggered marketing campaigns can enhance relevance and effectiveness, driving higher engagement and sales.

Holistic Healthcare

Providing comprehensive lifestyle solutions based on climate data can improve consumer engagement and health outcomes.

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