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NEXT-GEN

INFECTION CONTROL

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Read Time: 8 minutes

Proactive Infection Control Through AI

With respiratory diseases consistently ranking among the top 5 causes of fatality in the U.S., infection control remains a critical priority. Traditional temperature screening methods offer a quick, non-invasive, and cost-effective option, and while effective for detecting fever, they miss subtler signs of illness, allowing infections to spread undetected. However, AI-driven surveillance systems provide a proactive solution by accurately monitoring health risks in real time. This technology significantly reduces absenteeism and costly hospital-acquired infections (HAIs), enabling organizations to protect their workforce and/or patients while achieving substantial cost savings through enhanced infection prevention.

Undetected Spreaders: The Impact and Cause

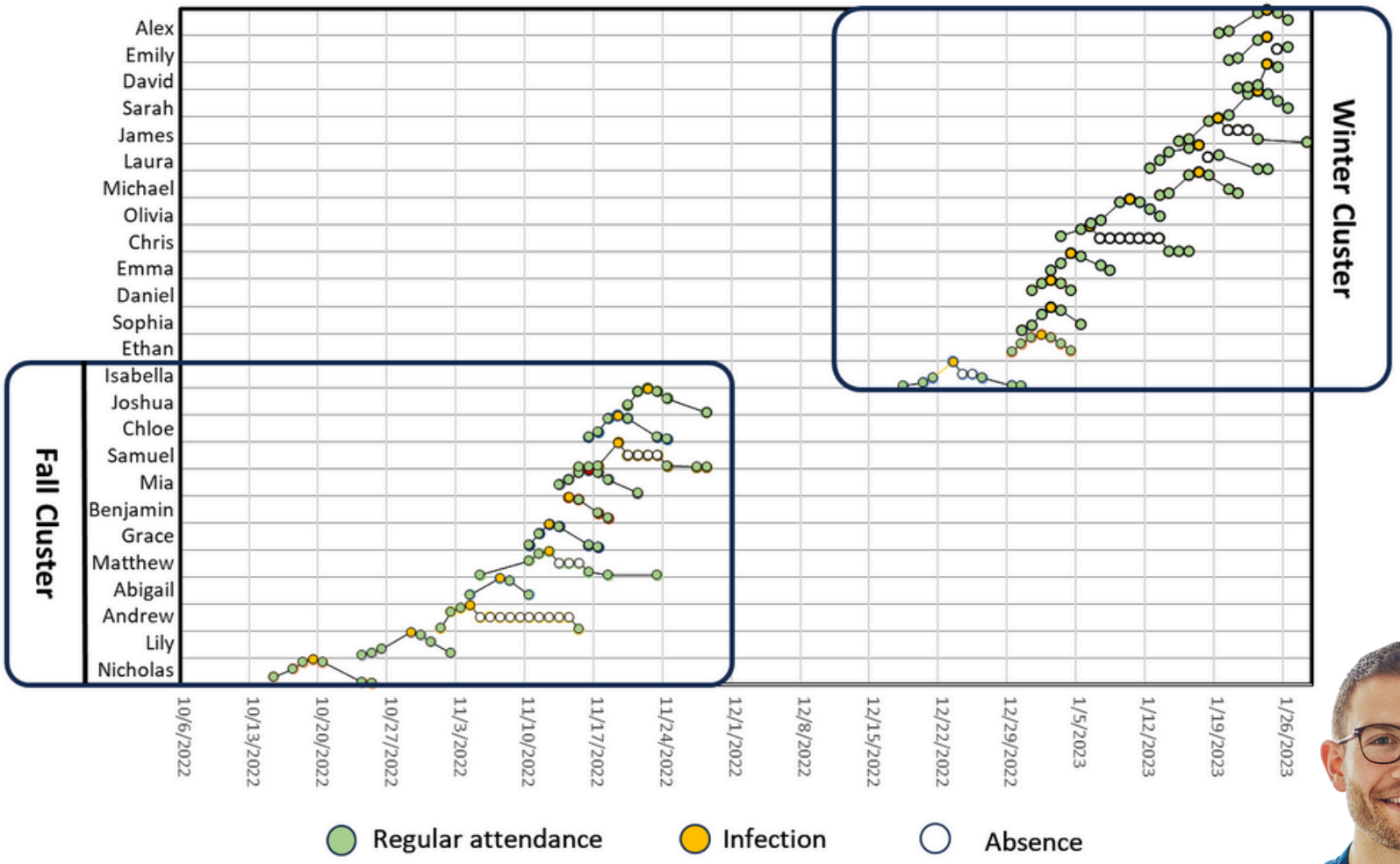
The Hidden Threat: Infection Spread in Closed Environments

In controlled environments such as hospitals, elder care facilities, schools, and production lines, infections can spread quickly due to close quarters and frequent interactions. Healthcare workers, for example, walk up to five miles per day, interacting with numerous patients and surfaces. This constant movement, combined with confined spaces, enables pathogens to spread unnoticed.

Similarly, schools and production lines bring people into close contact for extended periods. In schools, students and staff share classrooms and common areas, while in production lines, workers often stand shoulder-to-shoulder. These conditions create a perfect scenario for infections to spread rapidly, underscoring the critical need for early detection methods.

If you're managing disease spread based on symptoms, it's too late.

Timeline of infection spread among employees



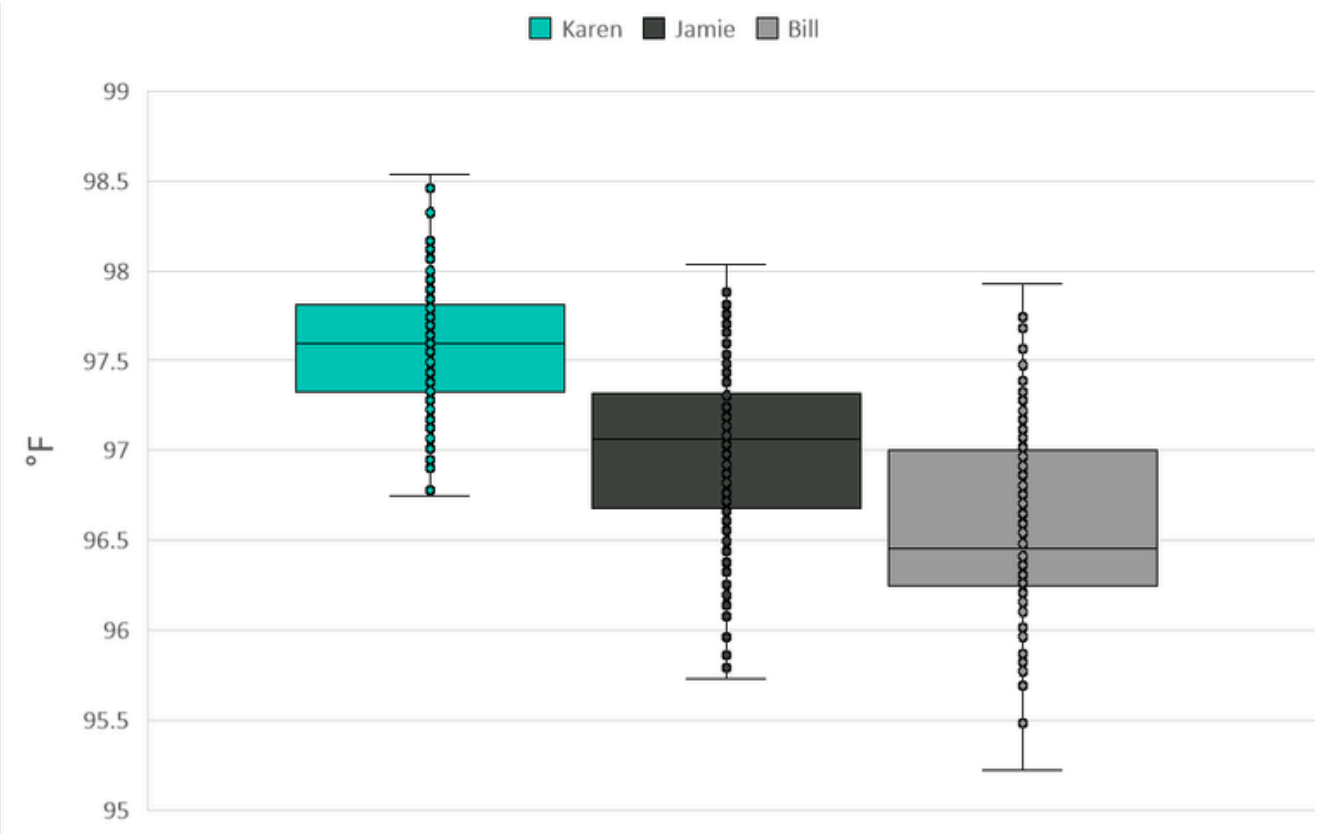
This figure presents data from an extensive study conducted at a healthcare facility in northern USA. While the facility's name cannot be disclosed due to confidentiality agreements, the datasets are publicly available upon request. The figure highlights how infections propagated through the workforce over time. Each row corresponds to an individual employee, with the chart displaying regular attendance (green), AI-detected infections (yellow), and absenteeism (white). The two clusters—fall and winter—illustrate infection waves as detected by AI, showing how sickness spread across the workforce

The Limitations of Traditional Temperature Screening:

A rise in body temperature is one of the body's first lines of defense against infection. However, this response is often far more subtle than the clear fevers we associate with clinical illness. Traditional temperature screening relies on the 100.4°F fever threshold, which has been used for over a century to detect infections and minimize false positives.

This one-size-fits-all approach overlooks the fact that body temperature is like a fingerprint—unique to each individual and influenced by factors such as age, gender, time of day, race and many others. As a result, **traditional temperature screenings are designed to miss infections that don't trigger a clear fever.**

Unique Temperature Profile by individual



This chart illustrates the normal temperature ranges for three individuals, showing how body temperature varies. It highlights the challenge of using a one-size-fits-all approach to temperature screening, as each person's temperature is influenced by individual factors.

AI-Driven Solutions for Early Infection Detection

Harnessing AI: Personalized Monitoring

Traditional temperature screening is limited by a one-size-fits-all threshold, but AI offers a groundbreaking approach that adapts to each individual. Instead of relying on a fixed fever threshold, **AI generates a personalized temperature baseline for every user.** Each time an individual is scanned, their temperature is compared to their personalized baseline, allowing the AI to detect subtle yet significant anomalies—often smaller than 0.1°F—that indicate potential illness.

As more data is collected from each individual, the AI algorithm improves, enhancing its ability to identify potential infections. Since physiological factors like age, gender, and race remain constant for each person, they are accounted for in creating what we call the "temperature fingerprint," a unique profile for each individual. In addition to personalized baselines, AI compensates for external factors like weather, time of day, and season.

Performance Metrics: AI Screening Efficacy

Accuracy at a Glance:

80.2*%
Positive Predictive Value of spreaders

An elevated portion of flagged cases are confirmed infections, demonstrating strong reliability in detecting illness.

1.1%
Average Detection Rate

On average, the system identifies 1.1 sicknesses for every 100 scans.

>99%
Negative Predictive value

With over 99% accuracy, the system reliably rules out healthy individuals, minimizing unnecessary follow-ups.

3.2s
Time to Detection

The AI system can analyze and detect potential infections within just 3.2 seconds.

A Success Story: AI Effectiveness in Detecting Infections

AI-driven temperature screening has proven highly effective, as shown by a 2-year study in a northern USA hospital. While the facility's identity remains confidential in compliance with data privacy agreements, the datasets are publicly accessible upon request**.

Sample size

160,000

individuals were scanned, and the results were compared to qPCR testing for COVID.

Results:

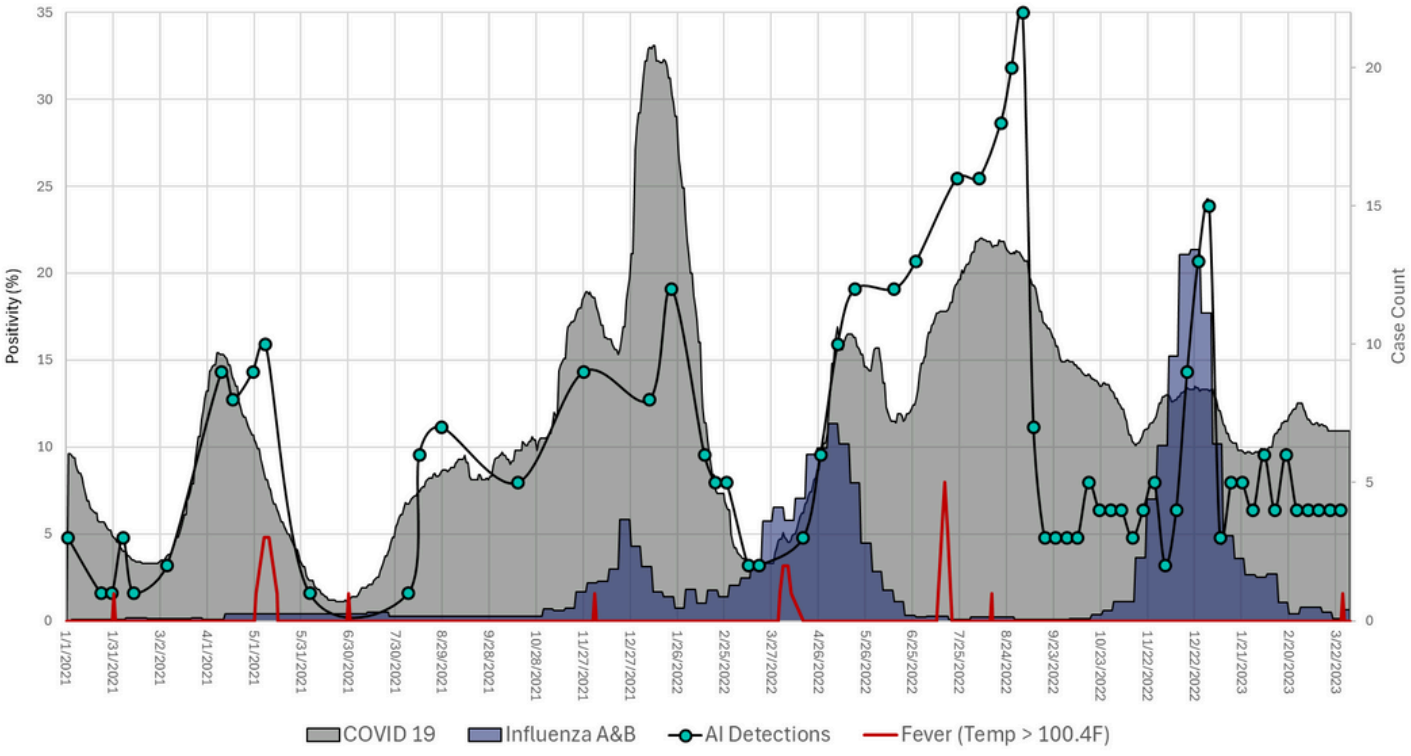
>80%

of COVID cases in staff and regular visitors were identified by AI, demonstrating its effectiveness in detecting infections.

Additionally, when the number of cases detected by AI was overlapped with regional positivity rates for COVID and influenza, a clear correlation emerged. This indicates that AI's detection rate closely follows regional case trends, further validating its predictive accuracy.

**For a more detailed analysis, including predictive values, positivity estimation, and source data, a comprehensive report is readily available upon request.

AI's Detection of Infections vs. Regional Infection Peaks



This chart shows the correlation between AI-detected illnesses and regional infection peaks for COVID and influenza types A and B. The blue and grey areas represent regional positivity rates for COVID and influenza, respectively, while the green points indicate AI's weekly detections. The red line represents the count of fever cases, based on the traditional 100.4°F fever threshold. The alignment of AI detections with infection peaks demonstrates the system's ability to identify illnesses well before this fever threshold is met. This underscores AI's potential to improve infection control by catching cases earlier than traditional methods.

COMMERCIAL APPLICATION: REDUCING COSTS OF ABSENTEEISM AND HAIS

The Financial Impact of Workplace Infections

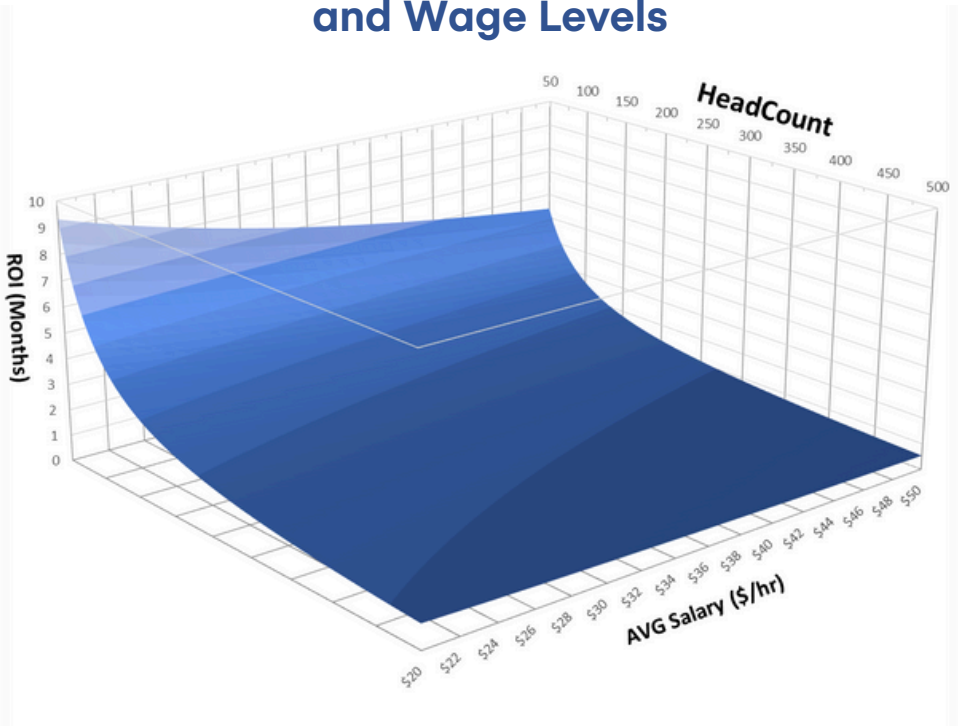
AI-driven temperature screening offers significant potential to reduce costs associated with both absenteeism and hospital-acquired infections (HAIs). In the U.S., approximately 2.6% of working hours are lost to illness. For healthcare workers like nurses, with an average salary of $86,070, this absenteeism translates to substantial productivity losses. By identifying illness early— before symptoms appear—AI can help lower this absenteeism rate significantly, preventing further disruption in staff availability.

Moreover, hospital-acquired infections are not only a health threat but also a major financial burden, costing an average of $12,216 per affected patient. With 1 in every 31 hospitalized patients contracting an HAI, this can lead to significant additional treatment costs and extended hospital stays. Implementing AI for early infection detection can reduce these infections, reducing both the health risks and the financial impact. Through predictive screening and real-time data analysis, AI enhances both infection control and operational efficiency, contributing to a healthier workforce and more cost-effective care.

Return on Investment

Investing in AI tools capable of identifying illness in staff typically costs around $500 per month. While various factors influence the ROI, when considering the average wages for U.S. nurses (around $86,070 annually) and a workforce size of 80 employees, the return on investment can be as short as a couple of months. After this period, organizations begin to see significant savings from reduced absenteeism and fewer hospital-acquired infections (HAIs), which can help lower operational costs in healthcare and other high-risk environments.

ROI Projections by Workforce Size and Wage Levels



This chart illustrates the return on investment (ROI) in months, based on two key factors: headcount and average employee salary. As the number of employees and the average salary increase, the ROI period shortens. This shows that larger workforces and higher-paid employees yield faster returns when using AI technology to reduce absenteeism and hospital-acquired infections (HAIs). The color-coded bands highlight different ROI timeframes, ranging from 0 to 10 months, providing a clear visual understanding of how quickly savings can be realized.

The Path Forward: AI's Role in Infection Control

In conclusion, AI technology offers a groundbreaking solution to address the challenges of absenteeism and hospital-acquired infections (HAIs) in healthcare and other high-risk environments. By creating personalized temperature baselines and detecting illness before symptoms appear, AI significantly reduces sick leave and infection rates. This leads to substantial cost savings, especially when considering the high costs of absenteeism and HAI treatments. With rapid ROI—sometimes within just a few months—AI-driven solutions are not only cost-effective but also critical for improving operational efficiency and health outcomes in controlled environments.

"An ounce of prevention is worth a pound of cure" - Benjamin Franklin

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