

Philips RATE: Algorithms that see the invisible

AI health insights for resilient operations

“Rate is not just about monitoring vitals – it’s about predicting risk. It’s an early warning system that helps commanders make informed decisions about readiness.” – Jeffrey “Mach” Schneider, former U.S. Air Force Officer, Program Manager at the Defense Innovation Unit; currently consulting with Philips.



What it is

High-exposure workforces such as soldiers, frontline workers, care providers and industrial crews that operate where one unseen factor can jeopardize lives and missions. Their daily risks include:

- Stress and fatigue
- Toxic exposure
- Heat strain
- Viral and biological hazards

These dangers don't just impact individual health, they undermine safety, performance and continuity of a team.

Philips is pioneering a new era of operational resilience with patented AI-driven technology. This vision moves beyond reactive care to predictive intelligence, helping organizations anticipate risks, prevent incidents and protect performance before failure occurs.

The solution seamlessly integrates with consumer wearables to gather biometric data – transforming it into actionable fitness and wellbeing insights.

Empowering workforce health at every level

System / Organizational level

Challenge

Identifying emerging threats at scale.

Solution

Organization-wide situational awareness. Real-time mapping of biological and environmental threats reveals hot spots early. This supports proactive outbreak prevention, smarter resource deployment and continuous operational resilience.

Team / Management level

Challenge

Limited visibility into team physiological status – especially in off-grid or high-stress environments.

Solution

Dynamic, on-site decision support for supervisors. Tracking fatigue, exposure and readiness to reduce accidents minimizes the impact of a potential threat such as viral spread, and optimizes resource utilization – ensuring teams remain “fit-for-duty” without compromising safety.

Individual / Operator level

Challenge

Workers lack real-time insights into their own physiological limits.

Solution

Edge-powered personal intelligence. Actionable health insights empower the individual with a “check engine light” for their body, enabling early intervention, self-care and safer performance in high-exposure environments.

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Operational resilience with predictive health AI

Algorithms that see the invisible

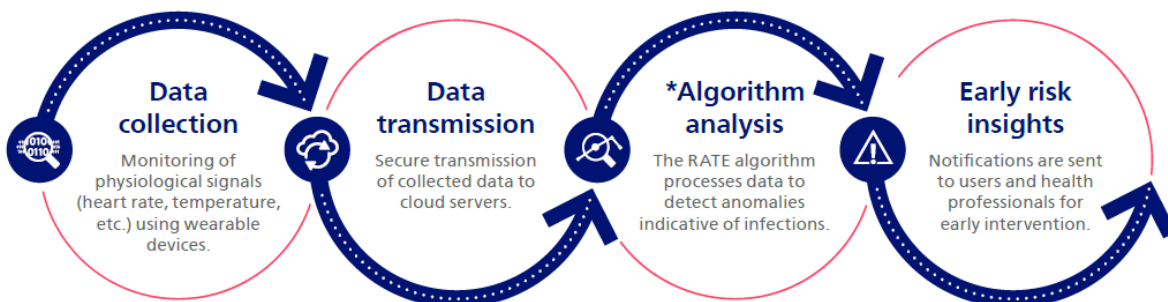
The algorithms reveal hidden risks including individual readiness, toxic exposure, heat stress and team performance. This empowers organizations to be proactive and keep their workforce prepared.

Readiness risk insight for workforce safety

Inspired by Rapid Analysis of Threat Exposure (RATE) algorithm, originally designed and tested to protect thousands high-risk military personnel during COVID, Philips' individual readiness innovation delivers early indicators from wearable data, helping teams anticipate and manage performance risks.

The RATE (Rapid Analysis of Threat Exposure) solution leverages wearable devices and advanced machine learning to detect infections on average 2.3 days before a positive test¹, providing an innovative solution for health monitoring and management.*

Unlocking personal health insights with RATE



Algorithm highlights

Early detection

Predicts infection onset an average of 2.3 days before a positive test, with the capability to detect up to 6 days in advance¹.

High accuracy

Demonstrates an Area Under the Curve (AUC) of 0.82, indicating high reliability in infection prediction¹.

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Non-invasive

Measurements obtained using wearables provides a non-invasive solution to detect infections, allowing for containment.

Monitoring

Provides monitoring of physiological signals, enabling health status updates and alerts.

Scalable and adaptable

Applicable to diverse populations and scalable across different organizational sizes and types.

Research and validation

The Study (June 2020 – April 2021)

- U.S. DoW personnel wore commercially available Garmin and Oura devices to constantly monitor vital biomarkers, including heart rate, inter-beat interval, respiration rate, pulse oxygenation, skin temperature and accelerometer data.
- 9,381 U.S. DoD personnel
- 599,174 user-days of service and 201 million hours of data
- 491 COVID-19 positive cases

Findings

The combination of commercial wearables, physiological monitoring and machine learning proved to predict infection on average, 48 hours before the onset.²

Additional analytics capabilities

Toxic exposure mapping

Currently designed to detect opioid exposure, this capability supports rapid response and compliance. Future applications may extend to a broader range of toxic exposures (biothreat and environmental hazard detection) as the technology evolves.

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Heat risk prediction

Predictive AI transforms wearable data into actionable insights – signaling potential heat stress before it impacts readiness. Built for downtime prevention, not for medical intervention.

Team readiness that keeps missions moving

Supports safe deployment, rest-cycle planning and rapid redeployment to optimize performance without compromising health.

Platform advantages

- Works with commonly available wearables (Garmin, Polar, Oura, and more)
- Seamless integration with existing systems
- Third party algorithm can run on the same platform
- Decentralized, scalable global deployments
- Edge capability for off-grid environments
- Distributed architecture for resilience and redundancy
- Military-grade security built into every layer

Continued development and strategic partnerships

- Defense-backed innovation: Supported through ongoing DoD funding
- Research and clinical validation: Backed by leading institutions and competitive grants
- Sports performance insights: partnerships with elite clubs such as PSV Eindhoven and Team Visma Lease a Bike

Quote

“Rate is not just about monitoring vitals—it’s about predicting risk. For a soldier, that means identifying potential health issues before they become mission-impacting. It’s an early warning system that helps commanders make informed decisions about Readiness.”

— Jeffrey “Mach” Schneider, former U.S. Air Force Officer, Program Manager at the Defense Innovation Unit; currently consulting with Philips.

*Product not currently available. Availability is subject to FDA clearance.

¹ Conroy et al., Scientific Reports (2022)

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² Nature: Real-time infection prediction with wearable physiological monitoring and AI to aid military workforce readiness during COVID-19.

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