Policy Brief

06/01/2025

Emerging Pathogen Risks from Melting Glaciers: A Call for Proactive Assessment

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Introduction

Glaciers, once considered uninhabitable, host diverse microorganisms, some of them with potential pathogenic features. As glacier melting accelerates, glacial microorganisms with antibiotic resistance features may pose risks to human and animal health.

Key messages

- Microbial Adaptability: Glacial bacteria thrive in extreme conditions and some may exhibit traits relevant to human pathogens.
- These microorganisms may enter water systems, posing direct and indirect health threats.
- Genetic Transfer Concerns: Antibiotic resistance genes may spread to other bacteria in medical settings, amplifying risks to public health.

Summary statement

Glacial bacteria, naturally adapted to cold environments, have demonstrated an unexpected ability to grow at higher temperatures, making them potentially relevant in clinical settings. Few isolates have been investigated exhibiting key pathogenic traits, including hemolytic activity and resistance to multiple antibiotics, suggesting their ability to survive medical treatments. The release of these bacteria into downstream ecosystems increases the likelihood of direct contact with human and animal populations. Genome sequencing has further identified the presence of antibiotic resistance genes, raising concerns about their potential role in the spread of antibiotic resistance and the transfer of pathogenicity-related genes to other microbes that could impact human and environmental health.
It is therefore crucial to conduct in-depth studies on glacial bacteria, as a comprehensive risk assessment is essential to understand and predict their potential behavior in the future.

Recommendations:

1. **Risk Assessment:** Study pathogenicity and resistance in glacial bacteria.
2. **Monitoring:** Establish programs to track emerging pathogens from glaciers.
3. **Policy Action:** Develop environmental surveillance frameworks and health guidelines for affected areas.