



Beyond Antibiotics: Broadening the Approach to Respiratory Infections

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ANTIBIOTICS are only one part of effective respiratory infection care. At the European Respiratory Society (ERS) Congress 2026, the session 'Beyond antibiotics: multidimensional approaches to respiratory infections' explored how immune modulation, phage therapy, nutrition, rehabilitation, and environmental interventions could broaden management. Across the presentations, speakers considered how to prevent infection, support recovery, and reduce lasting lung damage.

THE IMMUNE SYSTEM

Kicking off the scientific presentations, Marc Lipman, Royal Free London NHS Foundation Trust, UK, explored how harnessing the immune system could improve outcomes in respiratory infections. His talk on host-directed therapies aimed to bring to attention the importance of strengthening antimicrobial responses while controlling inflammation that can damage lung tissue, with the overall aim to help patients recover faster and reduce the lasting consequences of infection.

“**Matching phages to bacterial isolates, standardising susceptibility testing, and maintaining funding remain a challenge**”

Lipman used dexamethasone in severe COVID-19 to illustrate the potential of targeting the host response, using the RECOVERY trial as an example where patients who received invasive mechanical ventilation showed greatest survival benefit.¹ However, he emphasised that treatment timing, dose, and patient selection are crucial. Benefits observed in COVID-19 cannot automatically be extended to other infections, particularly given concerns about

corticosteroid use in influenza.

Furthermore, in infections such as tuberculosis (TB), Lipman emphasised that successful antimicrobial treatment does not necessarily prevent long-term lung damage. Potential adjunctive treatments, including metformin and statins, offer avenues for investigation, but evidence supporting their clinical use remains limited.^{2,3} Lipman concluded his talk by calling for standardised outcome measures to establish whether host-directed therapies improve lung function, reduce disability, and deliver benefits that matter to patients.

PHAGE THERAPY: PROMISE AND PRACTICAL CHALLENGES

In the second talk of the session, Laurent Debarbieux, Institut Pasteur, Paris, France, followed with an examination of phage therapy and its potential against difficult-to-treat bacterial infections. Debarbieux opened by describing how a bacteriophage's ability to infect susceptible bacteria and replicate within them during infection can offer a new therapeutic opportunity.

However, experimental pneumonia models presented by Debarbieux showed that this process depends on more than the interaction between phages and bacteria.⁴

Severe neutrophil depletion reduced treatment efficacy, suggesting that co-operation with the immune system is important for controlling infection. Other experiments showed that alveolar macrophages could remove phages, influencing their availability and showing how complex these interactions are.

Debarbieux also described encouraging compassionate-use experience in Europe, while stressing the need for clinical trials. Matching phages to bacterial isolates, standardising susceptibility testing, and maintaining funding remain a challenge.⁵

Finally, he stressed the importance of collecting detailed information before, during, and after treatment to strengthen the evidence base.

NUTRITION, REHABILITATION, AND THE MICROBIOME

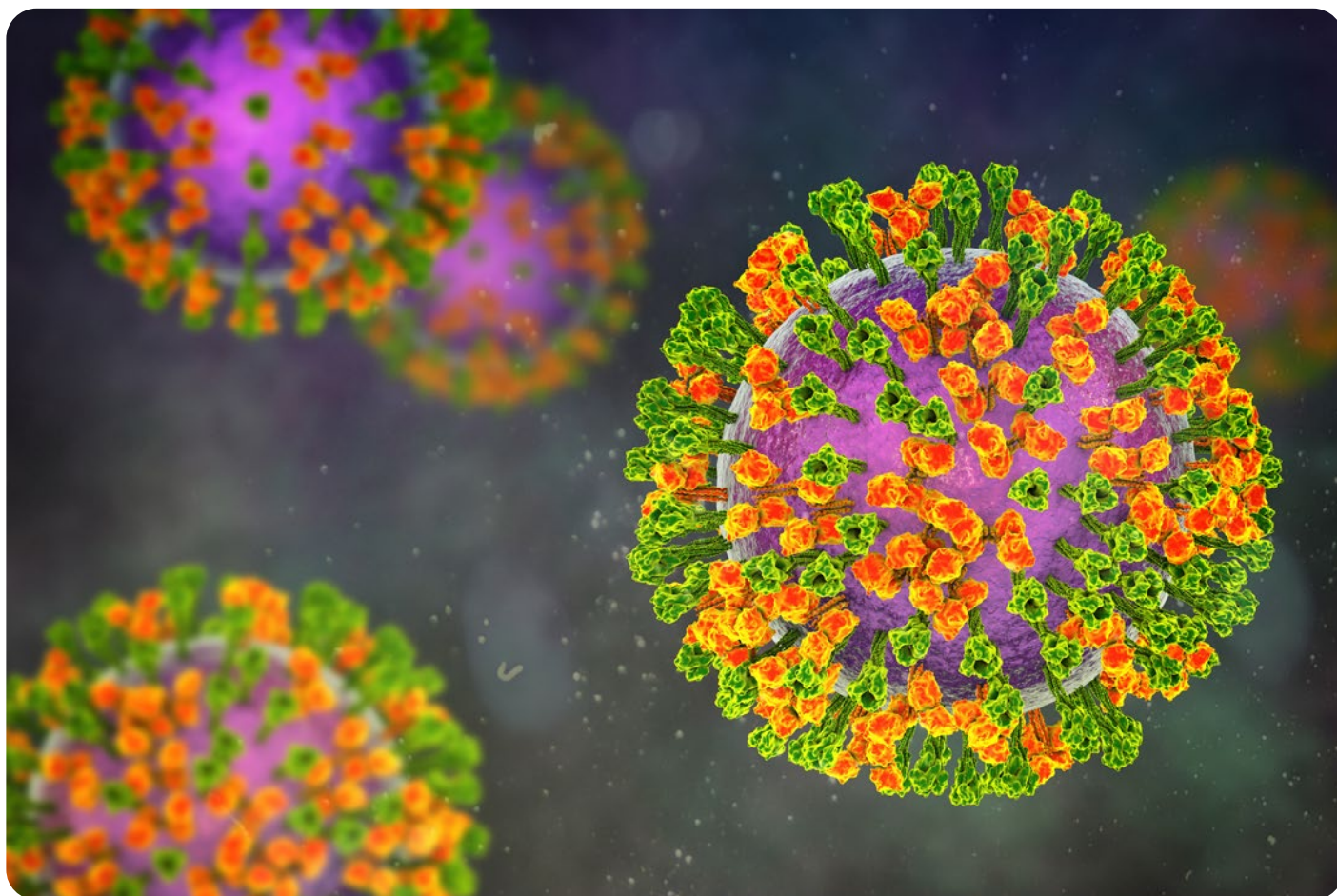
Introducing the next dimension of care, Gunar Günther, Insel Hospital Bern, Germany, turned to nutrition, the microbiome, and pulmonary rehabilitation. He opened with historical TB data from

Denmark, which showed substantial decline in disease incidence before antibiotics became available through improvements in living conditions, specifically better hygiene and nutrition,⁶ providing a reminder that infection outcomes are shaped by factors beyond antimicrobial treatment.

Developing the case for nutritional support, Günther presented evidence reviewing community-acquired pneumonia, where hospitalised patients at nutritional risk showed improved outcomes through individualised support in a broad trial population.⁷ Additionally, another subgroup with lower respiratory tract infections showed a similar direction of benefit, although the findings were not statistically significant.⁷ He also described a study in older patients in which nutritional targets and counselling for patients and caregivers reduced hospital readmissions.⁸

But the strongest example came from TB, specifically in the RATIONS trial in India, which investigated nutritional support for household contacts of patients with TB. The intervention reduced TB incidence by 39% across all forms of disease and by 48% for microbiologically confirmed pulmonary TB.





Among patients receiving nutritional support, gaining at least 5% of body weight within the first 2 months was associated with lower mortality.^{9,10} These findings reinforced the importance of addressing undernutrition in both patients and their households, which supports the earlier described findings of the Denmark study.

“**Respiratory infection care should begin before illness and continue beyond pathogen clearance**”

Moving from respiratory pathogens, Günther described pulmonary rehabilitation as another opportunity to improve recovery, particularly for people with post-TB lung disease.¹¹ Günther described evidence of improvements in exercise capacity and quality of life, while acknowledging limitations in study quality and uncertainty about longer-term benefits. However, questions remain about when such rehabilitation should

begin, which interventions work best, and how programmes can be delivered cost-effectively in settings with limited resources.

Günther then moved to microbiome-based interventions, though the current evidence for those interventions remains less established. Experimental work described by Günther suggested that gut bacteria producing short-chain fatty acids could influence pulmonary immune responses, while early human findings indicated possible associations with pneumonia outcomes.¹² However, Günther emphasised the limited translation into clinical benefit. Evidence supporting probiotics to reduce mortality or prevent long-term consequences of pneumonia and TB remains insufficient.¹³

REDUCING RISK THROUGH ENVIRONMENT AND BEHAVIOUR

Closing off the session, Sundeep Santosh Salvi, Symbiosis Medical College for Women, Pune, India, examined how

environmental exposures and daily behaviours influence susceptibility to respiratory infections. Household and outdoor air pollution were central to his discussion, with biomass smoke, tobacco smoke, and other indoor pollutants presented as important and potentially preventable contributors.¹⁴

Salvi explored how particulate exposure can impair the function of macrophages, weakening their ability to engulf and clear bacteria. Research presented from patients with COPD linked tobacco and biomass smoke exposure with greater airway bacterial burden and reduced macrophage function, providing a biological explanation for increased vulnerability to infection.^{15,16}

He then turned to ventilation and behavioural measures. Evidence from schools suggested that improved ventilation could reduce infection risk, while patterns observed during the COVID-19 pandemic illustrated the potential contribution of measures such as masking and hand hygiene.¹⁷ These observations supported incorporating environmental controls into prevention alongside vaccination.

Physical activity, hydration, and sleep also featured as components of resilience.

Salvi discussed emerging evidence linking activity and adequate sleep with stronger host defences, and described significant associations between dehydration and poorer pneumonia outcomes.¹⁸ During illness, he emphasised nutrition, appropriate hydration, early mobilisation, and smoking cessation. Recovery required continued attention to exercise, rehabilitation, education, airway clearance (where appropriate), and mental health.

EXTENDING CARE BEYOND MICROBIOLOGICAL CURE

Salvi's closing message brought the session's themes together: respiratory infection care should begin before illness and continue beyond pathogen clearance. Reducing susceptibility, supporting patients during treatment, and restoring health and function afterwards are complementary goals. Alongside emerging therapies, the presentations explored practical opportunities to improve care through nutrition, cleaner air, and rehabilitation, while making clear that several promising approaches still require stronger clinical evidence.

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