GBD 2023: Lower Respiratory Infections Remain Leading Infectious Cause of Death

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> Lower respiratory infections (LRIs) continue to represent a substantial global health challenge, consistently ranking as the primary infectious cause of mortality worldwide. The Global Burden of Disease Study (GBD) 2023 provides updated estimates on the incidence, mortality, and disability-adjusted life-years (DALYs) attributed to LRIs, offering a comprehensive overview of their global impact. Clinicians should note that despite public health efforts, LRIs maintain their position as a critical area for intervention and prevention.

KEY TAKEAWAYS

- The Pivot: The GBD 2023 study updates and expands previous estimates, incorporating new data and revised modelling techniques for LRIs.
- The Data: Lower respiratory infections remain the world's leading infectious cause of death.1
- The Action: Continued focus on LRI prevention, diagnosis, and treatment strategies is warranted, particularly in vulnerable populations.

The Global Burden of Disease Study (GBD) 2023, a systematic analysis, provides updated global, regional, and national estimates for lower respiratory infections (LRIs) from 1990 to 2023.1,2,3 This analysis confirms that LRIs remain the world's leading infectious cause of death.1,2,3 The GBD 2023 study offers an expansion and update to the GBD 2021 estimates, incorporating new data and revised modelling techniques.1,2,3

Study Design and Findings

The GBD 2023 Lower Respiratory Infections and Antimicrobial Resistance Collaborators conducted a systematic analysis for the Global Burden of Disease Study 2023.1 This analysis provided estimates of LRI incidence, mortality, and disability-adjusted life-years (DALYs) across 204 countries and territories.1 The study attributed these outcomes to 26 pathogens, including 11 newly modelled pathogens, spanning the period from 1990 to 2023.1

A related systematic analysis for the GBD 2023, conducted by the GBD 2023 Causes of Death Collaborators, examined the global burden of 292 causes of death in 204 countries and territories and 660 subnational locations from 1990 to 2023.2 This analysis also identified lower respiratory infections as the leading infectious cause of death globally.2 The GBD 2023 Demographics Collaborators further contributed to the overall GBD 2023 framework by providing global age-sex-specific all-cause mortality and life expectancy estimates for 204 countries and territories and 660 subnational locations from 1950 to 2023.3

A key objective of the LRI analysis was to assess progress towards the 2025 Global Action Plan for the Prevention and Control of Pneumonia and Diarrhoea (GAPPD) target for pneumonia mortality in children younger than 5 years.1,2,3

The consistent finding across these GBD 2023 analyses is the persistent and significant burden of LRIs on global health.1,2,3 The inclusion of 11 newly modelled pathogens in the LRI analysis provides a more granular understanding of the aetiological landscape of these infections.1

Lower respiratory infections encompass a range of conditions affecting the airways and lungs, including pneumonia, bronchitis, and bronchiolitis. These infections are primarily caused by viruses, bacteria, and fungi. Common viral pathogens include respiratory syncytial virus (RSV), influenza viruses, and rhinoviruses. Bacterial causes frequently involve Streptococcus pneumoniae, Haemophilus influenzae, and Staphylococcus aureus. The clinical presentation of LRIs varies depending on the specific pathogen, host factors, and the severity of the infection, ranging from mild cough and fever to severe respiratory distress and sepsis. Vulnerable populations, such as young children, the elderly, and individuals with compromised immune systems or underlying chronic conditions, experience a disproportionately higher burden of severe LRI outcomes. The GBD 2023 analyses specifically highlight the impact on children younger than 5 years, a demographic group particularly susceptible to severe pneumonia. Understanding the specific pathogens driving LRI burden in different regions and age groups is crucial for targeted public health interventions, including vaccination strategies and antimicrobial stewardship programs. The expanded pathogen attribution in GBD 2023 contributes to this understanding by identifying emerging or previously under-recognized contributors to LRI morbidity and mortality. The DALY metric, which combines years of life lost due to premature mortality and years lived with disability, provides a comprehensive measure of the overall health burden of LRIs, reflecting both fatal and non-fatal outcomes.

Limitations and Next Steps

The GBD 2023 studies are systematic analyses based on available data, and while they incorporate new modelling techniques and expanded data sets, inherent limitations exist in any large-scale epidemiological estimation. Data availability and quality can vary across different countries and territories, potentially affecting the precision of estimates in certain regions. The attribution of DALYs and mortality to specific pathogens relies on complex modelling, which may involve assumptions that could influence the final estimates. For instance, the accuracy of pathogen-specific mortality estimates depends on the quality of diagnostic data and the ability of models to account for co-infections and syndromic presentations. Furthermore, the impact of antimicrobial resistance on LRI outcomes, while a focus of the LRI collaborators, presents a complex challenge for accurate quantification within large-scale burden estimates.

The GBD framework continuously evolves, and future iterations of the GBD study will likely continue to refine these methodologies and incorporate additional data sources to improve the accuracy and comprehensiveness of the burden estimates for LRIs and other health outcomes. Continued investment in robust surveillance systems and diagnostic capabilities globally will be essential to enhance the precision of these estimates and inform evidence-based health policies.

For further comprehensive clinical insights into another major health outcome globally scrutinised by GBD studies, consult the Oxford Handbook of Cardiology.

> **CLINICAL IMPLICATIONS**
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> The consistent finding from the Global Burden of Disease Study 2023, reiterating lower respiratory infections as the leading infectious cause of death globally, should serve as a stark reminder for clinicians. Despite

advancements in diagnostics and therapeutics, the sheer volume of morbidity and mortality attributed to LRIs indicates that current prevention and management strategies are insufficient on a global scale. This is not merely an academic statistic; it represents millions of patient lives and a significant strain on healthcare systems, particularly in low- and middle-income countries.

For general practitioners and specialists, this underscores the ongoing importance of vaccination programmes, early diagnosis, and appropriate antimicrobial stewardship. The inclusion of 11 newly modelled pathogens in the LRI analysis highlights the evolving understanding of aetiology, suggesting that surveillance and diagnostic capabilities must adapt. While the GBD 2023 assessed progress towards the 2025 GAPPD target for pneumonia mortality in children younger than 5 years, the overarching message is that the battle against LRIs is far from won. Pharmaceutical companies and public health initiatives must continue to invest in novel vaccines and accessible, effective treatments, particularly for the most vulnerable populations.

The persistent burden of LRIs also has significant implications for patient education. Emphasising basic hygiene, understanding symptom progression, and seeking timely medical attention remain critical. The data suggests that despite decades of effort, the fundamental challenges of infectious disease control persist, demanding renewed focus and resource allocation from policymakers and healthcare providers alike. The GBD 2023 is not just a report; it is a call to action for a sustained, evidence-based approach to a pervasive global health threat.

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