VitalTransformation
Better Science, Better Health

Summary: Economic and Hospital Impact of Antimicrobial Resistance (AMR)

Study Overview

A retrospective analysis conducted by Vital Transformation assessed the direct clinical and economic impact of AMR among hospitalized patients with **sepsis, hospital acquired pneumonia, and complicated urinary tract infection (cUTI)**, with modeled estimates suggesting that the cumulative US economic burden of AMR could reach $655 billion over the 20-year period through 2045. The analysis used longitudinal electronic health records from Vanderbilt University Medical Center (2016–2024), covering a cohort of **50,189 patients**. The analysis combined patient-level health data, billing-derived cost estimates, and statistical adjustments for pre-existing health conditions to estimate the additional hospital costs and resource utilization associated with AMR.

Vanderbilt's catchment area reflects a broad section of the southern US, with a mix of urban and rural populations, making it unique in being demographically representative of the US at large: TN (84%), IN (4%), AL (2%), KY (1%), FL (1%), TX (1%), MO (1%), and rest inclusive of NC–MS–AK– (6%)

Key Findings

Findings from the Vanderbilt University Medical Center patient cohort are presented alongside modeled estimates of the national economic burden of AMR.

Measure	Finding
VUMC PATIENT COHORT — OBSERVED AND ADJUSTED FINDINGS	
Total cohort	50,189 patients
AMR prevalence	13% (6,713 patients)
Additional hospital stay	4 additional days per AMR infection in adjusted analysis
Direct medical cost	$21,453 in additional costs per AMR infection in balanced cohort
Readmission rate	28% for AMR vs. 21% for non-AMR (+7 percentage points)
U.S. NATIONAL ESTIMATES AND PROJECTIONS	
US annual AMR cost (2025)	$31 billion (national estimate)
Projected US annual cost (2045)	$52 billion (base-case projection)
20-year economic burden	$655 billion (projected net present value)

Read the full study

Hospital Impact

AMR substantially increases resource utilization. Across the three infections studied, AMR is associated with longer hospital stays, higher costs, and increased readmissions. Hospital stays account for approximately **83% of the additional hospital costs** associated with AMR in the

adjusted analysis. The study estimates that AMR-related infections account for approximately **2.1 million additional hospital bed-days annually in the U.S.**, potentially increasing to **3.5 million days by 2045**.

Clinical Burden

Mortality remains substantial across all indications:

- **Sepsis:** ~34% mortality
- **Hospital Acquired Pneumonia:** ~33% mortality
- **cUTI:** ~24% mortality

A significant proportion of deaths occur within the first two weeks of infection, highlighting the importance of early and effective treatment.

AMR was also associated with approximately one-third higher readmission rates compared with non-AMR infections (28% versus 21%, respectively), a difference of 7 percentage points.

Implications

AMR represents a growing threat to hospital capacity and healthcare economics. AMR incidence is increasing faster than both population growth and overall infection rates. Without effective interventions and innovative antimicrobial treatments, the US healthcare system could face significant additional capacity requirements and hundreds of billions of dollars in cumulative costs over the next 20 years. The findings suggest a substantial potential economic return for investments in new antimicrobial therapies that reduce AMR-related hospital utilization and costs.

AMR is not only a major clinical challenge — it is a significant and growing driver of hospital costs, bed utilization, and readmissions, strengthening the case for investment in innovative antimicrobial solutions.

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