From awareness to action:
Can we do more to combat antimicrobial resistance in heavily immunocompromised patients?

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Introduction

- Antimicrobial resistance (AMR) is a global health threat, causing **4.71 million deaths** in 2021 (1.14 million directly from resistant infections).[1]
- By 2050, AMR could lead to **8.22 million deaths** annually and **$6.1 trillion** in economic losses (3.8% of GDP).[1,2]
- **Transplant recipients and patients with cancer** face a higher risk of AMR infections due to immunosuppression, frequent hospitalisations, invasive procedures and antibiotic exposure.[3-5]

Methods

- We conducted a **keyword search** using PubMed for publications (2018–2023) reporting burdens from AMR bacterial infections from Europe and North America.
- Fungal and viral infections were excluded to maintain a focused scope.

Objective: To assess AMR impact in heavily immunocompromised patients, focusing on treatment delays, patient experience and economic burden.

Results

- Search results (**Figure 1**) were reviewed in a virtual steering committee meeting, with additional publications included based on author expertise.
- Most studies identified in the literature reported retrospective cohort data (**n=113**), with the next most common being prospective cohorts (**n=35**).

Epidemiology of AMR and its mortality

- The impact of AMR on mortality varies significantly, with 30-day mortality rates ranging from **3%** to **64.6%**, depending on population and disease type.[6-68]
- **Inappropriate empirical antibiotic therapy** (IEAT) is a key factor contributing to AMR-associated mortality, with IEAT rates reported between **16.9** and **68.6%**.[11,13,36,42,43,62,69–79]
- The frequency of AMR and associated mortality rates **vary widely** (**Table 1**).

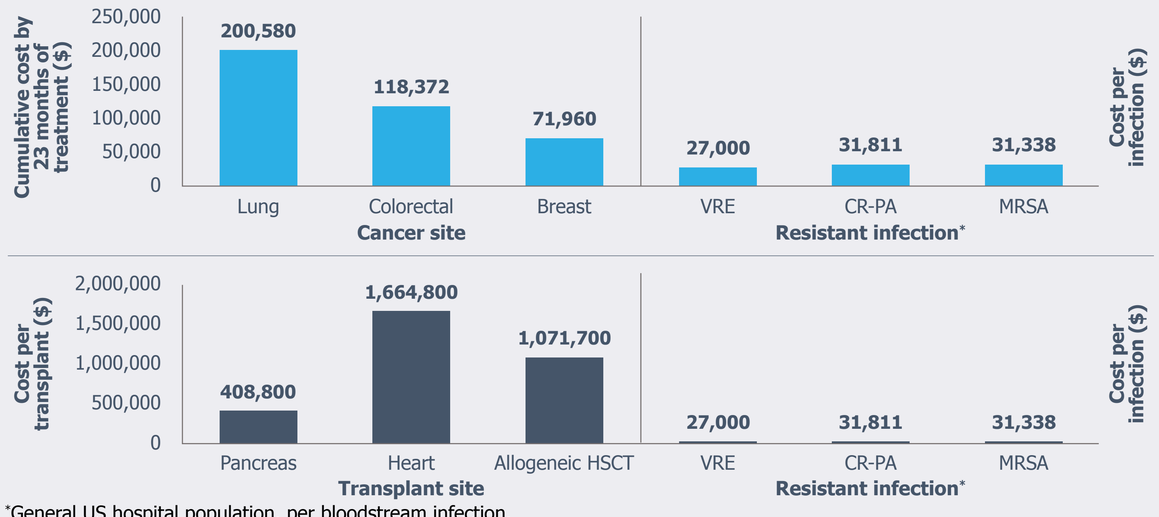
Table 1: Frequency of AMR and 30-day mortality across disease areas explored

	Solid cancer	Haematological malignancy	Solid organ transplant
Frequency of AMR	0.6–71.7%	1.7–52.3%	0–73.8%
30-day mortality	29.5–43%	6–50%	3.9–50%

Clinical management practices

- Many standard prophylactic regimens could be considered **inadequate** against AMR infections, particularly in oncology.[24,89]
- The development of **rapid**[90,91] **diagnostic** tests offers clinicians a valuable tool for timely microbiological assessment.
- **Appropriate stewardship** is pivotal to maintaining effectiveness of existing antibiotics.[92,93]

Figure 2: General cost of treating underlying diseases vs cost of treating AMR



*General US hospital population, per bloodstream infection.
CR-PA, carbapenem-resistant *Pseudomonas aeruginosa*; HSCT, haematopoietic stem cell transplant; MRSA, methicillin-resistant *Staphylococcus aureus*; VRE, vancomycin-resistant enterococci.

Consequences for patients

- There are **no controlled studies** exploring patient-reported experience measures, and real-world data on the impact of antibiotic stewardship programmes remain **limited**.
- Several case studies have highlighted the substantial burden of resistant infections on patients (**Table 2**).

Figure 1: Literature identification – flow chart of results identified and screened

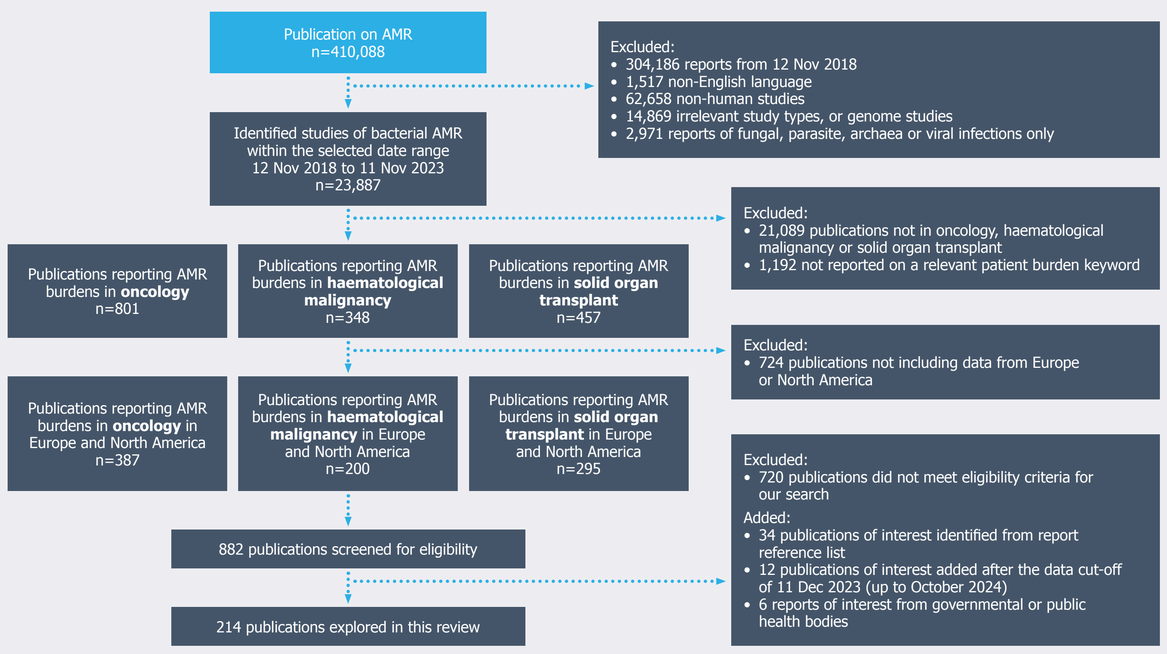


Table 2: Patient burdens associated with AMR infections[83-88]

Patient burdens
Delayed cancer treatment and delays to adjuvant therapy
Surgical revisions/debridement, leading to potential skin grafting
Amputation in severe cases
Central venous catheter infections, often requiring peripheral intravenous access for chemotherapy, increasing the risk of **phlebitis, vein obliteration and long-term vascular damage**
Intensive care unit (ICU)-associated burdens such as invasive mechanical ventilation and prolonged social isolation
Social isolation outside of the ICU, due to fears of catching potentially life-threatening infections

Direct and indirect costs of AMR

- The **financial burden** of AMR infections is substantial, largely driven by prolonged hospitalisations, ICU admissions and ventilator dependence.[15]
- Managing an immunocompromised patient's underlying disease is often **far more expensive** than treating an AMR infection itself (**Figure 2**).
- Greater investment in **infection control**, **rapid diagnostics** and **targeted therapies** has the potential to reduce overall healthcare costs.
- **Indirect costs**, such as long-term economic burden and patient productivity loss, remain poorly characterised.

Call to action

AMR continues to place a **growing strain on healthcare** resources, leading to treatment delays, increased patient burden, and social isolation. To address these challenges, we propose **three key actions**.

1. Increase **education** of clinicians across oncology and transplant to support the use of **appropriate, tailored empirical antibiotic therapy**.
2. Expand access to **rapid diagnostic tools** to guide treatment decisions.
3. Conduct **cost-effectiveness studies** to assess AMR's broader economic impact.

AMR Conference 2025 | Poster 73

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