



THE UNIVERSITY OF
SYDNEY

The role of conflict and unrest in evolving human-microbial ecologies

A research agenda

Sydney Centre for Healthy Societies
Sunshine Coast Hospital and Health Service



Acknowledgement of Country

We acknowledge the Aboriginal and Torres Strait Islander peoples as the First and Traditional Custodians of the lands where we live and work. We recognise and pay respect to the Elders and communities – past and present – and recognise their continuous connection to water, sky and Country.

Conflict microbes: the story so far

Mutating microbes and antimicrobial resistance are being supercharged by the intensifying conditions of war and displacement.

Microbes have always been central to conflict. The discovery and mass-production of antibiotics transformed battlefield outcomes in World War II, saving lives, enabling faster returns to combat, freeing up hospital resources and boosting morale. Before this, wound infections, pneumonia and dysentery killed more soldiers than direct combat.

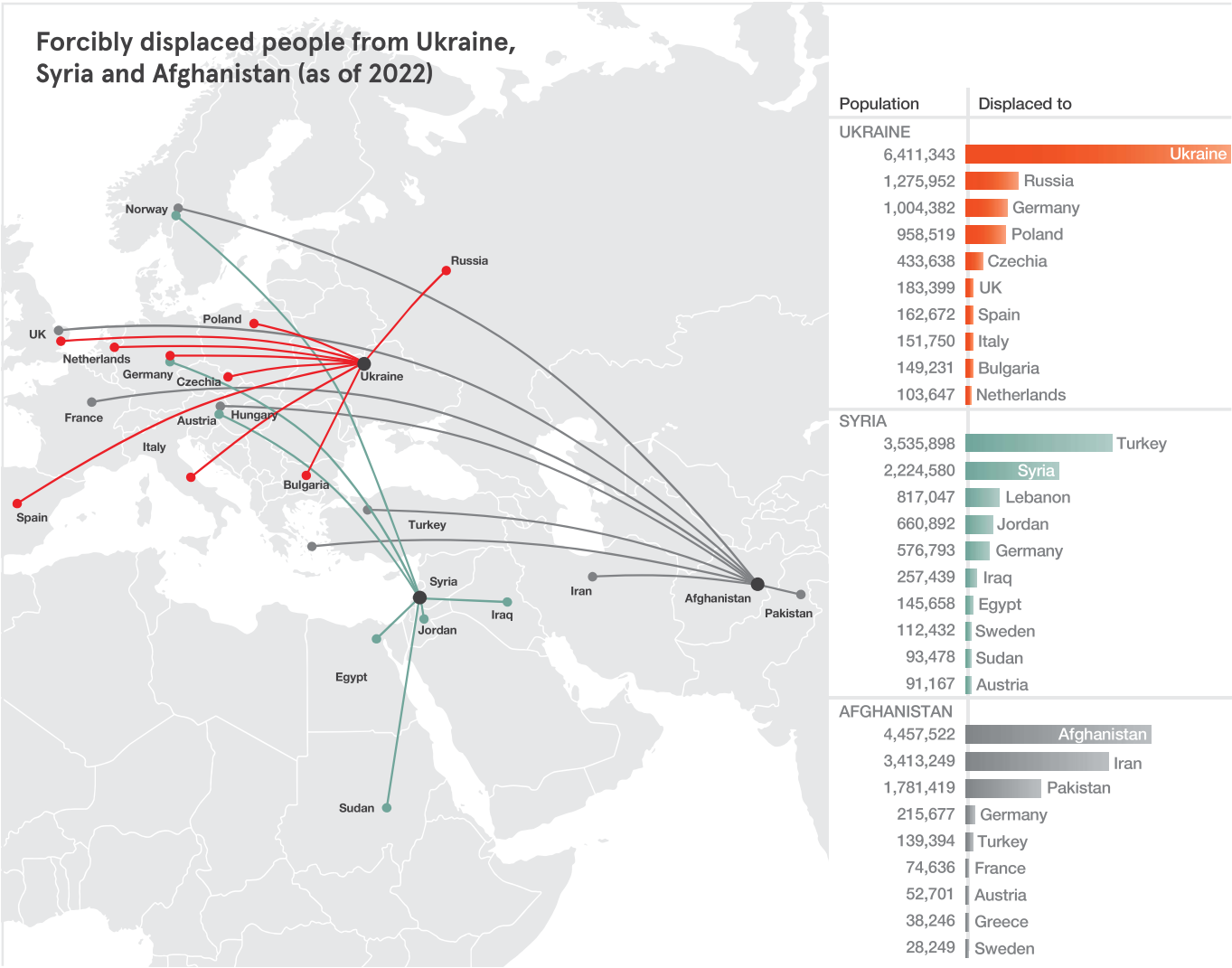
Today, mutating microbes and surging antimicrobial resistance (AMR) are an emerging, dangerous and poorly understood form of collateral damage from war and conflict. The current crisis of rising conflict is compounding the more widely recognised, but still under-addressed surge in AMR, which has been identified as a top global threat.¹



Image: stu.dio / Shutterstock.com

The role of conflict in driving AMR reared its head in the early 2000s when a resistant form of *A. baumannii* emerged in Iraqi, Kuwaiti and German military hospitals. *A. baumannii* infections resulted, and mortality rates among veterans rose.

Now, infection is becoming one of the most significant causes of non-battle injury in the Ukrainian War, and AMR is dramatically worsening this issue. Ukrainian soldiers are showing alarmingly high rates of extensively resistant NDM-1/OXA-48 producing *Klebsiella pneumoniae*. This superbug has spread, with the flow of casualties, beyond Ukraine. Neighbouring countries – including Germany – are now reporting spikes within their health systems.²



Mass injuries, moving populations and infrastructure collapse are causing resistant microbes to flourish. And we remain ill-prepared for this crisis.

The creation and spread of AMR through conflict

Levels of conflict are rising.

As bullets and shrapnel tear through bodies, and health systems containing and preventing infections are destroyed, the door is opened to novel and alarming infections. Areas of conflict become fertile breeding grounds for drug-resistant microbes.

- *In the past five years, conflict levels have almost doubled globally.*
- *In 2024, one in eight people were exposed to conflict.*
- *50 countries are experiencing turbulent, high, or extreme levels of conflict.³*

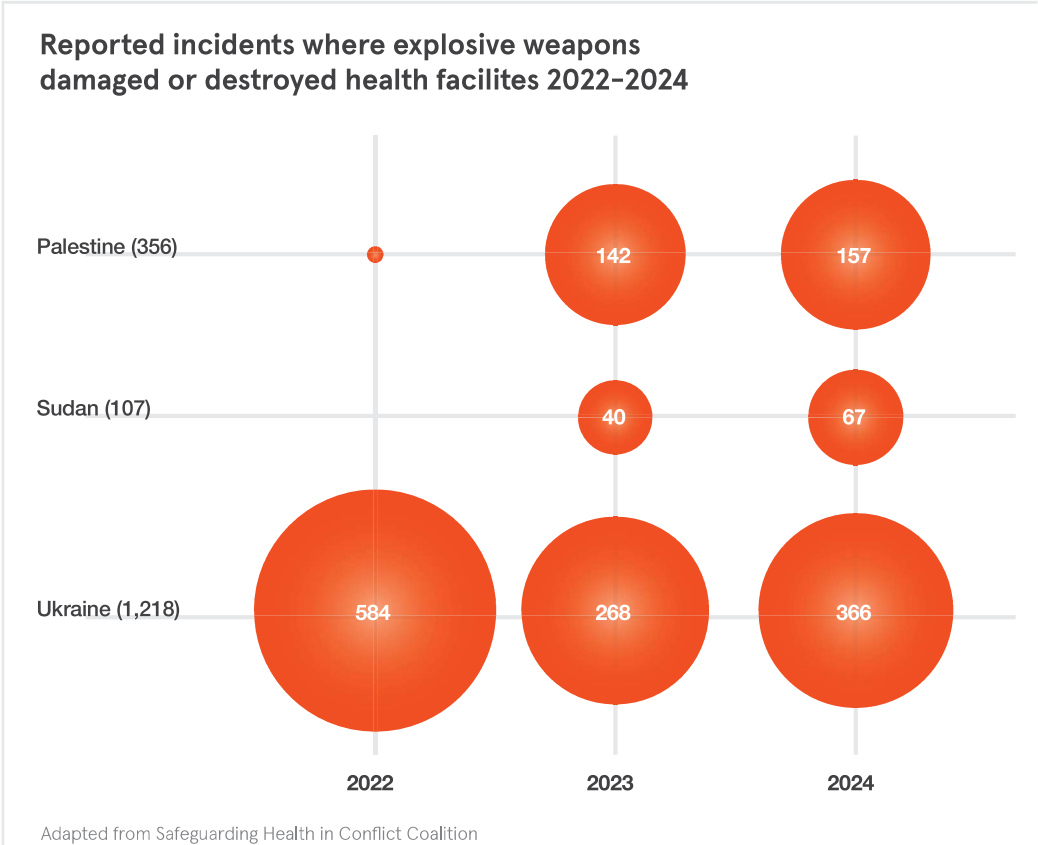
Amongst this, there is growing evidence that war and conflict fundamentally shift microbial life.

Infrastructural collapse fosters antimicrobial resistance.

In the recent Gaza conflict, almost all hospitals have been damaged, and healthcare providers and facilities have been targets of war. As a result, primary healthcare has collapsed. This collapse impacts everyone, and it is increasingly common in conflict.



In 2024, there were over 1,000 reported incidents of healthcare facilities being damaged or destroyed. This accounts for approximately one third of incidents where healthcare was disrupted, including instances where healthcare workers were killed, arrested or kidnapped. Overall, this is a 15% increase from 2023, and a 62% increase from 2022.⁴



With loss of diagnostics and dire clinical scenarios, clinicians often need to rely heavily on a few broad-spectrum, last-resort antibiotics, the use of which accelerates resistance and in turn increases the use of antibiotics. The use of antibiotics also increases when the infrastructure necessary for healthcare and infection control – hospitals, reliable food supply, sanitation – is destroyed.

The microbial mutations that occur in this environment can impact health for generations.

The consequences of war are never confined to the battlefields.

People who are forcibly displaced by these conflicts are often herded into overcrowded camps. In these places, weakened immune systems collide with emerging resistant infections, disruption to sanitation and sewage, and malnutrition. This creates optimal circumstances for rampant transmission of microbes from person-to-person and outbreaks of disease.

- Worldwide, the number of forcibly displaced people has more than tripled over the past 25 years.
- In 2024, there were 122.6 million forcibly displaced people.⁵

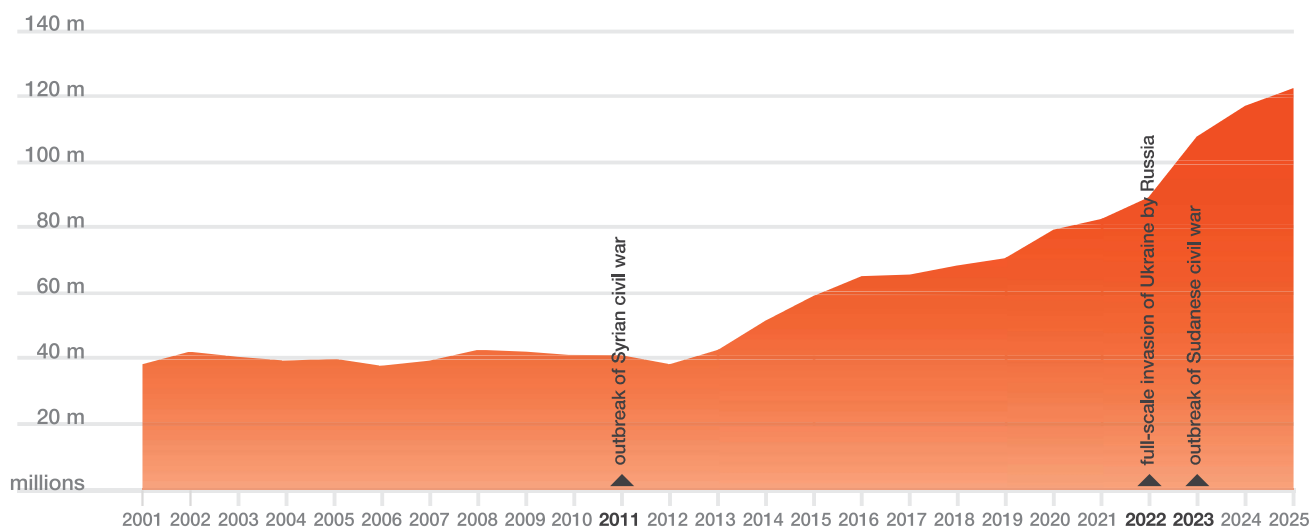
Resistant bugs then travel with people out of conflict zones, seeding future outbreaks across countries and continents. It is not just those who have been displaced who get infected: resistant microbes can also infect soldiers, aid workers and journalists. These hidden and dangerous microbes from conflict zones emerge in different healthcare facilities over space and time.

The harmful impacts of pathogens may intensify during conflict, but they are never confined to these places and periods.

122.6 MILLION

forcibly displaced people worldwide

at mid-2024 as a result of persecution, conflict, violence, human rights violations or events seriously disturbing public order.



We urgently need more data and awareness

With conflict and unrest rising – and Australia increasingly involved in regional security, disaster relief and humanitarian activities – we need to map the impacts of conflict on human-microbial ecologies and design reforms that limit harm.

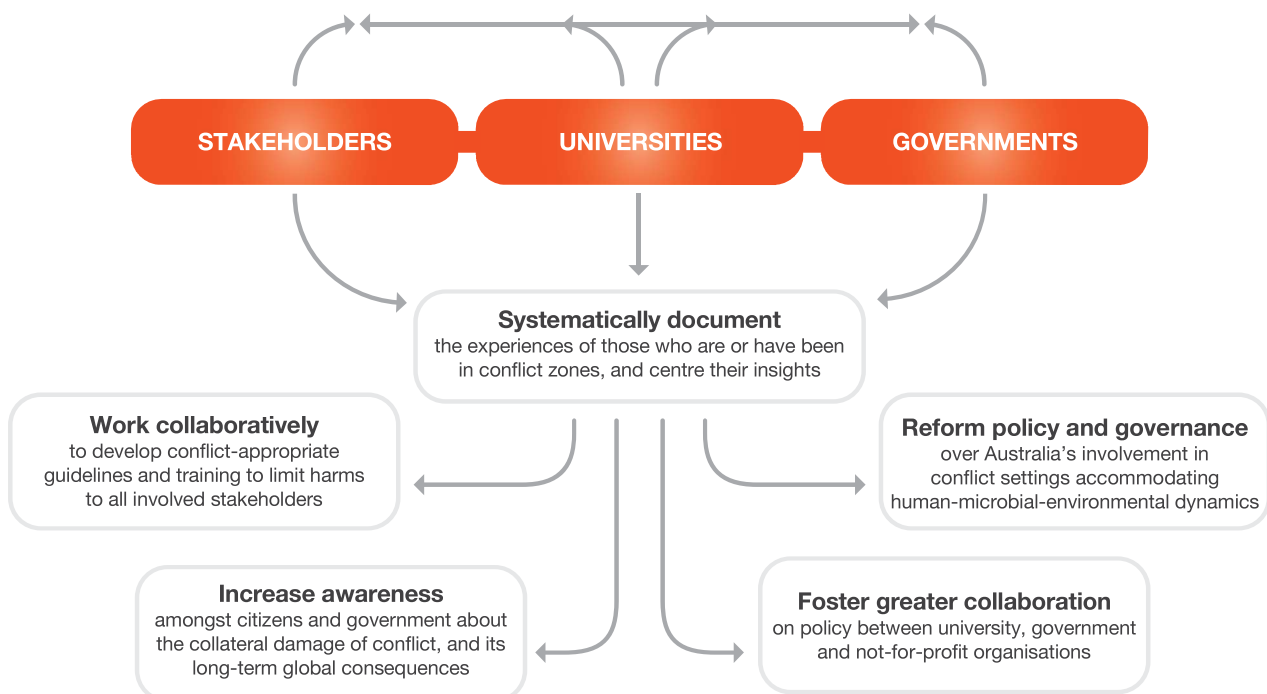
Tracking the spread of resistant microbes is not enough.

While science-based approaches have identified extensive AMR in conflict zones, we need a broader reckoning with the cultural, political and ecological conditions that produce – and sustain – this crisis.

Currently, most AMR policy and ideas are skewed towards stable, well-resourced settings. More needs to be done to confront and respond to AMR elsewhere, especially in conflict zones.

What do we need to know?

- *How is conflict shaping microbial life?*
- *How does conflict propel global problems like antimicrobial resistance?*
- *How are frontline personnel managing antimicrobial resistance?*
- *How can we protect military and non-military personnel now and in the future?*
- *How should these consequences be weighed when deciding whether to enter into conflict?*



About us

Sydney Centre for Healthy Societies

The Sydney Centre for Healthy Societies (SCHS) is a Flagship Centre of the Faculty of Arts and Social Sciences at the University of Sydney. Synthesising different disciplinary approaches across scales of observation from the microbial to the planetary, the work of the SCHS highlights how historical context, political arrangements, economic structures, enduring inequalities, and interspecies and environmental relations both produce health problems and might map paths to new solutions.

Sunshine Coast Hospital and Health Service

Sunshine Coast Hospital and Health Service (SCHHS) are committed to improving health and wellbeing via high-quality, cost-effective, innovative and person-centred services, in collaboration with communities and partners. The SCHHS has an outward facing approach, both engaging with acute challenges, but also, upstream societal conditions (local and global) which give rise to health and wellbeing issues for our communities.

Authors

Professor Alex Broom

Dr Olga Oleinikova

Professor Assa Doron

Dr Jennifer Broom

Dr Imogen Harper

Suggested citation: Broom A, Oleinikova O, Broom J, Harper I (2025). *The role of conflict and unrest in emerging human-microbial relations: A research agenda*. Sydney Centre for Healthy Societies, Sunshine Coast Hospital and Health Service.

Endnotes

- 1 Antimicrobial Resistance Collaborators (2022). "Global burden of bacterial antimicrobial resistance in 2019: a systematic analysis." *The Lancet* 399 (10325): 629–655.
- 2 Pallett et al., (2023). "The contribution of human conflict to the development of antimicrobial resistance." *Communications Medicine* 3: 153.
- 3 ACLED. Conflict Index: December 2024. <https://acleddata.com/conflict-index/>
- 4 Safeguarding Health in Conflict. Epidemic of Violence: Violence Against Health Care in Conflict, 2024. <https://shcc.pub/AnnualReport2024>
- 5 UNHCR. Refugee Data Finder. <https://www.unhcr.org/refugee-statistics>



THE UNIVERSITY OF
SYDNEY