



Lessons Learned from Implementation of Antimicrobial Resistance Research to Improve Outcomes of Traumatic Wounds in Ukraine

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Anschutz





ANTIMICROBIAL RESISTANCE RESEARCH TO IMPROVE OUTCOMES OF TRAUMATIC WOUNDS

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Collaborators



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Disclaimer and Disclosures

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COI: None

Superbugs pose 'huge challenge' treating Ukraine war wounds

national

RUSSIAN WAR IN UKRAINE >

Superbugs gain a foothold in the trenches of Ukraine war

of German physicians treating war-wounded soldiers and civilians about the high number of antibiotic-resistant pathogens they



MUSIC POLITICS TV & MOVIES (SUB)CULTURE RS RECOMMENDS

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Challenges of Care in Ukraine

- Prolonged evacuation times
 - At the site of injury
 - Interfacility transfers
- Resource scarcity
- Lack of available personnel
- Logistical challenges
- Significant psychological stress impacting both healthcare personnel and patients
- Drone warfare



LEARNING OBJECTIVES

01

Describe facilitators and barriers associated with conduct of ARROW a multicenter observational trial during active war

02

Identify key strategies that have led to the success and maintenance of ongoing patient enrollment and site participation in ARROW



ANTIMICROBIAL RESISTANCE RESEARCH TO IMPROVE
OUTCOMES OF TRAUMATIC WOUNDS

Prospective longitudinal cohort study

5 civilian hospitals in Ukraine

Hospitalized adult patients with traumatic wounds

Serial Follow-up at Day 0, 7, 14 and 28 days

Sample size: min 250 ; max 1000

Duration: 1.5 years of data collection

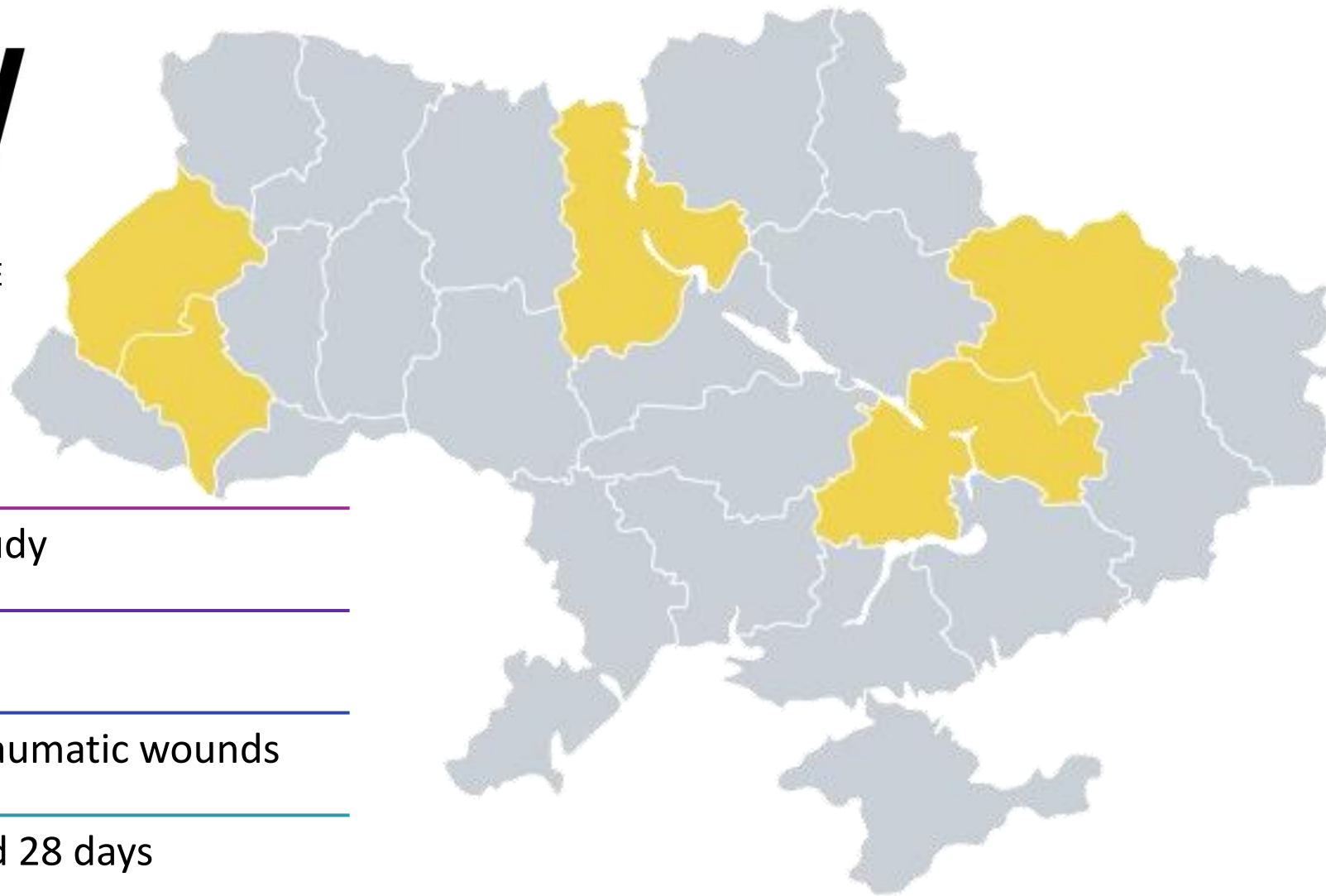
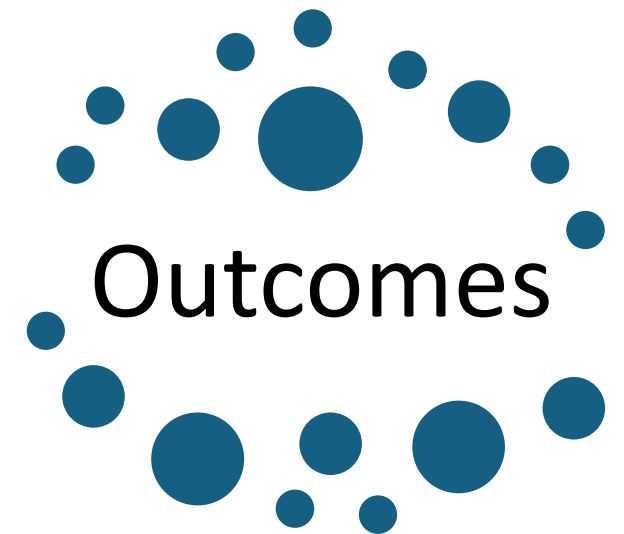
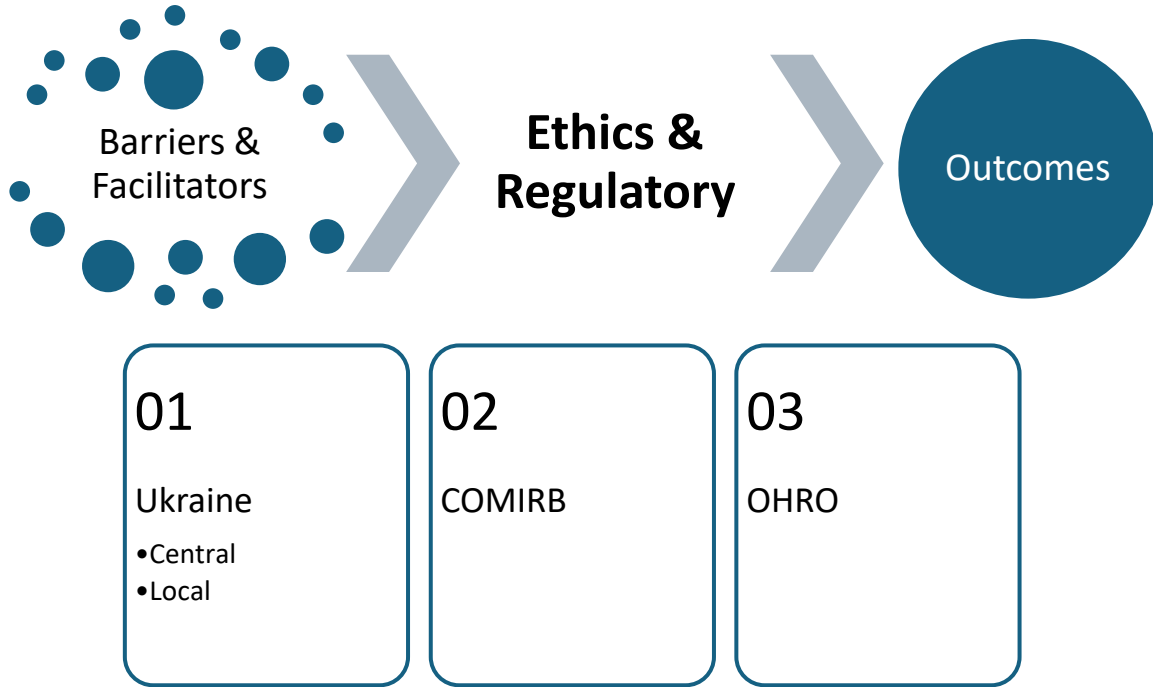


Figure. Ukraine Participating Sites by Region





CLINICAL TRIALS DURING WAR in UKRAINE: THE CHALLENGE FOR MODERN RESEARCH ETHICS



DIA

Advice to sponsors on managing the impact of the war in Ukraine on clinical trials [Share](#)

News 30/03/2022

In view of the disruption of the European Medicines Agency's operations, sponsors on how to

The ongoing war in Ukraine may need the disruptions. Certain example scheduled participants who are Adaptations will also ongoing trial treatment Sponsors have asked data collection, pro

Where applicable, sponsors should apply the approach documents:

- Guidance on the
- Points to consider



Impact of the war in Ukraine on methodological aspects of ongoing clinical trials [Share](#)

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This guidance covers actions that sponsors of ongoing [clinical trials](#) affected by the war in Ukraine can take to help ensure the integrity of their studies and the interpretation of the study results while safeguarding the safety of trial participants as a first priority.

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[frontiers](#) | Frontiers in Medicine

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The continuation of clinical trials in times of war: A need to develop ethics and situationally adaptive clinical research guidelines

[Home](#) | [JAMA Oncology](#) | Vol. 8, No. 9

Viewpoint

Research During Wartime—Ethical Challenges Faced by Oncology Researchers in Ukraine

Maksym Basarab, MD¹; Emily E. Anderson, PhD, MPH²

PACT-ARROW

*Prevention and Treatment Clinical Trials (**PACT**) for Antimicrobial Resistance Research to
Improve Outcomes of Traumatic Wounds in Ukraine (**ARROW**)*

Master Clinical Trial Protocol—rapidly testing deployable solutions

- **PACT-ARROW:** Novel master protocol to provide a framework for multiple clinical and public-health interventions for improved wound care and reduced antimicrobial resistance in Ukraine
- Supports future scientific studies aimed at addressing urgent need for innovative approaches to wound management and AMR mitigation
- Approved by Ukrainian and U.S. regulatory authorities and local Ukrainian ethics committees

Bills CB, et al. Design and implementation of an international multiarm, multistage master protocol for trials of complex traumatic wound care during active war in Ukraine. *J Trauma Acute Care Surg*. May 5, 2026.



**Operations &
Logistics**

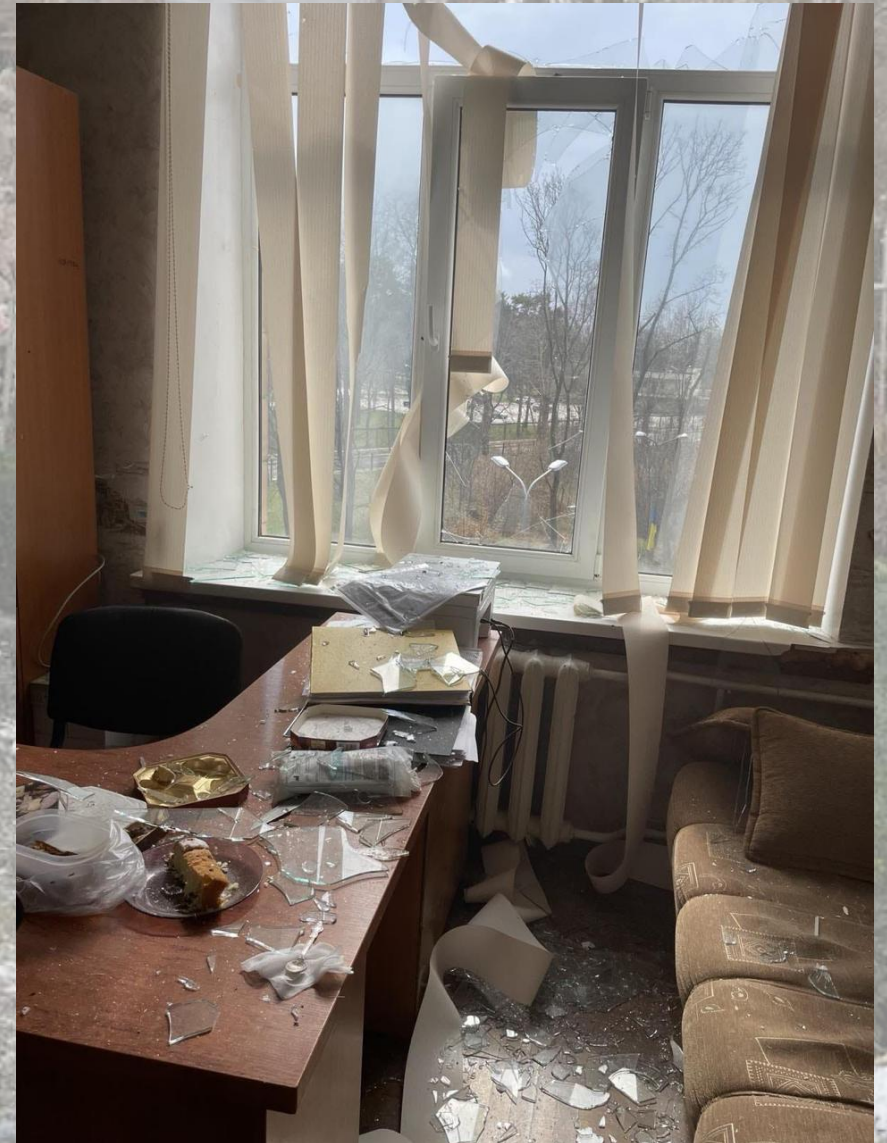
Outcomes

**92% of providers reported
power outages**



**ATTACKS AGAINST UKRAINE'S ENERGY
INFRASTRUCTURE AND UPDATE ON THE HUMAN
RIGHTS SITUATION IN UKRAINE**

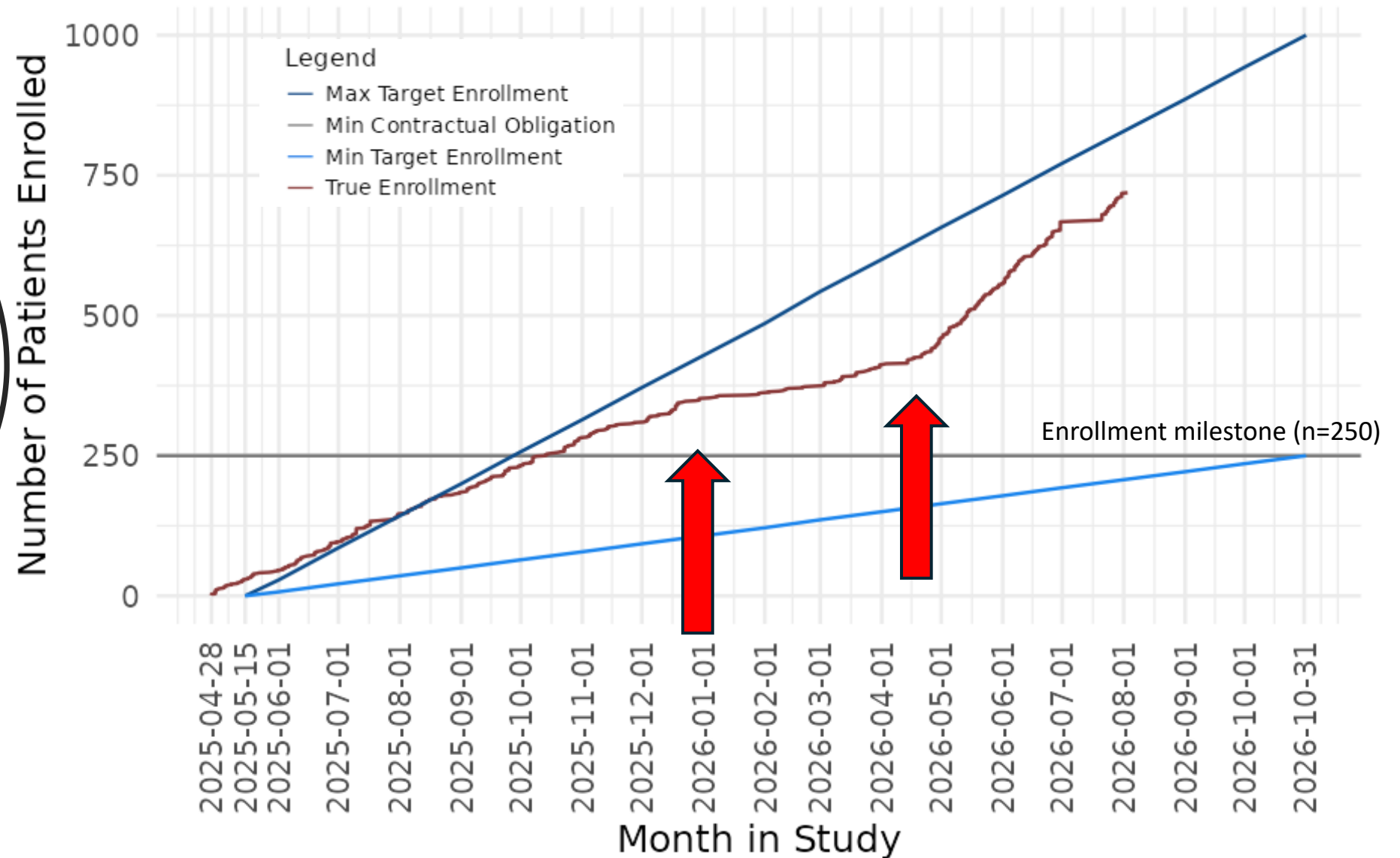
1 December 2025 – 31 May 2026

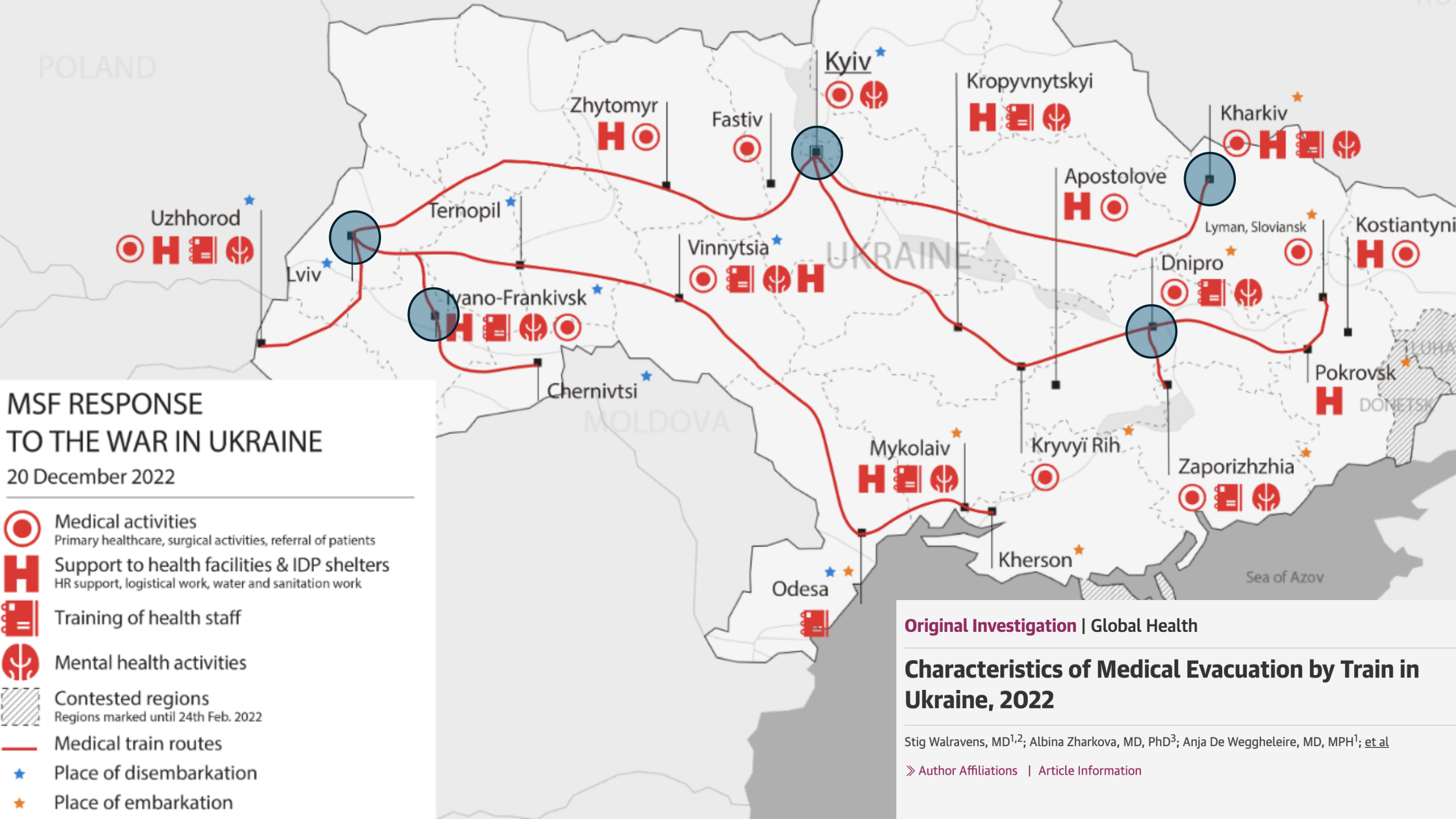


**Exceptional Enrollment:
Started Early, Met Goal in <6 months**

ARROW
Enrollment

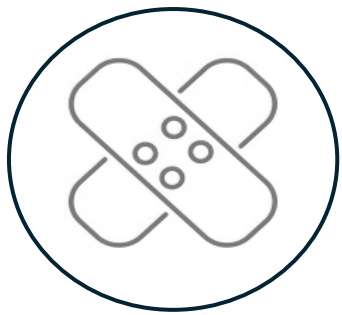
N=725





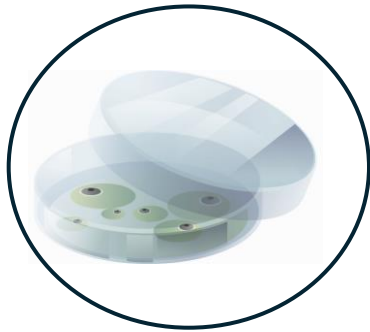


Clinical



- In-hospital interventions
- Patient outcomes

Microbiology



- Bacteria type
- Antimicrobial resistance phenotype
- Whole genome sequencing

Photography



- Wound characteristics
- Serial change

	Enrollment (N=725)	Day 7 (N=628)	Day 14 (N=336)	Day 28/DC (N=623)* 52% DC
Wound Appears Infected	99%	91%	81%	56%
Wound Swab Collected	100%	94%	83%	43%
Wound Photo Taken	100%	98%	99%	81%



Day 0



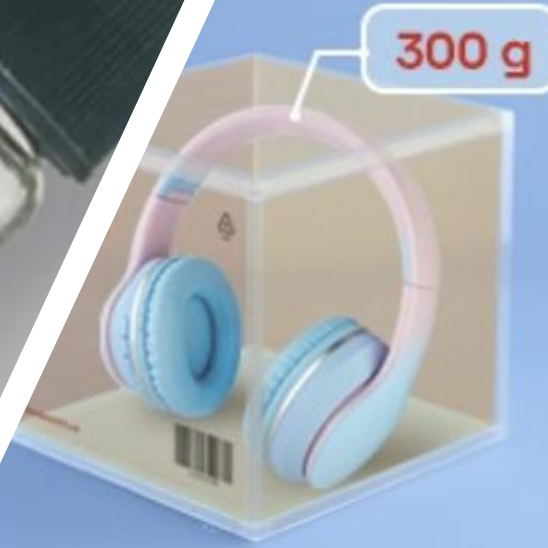
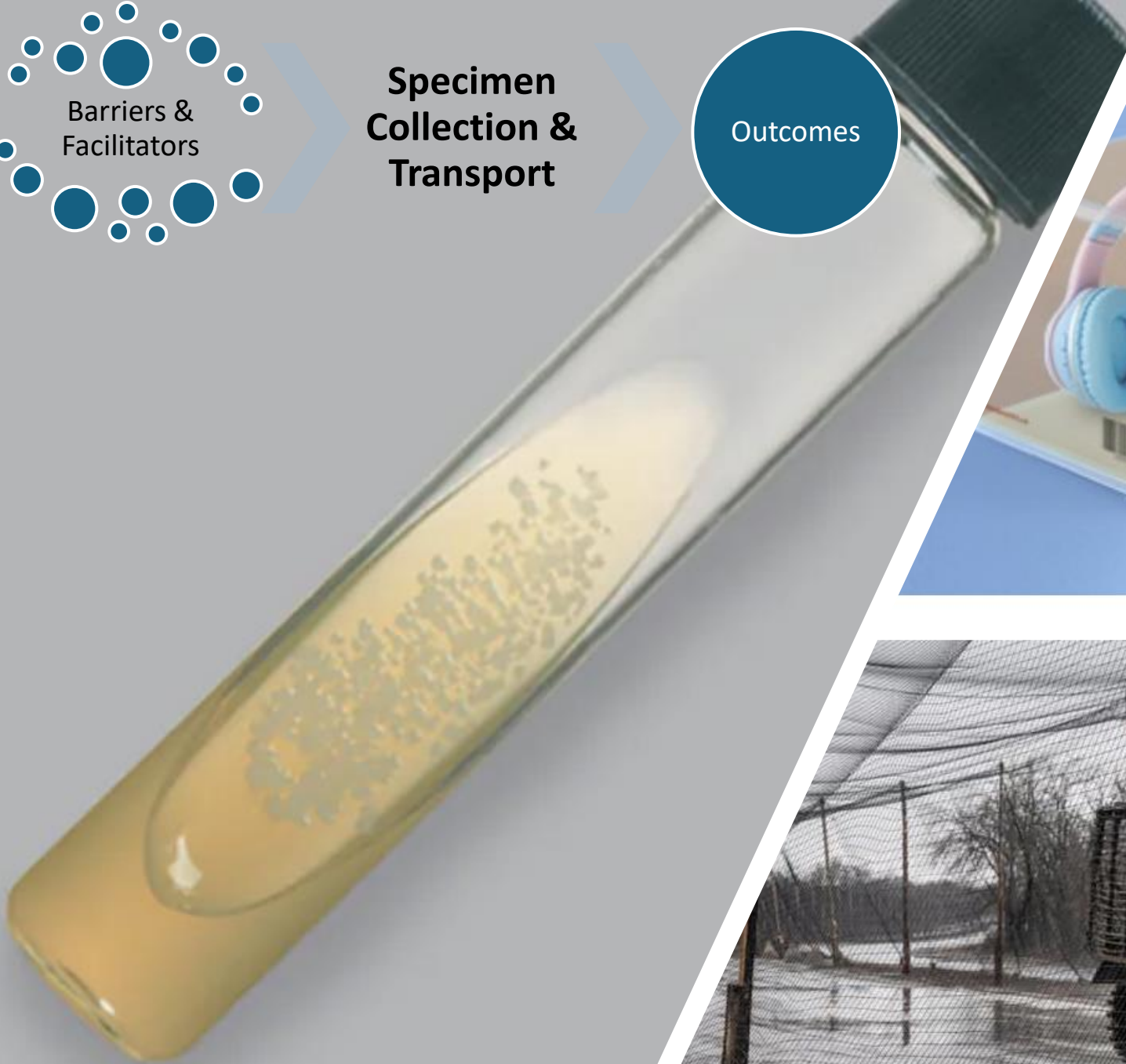
Day 28

~2000 photographs



**Specimen
Collection &
Transport**

Outcomes



**Send
Ukraine → World***

Pay for the actual
weight of the parcel





Specimen
Collection &
Transport

Outcomes

100% of swabs
collected and
shipped and
received within 24
hours of collection
for in country
processing



**Send
Ukraine → World***
Pay for the actual
weight of the parcel

>1100 isolates sent
from Ukraine to US
and partners for
sequencing





Barriers &
Facilitators

Security &
Safety



Outcomes

- **2,591** attacks on health since February 2022
- **1,389** attacks damaging or destroying hospitals and clinics
- **235** attacks on ambulances
- **359** health workers killed and **379** injured





Self-assessed mental health

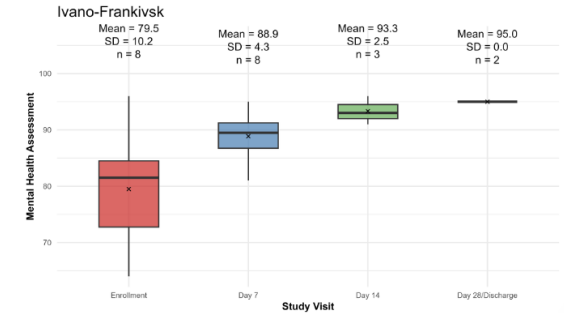
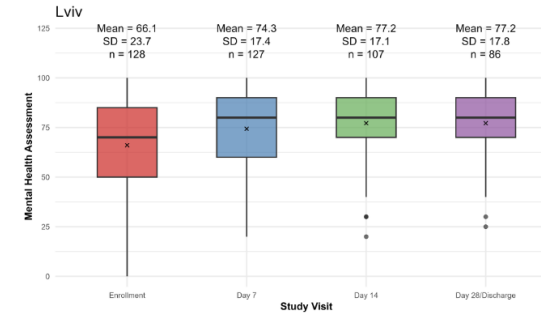
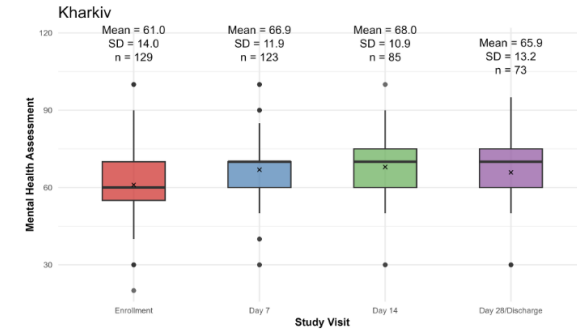
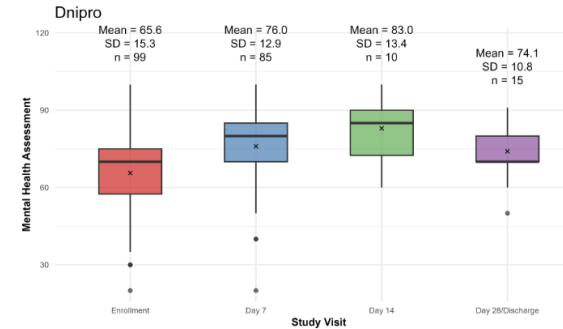
Patients

>50% of population affected

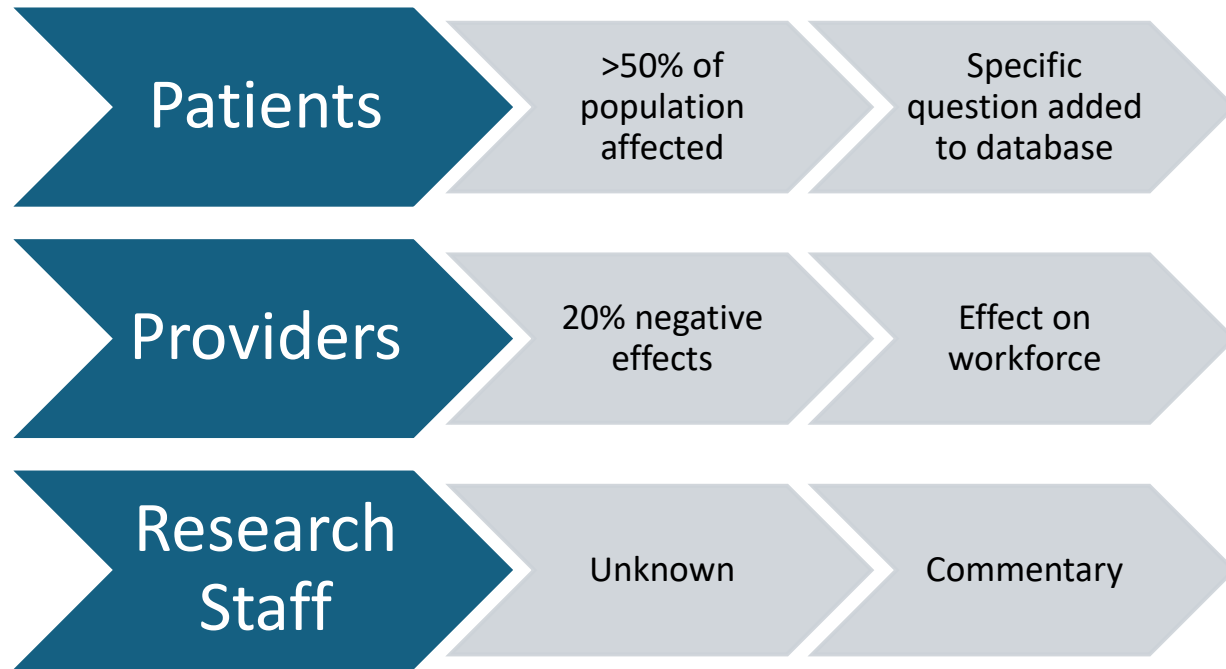
Specific question added to database



Health needs assessment of the adult population in Ukraine



Health needs assessment of the adult population in Ukraine: survey report: April 2024. Copenhagen: WHO Regional Office for Europe; 2024.



Psychological distress in clinical research professionals in acute care settings: Potential risks and future directions

Ian H. Stanley^{1,2} , Corey B. Bills¹ and Adit A. Ginde^{1,2}

Conclusions & Lessons Learned

War has profound effects on both clinical care and research

ARROW has highlighted high quality data collection can occur in a wartime environment

Addressing the operational challenges provides unique opportunities for current and future studies

Ongoing data collection with over 750 patients enrolled and >1100 biospecimens sent and analyzed

Future work

Ongoing data collection, continued analyses, and dissemination

Intervention and clinical trials making use of the PACT-ARROW platform

Support ongoing efforts to continue to engage Ukraine ongoing research collaboration

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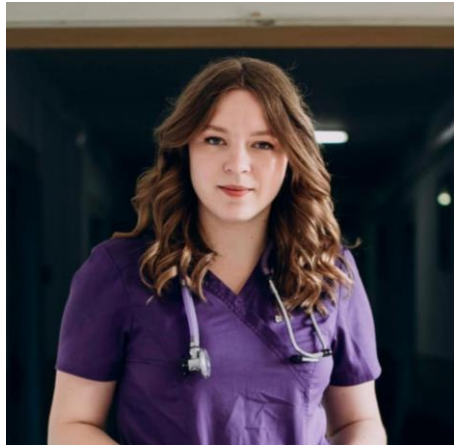


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