



# Global Antimicrobial Resistance Surveillance System (GLASS)

## Early implementation protocol for inclusion of *Candida* spp.

August 2019





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## Acknowledgements

WHO thanks the following authors and contributors: Ana Alastruey-Izquierdo (Spain), Hanan Balkhy (Saudi Arabia), Arunaloke Chakrabarti (India), Leili Chamani-Tabriz (United Arab Emirates), Dr Methee Chayakulkeeree (Thailand), Tom Chiller (USA), Arnaldo Colombo (Brazil), Susana Cordoba (Argentina), Oliver Cornely (Germany), Brion Edwards (USA), Joveria Farooqi (Pakistan), Kaitlin Forsberg (USA), Nathalie Friberg (Finland), Brendan Jackson (USA), Shawn Lockhart (USA), Jacques Meis (Netherlands), Nelesh Govender (South Africa), Thi Hoa Nguyen (Vietnam), Elizabeth Johnson (United Kingdom), Katherine Kooij (The Netherlands), Cornelia Lass-Flörl (Austria), Olga Perovic (South Africa), Diamantis Plachouras (Sweden), Jong-Hee Shin (Korea), Susana Zurita (Peru)

Contributions by WHO staff: Nienke Bruinsma, Marcelo Galas and Pilar Ramon Pardo at the Regional Office for the Americas (PAHO); Aparna Singh Shah at the Regional Office for South East Asia (SEARO); Sergey Eremin and Carmem Lucia Pessoa-Silva at the WHO Headquarters.

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Editing: Laura Nellums

Financial support: The Government of the United States of America

## Abbreviations

AMR	Antimicrobial resistance
AFST	Antifungal susceptibility testing
AST	Antimicrobial susceptibility testing
BSI	Bloodstream infection
CRC	<i>Candida</i> reference centre
CLSI	Clinical & Laboratory Standards Institute
EQAS	External quality assurance system
EUCAST	European Committee on Antimicrobial Susceptibility Testing
GAP-AMR	Global Action Plan on Antimicrobial Resistance
GLASS	Global Antimicrobial Resistance Surveillance System
ICU	Intensive care unit
MALDI-TOF	Matrix-assisted laser desorption/ionization-time of flight mass spectrometry
MIC	Minimum inhibitory concentration
NCC	National coordinating centre
NRL	National reference laboratory
SOP	Standard operating procedure
WHO	World Health Organization
WHONET	Database software for management and analysis of microbiology laboratory data developed by the World Health Organization

## 1. Introduction

The Global Antimicrobial Resistance Surveillance System (GLASS) aims to support the implementation of the Global Action Plan on Antimicrobial Resistance (GAP-AMR) by promoting and strengthening standardized antimicrobial resistance (AMR) surveillance worldwide. GLASS combines patient, laboratory, and epidemiological surveillance data to enhance understanding of the extent and impact of AMR on populations. In its early implementation phase (2015-2019), GLASS aims to combine data on the status of enrolled countries' AMR surveillance systems with AMR data for selected bacterial pathogens that cause infections in humans. However, recognizing the growing threat of resistant fungal infections, GLASS started a global collaborative effort to also compile available data on antifungal-resistant infections. Although largely out of the public's view, fungi are also major causes of human disease and death, and resistance to antifungal medications is a growing problem, as it is for antibiotic drugs. One of the major limitations in addressing the threat of antifungal-resistant fungi is a lack of data at the global level. Few countries have effective surveillance systems for fungal diseases, and consequently, statistics on their incidence, resistance, and related burden of disease are limited.

As the spectrum of invasive antifungal-resistant infections is broad, the GLASS Fungal AMR effort will initially focus on invasive fungal bloodstream infections (BSIs) caused by *Candida* species (spp.). *Candida* spp. BSI is the most common type of invasive fungal disease. Antifungal susceptibility data of invasive *Candida* isolates, especially from patients in high-risk hospital units (e.g. intensive care units (ICUs), neonatal ICUs), that will be available through GLASS will provide an overview of the emerging resistance in *Candida* spp.

Unlike bacteria, accurate identification and antifungal susceptibility testing (AFST) of *Candida* spp. are still major challenges as many laboratories worldwide lack this capability. A fundamental limitation is that resistance breakpoints differ by individual species, with many species lacking defined breakpoints, and most laboratories rely on phenotypic *Candida*<sup>1</sup> identification methods that cannot reliably differentiate beyond the most common species of *Candida*. Also, the databases of automated commercial microbial identification methods used in routine microbiology laboratories to identify *Candida* species may lack emerging and new *Candida* species, thus requiring molecular methods for accurate identification. The AFST expertise to perform the reference broth microdilution methods for *Candida* species is generally restricted to specialized laboratories, and breakpoints for interpreting the susceptibility by reference broth microdilution methods have been established for only the common *Candida* spp.

This early implementation protocol was developed to support countries to strengthen or build their national fungal AMR surveillance, and enable incorporation of AMR surveillance for invasive *Candida* into GLASS. The protocol describes the objectives and methodology, and provides details of the proposed approach and defined targets for the surveillance of resistance in *Candida* BSIs. Using the evidence collected during the early implementation and the lessons learnt, the protocol will be

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