



## Viewpoint

# Advancing understanding and management of invasive fungal diseases in the intensive care unit: Insights from FUNDICU consensus definitions

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Invasive fungal diseases (IFDs) are increasingly relevant in critical care medicine.<sup>[1]</sup> Due to the population being admitted to an intensive care unit (ICU), the type of patient has significantly changed over the last two decades.<sup>[2]</sup> More often, patients affected by comorbid conditions are candidates for being admitted to an ICU. There are mainly two sources of patients. Patients with medical admission who often are aging and with some degree of acquired immunosuppression or surgical patients who underwent more and more complex surgical procedures and need prolonged ICU stays.<sup>[3]</sup> Looking at the recent epidemiology, it is easy to find an association of patients affected by IFD with high rates of mortality.<sup>[4]</sup> For instance, recent studies that aimed to determine the type of infections of patients admitted to the ICU found that those who had IFDs presented not only higher ICU but also hospital mortality and prolonged length of stays. This represents a high burden to the healthcare system when assessing the cost of diagnosis, treatment, and other healthcare resources.<sup>[5]</sup>

A common point of discrepancy is how IFDs are diagnosed.<sup>[6]</sup> Different and very variable rates have been published, and most importantly, there needs to be more understanding to determine the true association, the so-called attributable mortality, of this infection as a major contributor to the morbidity and mortality of ICU patients.<sup>[7]</sup> A ground-breaking paper has been recently published by experts and endorsed by many scientific societies, such as the European Society of Clinical Microbiology and Infectious Diseases Fungal Infection Study Group (ESGCI), the European Confederation of Medical Mycology (ECMM), the European Society of Intensive Care Medicine (ESICM), the Mycoses Study Group Education and Research Consortium (MSGERC), the International Society for Antimicrobial Chemotherapy (ISAC), and the International Society for Human and Animal Mycology (ISHA), represents a significant advancement in our understanding and management of IFDs in the ICU. The paper is

entitled: Invasive Fungal Diseases in Adult Patients in Intensive Care Unit (FUNDICU): 2024 Consensus Definitions.<sup>[8]</sup>

The FUNDICU consensus definitions aimed to standardize and create a common language and framework regarding the diagnosis, classification, and management of IFDs in non-immunosuppressed adult ICU patients. The main strength of this manuscript is the robust methodology applied to determine the clinical pathways when a patient is suspected to have an IFD. Moreover, it is unique as it also aims to provide a pragmatic approach to medical management, acknowledging areas of future research and facilitating research collaboration. This manuscript also aims to gather the opinions and knowledge of many points of view from experts with different specialties. A common problem is that IFDs are sometimes clearly defined by robust microbiological methods.<sup>[9]</sup> Still, the clinical consequences need to be included based on the complexity of the critically ill patient.<sup>[10]</sup>

A major and probably the most important aspect of the consensus was determining and standardizing the diagnostic criteria for IFDs in critically ill, no immunocompromised patients.<sup>[6]</sup> Due to the many definitions produced by scientific societies, the incidence and association of severity and patient outcomes can significantly vary due to different diagnostic criteria that are not agreed upon.<sup>[11]</sup> So, the main aim of this paper, thanks to the endorsement of many scientific societies, was to promote and implement clear and practical guidelines for identifying probable and proven IFDs. The combination of many aspects, including clinical, microbiological, radiological, and histopathological factors, allows for a comprehensive and systematic approach to diagnosis.

An essential aspect that is extremely concerning has been the increase in the prescription of antifungals and the emergence of resistant strains worldwide.<sup>[12]</sup> Antifungals were more restricted in the past due to the low number of fungal episodes. This doc-

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ument aims to improve their clinical outcome and facilitate the comparison and generalizability of research findings. For bacterial infections, there has been a very universal understanding based on the danger of multidrug-resistant pathogens<sup>[13]</sup>; this manuscript also aimed to determine the need for a coordinated and interdisciplinary approach; the consensus panel aims to improve the quality of care for ICU patients at risk of IFDs through multidisciplinary collaboration emphasizing the roles of infectious disease specialists, microbiologists, intensivists, pharmacists, and other healthcare professionals in the timely recognition and treatment of these infections. There is a need to implement more strategies focusing on the importance of antifungal stewardship and the appropriate use of diagnostic tests, including fungal biomarkers and imaging modalities, in guiding therapeutic decisions. By promoting a tailored and evidence-based approach to antifungal therapy, the consensus guidelines seek to optimize patient care while minimizing the risks of drug toxicity and the emergence of antifungal resistance.<sup>[14]</sup>

Another important aspect proposed in this consensus document is that the scope of the manuscript was not related to yeast or molds but to the most common fungal infection that a physician dealing with critically ill patients faces.<sup>[15]</sup> The manuscript worked toward establishing standardized research definitions for proven invasive candidiasis, probable deep-seated candidiasis, proven invasive aspergillosis, probable invasive pulmonary aspergillosis, and probable tracheobronchial aspergillosis. The final goal of such definitions and guidelines for diagnosing and managing IFDs is to provide adequate tools to be implemented in clinical practice. When guidelines or consensus documents are often released, a final step must be taken to determine the usefulness of such documents and their applicability and validation in real clinical scenarios. The publication of the FUNDICU consensus definitions represents a landmark event in the care of critically ill patients, and only time will determine if this type of document is more than a piece of research and is incorporated into daily practice. This was the ultimate and foremost most important approach when this document was produced.

In conclusion, FUNDICU consensus definitions aim to provide a crucial framework for addressing the challenges of IFDs in critically ill patients. Still, we will remain expectant to determine their effectiveness and applicability, which needs worldwide validation in clinical practice. Clinicians, researchers, and policymakers need to continue to sum up and create standardized and easy-to-use tools for being implemented in the care of patients. This also will allow us to determine the effectiveness of new drugs when being developed and approved and will allow us to compare the true efficacy that will be essential in ensuring their utility in guiding efforts to mitigate the impact of these devastating infections on patient care and public health.

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## Ethics Statement

Not applicable.

## Conflict of Interest

The author declares that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data Availability

Not applicable.

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