Reply to Bauer and Goff

TO THE EDITOR—We read with interest the letter by Bauer and colleagues commenting on the need for cost-justification of new diagnostic tests in the field of infectious diseases [1], such as the recently US Food and Drug Administration–approved T2Candida panel for diagnosis of candidemia [2]. Indeed, the new alternatives for disease diagnosis [3] contribute to the exponential rise of healthcare costs [4], making the optimal allocation of resources and, thus, research on the cost-effectiveness of newly developed technologies mandatory.

Candidemia is among the most costly infectious diseases [5]. However, determining the cost-effectiveness of a new rapid diagnostic method, such as the T2Candida panel, is challenging. Although the mortality of Candida species infections may exceed 40% and is significantly decreased by early initiation of treatment [2], candidemia is often a marker of end-stage disease. This makes it hard to estimate the quality-adjusted life-years gained by the rapid diagnosis and targeted antifungal treatment initiation, a parameter that is necessary to determine a willingness-to-pay threshold for every death averted.

Modeling studies have indicated that the T2Candida panel can be economically self-supported when used in niche populations [6, 7]. For example, a recently published cost analysis indicates that the T2Candida panel has the potential not only to reduce mortality but also to decrease costs, when used for high-risk hospital admissions (solid tumors, hematological malignancies, intensive care unit admissions, and transplantations), which had an annual incidence of 3% for candidemia [7]. The model acknowledges the increase in hospital budget from the capital cost of the instrument purchase and the increased cost per patient tested for candidemia; however, using a time horizon of 1 year, the model expects cost savings from the termination of unnecessary empiric antifungal treatment and the decreased length of hospital stay for patients with early initiation of targeted treatment. To appreciate the potential positive financial impact, an overall hospital budget perspective is required, as certain areas of the hospital budget (eg, microbiology) will increase, whereas others (eg, daily room charges) will decrease. Of note, the changing resistance pattern of different Candida species makes it difficult to make an accurate estimation of the cost reduction even when species-specific antifungal therapy is administered [8].

Optimal resource allocation demands targeted use of new technologies in high-risk patients. Clinical prediction models that use readily available clinical parameters at the time of sepsis diagnosis and that are applicable to the entire hospital population—for example, the recently published validated model by Guillamet et al [9]—could be of some help in management algorithms incorporating the T2Candida panel for septic patients, so as to maximize benefits and minimize costs. Temporal and spatial changes in the epidemiology of infectious diseases, such as the recently observed declining incidence of candidemia [10], pose additional challenges and make necessary the frequent validation of the available prediction models.

Importantly, although results to date are promising, the potential benefits, in both effectiveness and cost, of implementing a diagnostic algorithm that includes the T2Candida panel in high-risk septic patients should be confirmed in daily clinical practice and outcomes research.

Note

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