Practical Checklist for Implementation of Antifungal Stewardship Programs

Antifungal stewardship programs (SPs) are necessary implementations in health care facilities, to limit overuse or misuse of antifungals that were proven to be responsible for an increase in antifungal resistance. Antifungal SPs were indeed demonstrated to have an impact on antifungal consumption and antifungal expenditure. Thus, in line with the core elements edited by the Mycoses Study Group Education and Research Consortium and the Centers for Disease Control and Prevention, it is of utmost importance to establish a practical checklist that may be used at each health care facility level to implement antifungal SPs.

This checklist includes the following items:

- Leadership support
- Actions to support optimal antifungal use
- Actions to monitor antifungal prescribing, use, and resistance
- Educational programs

LEADERSHIP SUPPORT ***Essential**	NEEDED TO BE ESTABLISHED AT FACILITY	
A*. Does your facility leadership provide a formal statement that supports efforts to improve antifungal use (antifungal stewardship)?	❑ Yes	❑ No
B*. Does your facility leadership ensure that antifungal stewardship activities are integrated in other boards (e.g. Drug and Sterile Medical Devices Committee, anti-infective drugs committee)?	❑ Yes	❑ No
C. Does your facility receive any financial support for antifungal stewardship activities (e.g., support for salary, training)?	❑ Yes	❑ No
D. Does your facility leadership provide stewardship program leader(s) dedicated time to manage antifungal SP?	❑ Yes	❑ No
ACCOUNTABILITY ***Essential**		
A*. Does your facility have a leader or co-leaders to manage antifungal SP activities?	❑ Yes	❑ No
a. Is there an infectious disease physician leader responsible for stewardship activities at your facility?	❑ Yes	❑ No
b. Is there a pharmacist leader responsible for stewardship activities at your facility?	❑ Yes	❑ No
c. Is there a leader responsible for program outcomes?	❑ Yes	❑ No
B*. Do antifungal SP leaders have regularly scheduled meetings? If yes, please list frequency:	❑ Yes	❑ No
C. Does your facility have a formal multidisciplinary group that manages the antifungal SP (e.g. antifungal group)?	❑ Yes	❑ No
D. Do staff from key support departments have sufficient time to contribute to stewardship activities? If yes, provide the dedicated time:	❑ Yes	❑ No

KEY SUPPORT FOR THE ANTIFUNGAL STEWARDSHIP PROGRAM **Do any of the staff referenced below work with the stewardship leaders to improve antifungal use?**		
A. Pharmacists	❑ Yes	❑ No
B. Clinicians Which specialities ?	❑ Yes	❑ No
C. Infectious disease specialists	❑ Yes	❑ No
D. Mycology (Laboratory)	❑ Yes	❑ No
E. Pharmacology	❑ Yes	❑ No
F. Infection Prevention and Control	❑ Yes	❑ No
G. Information Technology (IT)	❑ Yes	❑ No
H. Nursing staff	❑ Yes	❑ No
I. Quality improvement	❑ Yes	❑ No
J. Education department	❑ Yes	❑ No

ACTIONS TO SUPPORT OPTIMAL ANTIFUNGAL USE		
POLICIES ***Essential**	POLICY ESTABLISHED	
A*. Does your facility have facility-specific treatment recommendations, based on national guidelines and local susceptibilities, to assist with antifungal selection for common clinical conditions?	❑ Yes	❑ No
B. Does your facility have tools implemented to help clinicians with the off-labelled use of antifungals?	❑ Yes	❑ No
C. Has your facility implemented tools that allow prescribers to document in the medical record or during order entry a dose, duration, and indication for all antifungal prescriptions?	❑ Yes	❑ No
SPECIFIC INTERVENTIONS TO IMPROVE ANTIFUNGAL USE Are the following actions to improve antifungal prescribing conducted in your facility?		
BROAD INTERVENTIONS ***Essential**	ACTION PERFORMED	
A*. Does your facility have an infectious disease telephone counseling option, a bedside case management process, or a mobile team for antifungals?	❑ Yes	❑ No
B*. Does your facility have access to the results of both fungal culture and non-culture-based tests (e.g. biomarkers, PCR)?	❑ Yes	❑ No
C. Does your facility have access to rapid yeast and mold identification (<24h)?	❑ Yes	❑ No
D. Does a physician or pharmacist review courses of therapy for specified antifungal agents (i.e. prospective audit with feedback) at your facility? If yes, list which antifungals:	❑ Yes	❑ No
E. Is there a formal procedure for all clinicians to review the appropriateness of all antifungals after the initial orders?	❑ Yes	❑ No
F. Do specified antifungal agents need to be approved by a physician or pharmacist prior to dispensing (i.e., pre-authorization) at your facility? If yes, list which antifungals:	❑ Yes	❑ No
G. Does your facility perform antifungal use evaluation (postprescription review) for specific antifungal agents to identify opportunities to improve use? If yes, list which antifungals and frequency of occurrence:	❑ Yes	❑ No

H. Does your facility have access to rapid diagnostic testing for any fungal pathogens, including point of care?	❑ Yes	❑ No
I. Does your facility have access to antifungal therapeutic drug monitoring? If yes, provide the time delay before results are available:	❑ Yes	❑ No
J. Does your facility perform routine antimicrobial susceptibility testing for the following fungal pathogens? a. Yeast species b. Mold species	 ❑ Yes ❑ Yes	 ❑ No ❑ No
PHARMACY-DRIVEN INTERVENTIONS **Are the following actions implemented in your facility? *Essential**	ACTION PERFORMED	
A*. Alerts in situations where therapy might be reevaluated or discontinued?	❑ Yes	❑ No
B. Changes from intravenous-to-oral antifungal therapy in appropriate situations?	❑ Yes	❑ No
C. Dose optimization (pharmacokinetics/pharmacodynamics) in cases of organ dysfunction or drug interactions, particularly for azoles?	❑ Yes	❑ No
D. A computer-assisted real-time request of all antifungal prescriptions?	❑ Yes	❑ No
DIAGNOSIS AND INFECTIONS SPECIFIC INTERVENTIONS **Does your facility have treatment recommendations to ensure optimal use of antifungals to treat the following common infections? *Essential**	ACTION PERFORMED	
A*. Invasive candidiasis	❑ Yes	❑ No
B*. Invasive aspergillosis	❑ Yes	❑ No
C. Mucormycosis	❑ Yes	❑ No
D. Cryptococcosis	❑ Yes	❑ No
E. Candiduria	❑ Yes	❑ No
F. Empirical invasive candidiasis	❑ Yes	❑ No
G. Antifungal prophylaxis (primary and/or secondary)	❑ Yes	❑ No

ACTIONS TO MONITOR ANTIFUNGAL PRESCRIBING, USE, AND RESISTANCE		
PROCESS MEASURES ***Essential**	MEASURE PERFORMED	
A*. Does your stewardship program monitor aspects of antifungal agent tracking?	❑ Yes	❑ No
B. Does your stewardship program monitor adherence to facility-specific treatment recommendations? E.g. empiric use of antifungals for candidemia	❑ Yes	❑ No
C. Does your antifungal SP monitor preauthorization interventions?	❑ Yes	❑ No
D. Does your antifungal stewardship program monitor antifungal use including implementation?	❑ Yes	❑ No
E. Does your facility have a local surveillance system for major invasive fungal diseases?	❑ Yes	❑ No
F. Does your facility monitor antifungal resistance using epidemiological cut off values?	❑ Yes	❑ No
ANTIFUNGAL USE AND OUTCOME MEASURES ***Essential**	MEASURE PERFORMED	
A*. Does your facility have access to an antifungal susceptibility report?	❑ Yes	❑ No

B*. Does your facility define outcome measures (i.e. antifungal consumption, antifungal resistance, or patient-level outcomes such as treatment efficacy, adverse effects occurrence, or hospital length of stay) to follow antifungal use from year to year?	❑ Yes	❑ No
C. Does your facility produce a report on the incidence of major invasive fungal diseases?	❑ Yes	❑ No
Does your facility monitor antifungal use (consumption) at the unit and/or facility-wide level by one of the following metrics:	MEASURE PERFORMED	
D*. At the facility level?	❑ Yes	❑ No
E*. At the unit level including intensive care unit, hematology, and pneumology?	❑ Yes	❑ No
F*. By number of grams used per 1,000 hospitalization days (Defined Daily Dose, DDD) or standardized antimicrobial administration ratio (SAAR) for antifungal agents?	❑ Yes	❑ No
G. By counts of antifungal(s) administered to patients per day (Days of Therapy, DOT)?	❑ Yes	❑ No
H. By direct expenditure for antifungals (purchasing costs)?	❑ Yes	❑ No
REPORTING INFORMATION TO STAFF ON IMPROVING ANTIFUNGAL USE AND RESISTANCE ***Essential**		
A*. Does you stewardship program share facility and/or prescriber-specific reports on antifungal use?	❑ Yes	❑ No
B*. Has a current antifungal susceptibility profile been distributed to prescribers at your facility?	❑ Yes	❑ No
C. Do prescribers ever receive direct, personalized communication about how they can improve their antifungal prescribing?	❑ Yes	❑ No
D. Do antifungal SP leaders share priorities with prescribers and/or facility leadership to improve antifungal use?	❑ Yes	❑ No

EDUCATION PROGRAM ***Essential**		
A*. Does your stewardship program provide education to clinicians and other relevant staff including junior doctors and residents, on improving antifungal prescribing?	❑ Yes	❑ No
B. Is there any formalization of education provided to clinicians and other relevant staff (e.g. professional development)?	❑ Yes	❑ No
C. Does your facility support the dissemination of educational messages to clinicians and other relevant staff regarding antifungal optimal use (e.g. intranet channel)?	❑ Yes	❑ No

This checklist is an adaptable framework that should be used in health care facilities on a periodic basis to assess key elements and actions to ensure optimal antifungal prescribing. This practical checklist is based on the core recommendations edited by the Mycoses Study Group Education and Research Consortium. Essential items needed to be implemented as a priority were defined in this checklist by the panel experts. To implement an antifungal stewardship program, facilities will be assisted by this checklist including essential items, whereas facilities which already have an antifungal stewardship program in place will use this checklist to develop new activities.

In conclusion, recommendations for implementing antifungal stewardship activities are as follows:

1. Define achievable objectives according to your facility and staff knowledge among the essential items of the checklist.
2. Define outcome measures (e.g. antifungal consumption).

3. Share reports with prescribers and facility leadership to make them involved in antifungal stewardship programs.
4. Define an improvement roadmap for the next period and new objectives connected with the roadmap.

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