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An Excel-based template for estimating induction-phase treatment costs for cryptococcal meningitis in high HIV-burden African countries

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Boston University

User Guide -- CM treatment costs

The OpenBU repository, titled: **An Excel-based template for estimating induction-phase treatment costs for cryptococcal meningitis in high HIV-burden African countries,** provides four country-specific case studies that use the same basic structure for estimating induction phase treatment costs. The Excel file for each case study is organized with the same structure, and any one of the four case studies can be used as template for replication in other locations or with updated information.

The Excel file for each case study is organized into five main sheets: table of contents; assumptions for all regimens; cost by regimen per patient; cost per 1,000 patients; and Figure 1 presenting results by regimen disaggregated by medications, laboratory tests, and hospital in-patient days. Additional sheets may be included in the country-specific analysis as needed (e.g., to create information needed as input into the other sheets in the model).

We want to emphasize that these results follow from the base case assumptions, which will likely change over time or across locations in the same country. The basic structure of these cost analyses is designed for ease of replication overtime with new information or assumptions. The interested analyst could easily add additional sensitivity analyses into the template.

An overview of each sheet is provided below.

Assumptions for all regimens

This sheet organizes the key set of parameter estimates or assumptions used to estimate costs per day for medications in the various regiments, unit costs of laboratory tests, and hospital bed-day costs. To begin, the country is specified, the year for analysis, and exchange rates as needed for converting local currency into US dollars. If needed, cost estimates in local currency from earlier years (e.g., 2017) could be inflation adjusted to 2019 using local inflation rates. The International Monetary Fund's (IMF) International Financial Statistics provides historical exchange rates for most countries in the world, while the IMF World Economic Outlook database provides inflation index numbers.

A patient weight needs to be specified because most medications are dosed by weight.

Costs per day per patient for fluconazole, AmpB-D, AmpB-L, and 5FC are then estimated based on weight (kg) and dosage (mg/kg/day) when relevant, the main unit of the medication (e.g., 200 mg pill, 50 mg powder vial for injection), and cost per main unit of the medication. The cost per main unit of the medication (e.g., 50 mg vial for infection, 200 mg pill of fluconazole, 500 mg pill of 5FC) is developed based on the primary item acquired (e.g., 28 pack of 200 mg pills, 100 pack of 500 mg pills, and so on). This process may differ by country/location based on the details.

The number of units of the medication required per day based on dosage, such as 50 mg power vial for injection, are rounded up as needed based on patient weight. For example, while a 50 kg

adult would generally receive three 50 mg powder vials of AmpB-L per day, a 60 kg adult would require 4 vials (and most of the fourth vial would be discarded).

After developing medication costs per day, the unit cost for main laboratory tests used for patient care during the induction phase are documented. In general, the list of tests follows from national guidelines when available.

A short set of "other" resources can be included in this worksheet, but the costs of such resources are likely to be relatively unimportant for comparing treatment cost by regimen. For example, the cost for a diagnostic lumbar puncture could be included the analysis, but in principle this resource would be provided to all patients regardless of regimen and could be considered as part of the costs of diagnosis rather than treatment. In the template, therapeutic lumbar punctures are included along with saline for AmpB-D regimens.

Given the varying time in hospital for the various regimens (14, 7 or 0 days), a basic hospital cost per bed day (in-patient day, hotel cost) is a key unit cost for this analysis. While this unit cost is key for the analysis, it is likely to be somewhat difficult to obtain in many contexts. The basic template allows the analyst to include 5 hospital bed-day costs and then to choose one for an analysis. The 'choice of hospital cost' assumption can then be changed between these 5 bed-day costs for simple sensitivity analyses. The oral regimens with short or no hospital stays will typically require outpatient follow up visits, so a cost per outpatient is needed.

Cost by regimen per patient

This worksheet uses the basic unit costs develop in the previous sheet along with additional regimen details (e.g., hospital days, number of laboratory tests, outpatient visits, etc.) to estimate a cost per patient per regimen over a two-week induction phase. To begin, a unit cost summary table is provided that simply summarizes the information developed in the previous sheet (and includes the choice of the hospital bed-day cost).

The 'treatment strategies' table then organizes costs for the two-week induction phase by regimen based on the quantity of resources and unit cost disaggregated to hospital bed-day costs (with outpatient visits if relevant for the regimen), laboratory monitoring, and medications. Total costs are then provided at the bottom of the table.

Costs per 1,000 patients

This sheet estimates the cost per 1,000 CM patients for the 7 main regimens and then includes the two additional scenarios:

Scenario 1: In the absence of 5FC, patients with baseline renal dysfunction (RD) receive AmpB-L while the rest receive AmpB-D. Some proportion of patients initiated on AmpB-D then develop RD (at one week) and then are switched to AmpB-L and begin a new two-week induction phase with AmpB-L and fluconazole.

Scenario 2: When 5FC is available, patients with baseline RD receive AmpB-L + 5FC, while the rest receive AmpB-D + 5FC. Given the one-week course of AmpB-D, few patients are expected to develop incident RD for this scenario.

Figure 1. Cost per 1,000 patients for two-week induction phase

Figure 1 simply provides a bar chart of the results from the prior sheet, with total costs and then costs for medications, laboratory tests, and hospital "basic costs" that includes the bed-day and other minor resources provided during the hospital period.