



**Directorate General of Health Services,
Ministry of Health and Family Welfare
Government of India**

**Standard Operating Procedure (SOP) for calculating
Antimicrobial Consumption at a Hospital/ health care
facility level (indoor patients only)**



1st Edition, August 2025

**National AMC Surveillance Network (NACNET)
National Programme on Antimicrobial Resistance Containment
National Centre for Disease Control, India**

List of Abbreviations

AMC	Antimicrobial Consumption
AMR	Antimicrobial Resistance
DDD	Defined Daily Dose
ATC	Anatomical Therapeutic Chemical (classification system)
AWaRe	Access, Watch, and Reserve (categories of antibiotics)
NCDC	National Centre for Disease Control
MRD	Medical Records Department
UD	Unit Dose
MU	Million Units
WHO	World Health Organization
SOP	Standard Operating Procedure
i	Item (used in pack size e.g., 1i = 1 tablet/capsule/etc.)

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Introduction

Containment of antimicrobial resistance (AMR) is a global and national priority. Overuse and misuse of antimicrobials contribute to the increase and spread of AMR. Therefore, strategic priority 4 of the Global Action Plan as well as the National Action Plan on AMR envisages monitoring of antimicrobial use in healthcare facilities for optimizing the use of antimicrobials.

National Centre for Disease Control (NCDC) is the nodal agency for the National Programme on AMR Containment. The human health sector has well-established functional AMC surveillance network at the national level, the National Antimicrobial Consumption Network (NAC-NET), coordinated by NCDC, with government medical colleges as surveillance sites.

Antibiotic consumption surveillance involves systematic data collection, analysis, and interpretation at various levels, including local, national, and international. Monitoring how antibiotics are used—in hospitals, healthcare facilities and communities— identifies patterns of overuse, misuse, and variations in prescribing practices across regions and healthcare settings. This information supports the development of evidence-based guidelines, strengthens antimicrobial stewardship (AMS) programs, and informs national and global health policies.

This document covers guidance on following

1. Collection of antimicrobial consumption data
2. Calculation of bed occupancy rate
3. Antibiotic consumption in DDD using WHO AMC tool

AMC Tool for Antimicrobial Consumption

AMC Tool 2019 v.1.9.0 is an open-source program, designed for the calculation of antimicrobial consumption data expressed in number of packages into number of DDDs at the substance level (antibiotic level). This SOP has been developed to calculate antibiotic consumption in hospitals/health care facilities in the unit of DDD/100 Bed Days.

Collection of Data

1. Antimicrobial Drug Consumption

Pharmacist will **collect data of number of antibiotics dispensed to inpatient departments** from the **hospital medical store** on a **monthly basis** and record it in the excel sheet in Standard format (henceforth known as **Master sheet**) under the volume column of the respective month in the **Master sheet** shared by NCDC. [\(Annex1\)](#):

		JANUARY	
PRODUCT NAME	AWARE CLASSIFICATION OF DRUGS	Volume	DDD

2. Monthly Bed Occupancy

Pharmacist will collect the following data from **Medical Records Department (MRD)**:

- Number of beds in the hospital** for subsequent calculations;
- Monthly bed occupancy rate**
- Annual bed occupancy rate**

In case bed occupancy is not available,

The pharmacist will have to calculate the **Bed Occupancy Rate** using the formula:

$$\text{Bed Occupancy Rate (in \%)} = \text{Occupied Bed/Available Beds} * 100$$

$$\text{Monthly Bed Occupancy Rate (in \%)} = \frac{\text{Total Occupied Beds during the month}}{\text{Available Beds during the month}} * 100$$

$$\text{Annual Bed Occupancy Rate (in \%)} = \frac{\text{Total Occupied Beds during the year}}{\text{Available Beds during the year}} * 100$$

Examples:

Case Scenario 1:

Let us consider an example of a **Healthcare facility with 100 Beds**.

To calculate the Bed Occupancy Rate in the month January for year 2025, in this healthcare facility, we will need to get the number of beds occupied daily in the hospital from the Medical Records Department (MRD) of the hospital.

No of beds occupied	No of days
75	15
89	10
100	6

Monthly Bed occupancy rate will be calculated using the formula:

$$\begin{aligned}\text{Bed Occupancy rate (January 2025)} &= (75*15+89*10+100*6) / (100*31) * 100 \\ &= (1125+ 890+600) / 3100 * 100 \\ &= 2615/3100*100 = 84.35\%\end{aligned}$$

Case Scenario 2:

Let us consider an example of a **Healthcare facility with 100 Beds**.

To calculate the consumption of single drug/ antimicrobial agents in the month January for year 2025, in this Healthcare facility, assuming that **all the beds are occupied**.

Monthly Bed Occupancy Rate will be calculated using the formula:

$$\begin{aligned}\text{Bed Occupancy rate (January 2025)} &= (100 \times 31) / (100 \times 31) \times 100 \\ &= 100\%\end{aligned}$$

Steps of calculation of Bed Days

Bed Days = Number of Beds* Number of Days

For a Healthcare facility with 100 Beds,

Bed Days for 1 month= Number of Beds* Number of Days
=100*31=3100

Bed Days for 1 year = Number of Beds* Number of Days
=100*365=36500

Checklist for data collection for Antimicrobial Consumption

S. No	Date to be collected	Yes/ No
1	Monthly data of all antibiotics dispensed to inpatient departments from the hospital medical store collected	
2	Total number of beds in the hospital from MRD	
3	Monthly Bed occupancy from MRD	

Calculation of antibiotic consumption using the AMC tool

1. DOWNLOAD the TOOL

The AMC tool is downloaded from the following website and installed.

<https://amu-tools.org/amctool/amctool.html>

The latest version of AMC Tool is 2019 v1.9.0 and includes the 2019 version of the ATC/DDD index. The installers come in two versions, please use the 32 bit installer for 32 bit version of windows and the 64 bit installer for the 64 bit version of windows.

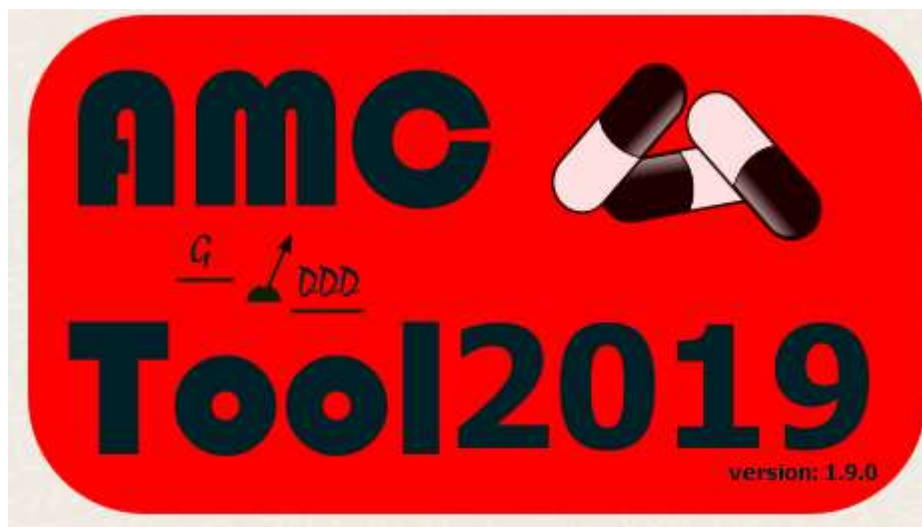


Fig 1: Logo of the AMC Tool [2019 v.1.9.0](https://amu-tools.org/amctool/amctool.html)

2. Data Entry in the tool

- a) Open the tool, as shown in the figure 2 below & select the “Consumption” tab from the Menu Bar.
- b) Select the first option “Packages data entry” to enter the details of your Antibiotics.

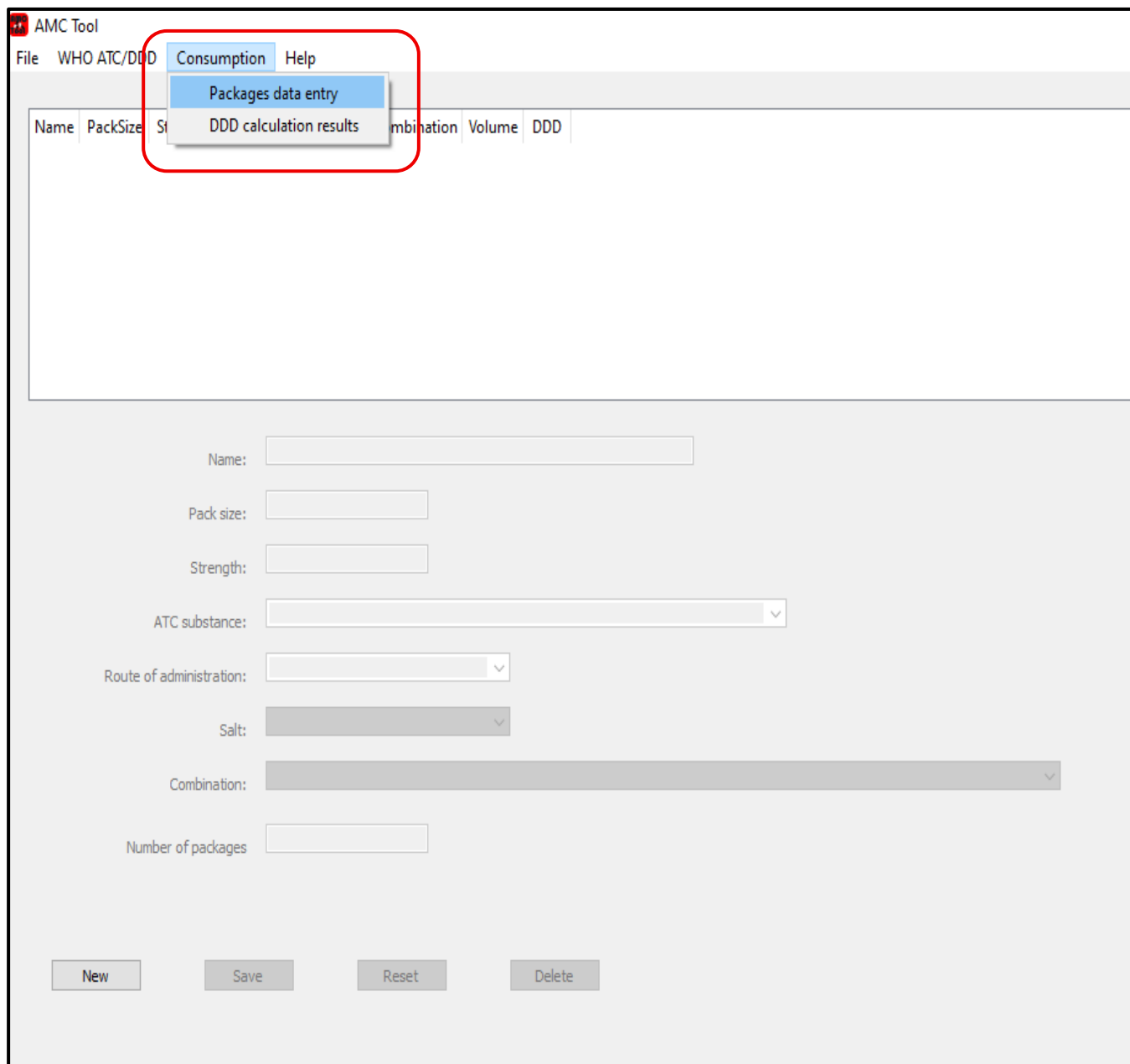


Fig 2: Interface of AMC Tool [2019 v.1.9.0](#)

c) Select the option '**New**' at the bottom left of the application (figure 3).

The screenshot shows the AMC Tool 2019 v.1.9.0 application window. At the top is a menu bar with 'File', 'WHO ATC/DDD', 'Consumption', and 'Help'. Below the menu is a table with columns: Name, PackSize, Strength, Route, Salt, ATC, Combination, Volume, and DDD. The table is currently empty. Below the table are several input fields: 'Name:' (text box), 'Pack size:' (text box), 'Strength:' (text box), 'ATC substance:' (dropdown menu), 'Route of administration:' (dropdown menu), 'Salt:' (dropdown menu), 'Combination:' (dropdown menu), and 'Number of packages' (text box). At the bottom left, there are four buttons: 'New', 'Save', 'Reset', and 'Delete'. The 'New' button is highlighted with a red rectangular box.

Fig 3: Antibiotic details entry section of AMC Tool [2019 v.1.9.0](#)

d) Enter the data in each of the fields such as Name, Pack size, Strength, ATC substance, Route of administration, and Volume etc.

e) **Pack size:** This is the number of tablets/ injections/ infusions consumed. It can be expressed as item (i) corresponding to one tablet, one capsule; one vial.... **The number of items will always be suffixed with an “i”**

In the case of syrups, the strength of a product is expressed as a concentration (e.g. g/ml). The number of doses (to be filled in the “pack size” section of the AMC Tool) has to be calculated first in these cases before we can calculate the DDD. (This has been described in detail in case scenario 4 [page no 37](#))

- f) **Strength** should always have a **unit as seen on vial/bottle/capsule**
- g) **ATC code and route of administration is selected using dropdown option**
- h) Click on ‘**Save**’ after the completion of every entry.
- i) For the next entry, click on ‘**New**’ and repeat steps from (d) to (h)

Example:

Let us consider the example of a Healthcare facility with 100 Beds.

The consumption of Antimicrobials in this Healthcare facility for the month of January 2025 is given in Table 1.

Table 1: Consumption of Antimicrobials in a Health Care Facility for January 2025

Product Name	Volume
Tab Azithromycin 500mg	1338
Inj. Ceftriaxone 1gm	7790
Tab Ciprofloxacin 500mg	817

1. Enter the consumption data in AMC tool.
2. Simultaneously record the single drug antimicrobial consumption data in Master sheet in the format given in ([Annexure 1](#)) along with their AWaRe Classification ([Annexure 2](#)).

3. Once you enter all the details for the first antibiotic in the AMC tool, click on “Save” option, then the value for DDD will be reflected as in figure 4.

The screenshot shows the AMC Tool interface. At the top, there is a menu bar with 'File', 'WHO ATC/DDD', 'Consumption', and 'Help'. Below the menu bar is a table with the following columns: Name, PackSize, Strength, Route, Salt, ATC, Combination, Volume, and DDD. The table contains one row of data: 'Tab Azithromycin 500mg', '1.0l', '500.0mg', 'O', an empty cell for Salt, 'J01FA10', an empty cell for Combination, '1338.000', and '2230.000'. Below the table is a form for entering drug details. The form includes the following fields: Name (Tab Azithromycin 500mg), Pack size (1.0l), Strength (500.0mg), ATC substance (J01FA10 - azithromycin), Route of administration (O - oral), Salt (empty), Combination (empty), and Number of packages (1338). At the bottom of the form are four buttons: New, Save, Reset, and Delete.

Name	PackSize	Strength	Route	Salt	ATC	Combination	Volume	DDD
Tab Azithromycin 500mg	1.0l	500.0mg	O		J01FA10		1338.000	2230.000

Name: Tab Azithromycin 500mg

Pack size: 1.0l

Strength: 500.0mg

ATC substance: J01FA10 - azithromycin

Route of administration: O - oral

Salt:

Combination:

Number of packages: 1338

New Save Reset Delete

Fig 4: Enter the antimicrobial drug into AMC-WHO [2019 v.1.9.0](#)

4. Enter the data for all the antibiotics consumed in that particular month.
5. After all the three entries, the tool interface will look as shown in Figure 5

The screenshot shows the AMC Tool 2019 v.1.9.0 interface. At the top, there is a menu bar with 'File', 'WHO ATC/DDD', 'Consumption', and 'Help'. Below the menu is a table with the following data:

Name	PackSize	Strength	Route	Salt	ATC	Combination	Volume	DDD
Tab Azithromycin 500mg	1.0l	500.0mg	O		J01FA10		1338.000	2230.000
Inj. Ceftriaxone 1gm	1.0l	1.0g	P		J01DD04		7790.000	3895.000
Tab Ciprofloxacin 500mg	1.0l	500.0mg	O		J01MA02		817.000	408.500

Below the table is a form for entering new data. The form includes the following fields:

- Name:
- Pack size:
- Strength:
- ATC substance:
- Route of administration:
- Salt:
- Combination:
- Number of packages:

At the bottom of the form are four buttons: 'New', 'Save', 'Reset', and 'Delete'.

Fig 5: Antibiotic data entry in AMC Tool 2019 v.1.9.0

6. And calculate DDD/100 bed days using AMC tool as below

Calculation of DDD/100 Bed Days:

1. For the **calculation of Bed Days**, select Consumption and click on “DDD calculation results” as shown in Fig 6.

The screenshot displays the AMC Tool 2019 v.1.9.0 interface. The 'Consumption' tab is selected, and the 'DDD calculation results' button is highlighted. Below this, a table lists three medications with their respective DDD values. The table has columns for Name, Pack size, Strength, Salt, ATC, Combination, Volume, and DDD.

Name	Pack size	Strength	Salt	ATC	Combination	Volume	DDD
Tab Azithromycin 500mg	1.0l	500.0mg	O	J01FA10		1338.000	2230.000
Inj Ceftriaxone 1 gm	1.0l	1.0g	P	J01DD04		7790.000	3895.000
Tab Ciprofloxacin 500mg	1.0l	500.0mg	O	J01MA02		817.000	408.500

Below the table, there are input fields for Name, Pack size, Strength, ATC substance, Route of administration, Salt, Combination, and Number of packages. At the bottom, there are buttons for New, Save, Reset, and Delete.

Fig 6: Interface of AMC Tool 2019 v.1.9.0

2. Enter the data in the tool for: number of beds, no of days and occupancy rate.

From **Case Scenario 2** above on page no. 10,

Enter Number of beds= 100

Number of days (January 2025) = 31 days

3. The tool will automatically calculate the number of bed days as shown in figure 7:

The screenshot shows the 'AMC Tool' window with a menu bar (File, WHO ATC/DDD, Consumption, Help) and a table of ATC/DDD codes. Below the table are two tabs: 'Bed-days' and 'Population'. The 'Bed-days' tab is active, showing input fields for 'Number of beds' (100), 'Number of days' (31), and 'Occupancy rate' (1). A red rounded rectangle highlights these three input fields. Below them is a field for 'Number of bed-days' showing the calculated value '3100'. At the bottom are two buttons: 'Clear denominator' and 'Apply denominator'.

Code	Name	Level	Route	DDD
> A	ALIMENTARY T...	1		0
> D	DERMATOLOGI...	1		0
> J	ANTIINFECTIVE...	1		6533.500
> P	ANTIPARASITIC...	1		0

Bed-days Population

Number of beds: 100

Number of days: 31

Occupancy rate: 1

Number of bed-days: 3100

Clear denominator Apply denominator

Fig 7: Calculation of Bed Days in AMC Tool [2019 v.1.9.0](#)

4. For the **calculation of DDD/100 Bed Days**:

- Click on “Apply Denominator” option in the tool.
- The DDD/100 bed days gets displayed in the right column of DDD (Figure 8)

The screenshot shows the AMC Tool interface. At the top, there is a menu bar with 'File', 'WHO ATC/DDD', 'Consumption', and 'Help'. Below the menu bar is a table with the following columns: Code, Name, Level, Route, DDD, and DDD/100 bed-days. The table contains four rows of data:

Code	Name	Level	Route	DDD	DDD/100 bed-days
> A	ALIMENTARY T...	1		0	0
> D	DERMATOLOGI...	1		0	0
> J	ANTIINFECTIVE...	1		6533.500	210.758
> P	ANTIPARASITIC ...	1		0	0

Below the table, there are two tabs: 'Bed-days' and 'Population'. Under the 'Bed-days' tab, there are three input fields: 'Number of beds' (100), 'Number of days' (31), and 'Occupancy rate' (1). Below these fields is a 'Number of bed-days' field with the value 3100. At the bottom of the interface, there are two buttons: 'Clear denominator' and 'Apply denominator'. The 'Apply denominator' button is highlighted with a red box.

Fig 8: Calculation of DDD/100 Bed Days

Calculation of DDD/100 Bed Days for each antibiotic in the master Excel sheet:

- In your master sheet calculate DDD/100 bed days by using following formula:
DDD/100 bed days = DDD of each antibiotic*100/Bed Days
- Apply this formula in your Excel sheet.
- Your total of DDD/100 Bed Days in the Master sheet and calculated by the tool should match.

For the above example:

DDD/100 bed days: $6533.500/3100*100= 210.7580$

Special case scenarios

Extra care should be taken while doing the entry for below listed antibiotics

- Scenario 1: Metronidazole
- Scenario 2: Combination Drugs:
 - Co-trimoxazole
 - Ampiclox
 - Ofloxacin and Ornidazole
- Scenario 3: Antibiotics expressed in “Million Units” and “Units”:
 - Benzylpenicillin
 - Polymyxin-B
- Scenario 4: Syrups
- Scenario 5: In the AWARE classification (Annexure 2), for the majority of drugs in the “NR Category” (with exceptions such as Ceftriaxone Sulbactam), the DDD is not calculated by the tool and you are required to put the same in the DDD column i.e., NR/NC (not calculated).

A. Scenario 1: Metronidazole

1. The ATC code is different for different routes of administration of metronidazole - oral (O) and parenteral (P).
2. It is antibacterial for parenteral (J01XD01) and antiprotozoal for oral (P01AB01).

The following figures (9-12) show how **DDD can or cannot be computed in different scenarios in case of the drug Metronidazole, if the entry is not done correctly:**

AMC Tool

File WHO ATC/DDD Consumption Help

Name	PackSize	Strength	Route	Salt	ATC	Combination	Volume	DDD
------	----------	----------	-------	------	-----	-------------	--------	-----

Name:

Pack size:

Strength:

ATC substance:

Route of administration:

Salt:

Combination:

Number of packages *

DDD does not exist for the combination (J01XD01, O).
No DDD will be computed.

New Save Reset Delete

Fig 9: DDD cannot be computed for Metronidazole when ATC code is J01XD01 and the Route of Administration is Oral

AMC Tool

File WHO ATC/DDD Consumption Help

Name	PackSize	Strength	Route	Salt	ATC	Combination	Volume	DDD
Metronidazole	1.0l	500.0mg	O		P01AB01		1500.000	375.000

Name:

Pack size:

Strength:

ATC substance:

Route of administration:

Salt:

Combination:

Number of packages:

Fig 10: DDD can be computed for Metronidazole when ATC code is P01AB01 and the Route of Administration is Oral

AMC Tool

File WHO ATC/DDD Consumption Help

Name	PackSize	Strength	Route	Salt	ATC	Combination	Volume	DDD
------	----------	----------	-------	------	-----	-------------	--------	-----

Name:

Pack size:

Strength:

ATC substance:

Route of administration:

Salt:

Combination:

Number of packages

DDD does not exist for the combination (P01AB01, P).
No DDD will be computed.

Fig 11: DDD cannot be computed for Metronidazole when ATC code is P01AB01 and the Route of Administration is Parenteral

AMC Tool

File WHO ATC/DDD Consumption Help

Name	PackSize	Strength	Route	Salt	ATC	Combination	Volume	DDD
Metronidazole	1.0l	500.0mg	P		J01XD01		1500.000	500.000

Name:

Pack size:

Strength:

ATC substance:

Route of administration:

Salt:

Combination:

Number of packages:

Fig 12: DDD can be computed for Metronidazole when ATC code is J01XD01 and the Route of Administration is Parenteral

B. Scenario 2: Combination Drugs

(i) Co-trimoxazole

- a) Go to the WHO ATC/DDD section of the menubar and select “Combined Products” as displayed below in Figure 13.

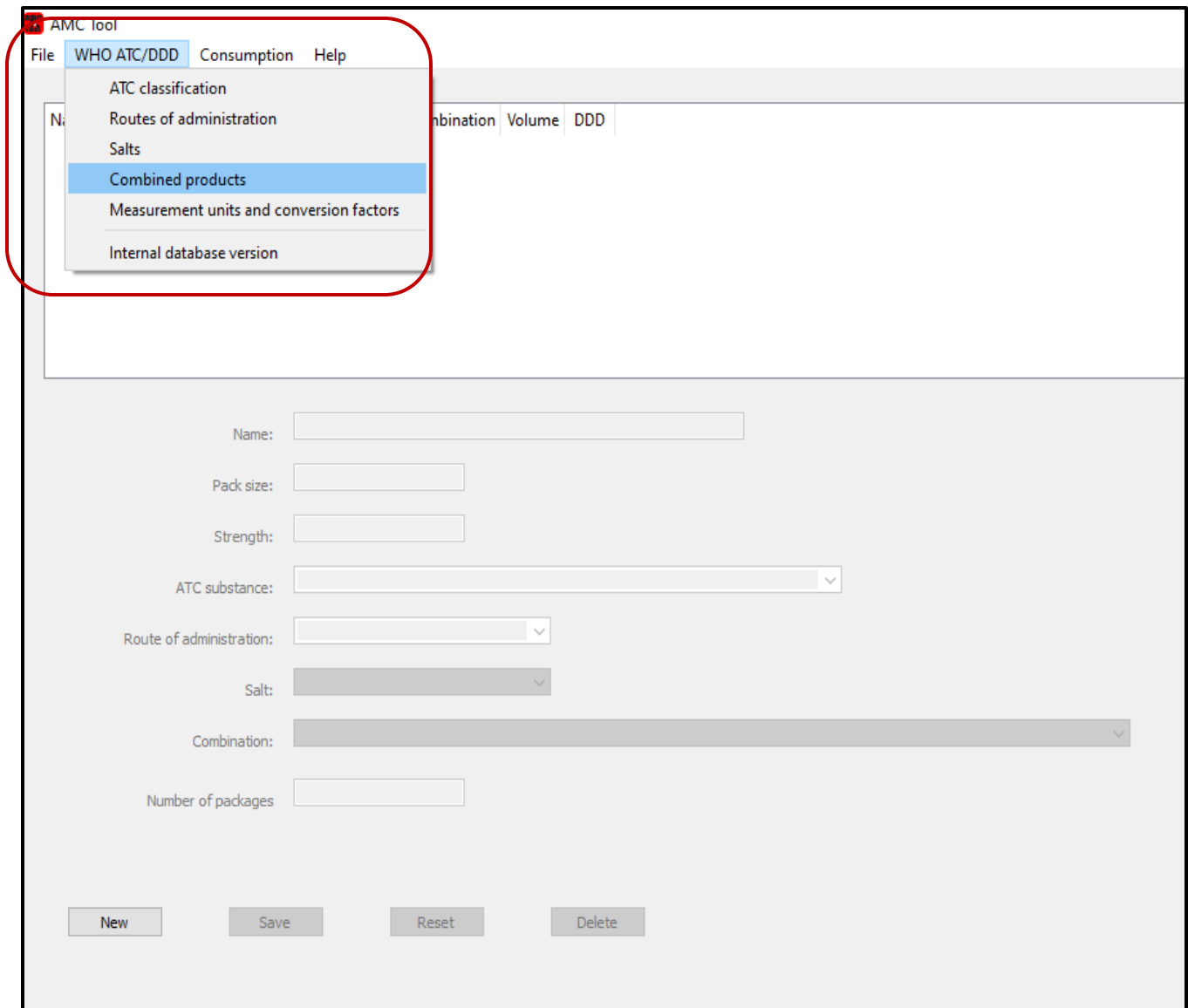


Fig 13: Selecting the Combined products from the AMC Tool Menu-bar

- b) Upon selecting the “Combined products”, a table showing all the combination drugs along with their conversion factor in the form of UD i.e., Unit dose shows up as shown in Figure 14 below.

- c) Find your combination drug from the list of drugs and choose the appropriate Unit Dose based on the strength of your drug.
- d) Now fill the appropriate UD in the strength column of the AMC tool and proceed with the rest of the steps as mentioned previously in Case Scenario .

AMC Tool							
File WHO ATC/DDD Consumption Help							
DDD for combined products							
Code	ATC5	Route	Form	Ingredients	DDD	Info	Examples
J01CR50_6	J01CR50	P	powder for inj	ampicillin 500 mg cloxacillin 500 mg	2UD	2 UD (=2 grams...	Vicillin-S
J01CR50_7	J01CR50	O	tab	ampicillin 125 mg cloxacillin 125 mg	8UD	8 UD (=8 tab)	Vicillin-S
J01EC20_1	J01EC20	O	tab	sulfacarbamide 0.167 g sulfadiazine 0.167 g sulfadimidine 0.167 g	4UD	4 UD (=4 tab)	Trisulfamid
J01EE01_1	J01EE01	P	inf conc	sulfamethoxazole 80 mg trimethoprim 16 mg	20UD	20 UD (=20 ml)	Bactrim, Eusapr...
J01EE01_2	J01EE01	O	mixt	sulfamethoxazole 0.2 g trimethoprim 40 mg	8UD	8 UD (= 40 ml)	Bactrim, Eusapr...
J01EE01_3	J01EE01	O	tab	sulfamethoxazole 0.4 g trimethoprim 80 mg	4UD	4 UD (=4 tab)	Bactrim, Eusapr...
J01EE02_1	J01EE02	O	mixt	sulfadiazine 0.205 g trimethoprim 45 mg	4UD	4 UD (=20 ml)	Triglobe, Trimin...
J01EE02_2	J01EE02	O	tab	sulfadiazine 0.41 g trimethoprim 90 mg	2UD	2 UD (=2 tab)	Triglobe, Trimin...
J01EE03_1	J01EE03	O	tab	sulfametreole 0.8 g trimethoprim 0.16 g	2UD	2 UD (=2 tab)	Lidaprim
J01EE03_2	J01EE03	P	powder for inj	sulfametreole 0.8 g trimethoprim 0.16 g per vial	2UD	2 UD (defined a...	Lidaprim
J01EE06_1	J01EE06	O	tab	sulfadiazin 0.25 g tetroxoprim 0.1 g	2UD	2 UD (=2 tab)	Sterinor
J01EE07_1	J01EE07	O	tab	sulfamerazin 0.12 g trimethoprim 80 mg	4UD	4 UD (=4 tab)	Berlocombin
J01RA04_1	J01RA04	O	tab	spiramycin 1.5 MU metronidazole 250 mg	3UD	3 UD (=3 tab)	Bidontogyl
J01RA04_2	J01RA04	O	tab	spiramycin 0.75 MU metronidazole 125 mg	6UD	6 UD (=6 tab)	Orogyl
J01RA05_1	J01RA05	O	tab	levofloxacin 250 mg ornidazole 500 mg	2UD	2 UD (=2 tab)	Duobact

Fig 14: Combination drug Co-trimoxazole (Sulfamethoxazole & Trimethoprim) highlighted within the red box along with the conversion factors mentioned in UD (unit Dose)

Please use the following UD conversions for the drug Co-trimoxazole (Sulfamethoxazole & Trimethoprim) as per the concentration (mg) of your respective drugs:

Table 2: Mg to UD conversion for the drug Sulfamethoxazole + Trimethoprim:

S.NO	Sulphamethoxazole + Trimethoprim Concentration	Mg to UD conversion
1.	Injection 80 + 16mg/ml	5ml=5UD
2.	Infusion 80 + 16mg/ml	15ml=15UD
3.	Tablet 800 + 160mg	1 tablet=2UD
4.	Tablet 400 + 80 mg	1 tablet=1UD
5.	Tablet 200 + 40 mg	1 tablet=0.5UD
6.	Syrup 200 + 40 mg (1 dose = 5ml)	5ml=1UD
7.	Syrup 400 + 80 mg (1 dose = 5ml)	5ml=2UD

(ii) Ampiclox (Combination drug of Ampicillin and Cloxacillin)

- As mentioned earlier, go to the WHO ATC/DDD section of the menubar and select “Combined Products” as displayed below in Figure 15.
- Find your combination drug from the list of drugs and choose the appropriate Unit Dose based on the strength of your drug.

AMC Tool							
File WHO ATC/DDD Consumption Help							
DDD for combined products							
Code	ATC5	Route	Form	Ingredients	DDD	Info	Examples
J01AA20_1	J01AA20	O	tab	tetracycline 115.4 mg chlortetracycline 115.4 mg ...	2UD	2 UD (=2 tab)	Deteclo
J01CA20_1	J01CA20	O	tab	pivampicillin 0.25 g pivmecillinam 0.2 g	3UD	3 UD (=3 tab)	Miraxid
J01CA20_2	J01CA20	O	tab	pivampicillin 0.125 g pivmecillinam 0.1 g	6UD	6 UD (=6 tab)	Miraxid mite
J01CE30_1	J01CE30	P	powder for inj	Comb. of benzylpenicillin procain-benzylpenicilli...	3.6g	3.6 g expressed as ben...	Bicillin C-R, Bici...
J01CR50_1	J01CR50	O	tab	ampicillin 0.25 g cloxacillin 0.25 g	4UD	4 UD (=4 tab)	Ampiclox
J01CR50_2	J01CR50	P	powder for inj	ampicillin 0.66 g cloxacillin 0.33 g	2UD	2 UD (= 2 g)	Amposium
J01CR50_3	J01CR50	O	caps	ampicillin 0.125g oxacillin 0.125 g	8UD	8 UD (= 8 caps)	Amposium
J01CR50_4	J01CR50	O	tab	ampicillin 0.25 g flucloxacillin 0.25 g	4UD	4 UD (=4 tab)	Co-fluampicil
J01CR50_5	J01CR50	P	powder for inj	ampicillin 250 mg cloxacillin 250 mg	2UD	2 UD (=2 grams of po...	Vicillin-S
J01CR50_6	J01CR50	P	powder for inj	ampicillin 500 mg cloxacillin 500 mg	2UD	2 UD (=2 grams of po...	Vicillin-S
J01CR50_7	J01CR50	O	tab	ampicillin 125 mg cloxacillin 125 mg	8UD	8 UD (=8 tab)	Vicillin-S
J01EC20_1	J01EC20	O	tab	sulfacarbamide 0.167 g sulfadiazine 0.167 g sulfad...	4UD	4 UD (=4 tab)	Trisulfamid
J01EE01_1	J01EE01	P	inf conc	sulfamethoxazole 80 mg trimethoprim 16 mg	20UD	20 UD (=20 ml)	Bactrim, Eusapr...
J01EE01_2	J01EE01	O	mixt	sulfamethoxazole 0.2 g trimethoprim 40 mg	8UD	8 UD (= 40 ml)	Bactrim, Eusapr...
J01EE01_3	J01EE01	O	tab	sulfamethoxazole 0.4 g trimethoprim 80 mg	4UD	4 UD (=4 tab)	Bactrim, Eusapr...
J01EE02_1	J01EE02	O	mixt	sulfadiazine 0.205 g trimethoprim 45 mg	4UD	4 UD (=20 ml)	Triglobe, Trimin...
J01EE02_2	J01EE02	O	tab	sulfadiazine 0.41 g trimethoprim 90 mg	2UD	2 UD (=2 tab)	Triglobe, Trimin...
J01EE03_1	J01EE03	O	tab	sulfametrole 0.8 g trimethoprim 0.16 g	2UD	2 UD (=2 tab)	Lidaprim
J01EE03_2	J01EE03	P	powder for inj	sulfametrole 0.8 g trimethoprim 0.16 g per vial	2UD	2 UD (defined as 2 vials)	Lidaprim

Fig 15: Combination drug Ampiclox (Ampicillin & Cloxacillin) highlighted within the red box along with the conversion factors mentioned in UD (unit Dose)

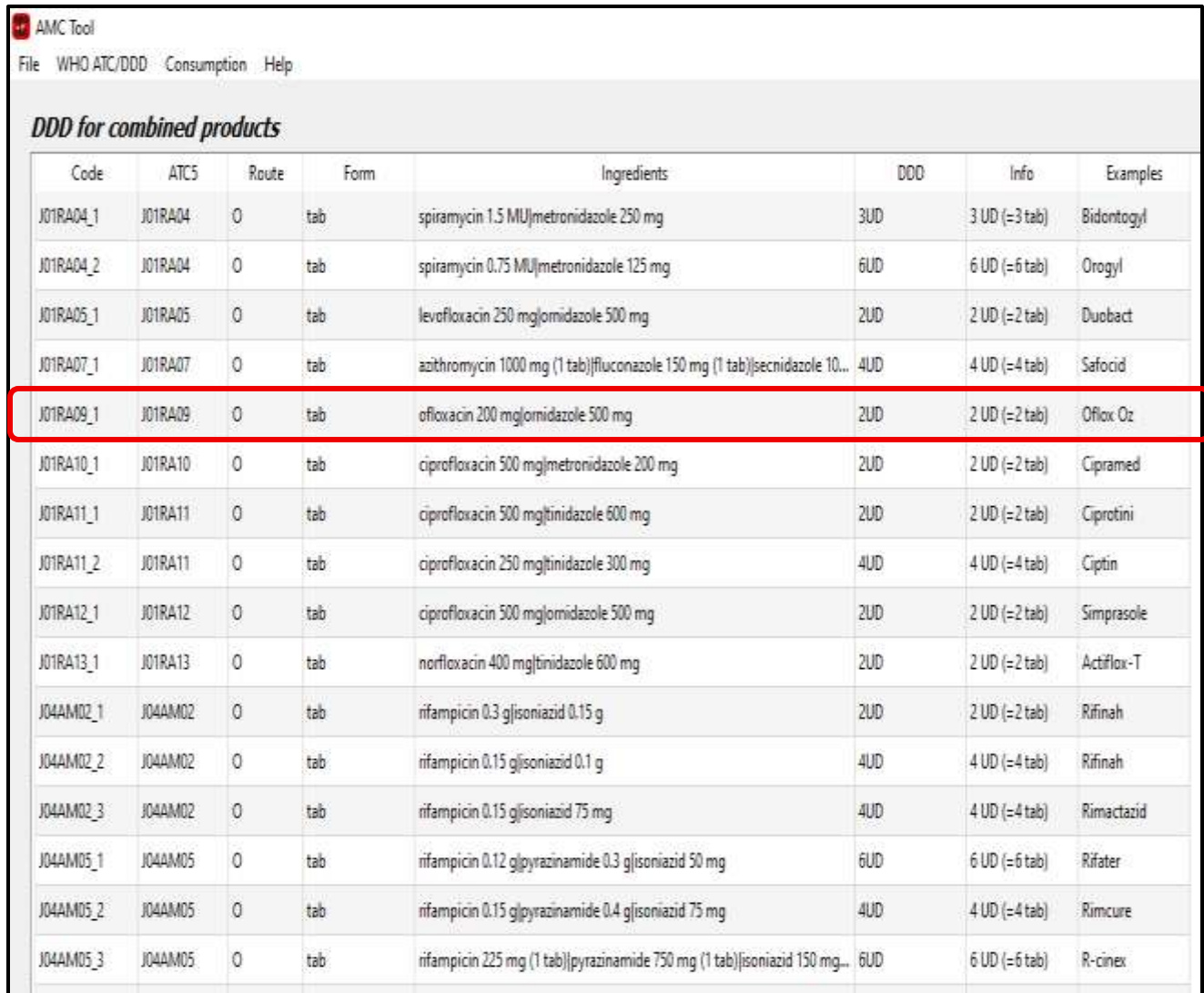
Please use the following Table 3 for Mg to UD conversions for the drug Ampiclox (Ampicillin & Cloxacillin) as per the concentration (mg) of your respective drugs

Table 3: Mg to UD conversion for the drug combination Ampicillin & Cloxacillin:

S.NO	Ampicillin & Cloxacillin	Mg to UD conversion
1.	Tablet 250 + 250 mg	1 tablet=1UD

(iii) Ofloxacin and Ornidazole

- As mentioned earlier, select “Combined Products” in the WHO ATC/DDD section of the menubar and find your combination drug as displayed Figure 16.
- Then, choose the appropriate Unit Dose based on the strength of your drug.



AMC Tool
File WHO ATC/DDD Consumption Help

DDD for combined products

Code	ATC5	Route	Form	Ingredients	DDD	Info	Examples
J01RA04_1	J01RA04	O	tab	spiramycin 1.5 MU/metronidazole 250 mg	3UD	3 UD (=3 tab)	Bidontogyl
J01RA04_2	J01RA04	O	tab	spiramycin 0.75 MU/metronidazole 125 mg	6UD	6 UD (=6 tab)	Orogyl
J01RA05_1	J01RA05	O	tab	levofloxacin 250 mg/ornidazole 500 mg	2UD	2 UD (=2 tab)	Duobact
J01RA07_1	J01RA07	O	tab	azithromycin 1000 mg (1 tab)/fluconazole 150 mg (1 tab)/secnidazole 10...	4UD	4 UD (=4 tab)	Safocid
J01RA09_1	J01RA09	O	tab	ofloxacin 200 mg/ornidazole 500 mg	2UD	2 UD (=2 tab)	Oflox Oz
J01RA10_1	J01RA10	O	tab	ciprofloxacin 500 mg/metronidazole 200 mg	2UD	2 UD (=2 tab)	Cipramed
J01RA11_1	J01RA11	O	tab	ciprofloxacin 500 mg/tinidazole 600 mg	2UD	2 UD (=2 tab)	Ciprotini
J01RA11_2	J01RA11	O	tab	ciprofloxacin 250 mg/tinidazole 300 mg	4UD	4 UD (=4 tab)	Ciptin
J01RA12_1	J01RA12	O	tab	ciprofloxacin 500 mg/ornidazole 500 mg	2UD	2 UD (=2 tab)	Simprasole
J01RA13_1	J01RA13	O	tab	norfloxacin 400 mg/tinidazole 600 mg	2UD	2 UD (=2 tab)	Actiflox-T
J04AM02_1	J04AM02	O	tab	rifampicin 0.3 g/isoniazid 0.15 g	2UD	2 UD (=2 tab)	Rifinah
J04AM02_2	J04AM02	O	tab	rifampicin 0.15 g/isoniazid 0.1 g	4UD	4 UD (=4 tab)	Rifinah
J04AM02_3	J04AM02	O	tab	rifampicin 0.15 g/isoniazid 75 mg	4UD	4 UD (=4 tab)	Rimactazid
J04AM05_1	J04AM05	O	tab	rifampicin 0.12 g/pyrazinamide 0.3 g/isoniazid 50 mg	6UD	6 UD (=6 tab)	Rifater
J04AM05_2	J04AM05	O	tab	rifampicin 0.15 g/pyrazinamide 0.4 g/isoniazid 75 mg	4UD	4 UD (=4 tab)	Rimcure
J04AM05_3	J04AM05	O	tab	rifampicin 225 mg (1 tab)/pyrazinamide 750 mg (1 tab)/isoniazid 150 mg...	6UD	6 UD (=6 tab)	R-cinex

Fig 16: Combination drug “Ofloxacin and Ornidazole” highlighted within the red circle along with the conversion factors mentioned in UD (unit Dose)

Please use the following Table 4 for Mg to UD conversions for Ofloxacin & Ornidazole:

Table 4: Mg to UD conversion for drug combination Ofloxacin & Ornidazole:

S.NO	Ofloxacin and Ornidazole	Mg to UD conversion
1.	Ofloxacin 200mg and Ornidazole 500mg	1 tablet=1UD

C. Scenario 3: Antibiotics expressed in “Million Units” and “Units”

(i) Benzylpenicillin

The DDD of Benzylpenicillin **can be calculated** when the strength is expressed either in milligrams (mg) or in Million Units (MU). The AMC Tool allows both the formats of strength to be used in order to calculate the DDD (Figures 17 and 18).

AMC Tool

File WHO ATC/DDD Consumption Help

Name	PackSize	Strength	Route	Salt	ATC	Combination	Volume	DDD
Benzylpenicillin	1.0I	1.0MU	P		J01CE01		57559.000	9593.166

Name: Benzylpenicillin

Pack size: 1.0I

Strength: 1.0MU

ATC substance: J01CE01 - benzylpenicillin

Route of administration: P - parenteral

Salt:

Combination:

Number of packages: 57559

New Save Reset Delete

Fig 17: Calculation of DDD for Benzylpenicillin with strength expressed in Million Units (1 MU filled in against the column of strength)

AMC Tool

File WHO ATC/DDD Consumption Help

Name	PackSize	Strength	Route	Salt	ATC	Combination	Volume	DDD
Benzylpenicillin	1.0I	1.0MU	P		J01CE01		57559.000	9593.166

Name: Benzylpenicillin

Pack size: 1.0I

Strength: 600mg

ATC substance: J01CE01 - benzylpenicillin

Route of administration: P - parenteral

Salt:

Combination:

Number of packages: 57559

New Save Reset Delete

Fig 18: Calculation of DDD for Benzylpenicillin 600mg with strength expressed in Milligrams

(ii) Polymyxin-B

In the case of drugs like Polymyxin B, the strength of the drug is mentioned in terms of “UNITS per vial”. As depicted in Figure 19 below, the strength is labelled in the image as 500,000 Units per vial.



Fig 19: A drug label depicting the strength of the drug Polymyxin-B

(Source: <https://dailymed.nlm.nih.gov/>)

- When the strength of 500,000 Units per vial is put in the AMC Tool, it **does not calculate the DDD of the drug** and a red asterisk is shown in the strength column (as shown in figure 20 below) which means the strength needs to be expressed in a different format.
- Therefore, we convert Units per vial into Milligrams (mg) in order to calculate the DDD for the drug Polymyxin-B.
- The following table 5 shows the conversion from Units per vial to Milligrams (mg) for Polymyxin B:

Table 5: Units per vial to Milligrams (mg) conversion for Polymyxin B:

S.NO	Polymyxin B	Units per vial to Milligrams(mg)conversion
1.	500000U	50mg
2.	750000U	75mg
3.	1000000U	100mg

AMC Tool

File WHO ATC/DDD Consumption Help

Name	PackSize	Strength	Route	Salt	ATC	Combination	Volume	DDD

Name:

Pack size:

Strength: *

ATC substance:

Route of administration:

Salt:

Combination:

Number of packages:

Fig 20: DDD cannot be computed for Polymyxin B when the strength is expressed in Units per vial

Note: the red asterisk as circled in this image in the strength column

AMC Tool

File WHO ATC/DDD Consumption Help

Name	PackSize	Strength	Route	Salt	ATC	Combination	Volume	DDD
Polymyxin B	1.0l	50.0mg	P		J01XB02		500.000	166.666

Name:

Pack size:

Strength:

ATC substance:

Route of administration:

Salt:

Combination:

Number of packages:

New Save Reset Delete

Fig 21: DDD can be computed for Polymyxin B when the strength is expressed in Milligrams (mg)

Note: No red asterisk as circled in this image in the strength column and the DDD is computed when strength is expressed in mg

D. Scenario 4: Syrups

- In the case of syrups, the strength of a product is expressed as a concentration (e.g. g/ml).
- The number of doses (to be filled in the “*pack size*” section of the AMC Tool) has to be calculated first in these cases before we can calculate the DDD.

Example 1: Let’s consider a bottle of the syrup **AmoxyClav** of 60 ml which has a strength expressed as 75mg/5ml which means that “each 5ml contains 75mg”.

The number of doses is calculated as below:

$$5\text{ml of Syrup} = 1 \text{ dose} = 1i$$

$$60\text{ml of Syrup} = 60\text{ml}/5\text{ml} = 12 = 12i$$

So we put “12i” in the “*pack size*” column for calculating the DDD for this drug and the strength of this syrup will be reported as 75mg.

AMC Tool

File WHO ATC/DDD Consumption Help

Name	PackSize	Strength	Route	Salt	ATC	Combination	Volume	DDD
AmoxyClav	12.0l	75.0mg	O		J01CR02		200.000	120.000

Name: AmoxyClav

Pack size: 12.0l

Strength: 75.0mg

ATC substance: J01CR02 - amoxicillin and beta-lactamase inhibitor

Route of administration: O - oral

Salt:

Combination:

Number of packages: 200

New Save Reset Delete

Fig 22: Calculation of DDD for Syrup AmoxyClav 60ml

Note 12l filled in against the column of pack size

Example 2: Let's consider a bottle of the syrup **Ofloxacin** of 30 ml which has a strength expressed as 50mg/5ml which means that “each 5ml contains 50mg”. The number of doses is calculated as below:

5ml of Syrup = 1 dose = 1i

30ml of Syrup = 6 doses = 6i

So we put “6i” in the “*pack size*” column for calculating the DDD for this drug and the strength of this syrup will be reported as 50mg (figure 23).

AMC Tool

File WHO ATC/DDD Consumption Help

Name	PackSize	Strength	Route	Salt	ATC	Combination	Volume	DDD
Ofloxacin	6.0I	50.0mg	O		J01MA01		550.000	412.500

Name: Ofloxacin

Pack size: 6.0I

Strength: 50.0mg

ATC substance: J01MA01 - ofloxacin

Route of administration: O - oral

Salt:

Combination:

Number of packages: 550

New Save Reset Delete

Fig 23: Calculation of DDD for Syrup Ofloxacin 30ml

Note 6i filled in against the column of pack size

Example:

The consumption of Antimicrobials in a Healthcare facility with 100 beds for the month of January is given in table 6 below.

Table 6: Consumption of Antimicrobials in a Health Care Facility for January:

Product Name	Volume
Inj. Metronidazole 500mg	1500
Tab. Sulfamethoxazole 800mg & Trimethoprim160mg	817
Inj. Benzylpenicillin, 5MU	380
Inj. Polymyxin B 500,000U	850
Syrup Amoxyclav 30ml (75mg/5ml)	4565
Syrup Ofloxacin 60ml (50mg/5ml)	8897

Calculate DDD and DDD/100 bed days using AMC tool and using excel master sheet.

- Enter the consumption data of each antibiotic in AMC tool.
- Simultaneously record the single drug antimicrobial consumption data in Master Excel sheet in the format given in (Annexure 1) along with their AWARe Classification (Annexure 2).
- After the first entry in the AMC tool, the interface will look as Figure 24 below:

AMC Tool

File WHO ATC/DDD Consumption Help

Name	PackSize	Strength	Route	Salt	ATC	Combination	Volume	DDD
Metronidazole	1.0l	500.0mg	P		J01XD01		1500.000	500.000

Name:

Pack size:

Strength:

ATC substance:

Route of administration:

Salt:

Combination:

Number of packages:

New Save Reset Delete

Fig 24: Enter the antimicrobial drug into AMC Tool [2019 v.1.9.0](#)

- After all the entries, the tool will look as seen in Figure 25 below

AMC Tool
File WHO ATC/DDD Consumption Help

Name	PackSize	Strength	Route	Salt	ATC	Combination	Volume	DDD
Metronidazole	1.0l	500.0mg	P		J01XD01		1500.000	500.000
Tab. Sulfamethoxazole 800mg & Trimethoprim160mg	1.0l	2.0UD	O		J01EE01	J01EE01_3	817.000	408.500
Inj. Benzylpenicillin, 5MU	1.0l	5.0MU	P		J01CE01		380.000	316.666
Inj. Polymyxin B 500,000U	1.0l	50.0mg	P		J01XB02		850.000	283.333
Syrup Amoxycylav 30ml (75mg/5ml)	6.0l	75.0mg	O		J01CR02		4565.000	1369.500
Syrup Ofloxacin 60ml (50mg/5ml)	12.0l	50.0mg	O		J01MA01		8897.000	13345.500

Name:

Pack size:

Strength:

ATC substance:

Route of administration:

Salt:

Combination:

Number of packages

Fig 25: Enter the drugs according to the data in AMC Tool 2019 v.1.9.0

Calculation of DDD/100 Bed Days using AMC tool:

- After entering the data, now proceed to the calculation of DDD/100 bed days by entering number of beds, number of days and occupancy rate.
- Clicking on Apply Denominator, will calculate and autofill DDD/100 bed days (Figure 26)

The screenshot shows the AMC Tool interface. At the top, there is a menu bar with 'File', 'WHO ATC/DDD', 'Consumption', and 'Help'. Below the menu bar is a table with the following columns: Code, Name, Level, Route, DDD, and DDD/100 bed-days. The table contains four rows of data:

Code	Name	Level	Route	DDD	DDD/100 bed-days
> A	ALIMENTARY T...	1		0	0
> D	DERMATOLOGI...	1		0	0
> J	ANTIINFECTIVE...	1		16223,500	523.339
> P	ANTIPARASITIC ...	1		0	0

Below the table, there are two tabs: 'Bed-days' and 'Population'. The 'Bed-days' tab is selected. Under this tab, there are three input fields: 'Number of beds' with the value '100', 'Number of days' with the value '31', and 'Occupancy rate' with the value '1'. Below these fields, there is a label 'Number of bed-days' followed by a text box containing the calculated value '3100'. At the bottom of the interface, there are two buttons: 'Clear denominator' and 'Apply denominator'.

Fig 26: Calculation of DDD/100 Bed Days using AMC Tool

Calculation of DDD/100 Bed Days in the master excel sheet:

- In your master sheet calculate DDD/100 bed days by using following formula:

$$\text{DDD/100 bed days} = \text{DDD of each antibiotic} \times 100 / \text{Bed Days}$$

- Apply this formula in your Master Excel sheet.

Your total of DDD/100 Bed Days in the Master sheet and calculated by the AMC tool should match.

[For the above example: $16223.500/3100 \times 100 = 523.339$]

COMPLETE THE EXERCISE AFTER READING THE SOP

The following table consists of the list of Antibiotics being used in the month of **April for the year 2023** in a Healthcare facility with **180 Beds**. Bed Occupancy rate for the month was 1.

Now fill in the following information in the table with the help of the SOP:

1. **AWaRe** Classification of each drug
2. Calculate the **DDD** of each drug with the help of the Case Scenarios discussed earlier in the SOP.
3. Calculate the **DDD/100 Bed Days** of each drug with the help of the Case Scenarios discussed earlier in the SOP.

S.No	Product Name	Volume	AWaRe	DDD	DDD/100 Bed Days
1	Tab. Norfloxacin 400mg.	562			
2	Tab. Doxycyclin 100mg	5012			
3	Inj Benzyl Pencillin 600mg	966			
4	Syp.Amoxyclav,60ml (75mg/5ml)	4789			
5	Syp.Ofloxacin,30ml (50mg/5ml)	546			
6	Tab.Ciprofloxacin 500mg.	788			
7	Inj. Metronidazole 500 mg	355			
8	Inj. Polymyxin B 500,000U	780			
9	Inj. Ofloxacin 2mg/ml, 100ml	621			
10	Tab.Sulphamethoxazole 800mg & Trimethoprim160mg	4020			

****For any further clarifications regarding the SOP, kindly contact us at amcncdc2018@gmail.com.**

Master Sheet

Name of the hospital:

Total no of beds:

Year

Number of Bed Days

[illegible]

Annexure 2

WHO Access, Watch, Reserve (AWaRe) classification of antibiotics for evaluation and monitoring of use, 2023

This classification is intended to be used as a tool for countries to better support antibiotic monitoring and stewardship activities. It is not intended as model for the inclusion of antibiotics on national essential medicine lists. Antibiotics classified under AWaRe and also included on the WHO Model Lists of Essential Medicines are indicated in the worksheets.

Antibiotic	Class	ATC code	Category	Listed on EML/EMLc 2023
Amikacin	Aminoglycosides	J01GB06	Access	Yes
Amoxicillin	Penicillins	J01CA04	Access	Yes
Amoxicillin/clavulanic-acid	Beta-lactam/beta-lactamase-ir	J01CR02	Access	Yes
Ampicillin	Penicillins	J01CA01	Access	Yes
Ampicillin/sulbactam	Beta-lactam/beta-lactamase-ir	J01CR01	Access	No
Arbekacin	Aminoglycosides	J01GB12	Watch	No
Aspoxicillin	Penicillins	J01CA19	Watch	No
Azidocillin	Penicillins	J01CE04	Access	No
Azithromycin	Macrolides	J01FA10	Watch	Yes
Azlocillin	Penicillins	J01CA09	Watch	No
Aztreonam	Monobactams	J01DF01	Reserve	No
Bacampicillin	Penicillins	J01CA06	Access	No
Bekanamycin	Aminoglycosides	J01GB13	Watch	No
Benzathine-benzylpenicillin	Penicillins	J01CE08	Access	Yes
Benzylpenicillin	Penicillins	J01CE01	Access	Yes
Biapenem	Carbapenems	J01DH05	Watch	No
Brodinoprim	Trimethoprim-derivatives	J01EA02	Access	No
Carbenicillin	Penicillins	J01CA03	Watch	No
Carindacillin	Penicillins	J01CA05	Watch	No
Carumonam	Monobactams	J01DF02	Reserve	No
Cefacetrile	First-generation-cephalosporin	J01DB10	Access	No
Cefaclor	Second-generation-cephalosporin	J01DC04	Watch	No
Cefadroxil	First-generation-cephalosporin	J01DB05	Access	No
Cefalexin	First-generation-cephalosporin	J01DB01	Access	Yes
Cefaloridine	First-generation-cephalosporin	J01DB02	Access	No
Cefalotin	First-generation-cephalosporin	J01DB03	Access	No
Cefamandole	Second-generation-cephalosporin	J01DC03	Watch	No
Cefapirin	First-generation-cephalosporin	J01DB08	Access	No
Cefatrizine	First-generation-cephalosporin	J01DB07	Access	No
Cefazedone	First-generation-cephalosporin	J01DB06	Access	No
Cefazolin	First-generation-cephalosporin	J01DB04	Access	Yes
Cefbuperazone	Second-generation-cephalosporin	J01DC13	Watch	No
Cefcapene-pivoxil	Third-generation-cephalosporin	J01DD17	Watch	No
Cefdinir	Third-generation-cephalosporin	J01DD15	Watch	No
Cefditoren-pivoxil	Third-generation-cephalosporin	J01DD16	Watch	No
Cefepime	Fourth-generation-cephalosporin	J01DE01	Watch	No
Cefetamet-pivoxil	Third-generation-cephalosporin	J01DD10	Watch	No
Cefiderocol	Other-cephalosporins	J01DI04	Reserve	Yes
Cefixime	Third-generation-cephalosporin	J01DD08	Watch	Yes
Cefmenoxime	Third-generation-cephalosporin	J01DD05	Watch	No
Cefmetazole	Second-generation-cephalosporin	J01DC09	Watch	No
Cefminox	Second-generation-cephalosporin	J01DC12	Watch	No
Cefodizime	Third-generation-cephalosporin	J01DD09	Watch	No
Cefonicid	Second-generation-cephalosporin	J01DC06	Watch	No
Cefoperazone	Third-generation-cephalosporin	J01DD12	Watch	No
Ceforanide	Second-generation-cephalosporin	J01DC11	Watch	No
Cefoselis	Fourth-generation-cephalosporin to be assigned		Watch	No
Cefotaxime	Third-generation-cephalosporin	J01DD01	Watch	Yes
Cefotetan	Second-generation-cephalosporin	J01DC05	Watch	No
Cefotiam	Second-generation-cephalosporin	J01DC07	Watch	No
Cefoxitin	Second-generation-cephalosporin	J01DC01	Watch	No
Cefozopran	Fourth-generation-cephalosporin	J01DE03	Watch	No
Cefpiramide	Third-generation-cephalosporin	J01DD11	Watch	No
Cefpirome	Fourth-generation-cephalosporin	J01DE02	Watch	No
Cefpodoxime-proxetil	Third-generation-cephalosporin	J01DD13	Watch	No
Cefprozil	Second-generation-cephalosporin	J01DC10	Watch	No
Cefradine	First-generation-cephalosporin	J01DB09	Access	No
Cefroxadine	First-generation-cephalosporin	J01DB11	Access	No
Cefsulodin	Third-generation-cephalosporin	J01DD03	Watch	No
Ceftaroline-fosamil	Fifth-generation cephalosporin	J01DI02	Reserve	No
Ceftazidime	Third-generation-cephalosporin	J01DD02	Watch	Yes
Ceftazidime/avibactam	Third-generation-cephalosporin	J01DD52	Reserve	Yes
Ceferam-pivoxil	Third-generation-cephalosporin	J01DD18	Watch	No

Ceftazole	First-generation-cephalosporin	J01DB12	Access	No
Ceftibuten	Third-generation-cephalosporin	J01DD14	Watch	No
Ceftizoxime	Third-generation-cephalosporin	J01DD07	Watch	No
Ceftobiprole-medocaril	Fifth-generation cephalosporin	J01DI01	Reserve	No
Ceftolozane/tazobactam	Fifth-generation cephalosporin	J01DI54	Reserve	Yes
Ceftriaxone	Third-generation-cephalosporin	J01DD04	Watch	Yes
Cefuroxime	Second-generation-cephalosporin	J01DC02	Watch	Yes
Chloramphenicol	Amphenicols	J01BA01	Access	Yes
Chlortetracycline	Tetracyclines	J01AA03	Watch	No
Cinoxacin	Quinolones	J01MB06	Watch	No
Ciprofloxacin	Fluoroquinolones	J01MA02	Watch	Yes
Clarithromycin	Macrolides	J01FA09	Watch	Yes
Clindamycin	Lincosamides	J01FF01	Access	Yes
Clofoctol	Phenol derivatives	J01XX03	Watch	No
Clometocillin	Penicillins	J01CE07	Access	No
Clomocycline	Tetracyclines	J01AA11	Watch	No
Cloxacillin	Penicillins		Access	Yes
Colistin_IV	Polymyxins	J01XB01	Reserve	Yes
Colistin_oral	Polymyxins	A07AA10	Reserve	No
Dalbavancin	Glycopeptides	J01XA04	Reserve	No
Dalfopristin/quinupristin	Streptogramins	J01FG02	Reserve	No
Daptomycin	Lipopeptides	J01XX09	Reserve	No
Delafloxacin	Fluoroquinolones	J01MA23	Watch	No
Demeclocycline	Tetracyclines	J01AA01	Watch	No
Dibekacin	Aminoglycosides	J01GB09	Watch	No
Dicloxacillin	Penicillins	J01CF01	Access	Yes (therapeutic alternative to cloxacillin)
Dirithromycin	Macrolides	J01FA13	Watch	No
Doripenem	Carbapenems	J01DH04	Watch	No
Doxycycline	Tetracyclines	J01AA02	Access	Yes
Enoxacin	Fluoroquinolones	J01MA04	Watch	No
Epicillin	Penicillins	J01CA07	Access	No
Eravacycline	Tetracyclines	J01AA13	Reserve	No
Ertapenem	Carbapenems	J01DH03	Watch	No
Erythromycin	Macrolides	J01FA01	Watch	Yes (therapeutic alternative to clarithromycin (EMLc))
Faropenem	Penems	J01DI03	Reserve	No
Fidaxomicin	Macrolides	A07AA12	Watch	No
Fleroxacin	Fluoroquinolones	J01MA08	Watch	No
Flomoxef	Second-generation-cephalosporin	J01DC14	Watch	No
Flucloxacillin	Penicillins	J01CF05	Access	Yes (therapeutic alternative to cloxacillin)
Flumequine	Quinolones	J01MB07	Watch	No
Flurithromycin	Macrolides	J01FA14	Watch	No
Fosfomicin_IV	Phosphonics	J01XX01	Reserve	Yes
Fosfomicin_oral	Phosphonics	J01XX01	Watch	No
Furazidin	Nitrofurans derivatives	J01XE03	Access	No
Fusidic-acid	Steroid antibacterials	J01XC01	Watch	No
Garenoxacin	Fluoroquinolones	J01MA19	Watch	No
Gatifloxacin	Fluoroquinolones	J01MA16	Watch	No
Gemifloxacin	Fluoroquinolones	J01MA15	Watch	No
Gentamicin	Aminoglycosides	J01GB03	Access	Yes
Grepafloxacin	Fluoroquinolones	J01MA11	Watch	No
Hetacillin	Penicillins	J01CA18	Access	No
Iclaprim	Trimethoprim-derivatives	J01EA03	Reserve	No
Imipenem/cilastatin	Carbapenems	J01DH51	Watch	Yes (therapeutic alternative to meropenem)
Imipenem/cilastatin/relebactam	Carbapenems	J01DH56	Reserve	No
Isepamicin	Aminoglycosides	J01GB11	Watch	No
Josamycin	Macrolides	J01FA07	Watch	No
Kanamycin_IV	Aminoglycosides	J01GB04	Watch	No
Kanamycin_oral	Aminoglycosides	A07AA08	Watch	No
Lascufloxacin	Fluoroquinolones	J01MA25	Watch	No
Latamoxef	Third-generation-cephalosporin	J01DD06	Watch	No
Lefamulin	Pleuromutilin	J01XX12	Reserve	No
Levofloxacin	Fluoroquinolones	J01MA12	Watch	No
Levonadifloxacin	Fluoroquinolones	J01MA24	Watch	No
Lincomycin	Lincosamides	J01FF02	Watch	No
Linezolid	Oxazolidinones	J01XX08	Reserve	Yes
Lomefloxacin	Fluoroquinolones	J01MA07	Watch	No
Loracarbef	Second-generation-cephalosporin	J01DC08	Watch	No
Lymecycline	Tetracyclines	J01AA04	Watch	No
Mecillinam	Penicillins	J01CA11	Access	No
Meropenem	Carbapenems	J01DH02	Watch	Yes
Meropenem/vaborbactam	Carbapenems	J01DH52	Reserve	Yes
Metacycline	Tetracyclines	J01AA05	Watch	No
Metampicillin	Penicillins	J01CA14	Access	No
Meticillin	Penicillins	J01CF03	Access	Yes (therapeutic alternative to cloxacillin)

Metronidazole_IV	Imidazoles	J01XD01	Access	Yes
Metronidazole_oral	Imidazoles	P01AB01	Access	Yes
Mezlocillin	Penicillins	J01CA10	Watch	No
Micronomicin	Aminoglycosides	to be assigned	Watch	No
Midecamycin	Macrolides	J01FA03	Watch	No
Minocycline_IV	Tetracyclines	J01AA08	Reserve	No
Minocycline_oral	Tetracyclines	J01AA08	Watch	No
Miocamycin	Macrolides	J01FA11	Watch	No
Moxifloxacin	Fluoroquinolones	J01MA14	Watch	No
Nafcillin	Penicillins	J01CF06	Access	Yes (therapeutic alternative to cloxacillin)
Nemonoxacin	Quinolones	J01MB08	Watch	No
Neomycin_IV	Aminoglycosides	J01GB05	Watch	No
Neomycin_oral	Aminoglycosides	A07AA01	Watch	No
Netilmicin	Aminoglycosides	J01GB07	Watch	No
Nifurtinol	Nitrofurans derivatives	J01XE02	Access	No
Nitrofurantoin	Nitrofurans-derivatives	J01XE01	Access	Yes
Norfloxacin	Fluoroquinolones	J01MA06	Watch	No
Ofloxacin	Fluoroquinolones	J01MA01	Watch	No
Oleandomycin	Macrolides	J01FA05	Watch	No
Omadacycline	Tetracyclines	J01AA15	Reserve	No
Oritavancin	Glycopeptides	J01XA05	Reserve	No
Ornidazole_IV	Imidazoles	J01XD03	Access	No
Ornidazole_oral	Imidazoles	P01AB03	Access	No
Oxacillin	Penicillins	J01CF04	Access	Yes (therapeutic alternative to cloxacillin)
Oxolinic-acid	Quinolones	J01MB05	Watch	No
Oxytetracycline	Tetracyclines	J01AA06	Watch	No
Panipenem	Carbapenems	J01DH55	Watch	No
Pazufloxacin	Fluoroquinolones	J01MA18	Watch	No
Pefloxacin	Fluoroquinolones	J01MA03	Watch	No
Penamceillin	Penicillins	J01CE06	Access	No
Penimepicycline	Tetracyclines	J01AA10	Watch	No
Pheneticillin	Penicillins	J01CE05	Watch	No
Phenoxyethylpenicillin	Penicillins	J01CE02	Access	Yes
Pipemidic-acid	Quinolones	J01MB04	Watch	No
Piperacillin	Penicillins	J01CA12	Watch	No
Piperacillin/tazobactam	Beta-lactam/beta-lactamase-inh	J01CR05	Watch	Yes
Piromidic-acid	Quinolones	J01MB03	Watch	No
Pivampicillin	Penicillins	J01CA02	Access	No
Pivmecillinam	Penicillins	J01CA08	Access	No
Plazomicin	Aminoglycosides	J01GB14	Reserve	Yes
Polymyxin-B_IV	Polymyxins	J01XB02	Reserve	Yes
Polymyxin-B_oral	Polymyxins	A07AA05	Reserve	No
Pristinamycin	Streptogramins	J01FG01	Watch	No
Procaine-benzylpenicillin	Penicillins	J01CE09	Access	Yes
Propicillin	Penicillins	J01CE03	Access	No
Prulifloxacin	Fluoroquinolones	J01MA17	Watch	No
Ribostamycin	Aminoglycosides	J01GB10	Watch	No
Rifabutin	Rifamycins	J04AB04	Watch	No
Rifampicin	Rifamycins	J04AB02	Watch	No
Rifamycin_IV	Rifamycins	J04AB03	Watch	No
Rifamycin_oral	Rifamycins	A07AA13	Watch	No
Rifaximin	Rifamycins	A07AA11	Watch	No
Rokitamycin	Macrolides	J01FA12	Watch	No
Rolitetracycline	Tetracyclines	J01AA09	Watch	No
Rosoxacin	Quinolones	J01MB01	Watch	No
Roxithromycin	Macrolides	J01FA06	Watch	No
Rufloxacin	Fluoroquinolones	J01MA10	Watch	No
Sarecycline	Tetracyclines	J01AA14	Watch	No
Secnidazole	Imidazoles	P01AB07	Access	No
Sisomicin	Aminoglycosides	J01GB08	Watch	No
Sitafloxacin	Fluoroquinolones	J01MA21	Watch	No
Solithromycin	Macrolides	J01FA16	Watch	No
Sparfloxacin	Fluoroquinolones	J01MA09	Watch	No
Spectinomycin	Aminocyclitols	J01XX04	Access	Yes
Spiramycin	Macrolides	J01FA02	Watch	No
Streptoduocin	Aminoglycosides	J01GA02	Watch	No
Streptomycin_IV	Aminoglycosides	J01GA01	Watch	No
Streptomycin_oral	Aminoglycosides	A07AA04	Watch	No
Sulbactam	Beta-lactamase-inhibitors	J01CG01	Access	No
Sulbenicillin	Penicillins	J01CA16	Watch	No
Sulfadiazine	Sulfonamides	J01EC02	Access	No
Sulfadiazine/tetroxoprim	Sulfonamide-trimethoprim-corr	J01EE06	Access	No
Sulfadiazine/trimethoprim	Sulfonamide-trimethoprim-corr	J01EE02	Access	No
Sulfadimethoxine	Sulfonamides	J01ED01	Access	No

Sulfadimidine	Sulfonamides	J01EB03	Access	No
Sulfadimidine/trimethoprim	Sulfonamide-trimethoprim-corr	J01EE05	Access	No
Sulfafurazole	Sulfonamides	J01EB05	Access	No
Sulfaisodimidine	Sulfonamides	J01EB01	Access	No
Sulfalene	Sulfonamides	J01ED02	Access	No
Sulfamazone	Sulfonamides	J01ED09	Access	No
Sulfamerazine	Sulfonamides	J01ED07	Access	No
Sulfamerazine/trimethoprim	Sulfonamide-trimethoprim-corr	J01EE07	Access	No
Sulfamethizole	Sulfonamides	J01EB02	Access	No
Sulfamethoxazole	Sulfonamides	J01EC01	Access	No
Sulfamethoxazole/trimethoprim	Sulfonamide-trimethoprim-corr	J01EE01	Access	Yes
Sulfamethoxypyridazine	Sulfonamides	J01ED05	Access	No
Sulfametomidine	Sulfonamides	J01ED03	Access	No
Sulfametoxydiazine	Sulfonamides	J01ED04	Access	No
Sulfametrole/trimethoprim	Sulfonamide-trimethoprim-corr	J01EE03	Access	No
Sulfamoxole	Sulfonamides	J01EC03	Access	No
Sulfamoxole/trimethoprim	Sulfonamide-trimethoprim-corr	J01EE04	Access	No
Sulfanilamide	Sulfonamides	J01EB06	Access	No
Sulfaperin	Sulfonamides	J01ED06	Access	No
Sulfaphenazole	Sulfonamides	J01ED08	Access	No
Sulfapyridine	Sulfonamides	J01EB04	Access	No
Sulfathiazole	Sulfonamides	J01EB07	Access	No
Sulfathiourea	Sulfonamides	J01EB08	Access	No
Sultamicillin	Beta-lactam/beta-lactamase-inh	J01CR04	Access	No
Talampicillin	Penicillins	J01CA15	Access	No
Tazobactam	Beta-lactamase-inhibitors	J01CG02	Watch	No
Tebipenem	Carbapenems	J01DH06	Watch	No
Tedizolid	Oxazolidinones	J01XX11	Reserve	Yes (therapeutic alternative to linezolid (EML))
Teicoplanin	Glycopeptides	J01XA02	Watch	No
Telavancin	Glycopeptides	J01XA03	Reserve	No
Telithromycin	Macrolides	J01FA15	Watch	No
Temafloracin	Fluoroquinolones	J01MA05	Watch	No
Temocillin	Penicillins	J01CA17	Watch	No
Tetracycline	Tetracyclines	J01AA07	Access	No
Thiamphenicol	Amphenicols	J01BA02	Access	No
Ticarcillin	Penicillins	J01CA13	Watch	No
Tigecycline	Glycylcyclines	J01AA12	Reserve	No
Tinidazole_IV	Imidazoles	J01XD02	Access	No
Tinidazole_oral	Imidazoles	P01AB02	Access	No
Tobramycin	Aminoglycosides	J01GB01	Watch	No
Tosufloxacin	Fluoroquinolones	J01MA22	Watch	No
Trimethoprim	Trimethoprim-derivatives	J01EA01	Access	Yes
Troleandomycin	Macrolides	J01FA08	Watch	No
Trovafloracin	Fluoroquinolones	J01MA13	Watch	No
Vancomycin_IV	Glycopeptides	J01XA01	Watch	Yes
Vancomycin_oral	Glycopeptides	A07AA09	Watch	Yes

