WHONET Training Course

Module 3 – Data entry

Exercises

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**WHONET – Getting Started - Exercises**

In these exercies, you will learn how to create new WHONET data files, enter and edit results, and print clinical reports.

1. **Creating a new data file**
   1. Selecting the laboratory

* Double-click on the WHONET icon on your desktop to begin WHONET.
* You will see a list of laboratory configurations currently defined on your computer. Select the laboratory configuration for the “WHONET Training Course Laboratory” (WTCL) that you created in the Exercises for Module 2 – Laboratory Configuration.
  1. Selecting the laboratory
* From the “Data entry” menu, select “New data file”.
* The new data file needs a name, and WHONET automatically suggests a name similar to WHO-WTCL-2024.sqlite indicating the country (“WHO”), the laboratory code “WTCL”), the current year (for example, “2024”), and an “sqlite” file extension. (SQLite is a commonly used database file structure with similarities to MySQL, SQL Server, and Oracle database files.)
* The new data file needs a location, and WHONET automatically suggests the location C:\WHONET on the local hard drive, but you could change this to select a central server location on your local area network to share files with colleagues within your organization or on in a secure cloud server location to facilitate sharing of data files with external collaborators.
* For purposes of this exercise, you can click on “Save” to create the data file and to advance to the data entry screen. Or alternatively, you could change the file name or location before saving.

1. Data entry

WHONET will proceed to data entry. In this exercise, you will enter results from two human health samples, one animal sample, one food sample, one environmental sample, and one quality control sample.

* 1. Isolate #1 – Human health. Enter the below details for the first isolate.

Origin = h (Human)

Identification number = 12345

Last name = Smith

First name = John

Sex = m (Male)

Date of Birth = 1/1/1980

Diagnosis = pneumo (Pneumonia)

Location = neuro (Neurology)

Specimen number = 1111

Specimen date = 16/12/2020\*

Specimen type = bl (Blood) (If you have selected a language different from English, then the code for Blood might be different.)

Organism = sau (*Staphylococcus aureus* ss. a*ureus*)

\* By default, WHONET uses the formatting of “Day/Mont/Year” for dates, but you can change this from the main WHONET menu by clicking on “File”, “Languages and dates”, “Dates”, and choose your preferred date format.

\*\* In English, the code for “Blood” is “bl”, but if you select a different language, then the code may be different. For example, in Spanish, blood would be “sa” for “Sangre”.

Antibiotic results

Beta-lactamase = + (Positive)

Cefoxitin = 20

Erythromycin = 18

Penicillin G = 12

Trimethoprim/sulfamethoxazole = 19

As you put in the antibiotic measurements, WHONET will automatically determine and display the interpretation.

Note: In the disk diffusion test, 6mm disks impregnated with specific antibiotics are placed on a Petri dish, typically 9cm or 15cm in diameter. After overnight incubation, the laboratory technologist will measure the diameter of the clear area around the antibiotic disk where the bacteria is unable to grow. This is the “zone of inhibition”. Small diameters, such as 6mm, 9mm, 13mm, etc. indicate that the organism is likely to be “resistant” to the antibiotic in that disk, whereas large diameters, such as 23mm and 35mm generally indicate the organism is likely to be “susceptible” to the antibiotic in the disk. CLSI and EUCAST publish annual guidelines are how “small” and “large” zone diameters should be categorized as “susceptible” (large measurements, “resistant” (small measurements), and “intermediate” (intermediate measurements) according to the organism and the antibiotic, but also in some instances by animal species (horse, cat, fish, *etc*.) or patient diagnosis (such as meningitis, non-meningitis, and uncomplicated urinary tract infection).

Example: If the breakpoint is presented as “14-16”, then isolates with zone diameters smaller than “14mm” would be considered “resistant” to the antibiotic, values larger than “16mm” would be considered to be susceptible to the antibiotic, and isolates with zone diameters of 14mm, 15mm, or 16mm would be considered to have “intermediate” results.

After you enter all of the results, click on “Save isolate”. From the choices given, select “Save the isolate and continue with the same specimen.”, and then click “OK”, which will return you to the data entry screen.

* 1. Isolate #2 – Human health.

Now enter a second bacterial isolate for the same blood specimen with the following results. The patient, location, and sample details are unchanged, so you only need to enter the microbiology results.

Second isolate

Organism = eco (*Escherichia coli*)

Ampicillin = 6

Ceftriaxone = 10

Ciprofloxacin = 22

Gentamicin = 13

Imipenem = 12

After you enter the ceftriaxone result, WHONET will display a “medium priority” alert in the lower right-hand corner of the screen indicating that this organism may be an ESBL-producing organism. After you enter the results for imipenem, you will receive a “high priority” alert about carbapenem non-susceptible results.

Click on “Save isolate”. The top part of the screen is unchanged from before (“Save the isolate”, etc.), and the bottom of the screen will provide a summary of the alerts for this isolate. Click on “Save the isolate” and “OK” to save the results and return to the data entry screen.

* 1. Isolate #3 – Human health. Enter the below results

Origin = h (Human)

Identification number = 67890

Last name = Jones

First name = Mary

Sex = f (Female)

Date of Birth = 3/1/2005

Location = nicu (Neonatal Intensive Care Unit)

Specimen number = 2222

Specimen date = 27/1/2006

Specimen type = sp (Sputum)

Organism = spn = *Streptococcus pneumonoiae*

Serotype = Streptococcus pneumoniae serotype 23F

Disk diffusion results

Erythromycin = 18

Trimethoprim/sulfamethoxazole = 7

Vancomycin = 17

Etest results (click on “Etest”)

Ceftiaxone Etest = >4

Penicillin Etest = 8

Vancomycin Etest = <=1

To enter the above Etest results, click on “Etest”. You will notice that there are multiple interpretations for ceftriaxone and penicillin depending on whether the patient has meningitis or not.

If you need to enter a result for an antibiotic test that does not appear on the panel for the organism you enter, change “Antibiotic panel” to “All antibiotics”. If the antibiotic test you want still doesn’t appear, you will need to go back to Laboratory configuration and add the additional tests to your antibiotic list.

Save the isolate as before by clicking on “Save isolate”, “Save the isolate”, and “OK”.

* 1. Isolate #4. Quality control. Enter the results for the below quality control strain.

Identification number = atcc25922

Last name = atcc25922

First name = atcc25922

Location = lab

Specimen number = 3333

Specimen date = 15/1/2006

Specimen type = qc (Quality control)

Organism = eco = (*Escherichia coli*)

Ampicillin = 16

Ceftriaxone = 22

Ciprofloxacin = 18

Imipenem = 15

When you leave the imipenem result, you will see that the result includes the symbol “@”. To see why this symbol is there, return to the imipenem box. On the right side of the screen, you will see the comment “The result is out of the QC range.”

Save the isolate as before by clicking on “Save isolate” and “OK”.

* 1. Isolate #5. Animal health. Enter the below results for an animal health isolate.

Origin = “a” (Animal). When you make this selection, the list of data fields will change.

Identification number = 123123123

Sex = f (Female)

Age category = adu (Adult)

Animal species = ctl (Cattle)

Animal type = dai (Dairy)

Market category = d (Domestic)

Location = farm2 (Farm 2)

Specimen number = 84848484

Specimen date = 15/1/2020

Specimen type = st

Organism = sen (*Salmonella* Enteritidis)

Ampicillin = 14

If you have configured your antibiotics to reflect CLSI guidelines, when you enter the ampicillin result, you will see that the isolate would be considered to be “Intermediate” for the treatment of human infections, but “Resistant” for the treatment of uncomplicated urinary tract infections in cats. There are no cattle-specific breakpoints for this organism and antibiotic. On the other hand, if you have configured your antibiotics to reflect EUCAST guidelines, you will only see the human breakpoints. There are no veterinary clinical breakpoints for this organism and antibiotic.

When finished, click on “Save isolate”, “Save isolate”, and “OK” to save the results and return to the data entry screen.

* 1. Isolate #6. Food safety. Enter the results for the below food sample.

Origin = “f” (Food). The list of data fields will change.

Identification number = 123123123

Sex = f (Female)

Age category = adu (Adult)

Animal species = chi (Chicken)

Animal type = mea (Meat)

Market category = i (Imported)

Location = mark3 (Market 3)

Specimen number = 17171717

Specimen date = 23/1/2020

Specimen type = 8 (08.0 Meat, meat product)

Organism = caj (*Campylobacter jejuni*)

When finished, click on “Save isolate”, “Save isolate”, and “OK” to save the results and return to the data entry screen.

* 1. Isolate #7. Environmental sampling. Enter the results for the below environmental sample.

Origin = “e” (Environment). The list of data fields will change.

Identification number = 876876876

Location = upstre (Upstream sampling site)

Specimen number = 80808080

Specimen date = 7

Specimen type = wariv (River water)

Organism = eco (*Escherichia coli*)

When finished, click on “Save isolate”, “Save isolate”, and “OK” to save the results and return to the data entry screen.

1. Viewing the database

After you have entered the results in the previous exercises, you can review, edit, and print the results.

* 1. Click on “View database”. You will then see a table view of all of the results tha you have entered. You will then have access to the below features.
* Sorting the results: If you click on any column heading, WHONET will sort the database by that column. This can help you to find results from a certain patient or with a certain organism. It can also help find errors in data entry, for example in the specimen date column.
* Edit the isolate: If there is a mistake in the database or if you have additional information to add, click on “Edit the isolate” to edit the isolate on the main data entry screen. When you finish, click on “Save isolate”.
* Edit the table: You can also edit the table directly. Click on “Edit the table” and you can make changes directly to the table. Click on “Save changes” when finished.
* Delete: Use this button to delete a record.
* Search: Use this button to search for records, for example certain patients, specimen numbers, or organisms.
* Print: This feature is described further in the next exercise.
* When finished reviewing these features, click on “Continue” to return to the main Data entry screen.

1. Clinical reports
   1. Printing a clinical report. Some laboratories use WHONET to report laboratory results back to clinicians. From the main data entry screen, you can click on “Print” to print out the current isolate on the screen. Or if you print from the table view when you click on “View database”.

* Click on “View database”, and click on a row in the table to select an isolate.
* Click on “Print”, and you see that you have a choice between printing the isolate that you have selected in the table or multiple isolates using a filter, such as the date of data entry.
* If you have access to a print, then click on “Print”. You can then choose a particular printer, and then select “Print”.
* Alternatively, you can usually select an option for “Printing to PDF”. The screens that you will see will change depending on what version of Windows you are using, but when you click on “Print”, Windows should ask you to give a name and location for the new PDF file that you are about to create.
* Many laboratories print these clinical reports on simple sheets of blank white paper. In other laboratories, they print clinical reports onto standard laboratory stationary including the organization’s logo, address, phone number, and other information.
  1. Modifying a clinical report. If you would like to change the format of the clinical report, you can choose the option “Modify clinical report” to make a number of changes. Among other options, you can indicate which fields should be included in the print, the font style and font size for the text, and whether to include standard text at the top of the page (“Report header”) or bottom of the page (“Report footer”), such as institutional phone number, email address, phone number, and/or signature line.
* There are no exercises on this feature, but feel free to play around with the options. You can click on “Print example” to see what the updated clinical report would look like.

1. Finishing data entry
   1. After you finish exploring the Data entry program, click on “Exit” to return to the main WHONET menu.
   2. In the above steps, you saw how to create a new data file in WHONET, and you entered results for several isolates. If you would now like to reopen this file to continue with data entry, you have two options:
      * On the “Data entry” menu, you will see the list of files that you have worked with most recently, including the file that you created in the steps above. Select this file to open it in data entry. You can then enter additional results or click on “View database” to see the results that you entered previously or “Print” to print out results.
      * Alternatively, you can click on “Open data file”, and then select the file that you would like to open.
   3. When you finish reviewing the data entry module, select “Exit” to return to the main WHONET menu, and then “File”, “Exit” to close WHONET.