# BacLink and SILAB



WHO Collaborating Centre for Surveillance of Antimicrobial Resistance

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# Introduction

WHONET is Windows-based database software developed for the management of microbiology laboratory data and the analysis of antimicrobial susceptibility test results. The software is available on the WHONET website at the following URL: <u>https://whonet.org/software.html</u>

Objectives of the software include:

- Enhancing the local use of laboratory data for guiding therapy, assisting infection control, characterizing resistance epidemiology and identifying laboratory testing errors
- Promoting collaboration in surveillance activities through the exchange of data

WHONET can be used for manual data entry, especially in laboratories without an existing computer system for microbiology data. For laboratories which do have systems for managing their data, the BacLink software is a valuable tool which facilitates the extraction and conversion of data from a number of different sources into WHONET, avoiding the need to re-enter results. BacLink can convert data from many common commercial databases and spreadsheet software, commercial susceptibility test instruments, and hospital and laboratory information systems. BacLink, available free of charge, downloads and installs automatically along with the WHONET software.

## WHONET with SILAB

The purpose of this document is to guide users through the process of exporting identification and antimicrobial susceptibility test (AST) data from the veterinary laboratory information system SILAB developed by the Istituto Zooprofilattico Sperimentale dell'Abruzzo e del Molise Giuseppe Caporale.

The instructions are divided into five parts:

- 1. Downloading and installing WHONET and BacLink
- 2. Exporting data from SILAB
- 3. Configuring BacLink
- 4. Converting SILAB data files to the WHONET data file format with BacLink
- 5. Getting started with WHONET

The frequency of data conversions depends on the local data analysis needs and interests. Many laboratories find that a weekly or monthly download is adequate for their infection control and quality assurance purposes, while less frequent analysis may be adequate if the principal use of the data is in following trends in resistance and guiding treatment recommendations.

# PART 1. Downloading and installing WHONET and BacLink

The WHONET and BacLink software are available free-of-charge from the WHONET website: <a href="https://whonet.org/">https://whonet.org/</a>

Double-click the setup file and select "Run" and follow the installation instructions. This process will install both the WHONET and BacLink software by default into the C:\WHONET\ folder. When you complete the installation, you will see icons for WHONET and BacLink on your desktop. Manuals for both software can be found in C:\WHONET\Documents\ on your computer.

# PART 2. Exporting data from SILAB

SILAB is a laboratory information system (LIS) supporting day-to-day operations in animal health laboratories in many countries in Africa and a few in Asia. Further information can be found in the below two links:

- Home page: www.izs.it/IZS/Cooperation/IZSAM and Africa/SILAB for Africa Project
- 2019 Publication "SILAB for Africa": An Innovative Information System Supporting the Veterinary African Laboratories, <u>pubmed.ncbi.nlm.nih.gov/30767711</u>

#### **SILAB Instructions**

- These instructions were made for SILAB version \_\_\_\_\_ and later. For older versions of SILAB, please contact the WHONET team at <u>help@whonet.org</u> and/or IZS.
- Launch the SILAB application and log in to reach the main menu.



- On the statistics menu, click on "Statistical Data"

the qualitative increase of the reports (Test Reports).

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y Management	System 🎒	🚴 🕜 M	4	<b>B</b>	Ve
: Sign/Email 🔻	Statistics 🔻	Query 🔻	Inve	entory	Module
c activities to ge	Statistical Da	ata			
	Download ad	lditional inforn	natio		
ISO);	One Health				

- This will bring you to the main data export screen in which you can choose one or more filters.
- The only required filter is for "Date Received". Enter in the desired time period.

× Silab For Africa × -	F	$\checkmark$	-
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ome iniziare   🙆 VPN 💆 Projects - GitLab 🧿 Izsbox 🕀	/manager 🕀 IZS-SUPPORT Z IZS-MAIL 🕀 SwaggerEntities 🌐 Swagge	r UI 💮 Silab_IPC_demo 💮 Sil	ab_NAHPRI (
Welcome test : Superuser Central	Veterinary Laboratory - Quality Management System – 🍈 🚴 🕜 M 🄇	Version 2.3.0	
Admin • Reception • Invoice • Analyses •	Test Report 👻 Test Report Sign/Email 👻 Statistics 👻 Query 💌 In	ventory Module 👻	
, Report			
Date Received:	from 15-07-2022 to 15-07-2024		
received in Section:	from to		
Receiving Laboratory:	^ X		
Testing Lab:	^  x		
Section:			
State:	Any ~		
Sampling purpose:	▲ X □Purpose in report		
Sampling plan:			
Disease description:	Oligent in report		
Species:			
Sample:			
Test:			Pin 1
Method:	^   x		
Province :	▲ X □Provinces in report		
District:	↑ X □Districts in report		
Dip-Tank:	↑ X □Dip-tank in report		
File Type:	○Excel ○Full excel report ●AMR excel Report		
·····	Search Reset		

- Choose any additional filters to select the samples and tests that you would like to include in your WHONET files. Common selections by many would be "Sampling purpose" and/or "Sampling plan".
- To facilitate later data processing, we would generally suggest that you export data within a single year, for example 2024. If your local implementation permits, then you could also try to export results from "Diseased animals" (often "passive surveillance) from "Healthy animals" (often active surveillance).
- At the bottom of the screen, you see three "File types" for the export:
  - o "Excel": This will export aggregate statistics for the selected samples and tests
  - "Full excel report": This will report results from all tests from all specimens meeting the selection criteria that you have selected, including both culture- and non-culture related tests.

 "AMR excel report": This will only export culture and susceptibility test results with a more convenient structure for data import with BacLink. Thus, in general, we would recommend utilizing this data export format:

Note: at the time of the writing of this tutorial, there are two deficiencies in the AMR Excel Report. If these have not yet been resolved in the most recent version of SILAB, then we would modify the instructions.

- Click on the "Export" button.
  - Note: We do not have an image of the full screen above, so we don't know whether the button is called "Export".
- SILAB will then proceed with the data export, creating a new file in your Downloads folder with a predefined name. The first time that you run the expert, the file will be named "FullExcelExport.xls". With subsequent exports, a number will be added to the file name, such as "FullExcelExport.xls (1)", "FullExcelExport.xls" (2), etc.
  - Note: These are only example file names, you may choose a more appropriate name for your own use.

# PART 3. Configuring BacLink

Start the BacLink program by double-clicking on the BacLink shortcut icon installed on your desktop. The BacLink program screen appears.

BacLink 2024		-		×
<u>File</u> Select <u>l</u> anguage <u>H</u> elp				
Choose the name and format of the Enter a name and format for the new If the format of your data file does no	original data file. v data file. Click on 'Begin conversion'. t appear on the list, choose 'New format'.			
File format	Bricham and Women's Hospital	New	format	
W:\WHONET.Source\BacLink\bin \x64\Debug\	Infarm test	<u>E</u> dit f	ormat	5
BWH-Sunquest.cfg		Delete	format	
File name	C:IWHONET/Inputi*.txt	Bro	wse	
New data file				
File name	C:\WHONET\Input\*.sqlite	Bro	wse	
Table name	For Access files only			
File format	WHONET (SQLite) ~			
	Begin conversion	E	xit	
			-	Ξ.

The first time BacLink is used, you must choose the kind of data file you would like to import (SILAB), as well as the name and code for your laboratory. These details are saved in a configuration file on your computer and will be used prospectively each time you need to convert a data file. To create your SILAB configuration, please follow the instructions below.

Click on the New Format button. The BacLink Configuration screen appears.

From the drop-down box, select the **Country**: for example, *United States*.

Enter the **Laboratory Name** – the name of your laboratory, for example *Boston General Hospital*. If data could be imported from a number of different sources you may wish to indicate this in the laboratory name, for example *Boston General Hospital (SILAB)*.

Enter up to 10 characters for the **Laboratory Code**, for example *BGH*. The laboratory code entered will be used by BacLink and WHONET as the default file extension for your WHONET data files.

BacLink Configuration Bos	ston General Hospital (SILAB)	-		×
Country	United States	V USA		
Laboratory name	Boston General Hospital (SILAB)			
Laboratory code	BGHSILAB			
Maximum 10 letters				
File structure	Describe the structure of your data files.			
Codes and dates	Enter the codes and date formats used in your data files.			
New data file	Indicate the name and format of the new data file.			
Data filter	Indicate the isolates to be included in the new data file.			
Save <u>a</u> s	Save		E <u>x</u> it	

Click on the File Structure button, and the screen shown below will appear.

Choose "SILAB" from the "File structure" list at the top of the screen. BacLink will now be configured to accept SILAB data files.

File structure			>
File structure	SILAB	~	
Field delimiter	~		
File location	C:\WHONET\Data		<u>B</u> rowse
File name	*.xls*		<u>B</u> rowse
Table name	Sheet1	~ A ~ 1	~
File origin	Unicode	~	
Character set	Unicode (UTF-8)	~	
Guidelines Number of rows of data	for each isolate	CLSI More than one row	
Number of rows of data	for each isolate	More than one row	
Antibiotic sequence		Variable antibiotic sequence	
Test methods		Disk	
Number of test methods	s in one row of data	One method	
Does the first row of the Yes	data file have the names of No	the data fields?	
<u>D</u> ata fields	Define the relation	ship between your data fields and WHONET	data fields.
			ОК

**File Location** - Indicate the folder where the source data (SILAB) files will be stored. C:\WHONET\Data\ is the default location suggested by BacLink, but any convenient location can be used. In many institutions, data files are placed in a folder on a central server or network drive.

Press the "OK" button to return to the "BacLink Configuration" screen.

Optional:

- Though not required, you may wish to click on the New data file button on the BacLink Configuration screen. There you can indicate the default data File location for your new WHONET files (BacLink's output files, not to be confused with the source data files you've exported from SILAB). You can indicate the name of the WHONET file that you will create, though it is generally more convenient to give a file name later, just before a file conversion, and not here on this screen.
- Click on the **OK** button to return to the BacLink Configuration screen.

Click on **Save** on the BacLink Configuration screen. Give a name to the BacLink configuration file, which will save the above-indicated user selections, for example "BGH-SILAB.cfg". You may give any valid Windows file name. BacLink will add ".cfg" as a file extension to indicate to BacLink that this is a configuration file.

Click on **Exit** to return to the main BacLink interface. Your newly defined file format will appear on the list of configurations available to you.

# PART 4. Converting SILAB data files to the WHONET data file format with BacLink

Now that you have a BacLink configuration file associated with your SILAB data, you can use BacLink to convert the source data into the WHONET data file format.

From the main BacLink interface, select your newly created configuration file from the central list.

BacLink 2024		-		×
<u>F</u> ile Select <u>l</u> anguage <u>H</u> elp				
Choose the name and format of the Enter a name and format for the new If the format of your data file does no	original data file. w data file. Click on 'Begin conversion'. ot appear on the list, choose 'New format'.			
File format	Boston General Hospital (SILAB)	Newf	format	
W:\WHONET.Source\BacLink\bin \x64\Debug\	Brigham and Women's Hospital	Edit f	ormat	
Boston General Hospital (SILAB)-SILAB.cfg	infarm test	<u>D</u> elete	format	
File name	C:WHONET\Data\*.xls*	Bro	wse	
Table name	Sheet1 ~			
New data file				
File name	C:\WHONET\Data\*.sqlite	Bro	wse	
Table name	For Access files only			
File format	WHONET (SQLite)			
	Begin conversion	E	<u>x</u> it	

Just below the list of configurations, press the "Browse" button to the right to select a source data file (SILAB export). Ex. C:\WHONET\Data\SILAB\_Export\_2024-10-17.xlsx

Next, use the lower "Browse" button to provide a new file name for the converted data file. Ex. C:\WHONET\Data\Converted\_SILAB\_Data\_File\_2024-10-17.sqlite

Click on **Begin Conversion**. BacLink begins converting the selected SILAB file to a WHONET file. BacLink will display the first three isolates to permit a visual inspection of the accuracy of the conversion. The information from your data file, as read by BacLink, appears to the left of the screen. The information which will be saved in the WHONET file appears to the right of the screen. Where appropriate, WHONET will change your codes and formats to those used by WHONET.

BacLink 2024 - Isolate 1		– 🗆 X
Field name	Local value	WHONET value
Identification number		
Sex		
Age		
Location		
Specimen number	2	2
Specimen date	20230104	04-Jan-2023
Specimen type	Enriched Innoculum	
Local specimen code	Enriched Innoculum	Enriched Innoculum
Isolate number		
Organism	ENTEROBACTER SP.	en-
Local organism code	ENTEROBACTER SP.	ENTEROBACTER SP.
Comment		
Accepting laboratory		
Testing section code	L1.3.1	L1.3.1
Testing section	Culture and Identification	Culture and Identification
Sampling purpose	Disease Surveillance	Disease Surveillance
Compling plop		
GEN_ND10 = 16	KAN_ND30 = 16	STR_ND10 = 15
TCY_ND30 = 24	SXT_ND1_2 = 26	
		Next Cancel

If you notice any discrepancies or errors in the field mappings, you may correct these from the main BacLink screen using "Edit format".

Click "Next" to advance through the first three isolates. After the third sample isolate, BacLink will then continue until the file is completely converted while displaying a summary of the conversion as shown below.

BacLink 2024 - Conversi Isolates 400   1748m:	on in progress			- 0	
Code type		Distinct count	Total occurren	nces	
Specimen type		3	462		
Code type	Local code		Specimen number	Identifica number	tion
Specimen type	Bacterial Colony		60		
Specimen type	Subculture bacteria		16		
Specimen type	Enriched Innoculum		2		
Reading code dictionari	es			-	1
Reading code dictionari CodeDict_Location_bgr CodeDict_Specimen_bg	es isilab.txt ghsilab.txt				1
Reading code dictionari CodeDict_Location_bgt CodeDict_Specimen_b CodeDict_Organism_bb CodeDict_Anglinism_bb	es tsilab.txt ghsilab.txt ghsilab.txt				1
Reading code dictionari CodeDict_Location_bgt CodeDict_Specimen_b CodeDict_Organism_bg CodeDict_Antibiotic_bg CodeDict_Specimen_M	es silab.txt ghsilab.txt psilab.txt nsilab.txt aster.txt				
Reading code dictionari CodeDict_Location_bgt CodeDict_Specimen_b CodeDict_Organism_bg CodeDict_Antibiotic_bgt CodeDict_Specimen_M CodeDict_Organism_M CodeDict_Antibiotic_Ma	es Isilab.bt ghsilab.bt hsilab.bt aster.bt aster.bt sater.bt				
Reading code dictionari CodeDict_Location_bgt CodeDict_Specimen_b CodeDict_Organism_bg CodeDict_Antibiotic_bgi CodeDict_Specimen_M CodeDict_Organism_M CodeDict_Antibiotic_Ma Data file	es asilab.txt ghsilab.txt ghsilab.txt aster.txt aster.txt ster_CLSI.txt				

At the end of the conversion, you will be presented with the screen below. You may inspect the data file by pressing "View database" or continue to the next step.

The conversion has been completed.	×
The conversion has been completed. 3:58 PM Time elapsed 00:00:02 Number of isolates = 947	
<u>C</u> ontinue <u>V</u> iew database	

If BacLink does not understand some of the data codes in your file, the program asks whether you would like to define them.

Define codes	×
BacLink did not understand a Do you want to review the ne	ll of the codes in your data file. w codes?
	Yes <u>N</u> o

If you answer **Yes**, you will be shown a list of the various organism, antibiotic, specimen type, location, gender, and test result codes that are undefined. Click on a variable of interest, such as "Organism", and click **Define codes**.

(	Unrecognized codes – 🗆 X								
	BacLink did not understand the following codes. If you want to define the codes, choose a data field and click on 'Define codes'.								
	Data Field	Codes	Number	•	Number ( isolates	of			
	Specimen type	Enriched Innoculum, Bacterial Colony, MILK, Subculture		4		947			
	Organism	Streptococcus Group B, Serratia liquefaciens group, EN		3		8			
	Define codes	<u>V</u> iew message file	<u>c</u>	ontii	nue				

You will subsequently be shown a list of each of the unrecognized codes. Select a code and click **Define code**. For most variables (except Location), you will be asked to select the matching or closest term from a list of WHONET codes.

For Location you will have the option of defining the patient department and type (inpatient, outpatient, ICU, *etc.*). Continue defining codes until you have defined all, or at least the most important and frequent, data elements. When finished click "OK", then "OK" again to return to the main BacLink interface.

If you have defined codes, you should then convert the same file a second time to utilize the new code matchings in the converted data file. When finished with BacLink, click Exit.

# PART 5. Getting started with WHONET

Now that you have created a valid WHONET file using BacLink and your SILAB export file, you can proceed to WHONET. For details on the use of WHONET, consult the manual WHONET and training materials available on <a href="https://whonet.org/training.html">https://whonet.org/training.html</a>

#### 1. Creating a laboratory configuration

- a. To begin using WHONET, you must first create a "Laboratory configuration" with descriptive information about your laboratory – antibiotics, breakpoints, patient locations, etc. For laboratories not using BacLink, this is typically done with a feature called "New laboratory", which requires you provide all of these details.
  - i. We have resources available on the training page of our website which describe this process in detail.
- b. However, for users of BacLink, there is a shortcut available called "Create a laboratory from a data file", which will glean as much information as possible from the WHONET data files you provide, making configuration much easier.
  - i. Double-click the WHONET icon on your desktop or start menu.
  - ii. You will be shown a list of WHONET laboratories defined on your computer. With the default installation, you will see a single laboratory "WHONET Test Laboratory".
  - iii. Press **Cancel** to indicate that you would like to proceed without selecting a laboratory.
  - iv. From the main WHONET interface, press "File" from the main menu, and choose the option to "Create a laboratory from a data file".

v. Indicate your country name, laboratory name and code.

	a data file		-		
Enter the name, code, an	d country of the new laboratory.				
Country	United States		V USA		
Laboratory name	Boston General Hospital (SIL/	AB)			
Laboratory code Maximum 10 letters	BGHSILAB Configu	iration file: la	abusa.bghsil	ab	
🔿 Human					
<ul> <li>Human</li> <li>Human, Animal, Foo</li> </ul>	I, Environment				
Human     Human, Animal, Foor	I, Environment				
<ul> <li>Human</li> <li>Human, Animal, Foor</li> <li>Data files</li> </ul>	I, Environment				
<ul> <li>Human</li> <li>Human, Animal, Foor</li> <li>Data files</li> </ul>	I, Environment				
<ul> <li>Human</li> <li>Human, Animal, Foor</li> <li>Data files</li> </ul>	I, Environment				
<ul> <li>Human</li> <li>Human, Animal, Foor</li> <li>Data files</li> </ul>	I, Environment				

vi. Press the "Data files" button to select one or more files to scan and press OK.

Select data files						-		×
File <u>n</u> ame			SQLite	(*.sqlite)	~	Clea	ar list	
□····································	Name AND-INF-2024.sqlite Specimens.sqlite USA-BGHSILAB-2024 WHO-EGASP-2024.sql	Last modified 15/7/2024 11:0 17/4/2024 7:53 17/10/2024 3:5 9/7/2024 5:54:0	Size 24 KB 512 KB 360 KB 20 KB	*	Data files	HSILAB-2	024-10-17	7.s
				C	<u>o</u> k		<u>C</u> ancel	

- vii. Press OK to begin generating your laboratory configuration, following any prompts you see on the screen. WHONET will scan the contents of this file antibiotics, location codes, *etc.* and create a valid WHONET laboratory configuration.
- viii. When requested, you can click **Yes** if you want to review the details of the configuration. Otherwise, click **No**, and continue with Data analysis.

# Note: After creating the configuration using this method, further edits such as any modifications to the antibiotic breakpoints, can be done with *Modify laboratory* which is found on the *File* menu.

- 2. Using WHONET
  - a. Once you have defined a laboratory configuration, it will appear in the list of laboratories each time you launch WHONET.

- b. Click on your laboratory name and press **Open laboratory** to begin with data entry or data analysis.
- c. Please see the training area of our website for more information about available WHONET analyses.