



National Department of Health

Title: AMR data management protocol

ID: G_90_SOP_26_A

1. Preparation and sharing of AMR data files
2. Minimum surveillance data elements to be submitted by all participating AMR surveillance sites to the national reference laboratory
3. Two-way information exchange between surveillance sites and the national reference laboratory

Developed by: May Varasmaite-Keket & Deborah Tong

Reviewed by: J Ferguson

Authorized by: W Porau

Review Period: 2 years

Issued: 28/2/22

Changes to the last Authorized Version:

Version	Date issued	Changes
G_90_SOP_26_A	28/2/22	New version

Certification of printed copy:

Version	
Authorised by (name)	
Signed	
Date	

NB. Printed copies of this document for local laboratory use require endorsement on the front page and recording on the Printed Document Logsheets.



Title: AMR data management protocol

ID: G_90_SOP_26_A

Revision Number: A

Issue date: 28/2/22

Page 2 of 15

1. Purpose

AMR surveillance data comprises isolate, patient and surveillance site level data. Appropriate data management is important in ensuring good data quality to inform guideline development, policies and action to mitigate AMR.

2. Scope

This procedure applies to AMR data management and reporting within the NAMRSC as the national coordinating centre, CPHL as the national reference laboratory and AMR surveillance sites in the human health sector.

3. Principle/Clinical application

AMR data should be analysed and reported to relevant stakeholders at the surveillance site level (clinicians, hospital management), nationally (relevant government departments and committees, development partners) and globally (Global AMR Surveillance and Use System [GLASS]) to drive policy and action.

4. Responsibilities

Role	Responsibility
Quality officer (surveillance site laboratory)	Export CSV file from SENAITE Convert to WHONET file using BacLink Perform data analysis using WHONET Provide feedback to Medicines and Therapeutics Committee Share data files and reports with CPHL
National AMR data officer (CPHL)	Provide support to surveillance sites on AMR data management Support development and provide feedback on AMR surveillance reports developed by surveillance sites Compile, analyse and report on AMR data from all surveillance sites

5. Data file

The starting point for data analysis using WHONET is a data file containing AMR data from the surveillance site(s) derived from the laboratory information management system SENAITE.



Title: AMR data management protocol

ID: G_90_SOP_26_A

Revision Number: A

Issue date: 28/2/22

Page 3 of 15

6. Equipment/Materials

- Computer or laptop
- SENAITE laboratory information management system
- BacLink 2021 software
- WHONET 2021 software
- AMR data file(s)

7. Procedure

7.1 Preparation and sharing of AMR data files

- a) Once logged into SENAITE, click on the Reporting icon in the top right corner of the screen, and select 'Export to WHONET'.

The screenshot shows the SENAITE System Dashboard. The top right corner has a 'Reports' menu with options: Reports, Import, Search, Audit Log, and Export to WHONET. The 'Export to WHONET' option is circled in red. The dashboard displays various metrics for Analyses and Samples, including counts and percentages for different stages like Assignment pending, Results pending, To be verified, and Verified.

- b) Type the start and end date into the date fields to select the date range, and click 'Generate BacLink file'. This downloads the data in CSV file format and can be found in the Downloads folder of your computer.



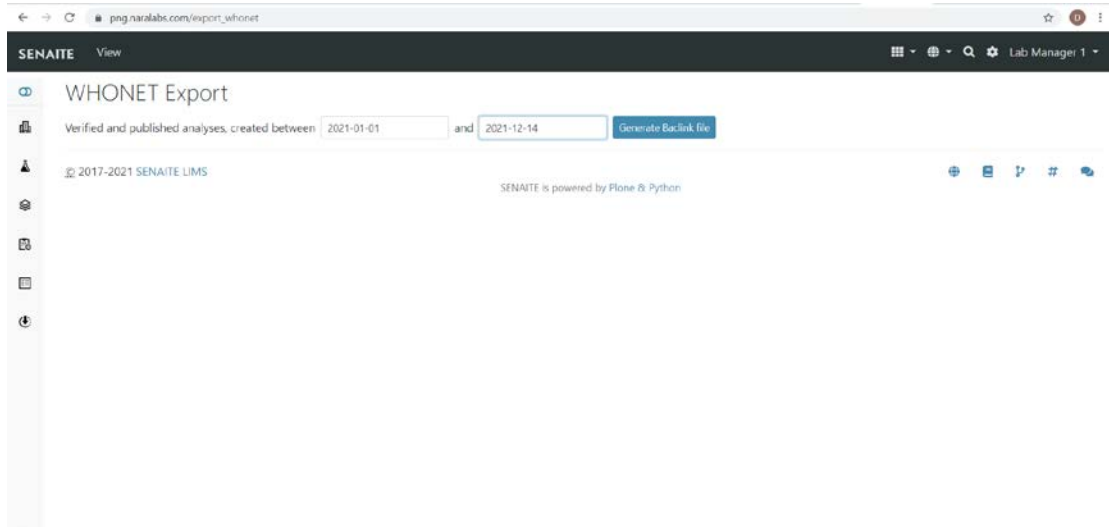
Title: AMR data management protocol

ID: G_90_SOP_26_A

Revision Number: A

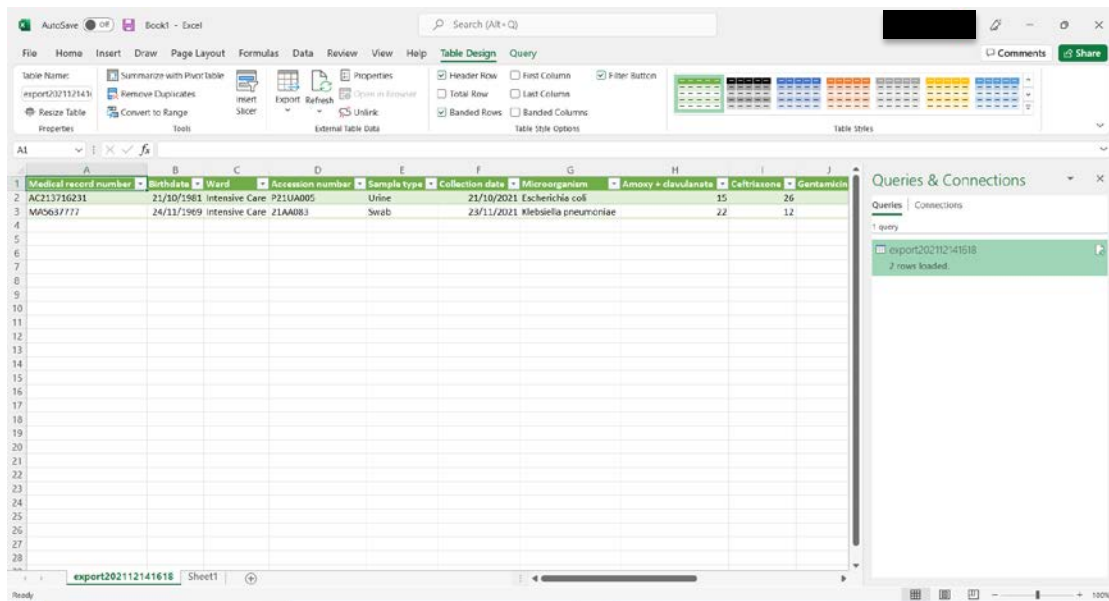
Issue date: 28/2/22

Page 4 of 15



c) Open the CSV file in MS Excel. If it opens as a Tab-Separated Values (TSV) file (in which the data elements are not separated into distinct columns):

- i. Click on 'Data tab'
- ii. Click on 'From Text/CSV'
- iii. Choose the TSV file
- iv. Click on 'Import'
- v. Check that the Delimiter is Tab
- vi. Click on 'Load'





Title: AMR data management protocol

ID: G_90_SOP_26_A

Revision Number: A

Issue date: 28/2/22

Page 5 of 15

- d) To use the file in WHONET, the Excel file needs to be converted using BacLink. Before the conversion, delete any extraneous information in the Excel file which is not part of the data to be converted (e.g. data elements which will not be analysed or reported).
- e) Save the file in Text (Tab delimited) (*.txt) format.
- f) Open BacLink and configure a new file format (only needs to be done once):
 - i. Click on 'New Format'
 - ii. Select country
 - iii. Enter the Laboratory name
 - iv. Enter a Laboratory code

BacLink Configuration Port Moresby General Hospital

Country: Papua New Guinea PNG

Laboratory name: Port Moresby General Hospital

Laboratory code: PMGH
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 as Save Exit

- v. Click on 'File structure' to define its configuration
 - a. Ensure 'File structure' is Text (delimited) and 'Field delimiter' is Tab (these options should be selected by default)
 - b. Select location of data file
 - c. File name can be left blank for the time being, and entered just prior to converting the data



Title: AMR data management protocol

ID: G_90_SOP_26_A

Revision Number: A

Issue date: 28/2/22

Page 6 of 15

File structure

File structure: Text (Delimited)

Field delimiter: Tab

File location: C:\WHONET

File name: *.txt

Table name: For Access files only

File origin: Windows (ANSI)

Character set: Western European (Windows)

Antibiotics Enter information about the antibiotics in your data file

Guidelines: No answer

Number of rows of data for each isolate: No answer

Antibiotic sequence: No answer

Test methods: No answer

Number of test methods in one row of data: No answer

Does the first row of the data file have the names of the data fields?

Yes No

Data fields Define the relationship between your data fields and WHONET data fields.

OK

- vi. Click on 'Antibiotics' to define their configuration
 - a. Change 'Guidelines' to EUCAST
 - b. Check the box(es) of the test method(s) contained in the data file
 - c. Click 'OK'

Configure antibiotics

File format: TEXT (DELIMITED)

Does your file include antibiotics results? Yes No

Guidelines: EUCAST

The antibiotics of one isolate require how many rows of data? One row More than one row

In what sequence do the antibiotics appear? Fixed antibiotic sequence Variable antibiotic sequence

The data file includes what test methods?

Disk diffusion

MIC

Etest

OK

Cancel

- vii. Answer 'Yes' to 'Does the first row of the data file have the names of the data fields?'



Title: AMR data management protocol

ID: G_90_SOP_26_A

Revision Number: A

Issue date: 28/2/22

Page 7 of 15

File structure

File structure: Text (Delimited)

Field delimiter: Tab

File location: C:\WHONET\

File name: *.txt

Table name: For Access files only

File origin: Windows (ANSI)

Character set: Western European (Windows)

Antibiotics Enter information about the antibiotics in your data file

Guidelines	EUCAST
Number of rows of data for each isolate	One row
Antibiotic sequence	Fixed antibiotic sequence
Test methods	Disk
Number of test methods in one row of data	One method

Does the first row of the data file have the names of the data fields?

Yes No

Data fields Define the relationship between your data fields and WHONET data fields.

OK

- viii. Click on 'Data fields'
 - a. Click on 'Select a sample file'
 - b. Find your Text (Tab delimited) (*.txt) file

Data fields

Click on a WHONET data field and on the corresponding field from your data file.

Click '=' to match the two fields.

Data fields in the new file

- First name = <None>
- Full name = <None>
- Sex = <None>
- Date of birth (D/M/Y) = <None>
- Age = <None>
- Location = <None>
- Department = <None>
- Specimen number = <None>
- Specimen date (D/M/Y) = <None>
- Specimen type = <None>
- Isolate number = <None>
- Organism = <None>
- Comment = <None>
- Antibiotic result 1 (Undefined) = <None>
- Antibiotic result 2 (Undefined) = <None>
- Antibiotic result 3 (Undefined) = <None>

export202112141618.bt

- <None of the below>
- Medical record number = AC213716231
- Birthdate = 21/10/1981
- Ward = Intensive Care
- Accession number = P21UA005
- Sample type = Urine
- Collection date = 21/10/2021
- Microorganism = Escherichia coli
- Amoxy + clavulanate = 15
- Ceftriaxone = 26
- Gentamicin = 20
- Ciprofloxacin = 12
- Nitrofurantoin = 35
- Sulph/trimethoprim = 12
- Meropenem = 12
- Ceftazidime = 12
- Piperacillin + tazobactam = 12
- Amikacin = 12
- Chloramphenicol = 12
- Tobramycin = 12

Fixed value

Date format

Next Close

- c. Match each WHONET data field on the left with the corresponding field on the right by clicking on the WHONET data field on the left,



Title: AMR data management protocol

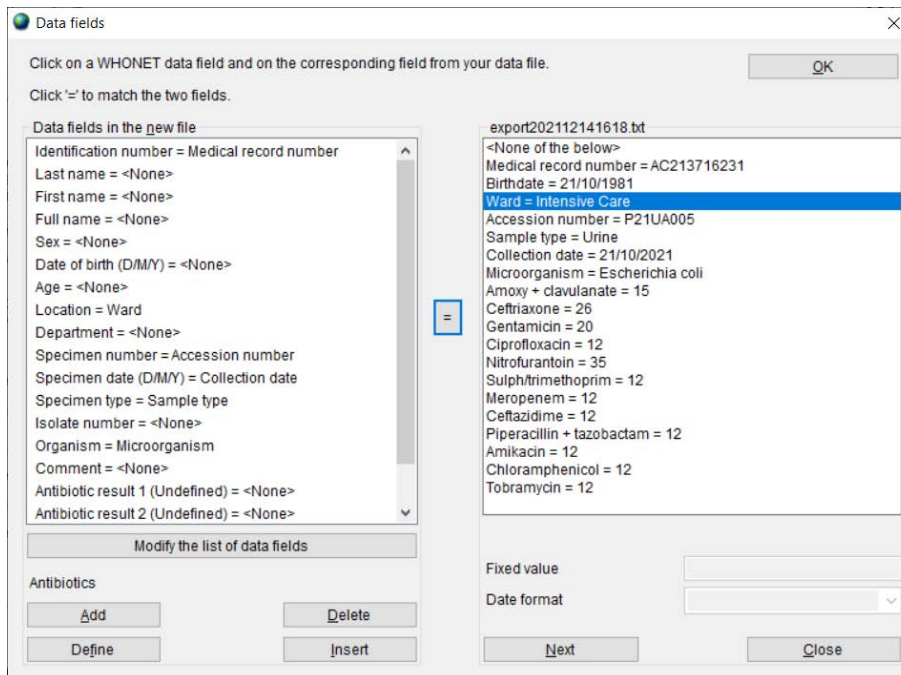
ID: G_90_SOP_26_A

Revision Number: A

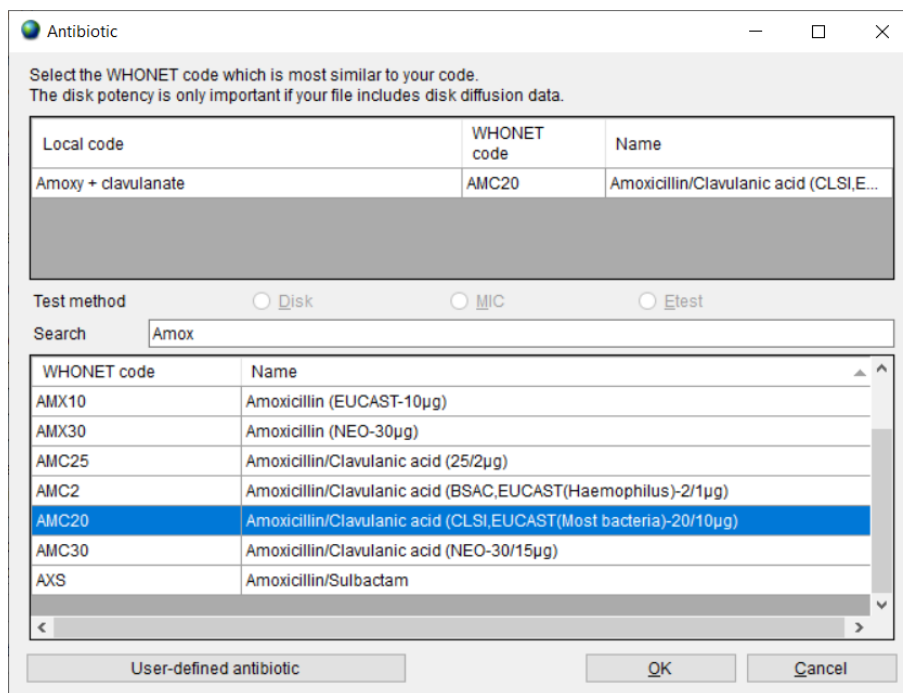
Issue date: 28/2/22

Page 8 of 15

then clicking on the matching data field on the right, and then the “=” sign in the middle. Continue doing this until all fields have been matched.



- d. Match 'Antibiotic result 1 (Undefined) = <None>' on the left with the first antibiotic result on the right, then click 'Define' and select the appropriate EUCAST breakpoint and click 'OK'.





Title: AMR data management protocol

ID: G_90_SOP_26_A

Revision Number: A

Issue date: 28/2/22

Page 9 of 15

- e. Continue doing this for all AST results in the data file. Add more antibiotic results as required.

Data fields

Click on a WHONET data field and on the corresponding field from your data file.

Click '=' to match the two fields.

Data fields in the new file

- Specimen type = Sample type
- Isolate number = <None>
- Organism = Microorganism
- Comment = <None>
- Antibiotic result 1 (AMC20) = Amoxy + clavulanate
- Antibiotic result 2 (CRO30) = Ceftriaxone
- Antibiotic result 3 (GEH30) = Gentamicin
- Antibiotic result 4 (CIP5) = Ciprofloxacin
- Antibiotic result 5 (NIT100) = Nitrofurantoin
- Antibiotic result 6 (SXT1.2) = Sulph/trimethoprim
- Antibiotic result 7 (MEM10) = Meropenem
- Antibiotic result 8 (CAZ10) = Ceftazidime
- Antibiotic result 9 (TZP30) = Piperacillin + tazobac...
- Antibiotic result 10 (AMK30) = Amikacin
- Antibiotic result 11 (CHL30) = Chloramphenicol
- Antibiotic result 12 (TOB10) = Tobramycin

export202112141618.bt

- <None of the below>
- Medical record number = AC213716231
- Birthdate = 21/10/1981
- Ward = Intensive Care
- Accession number = P21UA005
- Sample type = Urine
- Collection date = 21/10/2021
- Microorganism = Escherichia coli
- Amoxy + clavulanate = 15
- Ceftriaxone = 26
- Gentamicin = 20
- Ciprofloxacin = 12
- Nitrofurantoin = 35
- Sulph/trimethoprim = 12
- Meropenem = 12
- Ceftazidime = 12
- Piperacillin + tazobactam = 12
- Amikacin = 12
- Chloramphenicol = 12
- Tobramycin = 12

Fixed value

Date format

Next Close

- f. Click 'OK' in the top right corner

- ix. Click 'OK' to complete the configuration of the file structure



Title: AMR data management protocol

ID: G_90_SOP_26_A

Revision Number: A

Issue date: 28/2/22

Page 10 of 15

File structure

File structure: Text (Delimited)

Field delimiter: Tab

File location: C:WHONET

File name: *.txt

Table name: For Access files only

File origin: Windows (ANSI)

Character set: Western European (Windows)

Antibiotics Enter information about the antibiotics in your data file

Guidelines: EUCAST

Number of rows of data for each isolate: One row

Antibiotic sequence: Fixed antibiotic sequence

Test methods: Disk

Number of test methods in one row of data: One method

Does the first row of the data file have the names of the data fields?

Yes No

Data fields Define the relationship between your data fields and WHONET data fields.

OK

x. Save the configuration and click 'Exit'

BacLink Configuration Port Moresby General Hospital

Country: Papua New Guinea PNG

Laboratory name: Port Moresby General Hospital

Laboratory code: PMGH

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 as Save Exit

g) To run the conversion, select the Text (Tab delimited) (*.txt) file by clicking 'Browse' next to File name. The new data file name will be auto-populated by WHONET. Change this to a consistent file name that includes reporting year, reporting month and the name of the surveillance site.



Title: AMR data management protocol

ID: G_90_SOP_26_A

Revision Number: A

Issue date: 28/2/22

Page 11 of 15

BaLink 2021

File Select language Help

Choose the name and format of the original data file.
Enter a name and format for the new data file. Click on 'Begin conversion'.
If the format of your data file does not appear on the list, choose 'New format'.

File format: C:\WHONET\ Port Moresby General Hospital

Port Moresby General Hospital-TEXT.cfg

File name: C:\WHONET\export202112141618.bt

Table name: For Access files only

New data file

File name: C:\WHONET\Data\PNG-PMGH-Dec2021.sqlite

Table name: For Access files only

File format: WHONET (SQLite)

Buttons: New format, Edit format, Delete format, Browse, Dates, Begin conversion, Exit

- h) Click 'Begin conversion'. BaLink will display for you results from the conversion of the first three isolates in the original data file. Check all the fields have been converted correctly.

BaLink 2021 - Isolate 1

Field name	Local value	WHONET value
Identification number	AC213716231	AC213716231
Last name		
First name		
Full name		
Sex		
Date of birth		
Age		
Location	Intensive Care	Intensive Care
Department		
Specimen number	P21UA005	P21UA005
Specimen date	21/10/2021	21-Oct-2021
Specimen type	Urine	ur
Local specimen code	Urine	Urine
Isolate number		
Organism	Escherichia coli	eco
Local organism code	Escherichia coli	Escherichia coli
Comment		
AMC_ED20 = 15	CRO_ED30 = 26	GEH_ED30 = 20
CIP_ED5 = 12	NIT_ED100 = 35	SXT_ED1_2 = 12
MEM_ED10 = 12	CAZ_ED10 = 12	TZP_ED30 = 12
AMK_ED30 = 12	CHL_ED30 = 12	TOB_ED10 = 12

Buttons: Next, Cancel

- i) You will be notified of the completion of the conversion.



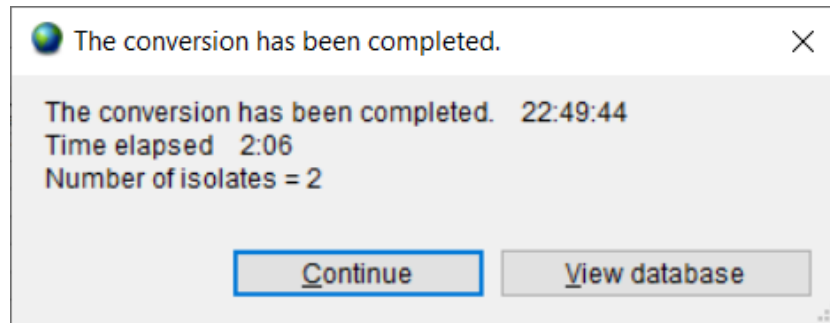
Title: AMR data management protocol

ID: G_90_SOP_26_A

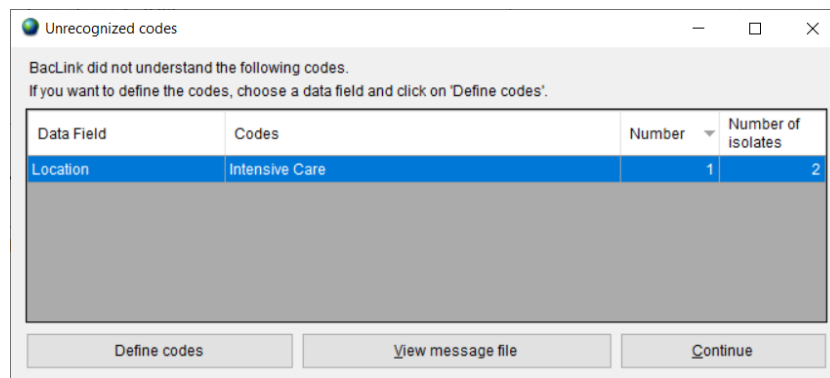
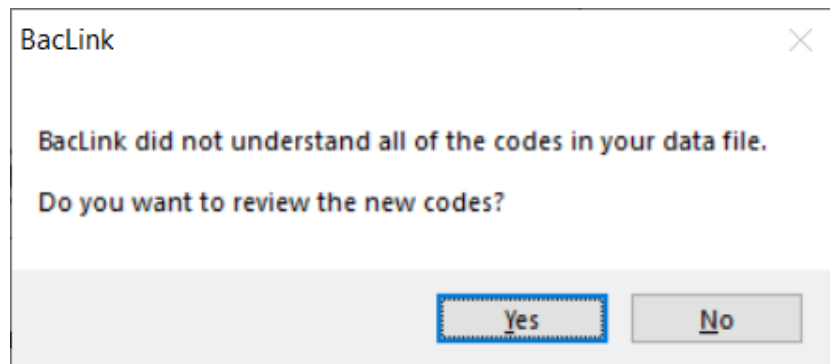
Revision Number: A

Issue date: 28/2/22

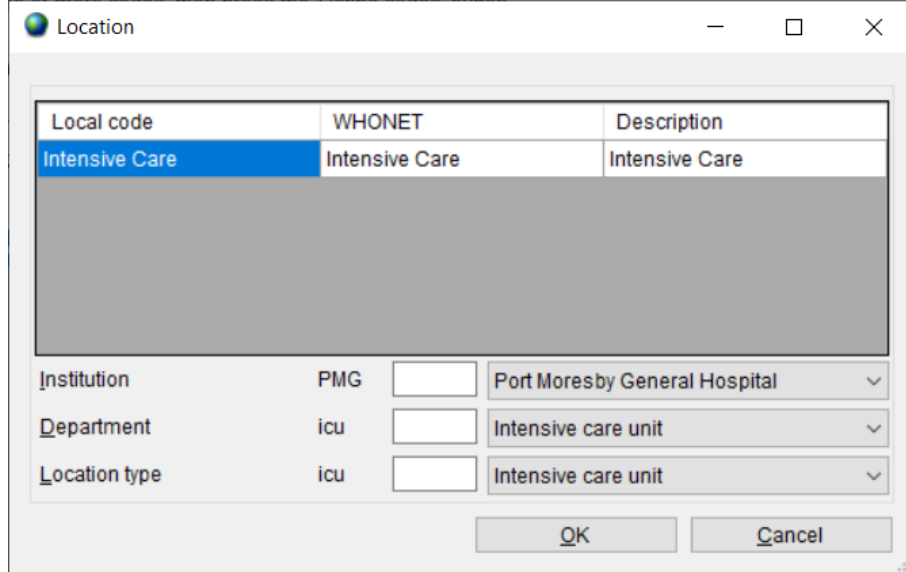
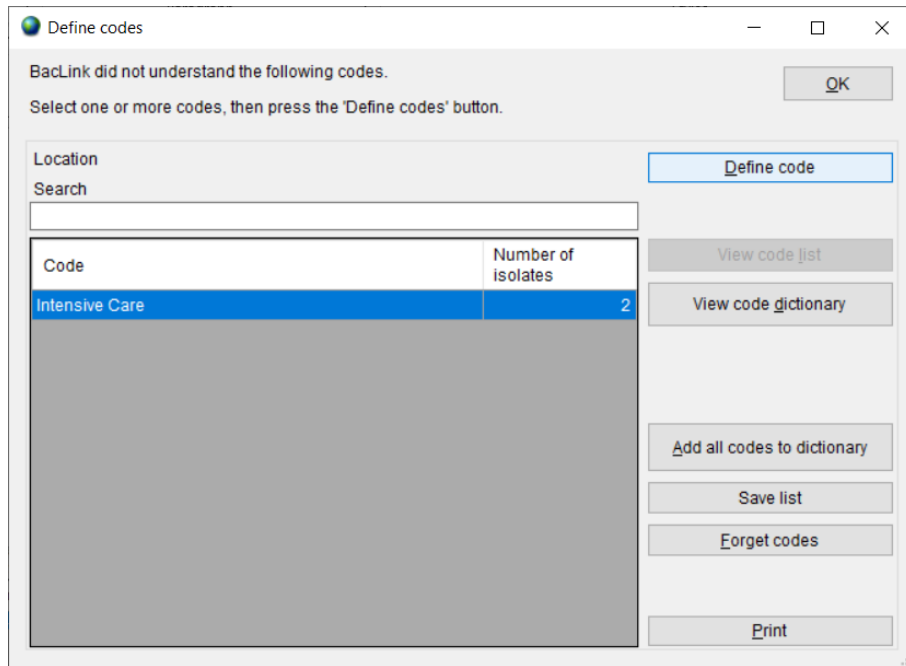
Page 12 of 15



- j) Click 'Continue' and there may be some new/unrecognised codes to review and define



- i. Click 'Define code' and complete defining the relevant code(s).



- k) Run the conversion again (allow replacement of the existing file) and click 'View database'.



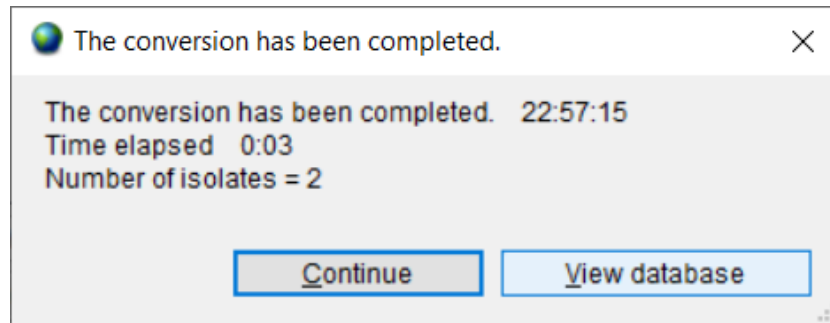
Title: AMR data management protocol

ID: G_90_SOP_26_A

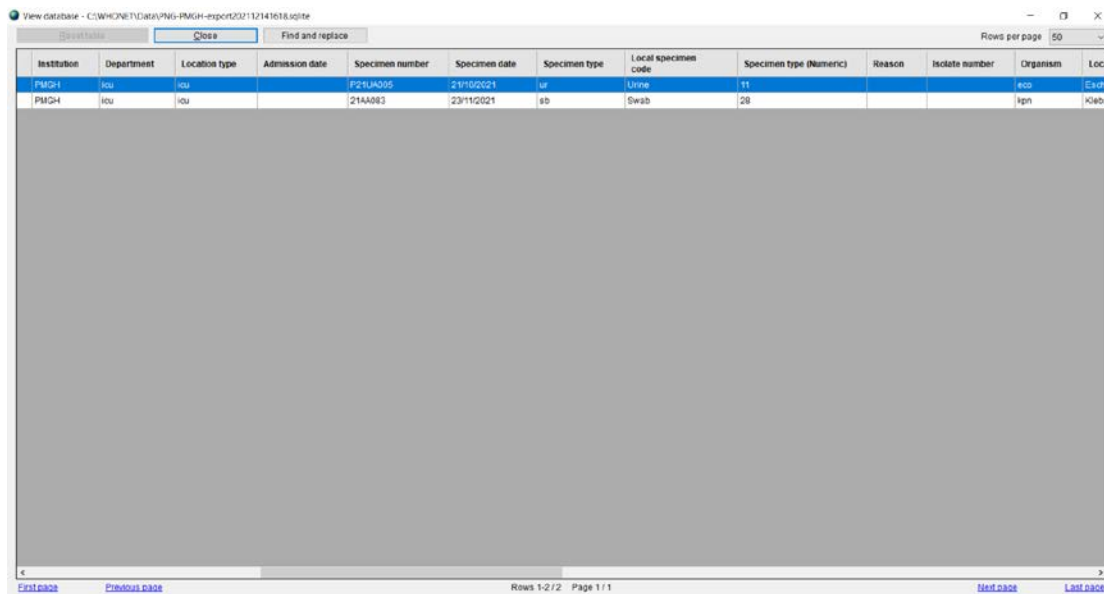
Revision Number: A

Issue date: 28/2/22

Page 14 of 15



- l) The output screen should display as follows. The sqlite data file is then checked for internal errors and consistency, as well as de-duplicated to include a single result for each patient and specimen type using WHONET.



7.2 Minimum surveillance data elements to be submitted by all participating AMR surveillance sites to the national reference laboratory (other data elements may be removed prior to sharing)

Data element	Description
Unique patient identifier / medical record number	A unique numerical code which allows the facility to identify the patient from whom a specimen was collected
Patient admission date	Date of admission to hospital, in the format DD/MM/YYYY
Patient sex	Sex of the patient: female, male or unknown



Title: AMR data management protocol

ID: G_90_SOP_26_A

Revision Number: A

Issue date: 28/2/22

Page 15 of 15

Patient date of birth / age	(Ability to calculate) age of the patient
Patient location	Ward/department the patient is situated in
Date of specimen collection	The date the specimen was collected, in the format DD/MM/YYYY
Specimen type	Type of specimen: blood, urine, stool, urethral/cervical swab, etc
Pathogen identification	Identification of the pathogen isolated OR indicate 'no growth'
AST results	Zone of inhibition diameter (mm) for each antibiotic tested OR minimum inhibitory concentration, AND interpretation (S, I, R)

7.3 Two-way information exchange between surveillance sites and the national reference laboratory

- a) Surveillance sites share sqlite data files with the national reference laboratory via email by the 10th of each month (e.g. November 2021 data to be shared by 10 December 2021).
- b) Once received, the national reference laboratory adds a surveillance site identifier as a data element, performs a quality check and basic analysis of the data, ensures data has been de-duplicated, provides feedback to the surveillance site and follows up on any missing information by the end of the month (e.g. feedback on November 2021 data files by 31 December 2021).
- c) The national reference laboratory maintains backups of all data files.

8. Safety

N/A

9. Quality Control

Data quality should be verified by checking for accuracy and completeness prior to data analysis.

10. Reference and related documents

WHO Collaborating Centre for Surveillance of AMR 2006, *WHONET: Data analysis 1*, accessed 15 November 2021, <https://whonet.org/documentation.html>

WHO Collaborating Centre for Surveillance of AMR 2006, *WHONET: Data analysis 2*, accessed 17 November 2021, <https://whonet.org/documentation.html>