Supplementary:

Data indicators report

Hospital name: WHO Test Hospital

Country name: World Health Organization

Data from:

01 Jan 1995 to 31 Jan 1995

This is a detailed report for records with data indicators. This report, together with the full list in Excel format, is for users to check and validate records with notifiable bacteria, notifiable antibiotic-pathogen combinations, infrequent phenotypes or potential errors in the AST results at the local level. The identifiers listed include hospital number and specimen collection date. Users should not share or transfer this Supplementary data indictors report (in PDF and Excel formats) to any party outside of the hospital without data security management and confidential agreement.

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Summary result

The tables are counts of records of blood samples that violated the data validation indicators stratified by the level of priority as indicated in the list_of_indicators.xlsx.

In brief, the microbiology data is de-duplicated by including only the first isolate per unique specimen number per specimen type per organism identified per evaluation period.

The microbiology_data file had:

Sample collection dates ranged from 01 Jan 1995 to 31 Jan 1995

Number of records of all specimen types collected within the above date range:

622 records

Number of records of all specimen types with culture positive for a microorganism:

622 records

Number of records of blood specimens collected within the above date range:

81 records

Number of records of blood specimens with culture positive for a microorganism:

81 records

Number of records of blood specimens with no growth for a microorganism:

0 records

Organisms	Proportion of blood samples (n)
Arcanobacterium spp.	NA
Arthrobacter spp.	NA
Bacillus spp. except Bacillus anthracis	NA
Brevibacillus spp.	NA
Brevibacterium spp.	NA
Cellulomonas spp.	NA
Cellulosimicrobium spp.	NA
Corynebacterium spp. except Corynebacterium diphtheriae, Corynebacterium jeikeium, Corynebacterium pseudotuberculosis, Corynebacterium striatum, Corynebacterium ulcerans, and Corynebacterium urealyticum	NA
Cutibacterium spp.	NA
Dermabacter spp.	NA
Dermacoccus spp.	NA
Diphtheroids spp.	NA
Exiguobacterium spp.	NA
Geobacillus spp.	NA
Helcobacillus spp.	NA
Janibacter spp.	NA
Knoellia spp.	NA
Kocuria spp.	NA
Kytococcus spp.	NA
Leifsonia spp.	NA
Microbacterium spp.	NA
Micrococcus spp.	NA
Nesterenkonia spp.	NA
Paenibacillus spp.	NA
Propionibacterium spp.	NA
Pseudoclavibacter spp.	NA
Staphylococcus spp. except Staphylococcus aureus, and Staphylococcus lugdunensis	NA
Trueperella spp.	NA
Virgibacillus spp.	NA
Viridans group streptococci include Streptococcus anginosus, Streptococcus bovis, Streptococcus constellatus, Streptococcus gallolyticus, Streptococcus gordonii, Streptococcus intermedius, Streptococcus mitis, Streptococcus mutans, Streptococcus oralis, Streptococcus salivarius, Streptococcus sanguinis, and Streptococcus vestibularis	NA

Blood culture contamination rate is defined as the number of raw contaminated cultures per number of blood cultures received by the laboratory per reporting period. Blood culture contamination rate will not be estimated in case that the data of negative culture (specified as 'no growth' in the dictionary_for_microbiology_data file) is not available. Details of the criteria are available in "list_of_indicators.xlsx" in the folder "Configuration".

Table 1 (continue): Summary of potential contaminants

Organisms	Proportion of blood samples (n)
Other contaminants	NA

Blood culture contamination rate is defined as the number of raw contaminated cultures per number of blood cultures received by the laboratory per reporting period. Blood culture contamination rate will not be estimated in case that the data of negative culture (specified as 'no growth' in the dictionary_for_microbiology_data file) is not available. Details of the criteria are available in "list_of_indicators.xlsx" in the folder "Configuration".

Table 2: Summary of notifiable antibiotic-pathogen combinations

Organisms	Antimicrobial-susceptible profile	Proportion of blood samples (n)
Acinetobacter baumannii	Carbapenems-NS	NA
Pseudomonas aeruginosa	Carbapenems-NS	NA
Enterobacteriaceae	Carbapenems-NS	NA
Enterobacteriaceae	3GC-NS	NA
Enterobacteriaceae	Carbapenem-S and 3GC-NS	NA
Enterococcus faecium	Vancomycin-NS	NA
Staphylococcus aureus	Vancomycin-NS	NA
Staphylococcus aureus	Methicillin-NS	NA
Helicobacter pylori	Clarithromycin-NS	NA
Campylobacter spp.	Fluoroquinolones-NS	NA
Salmonella spp.	Fluoroquinolones-NS	NA
Neisseria gonorrhoeae	3GC-NS	NA
Neisseria gonorrhoeae	Fluoroquinolones-NS	NA
Neisseria gonorrhoeae	Fluoroquinolones-NS and 3GC-S	NA

Notifiable antibiotic-pathogen combinations and their classifications are defined as WHO list of AMR priority pathogen published in 2017 [1]. The proportion represents the number of patients with blood culture positive for non-susceptible isolates (numerator) over the total number of patient with blood culture positive and AST result available in the raw microbiology data (denominator). Details of the criteria are available in "list_of_indicators.xlsx" in the folder "Configuration". NS=Non-susceptible; 3GC-NS=3rd-generation cephalosporin; Carbapenems-NS: imipenem, meropenem, ertapenem or doripenem; Fluoroquinolones-NS: ciprofloxacin or levofloxacin; Methicillin: methicillin, oxacillin, or cefoxitin

^[1] World Health Organization. Global priority list of antibiotic-resistant bacteria to guide research discover, and development of new antibiotics. 2017.

https://www.who.int/medicines/publications/WHO-PPL-Short_Summary_25Feb-ET_NM_WHO.pdf. accessed 7th December 2021.

Table 3: Summary of infrequent phenotypes or potential errors in AST results based on the indicators that the organisms are intrinsically resistant to an antibiotic but are reported as susceptible

Organisms	Antibiotic that intrinsically resistant but reported as susceptible	Proportion of blood samples (n)
Achromobacter xylosoxidans	Amoxicillin	NA
Achromobacter xylosoxidans	Ampicillin	NA
Achromobacter xylosoxidans	Aztreonam	NA
Achromobacter xylosoxidans	Ceftriaxone	NA
Achromobacter xylosoxidans	Doxycycline	NA
Achromobacter xylosoxidans	Ertapenem	NA
Achromobacter xylosoxidans	Fosfomycin	NA
Achromobacter xylosoxidans	Tetracycline	NA
Achromobacter xylosoxidans	Trimethoprim	NA
Acinetobacter baumannii	Amoxicillin and clavulanic acid	NA
Acinetobacter baumannii	Amoxicillin	NA
Acinetobacter baumannii	Ampicillin	NA
Acinetobacter baumannii	Aztreonam	NA
Acinetobacter baumannii	Ceftriaxone	NA
Acinetobacter baumannii	Doxycycline	NA
Acinetobacter baumannii	Ertapenem	NA
Acinetobacter baumannii	Fosfomycin	NA
Acinetobacter baumannii	Tetracycline	NA
Acinetobacter baumannii	Trimethoprim	NA
Acinetobacter nosocomialis	Ceftriaxone	NA
Acinetobacter nosocomialis	Amoxicillin	NA
Acinetobacter nosocomialis	Amoxicillin and clavulanic acid	NA
Acinetobacter nosocomialis	Ampicillin	NA
Acinetobacter nosocomialis	Aztreonam	NA
Acinetobacter nosocomialis	Doxycycline	NA
Acinetobacter nosocomialis	Ertapenem	NA
Acinetobacter nosocomialis	Fosfomycin	NA
Acinetobacter nosocomialis	Tetracycline	NA
Acinetobacter nosocomialis	Trimethoprim	NA
Acinetobacter pittii	Ceftriaxone	NA

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Table 3 (continue): Summary of infrequent phenotypes or potential errors in AST results based on the indicators that the organisms are intrinsically resistant to an antibiotic but are reported as susceptible

Organisms	Antibiotic that intrinsically resistant but reported as susceptible	Proportion of blood samples (n)
Acinetobacter pittii	Amoxicillin	NA
Acinetobacter pittii	Amoxicillin and clavulanic acid	NA
Acinetobacter pittii	Ampicillin	NA
Acinetobacter pittii	Aztreonam	NA
Acinetobacter pittii	Doxycycline	NA
Acinetobacter pittii	Ertapenem	NA
Acinetobacter pittii	Fosfomycin	NA
Acinetobacter pittii	Tetracycline	NA
Acinetobacter pittii	Trimethoprim	NA
Aeromonas caviae	Amoxicillin	NA
Aeromonas caviae	Ampicillin	NA
Aeromonas caviae	Ampicillin and sulbactam	NA
Aeromonas dhakensis	Amoxicillin	NA
Aeromonas dhakensis	Ampicillin	NA
Aeromonas dhakensis	Ampicillin and sulbactam	NA
Aeromonas dhakensis	Cefoxitin	NA
Aeromonas hydrophila	Amoxicillin	NA
Aeromonas hydrophila	Ampicillin	NA
Aeromonas hydrophila	Ampicillin and sulbactam	NA
Aeromonas veronii	Amoxicillin	NA
Aeromonas veronii	Ampicillin	NA
Aeromonas veronii	Ampicillin and sulbactam	NA
Aeromonas veronii	Ticarcillin	NA
Burkholderia cepacia complex	Ampicillin	NA
Burkholderia cepacia complex	Aminoglycosides	NA
Burkholderia cepacia complex	Amoxicillin	NA
Burkholderia cepacia complex	Amoxicillin and clavulanic acid	NA
Burkholderia cepacia complex	Ampicillin and sulbactam	NA
Burkholderia cepacia complex	Aztreonam	NA
Burkholderia cepacia complex	Ceftriaxone	NA

Table 3 (continue): Summary of infrequent phenotypes or potential errors in AST results based on the indicators that the organisms are intrinsically resistant to an antibiotic but are reported as susceptible

Organisms	Antibiotic that intrinsically resistant but reported as susceptible	Proportion of blood samples (n)
Burkholderia cepacia complex	Chloramphenicol	NA
Burkholderia cepacia complex	Ciprofloxacin	NA
Burkholderia cepacia complex	Colistin	NA
Burkholderia cepacia complex	Ertapenem	NA
Burkholderia cepacia complex	Fosfomycin	NA
Burkholderia cepacia complex	Piperacillin	NA
Burkholderia cepacia complex	Piperacillin and tazobactam	NA
Burkholderia cepacia complex	Ticarcillin	NA
Burkholderia cepacia complex	Ticarcillin and clavulanic acid	NA
Burkholderia cepacia complex	Trimethoprim	NA
Citrobacter amalonaticus	Amoxicillin	NA
Citrobacter amalonaticus	Ampicillin	NA
Citrobacter freundii	Amoxicillin and clavulanic acid	NA
Citrobacter freundii	Amoxicillin	NA
Citrobacter freundii	Ampicillin	NA
Citrobacter freundii	Ampicillin and sulbactam	NA
Citrobacter freundii	Cefadroxil	NA
Citrobacter freundii	Cefalexin	NA
Citrobacter freundii	Cefazolin	NA
Citrobacter freundii	Cefoxitin	NA
Citrobacter freundii	Cephalothin	NA
Citrobacter koseri	Amoxicillin	NA
Citrobacter koseri	Ampicillin	NA
Elizabethkingia anophelis	Ampicillin	NA
Elizabethkingia anophelis	Amoxicillin	NA
Elizabethkingia anophelis	Amoxicillin and clavulanic acid	NA
Elizabethkingia anophelis	Ampicillin and sulbactam	NA
Elizabethkingia anophelis	Aztreonam	NA
Elizabethkingia anophelis	Cefepime	NA
Elizabethkingia anophelis	Ceftazidime	NA

Table 3 (continue): Summary of infrequent phenotypes or potential errors in AST results based on the indicators that the organisms are intrinsically resistant to an antibiotic but are reported as susceptible

Organisms	Antibiotic that intrinsically resistant but reported as susceptible	Proportion of blood samples (n)
Elizabethkingia anophelis	Ceftriaxone	NA
Elizabethkingia anophelis	Ertapenem	NA
Elizabethkingia anophelis	Imipenem	NA
Elizabethkingia anophelis	Meropenem	NA
Elizabethkingia anophelis	Ticarcillin	NA
Elizabethkingia anophelis	Ticarcillin and clavulanic acid	NA
Elizabethkingia meningoseptica	Ampicillin	NA
Elizabethkingia meningoseptica	Amoxicillin	NA
Elizabethkingia meningoseptica	Amoxicillin and clavulanic acid	NA
Elizabethkingia meningoseptica	Ampicillin and sulbactam	NA
Elizabethkingia meningoseptica	Aztreonam	NA
Elizabethkingia meningoseptica	Cefepime	NA
Elizabethkingia meningoseptica	Ceftazidime	NA
Elizabethkingia meningoseptica	Ceftriaxone	NA
Elizabethkingia meningoseptica	Colistin	NA
Elizabethkingia meningoseptica	Ertapenem	NA
Elizabethkingia meningoseptica	Imipenem	NA
Elizabethkingia meningoseptica	Meropenem	NA
Elizabethkingia meningoseptica	Ticarcillin	NA
Elizabethkingia meningoseptica	Ticarcillin and clavulanic acid	NA
Enterobacter cloacae complex	Amoxicillin	NA
Enterobacter cloacae complex	Amoxicillin and clavulanic acid	NA
Enterobacter cloacae complex	Ampicillin	NA
Enterobacter cloacae complex	Ampicillin and sulbactam	NA
Enterobacter cloacae complex	Cefadroxil	NA
Enterobacter cloacae complex	Cefalexin	NA
Enterobacter cloacae complex	Cefazolin	NA
Enterobacter cloacae complex	Cefoxitin	NA
Enterobacter cloacae complex	Cephalothin	NA
Enterococcus casseliflavus	Vancomycin	NA

Table 3 (continue): Summary of infrequent phenotypes or potential errors in AST results based on the indicators that the organisms are intrinsically resistant to an antibiotic but are reported as susceptible

Organisms	Antibiotic that intrinsically resistant but reported as susceptible	Proportion of blood samples (n)
Enterococcus faecalis	Ceftazidime	NA
Enterococcus faecalis	Aminoglycosides	NA
Enterococcus faecalis	Ceftazidime	NA
Enterococcus faecalis	3GC	NA
Enterococcus faecalis	Clindamycin	NA
Enterococcus faecalis	Fusidic acid	NA
Enterococcus faecium	Macrolides	NA
Enterococcus faecium	Dalfopristin and quinupristin	NA
Enterococcus faecium	Sulfonamides	NA
Enterococcus gallinarum	Vancomycin	NA
Escherichia hermannii	Ampicillin	NA
Escherichia hermannii	Ticarcillin	NA
Hafnia alvei	Amoxicillin	NA
Hafnia alvei	Amoxicillin and clavulanic acid	NA
Hafnia alvei	Ampicillin	NA
Hafnia alvei	Colistin	NA
Klebsiella aerogenes	Amoxicillin	NA
Klebsiella aerogenes	Amoxicillin and clavulanic acid	NA
Klebsiella aerogenes	Ampicillin	NA
Klebsiella aerogenes	Ampicillin and sulbactam	NA
Klebsiella aerogenes	Cefadroxil	NA
Klebsiella aerogenes	Cefalexin	NA
Klebsiella aerogenes	Cefazolin	NA
Klebsiella aerogenes	Cefoxitin	NA
Klebsiella aerogenes	Cephalothin	NA
Klebsiella oxytoca	Amoxicillin	NA
Klebsiella oxytoca	Ampicillin	NA
Klebsiella pneumoniae	Amoxicillin	NA
Klebsiella pneumoniae	Ampicillin	NA

Table 3 (continue): Summary of infrequent phenotypes or potential errors in AST results based on the indicators that the organisms are intrinsically resistant to an antibiotic but are reported as susceptible

Organisms	Antibiotic that intrinsically resistant but reported as susceptible	Proportion of blood samples (n)
Klebsiella variicola	Ampicillin	NA
Leclercia adecarboxylata	Fosfomycin	NA
Morganella morganii	Amoxicillin	NA
Morganella morganii	Amoxicillin and clavulanic acid	NA
Morganella morganii	Ampicillin	NA
Morganella morganii	Cefadroxil	NA
Morganella morganii	Cefalexin	NA
Morganella morganii	Cefazolin	NA
Morganella morganii	Cephalothin	NA
Morganella morganii	Colistin	NA
Morganella morganii	Nitrofurantoin	NA
Morganella morganii	Tetracyclines	NA
Ochrobactrum anthropi	Ampicillin	NA
Ochrobactrum anthropi	Amoxicillin	NA
Ochrobactrum anthropi	Amoxicillin and clavulanic acid	NA
Ochrobactrum anthropi	Ampicillin and sulbactam	NA
Ochrobactrum anthropi	Aztreonam	NA
Ochrobactrum anthropi	Cefepime	NA
Ochrobactrum anthropi	Ceftazidime	NA
Ochrobactrum anthropi	Ceftriaxone	NA
Ochrobactrum anthropi	Ertapenem	NA
Ochrobactrum anthropi	Piperacillin	NA
Ochrobactrum anthropi	Piperacillin and tazobactam	NA
Ochrobactrum anthropi	Ticarcillin	NA
Ochrobactrum anthropi	Ticarcillin and clavulanic acid	NA
Proteus mirabilis	Colistin	NA
Proteus mirabilis	Nitrofurantoin	NA
Proteus mirabilis	Tetracyclines	NA
Proteus mirabilis	Tigecycline	NA
Proteus penneri	Amoxicillin	NA

Table 3 (continue): Summary of infrequent phenotypes or potential errors in AST results based on the indicators that the organisms are intrinsically resistant to an antibiotic but are reported as susceptible

Organisms	Antibiotic that intrinsically resistant but reported as susceptible	Proportion of blood samples (n)
Proteus penneri	Ampicillin	NA
Proteus penneri	Cefadroxil	NA
Proteus penneri	Cefalexin	NA
Proteus penneri	Cefazolin	NA
Proteus penneri	Cefuroxime	NA
Proteus penneri	Cephalothin	NA
Proteus penneri	Colistin	NA
Proteus penneri	Nitrofurantoin	NA
Proteus penneri	Tetracyclines	NA
Proteus penneri	Tigecycline	NA
Proteus rettgeri	Amoxicillin	NA
Proteus rettgeri	Amoxicillin and clavulanic acid	NA
Proteus rettgeri	Ampicillin	NA
Proteus rettgeri	Ampicillin and sulbactam	NA
Proteus rettgeri	Cefadroxil	NA
Proteus rettgeri	Cefalexin	NA
Proteus rettgeri	Cefazolin	NA
Proteus rettgeri	Cephalothin	NA
Proteus rettgeri	Colistin	NA
Proteus rettgeri	Nitrofurantoin	NA
Proteus rettgeri	Tetracyclines	NA
Proteus stuartii	Amoxicillin and clavulanic acid	NA
Proteus stuartii	Amoxicillin	NA
Proteus stuartii	Ampicillin	NA
Proteus stuartii	Ampicillin and sulbactam	NA
Proteus stuartii	Cefadroxil	NA
Proteus stuartii	Cefalexin	NA
Proteus stuartii	Cefazolin	NA
Proteus stuartii	Cephalothin	NA
Proteus stuartii	Colistin	NA

Table 3 (continue): Summary of infrequent phenotypes or potential errors in AST results based on the indicators that the organisms are intrinsically resistant to an antibiotic but are reported as susceptible

Organisms	Antibiotic that intrinsically resistant but reported as susceptible	Proportion of blood samples (n)
Proteus stuartii	Gentamicin	NA
Proteus stuartii	Nitrofurantoin	NA
Proteus stuartii	Tetracyclines	NA
Proteus vulgaris	Ampicillin	NA
Proteus vulgaris	Amoxicillin	NA
Proteus vulgaris	Cefadroxil	NA
Proteus vulgaris	Cefalexin	NA
Proteus vulgaris	Cefazolin	NA
Proteus vulgaris	Cefuroxime	NA
Proteus vulgaris	Cephalothin	NA
Proteus vulgaris	Colistin	NA
Proteus vulgaris	Nitrofurantoin	NA
Proteus vulgaris	Tetracyclines	NA
Proteus vulgaris	Tigecycline	NA
Pseudomonas aeruginosa	Ampicillin	NA
Pseudomonas aeruginosa	Amoxicillin	NA
Pseudomonas aeruginosa	Amoxicillin and clavulanic acid	NA
Pseudomonas aeruginosa	Ampicillin and sulbactam	NA
Pseudomonas aeruginosa	Ceftriaxone	NA
Pseudomonas aeruginosa	Chloramphenicol	NA
Pseudomonas aeruginosa	Ertapenem	NA
Pseudomonas aeruginosa	Kanamycin	NA
Pseudomonas aeruginosa	Neomycin	NA
Pseudomonas aeruginosa	Tigecycline	NA
Pseudomonas aeruginosa	Trimethoprim	NA
Raoultella spp.	Amoxicillin	NA
Raoultella spp.	Ampicillin	NA
Raoultella spp.	Ticarcillin	NA
Serratia marcescens	Amoxicillin and clavulanic acid	NA
Serratia marcescens	Amoxicillin	NA

Table 3 (continue): Summary of infrequent phenotypes or potential errors in AST results based on the indicators that the organisms are intrinsically resistant to an antibiotic but are reported as susceptible

Organisms	Antibiotic that intrinsically resistant but reported as susceptible	Proportion of blood samples (n)	
Serratia marcescens	Ampicillin	NA	
Serratia marcescens	Ampicillin and sulbactam	NA	
Serratia marcescens	Cefadroxil	NA	
Serratia marcescens	Cefalexin	NA	
Serratia marcescens	Cefazolin	NA	
Serratia marcescens	Cefoxitin	NA	
Serratia marcescens	Cefuroxime	NA	
Serratia marcescens	Cephalothin	NA	
Serratia marcescens	Colistin	NA	
Serratia marcescens	Nitrofurantoin	NA	
Serratia marcescens	Tetracyclines	NA	
Yersinia enterocolitica	Amoxicillin	NA	
Yersinia enterocolitica	Amoxicillin and clavulanic acid	NA	
Yersinia enterocolitica	Ampicillin	NA	
Yersinia enterocolitica	Ampicillin and sulbactam	NA	
Yersinia enterocolitica	Cefadroxil	NA	
Yersinia enterocolitica	Cefalexin	NA	
Yersinia enterocolitica	Cefazolin	NA	
Yersinia enterocolitica	Cefoxitin	NA	
Yersinia enterocolitica	Cephalothin	NA	
Yersinia enterocolitica	Ticarcillin	NA	
Yersinia pseudotuberculosis	Colistin NA		

Table 4: Summary of infrequent phenotypes or potential errors in AST results based on the indicators that the isolates exhibit discordant AST results

Organisms	Antibiotic class that the isolates exhibit discordant AST results	Proportion of blood samples (n)
All	Penicillins, Betalactam combinations*	NA
All	Penicillins**	NA
All	Quinolones, Fluoroquinolones***	NA
Enterobacteriaceae	Aminoglycosides****	NA
Enterobacteriaceae	Cephems****	NA
Pseudomonas aeruginosa	Aminoglycosides****	NA

^{*}The numerator counts the number of isolates that exhibit discordant AST results between penicillin and beta-lactam combinations. For example, an isolate which is reported as susceptible to amoxicillin but non-susceptible to amoxicillin/clavulanic acid.

^{**}The numerator counts the number of isolates that exhibit discordant AST results in penicillin antibiotics. For example, an isolate which is reported as is susceptible to ampicillin/sulbactam but non-susceptible to piperacillin/tazobactam OR ticarcillin/clavulanic acid.

^{***}The numerator counts the number of isolates that exhibit discordant AST results between quinolone and fluoroquinolone. For example, an isolate which is reported as susceptible to nalidixic acid but non-susceptible to fluoroquinolones.

^{****}The numerator counts the number of Enterobacteriaceae or *P. aeruginosa* isolates that exhibit discordant AST in aminoglycosides. For example, an Enterobacteriaceae isolate which is reported as non-susceptible to amikacin but susceptible to gentamicin, netilmicin, or tobramycin.

^{*****}The numerator counts the number of Enterobacteriaceae isolates that exhibit discordant AST in cephems. For example, an Enterobacteriaceae isolate which is reported as susceptible to first generation cephalosporin or second-generation cephalosporin, but non-susceptible to third-generation cephalosporin.

Table 5: List of specimens culture positive for notifiable organisms

Hospital number	Specimen collection date	Specimen type	Organisms
3351596206	11 Jan 1995	Others	Neisseria meningitidis
3491549456	17 Jan 1995	Others	Neisseria meningitidis

 $^{^{\}star}\text{CSF} = \text{Cerebrospinal fluid}; \ \text{RTS} = \text{Respiratory tract specimens}; \ \text{Others} = \text{Others sample types}$