

Antimicrobial susceptibility testing control strains available from NCTC

Public Health England's National Collection of Type Cultures (NCTC) offers a wide range of strains that can be used as controls in antimicrobial susceptibility testing to:

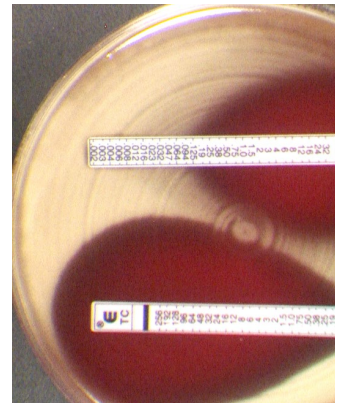
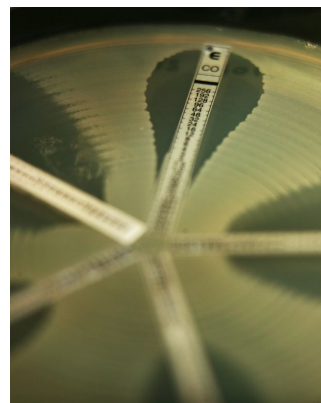
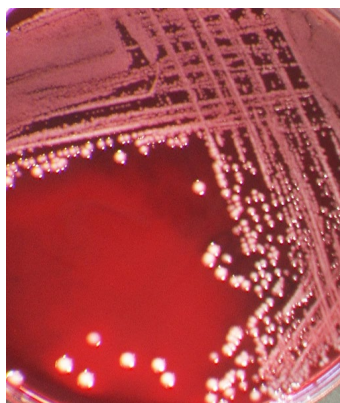
- monitor test performance and quality of the materials used
- confirm that the in-use method will detect resistance

NCTC strains are verified by Public Health England's Antimicrobial Resistance and Healthcare Associated Infections (AMRHAI) Reference Unit and are used in diagnostic testing laboratories worldwide.

The strains listed are specifically recommended by one or more of the following:

- the European Committee on Antimicrobial Susceptibility Testing (EUCAST)
- Clinical and Laboratory Standards Institute (CLSI)
- United Kingdom Standards for Microbiology Investigations (formerly National Standard Methods)
- British Society of Antimicrobial Chemotherapy (BSAC)

For more information or to order online visit: www.phe-culturecollections.org.uk



European Committee on Antimicrobial Susceptibility Testing (EUCAST)
Recommended Strains for Routine and Extended Internal Quality Control (Version 7.0)

Organism	NCTC® Strain Reference	Routine or extended internal QC	Characteristics	Other collection number
<i>Campylobacter jejuni</i>	NCTC 11351	Routine internal QC	-	ATCC 33560; CCUG 11284; CIP 702; DSM 4688
<i>Enterococcus faecalis</i>	NCTC 12697	Routine internal QC	-	ATCC 29212; CECT 795; CIP 103214; CCUG 9997; DSM 2570; WDCM 00087
<i>Enterococcus faecalis</i>	NCTC 13379	Extended internal QC	High-level gentamicin resistant (HLGR)	ATCC 51299; CCUG 34289; CIP 104676; DSM 12956; WDCM 00085; WDCM 00152
<i>Escherichia coli</i>	NCTC 12241	Routine internal QC	-	ATCC 25922; CECT 434; CIP 76.24; CCUG 17620; DSM 1103; NCIMB 12210; WDCM 00013
<i>Escherichia coli</i>	NCTC 11954	Routine internal QC	TEM-1 β -lactamase (Non-ESBL) producer	ATCC 35218; CECT 943 CIP 102181; CCUG 30600 DSM 5923
<i>Escherichia coli</i>	NCTC 13846	Routine internal QC	MCR-1 positive	-
<i>Haemophilus influenzae</i>	NCTC 12975	Routine internal QC	-	ATCC 49766; CCUG 29539; CIP 103570; DSM 11970
<i>Haemophilus influenzae</i>	NCTC 12699	Extended internal QC	-	ATCC 49247; CCUG 26214; CIP 104604; DSM 9999
<i>Klebsiella pneumoniae</i>	NCTC 13368	Routine and extended internal QC	SHV-18 ESBL producing	ATCC 700603; CECT 7787; CCUG 45421
<i>Pseudomonas aeruginosa</i>	NCTC 12903	Routine internal QC	-	ATCC 27853; CECT 108 CIP 76.110; CCUG 17619; DSM 1117; WDCM 00025
<i>Staphylococcus aureus</i>	NCTC 12493	Extended internal QC	Methicillin resistant (MRSA), <i>mecA</i> positive	CCUG 67181; WDCM 00212
<i>Staphylococcus aureus</i>	NCTC 12973	Routine internal QC	Weak β -lactamase positive, <i>mecA</i> negative	ATCC 29213; CECT 794; CIP 103429; CCUG 15915; DSM 2569; JCM 2874; WDCM 00131
<i>Streptococcus pneumoniae</i>	NCTC 12977	Routine internal QC	Penicillin intermediate (altered penicillin binding protein)	ATCC 49619; CCUG 33638; CIP 104340; DSM11967

Clinical and Laboratory Standards Institute (CLSI)

Recommended performance standards for antimicrobial susceptibility testing (M100-S24)

Organism	NCTC® Strain Reference	Characteristics	Other collection number
<i>Bacteroides fragilis</i>	NCTC 9343	β-lactamase positive	ATCC 25285; CN 6300; DSM 2151
<i>Bacteroides thetaiotaomicron</i>	NCTC 13706	β-lactamase positive	-
<i>Enterococcus faecalis</i>	NCTC 12697	-	ATCC 29212; WDCM 00087
<i>Enterococcus faecalis</i>	NCTC 13379	Resistant to vancomycin (VanB) and high-level aminoglycosides	ATCC 51299; CIP 10467; WDCM 00085; WDCM 00152
<i>Enterococcus faecalis</i>	NCTC 13705	-	WDCM 00210
<i>Escherichia coli</i>	NCTC 12241	β-lactamase negative	ATCC 25922; DSM 1103; NCIMB 12210; WDCM 00013
<i>Escherichia coli</i>	NCTC 11954	Contains plasmid-encoded TEM-1 β-lactamase (Non-ESBL) producer	ATCC 35218
<i>Haemophilus influenzae</i>	NCTC 12699	BLNAR (β-lactamase negative, ampicillin resistant)	ATCC 49247
<i>Haemophilus influenzae</i>	NCTC 12975	Ampicillin susceptible	ATCC 49766; CIP 103570
<i>Haemophilus influenzae</i>	NCTC 13377	-	ATCC 10211; CIP 103708
<i>Helicobacter pylori</i>	NCTC 11637	-	ATCC 43504; CCUG 17874; DSM 4867; LMG 7539;
<i>Klebsiella pneumoniae</i>	NCTC 13368	SHV-18 ESBL producing	ATCC 700603; CCUG 45421; LMG 20218
<i>Neisseria gonorrhoeae</i>	NCTC 12700	CMRNG (Chromosome-mediated resistant <i>Neisseria gonorrhoeae</i>)	ATCC 49226
<i>Pseudomonas aeruginosa</i>	NCTC 12903	Contains inducible AmpC β-lactamase	ATCC 27853; WDCM 00025
<i>Staphylococcus aureus</i>	NCTC 12981	β-lactamase negative, <i>mecA</i> negative, little value in MIC testing due to its extreme susceptibility to most drugs	ATCC 25923; CIP 76.25; DSM 1104; JCM 2413; WDCM 00034
<i>Staphylococcus aureus</i>	NCTC 12973	Weak β-lactamase positive, <i>mecA</i> negative	ATCC 29213; CIP 103429; DSM 2569; JCM 2874; WDCM 00131
<i>Staphylococcus aureus</i>	NCTC 13373	Oxacillin resistant, <i>mecA</i> negative	ATCC 43300; WDCM 00211
<i>Streptococcus pneumoniae</i>	NCTC 12977	Penicillin intermediate (altered penicillin binding protein)	ATCC 49619; CIP 104340

UK Standard for Microbiology Investigations (UKSMI)

Recommended in B59: Enterobacteriaceae producing Extended Spectrum β -lactamases

Organism	NCTC® Strain Reference	Characteristics	Other collection number
<i>Escherichia coli</i>	NCTC 13353	CTX-M-15 (cefotaxime)	-
<i>Escherichia coli</i>	NCTC 13351	TEM-3 (Broad Spectrum)	-
<i>Escherichia coli</i>	NCTC 13352	TEM-10 (ceftazidimase)	-
<i>Escherichia coli</i>	NCTC 10418	Negative control	ATCC 10536; CN 6455; DSM 682; NCIB 8879;
<i>Klebsiella pneumoniae</i>	NCTC 13368	SHV-18 ESBL producing	ATCC 700603; CCUG 45421; LMG 20218

Recommended in B60: Detection of bacteria with carbapenem-hydrolysing β -lactamases (carbapenemases)

Organism	NCTC® strain reference	Characteristics	Other collection number
Class A Carbapenemase			
<i>Klebsiella pneumoniae</i>	NCTC 13438	Member of the international ST258 clone producing KPC-3 carbapenemase	-
Class B Carbapenemases (Metallo-β-lactamases)			
<i>Escherichia coli</i>	NCTC 13476	IMP-type (unsequenced)	CCUG 68729
<i>Klebsiella pneumoniae</i>	NCTC 13439	VIM-1; QnrS1 (outbreak strain)	-
<i>Klebsiella pneumoniae</i>	NCTC 13440	VIM-1; QnrS1 (sporadic)	-
<i>Klebsiella pneumoniae</i>	NCTC 13443	New Delhi Metallo- β -lactamase (NDM-1)	CCUG 68728
<i>Pseudomonas aeruginosa</i>	NCTC 13437	VIM-10; VEB-1	-
Class D Carbapenemases (OXA carbapenemases)			
<i>Acinetobacter baumannii</i>	NCTC 13301	OXA-23 (also with OXA-51-like)	-
<i>Acinetobacter baumannii</i>	NCTC 13302	OXA-25 (OXA-24/40-like) (also with OXA-51-like)	-
<i>Acinetobacter baumannii</i>	NCTC 13303	OXA-26 (also with OXA-51-like)	-
<i>Acinetobacter baumannii</i>	NCTC 13304	OXA-27 (also with OXA-51-like)	-
<i>Acinetobacter baumannii</i>	NCTC 13305	(A 15) OXA-58 (also with OXA-51-like)	-
<i>Acinetobacter baumannii</i>	NCTC 13421	OXA-23 Clone 2 (also with OXA-51-like)	-
<i>Acinetobacter baumannii</i>	NCTC 13424	OXA-23 Clone 1 (also with OXA-51-like)	-
<i>Acinetobacter baumannii</i>	NCTC 13420	SE Clone OXA-51-like	-
<i>Acinetobacter baumannii</i>	NCTC 13422	NW Clone OXA-51-like	-
<i>Acinetobacter baumannii</i>	NCTC 13423	T strain (UK3) OXA-51-like	-
<i>Klebsiella pneumoniae</i>	NCTC 13442	Sequence type 353 with OXA-48	CCUG 68727

Note: Either *E. coli* NCTC 10418 or ATCC 25922 should be used as a negative control in confirmation tests.

World Health Organisation (WHO)
Neisseria gonorrhoeae panel

Organism	NCTC® Strain Reference	WHO Designation	Characteristics	Other collection number
<i>Neisseria gonorrhoeae</i>	NCTC 13477	WHO F	Fully susceptible isolate	CCUG 57595
<i>Neisseria gonorrhoeae</i>	NCTC 13478	WHO G	Resistant to; ciprofloxacin (Low-level), penicillin (intermediate) tetracycline (TRNG).	CCUG 57596
<i>Neisseria gonorrhoeae</i>	NCTC 13479	WHO K	Resistant to; cefixime (low-level), ciprofloxacin (high-level), penicillin G, tetracycline.	CCUG 57597
<i>Neisseria gonorrhoeae</i>	NCTC 13480	WHO L	Resistant to; azithromycin (intermediate), penicillin G, ceftriaxone (low-level), ciprofloxacin (high-level), tetracycline	CCUG 57598
<i>Neisseria gonorrhoeae</i>	NCTC 13481	WHO M	Resistant to; ciprofloxacin, penicillin G (penicillinase-producing), tetracycline	CCUG 57599
<i>Neisseria gonorrhoeae</i>	NCTC 13482	WHO N	Resistant to; penicillin G (penicillinase-producing), ciprofloxacin, tetracycline (TRNG)	CCUG 57600
<i>Neisseria gonorrhoeae</i>	NCTC 13483	WHO O	Resistant to; penicillin G (penicillinase-producing), spectinomycin, tetracycline	CCUG 57601
<i>Neisseria gonorrhoeae</i>	NCTC 13484	WHO P	Resistant to; azithromycin, penicillin G (intermediate), tetracycline (intermediate).	CCUG 57602
<i>Neisseria gonorrhoeae</i>	NCTC 13817	WHO U	Resistant to; azithromycin, ciprofloxacin (high-level), penicillin G (intermediate), tetracycline (intermediate).	-
<i>Neisseria gonorrhoeae</i>	NCTC 13818	WHO V	Resistant to; azithromycin (high-level), ciprofloxacin (high-level), penicillin G (penicillinase-producing), tetracycline.	-
<i>Neisseria gonorrhoeae</i>	NCTC 13819	WHO W	Resistant to; cefixime (low-level), ciprofloxacin (high-level), penicillin G, tetracycline.	-
<i>Neisseria gonorrhoeae</i>	NCTC 13820	WHO X	Resistant to; azithromycin (intermediate). Cefixime (high-level), ceftriaxone (high-level), ciprofloxacin (high-level), penicillin G.	-
<i>Neisseria gonorrhoeae</i>	NCTC 13821	WHO Y	Resistant to; azithromycin, cefixime (high-level), ceftriaxone (high-level) and ciprofloxacin (high-level), penicillin G (intermediate), tetracycline.	-
<i>Neisseria gonorrhoeae</i>	NCTC 13822	WHO Z	Resistant to; azithromycin, ceftriaxone (low-level), cefixime (high-level) and ciprofloxacin (high-level), penicillin G, tetracycline.	-

British Society for Antimicrobial Chemotherapy (BSAC)
 Method for Antimicrobial Susceptibility Testing (Version 14 January 2015)
 Control strains with a resistance mechanism

Organism	NCTC® Strain Reference	Characteristics	Other collection number
<i>Bacteroides fragilis</i>	NCTC 9343	Susceptible	ATCC 25285; CN 6300; DSM 2151
<i>Bacteroides thetaiotaomicron</i>	NCTC 13706	Susceptible	-
<i>Clostridium perfringens</i>	NCTC 8359	Susceptible	ATCC 12915; CN 3335
<i>Enterococcus faecalis</i>	NCTC 12697	Susceptible	ATCC 29212; WDCM 00087
<i>Escherichia coli</i>	NCTC 12241	Susceptible (β -lactamase negative)	ATCC 25922; DSM 1103; NCIMB 12210; WDCM 00013
	NCTC 10418	Susceptible	ATCC 10536; CN 6455; DSM 682; NCIB 8879;
<i>Escherichia coli</i>	NCTC 11560	TEM-1 β -lactamase producer	-
<i>Haemophilus influenzae</i>	NCTC 11931	Susceptible	-
<i>Haemophilus influenzae</i>	NCTC 12699	Resistant to β -lactams (β -lactamase-negative)	ATCC 49247
<i>Neisseria gonorrhoeae</i>	NCTC 12700	Low level chromosome mediated resistant to penicillin	ATCC 49226
<i>Pasteurella multocida</i>	NCTC 8489	Susceptible	-
<i>Pseudomonas aeruginosa</i>	NCTC 12903	Susceptible (contains inducible AmpC β -lactamase)	ATCC 27853; WDCM 00025
	NCTC 10662	Susceptible	ATCC 25668; CCUG 1423; DSM 46358; WDCM 00114
<i>Staphylococcus aureus</i>	NCTC 12981	Susceptible (β -lactamase negative)	ATCC 25923; CIP 76.25; DSM 1104; JCM 2413; WDCM 00034
	NCTC 6571	Susceptible	ATCC 9144; CN 6457; NCIB 6571; NRRL-B314; WDCM 00035
<i>Staphylococcus aureus</i>	NCTC 12493	<i>MecA</i> positive, methicillin resistant	WDCM 00212
<i>Streptococcus pneumoniae</i>	NCTC 12977	Low level resistant to penicillin (altered penicillin binding protein)	ATCC 49619; CIP 104340

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The European Committee on Antimicrobial Susceptibility Testing (EUCAST)

www.clsi.org

Clinical and Laboratory Standards Institute (CLSI)

www.gov.uk

UK Standards for Microbiological Investigations

www.bsac.org.uk

British Society for Antimicrobial Chemotherapy (BSAC)

