# 2014 UAH ANTIBIOGRAM

## www.antibiogram.ca

**University of Alberta Hospital and the Stollery Children's Hospital**

**Department of Laboratory Medicine and Pathology**

Alberta Health Services

PROVLAB ALBERTA

## Introduction

The antibiogram is an annual cumulative report of the antimicrobial susceptibility rates of common microbial pathogens to antimicrobials available on the hospital formulary. This report represents the local microbial epidemiology at the University of Alberta Hospital (UAH), Stollery Children's Hospital, and the Cross Cancer Institute (CCI), and is to be used as a resource to direct empiric antimicrobial therapy.

Antibiograms are generated by the compilation of susceptibility results from all 'first' clinical isolates of a specific pathogen recovered from an individual patient per calendar year. That is, only the first isolate within a 14-day period, regardless of specimen type or body site, is selected for analysis. The rationale for this referral period is based on the need to represent 'wild-type' susceptibility profiles and avoid over-representing antimicrobial resistance that may develop *de novo* during a patient's prolonged hospital stay. Susceptibility rates for patient groups (ie. age or ward location) represented by less than 30 isolates of a pathogen are not calculated due to the limited statistical significance and interpretive value.

This antibiogram contains summary data for 2014 and notable resistance trends over several years.

Web app available at www.antibiogram.ca

PDF version is available at http://www.albertahealthservices.ca/3294.asp.

A tremendous amount of effort goes into the creation of this document each year and the effort of the entire medical microbiology technologist staff is truly appreciated. We would also like to acknowledge Dr. Darren Hudson, UAH, for his assistance with the antibiogram data synthesis.

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# Antibiogram Resistance Trends

**Enterobacteriaceae:**

*Enterobacter, Citrobacter,* and *Serratia* species are intrinsically resistant to ampicillin, cefazolin, and cefuroxime and may develop resistance to broader-spectrum β-lactams during prolonged β-lactam therapy. Carbapenems are effective empiric options but a small proportion of these species (<10%) exhibit *in vitro* resistance to ertapenem, albeit susceptible to imipenem and meropenem.

The extended-spectrum β-lactamase (ESBL) resistance phenotype confers resistance to all third-generation cephalosporins and, in many cases, piperacillin-tazobactam. The proportion of *E. coli* culture isolates that are ESBL-positive has increased steadily from 5% in 2010 to 9.5% in 2014. In 2014, the cross-resistance rates for ESBL-positive *E. coli* to the quinolones, aminoglycosides, and trimethoprim-sulfamethoxazole were 82%, 34%, and 66%, respectively.

The proportion of *K. pneumoniae* culture isolates that are ESBL-positive has remained at ~5% since 2007. Similar to *E. coli* ESBLs, resistance rates to other antibiotic classes are characteristically high but the overall annual recovery is low.

***Pseudomonas aeruginosa*:**

Resistance rates in *P. aeruginosa* have remained relatively unchanged over nine years of surveillance of patients with and without cystic fibrosis (adult and paediatric). Overall resistance in 2014 was 11% to ceftazidime, 18% to ciprofloxacin and gentamicin, 20% to imipenem, and 14% to meropenem.

***Streptococcus pneumoniae*:**

The susceptibility of *S. pneumoniae* to certain β-lactams is pharmacodynamically interpreted to direct appropriate therapy for meningeal (M) and non-meningeal (NM) infections, and for infections treated with oral penicillin V (PO). In 2014, resistance rates using meningeal and non-meningeal interpretations were 12% and 2% for penicillin, and 14% and 3% for ceftriaxone, respectively. Note, these rates do not reflect actual cases of pneumococcal meningitis.

## Medically Relevant Pathogens Based on Gram Morphology

| Gram-negative Bacilli | | |
|---|---|---|
| **Lactose Fermenters** | **Non-lactose Fermenters** | **Glucose Non-fermenters** |
| *Escherichia coli* | *Serratia marcescens* | *Pseudomonas aeruginosa* |
| *Klebsiella pneumoniae* | *Salmonella* spp. | *Pseudomonas* spp. |
| *Klebsiella oxytoca* | *Proteus* spp. | *Stenotrophomonas maltophilia* |
| *Enterobacter cloacae* | *Morganella morganii* | *Acinetobacter baumanii* complex |
| *Citrobacter freundii* complex | *Aeromonas* spp. | *Achromobacter* species |
| *Enterobacter aerogenes* | *Providencia* spp. | *Burkholderia cepacia* |
| *Citrobacter koseri* | *Yersinia* spp. | *Chryseobacterium* species |

| Gram-positive Cocci | |
|---|---|
| **Gram-positive Cocci in Chains** | **Gram-positive Cocci in Clumps** |
| *Enterococcus faecium, Enterococcus faecalis* | *Staphylococcus aureus* |
| *Streptococcus pyogenes* (Group A) | *Staphylococcus* spp., coagulase-negative |
| *Streptococcus agalactiae* (Group B) | *Staphylococcus lugdunensis* |
| *Streptococcus pneumoniae* | *Micrococcus* spp. |
| Viridans group streptococci | *Aerococcus* spp. |
| *Streptococcus anginosus* group | *Rothia mucilaginosus* |

## Abbreviation Glossary for Antimicrobials

| Antimicrobial | Abbreviation | Antimicrobial | Abbreviation |
|---|---|---|---|
| Amikacin | AMK | Gentamicin Synergy | GM500 |
| Amoxicillin/clavulanate | A/C | Imipenem | IMI |
| Ampicillin | AMP | Levofloxacin | LEV |
| Amphotericin B | AMB | Linezolid | LNZ |
| Cefazolin | FAZ | Meropenem | MERO |
| Ceftriaxone | CRO | Metronidazole | MET |
| Ceftazidime | CAZ | Micafungin | MICA |
| Cefuroxime | CXM | Nitrofurantoin | NIT |
| Ciprofloxacin | CIP | Penicillin | PEN |
| Clindamycin | CLIN | Piperacillin | PIP |
| Cloxacillin | CLOX | Tetracycline | TET |
| Doxycycline | DOXY | Tobramycin | TOB |
| Erythromycin | ERY | Trimethoprim-sulfamethoxazole | SXT |
| Fluconazole | FLUC | Vancomycin | VAN |
| Gentamicin | GEN | Voriconazole | VORI |

# Antibiogram Tables

| ***Acinetobacter baumanii* complex** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **CAZ** | **CIP** | **GEN** | **MERO** | **TOB** | **SXT** |
| ALL Ages | **% SUSC** | **61** | **75** | **97** | **97** | **97** | **97** |
| | # SUSC | 22 | 27 | 35 | 35 | 35 | 35 |
| | # TESTED | 36 | 36 | 36 | 36 | 36 | 36 |

| ***Bacteroides fragilis* group** | | | | | |
|---|---|---|---|---|---|
| **All Specimen Sources** | | **A/C** | **CLIN** | **IMI** | **MET** |
| ALL Ages | **% SUSC** | **78** | **52** | **95** | **100** |
| | # SUSC | 36 | 24 | 44 | 46 |
| | # TESTED | 46 | 46 | 46 | 46 |

| ***Citrobacter freundii* complex** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **AMP** | **FAZ** | **CRO** | **CIP** | **GEN** | **MERO** | **NIT** | **SXT** |
| ALL Ages | **% SUSC** | **0** | **0** | **73** | **86** | **88** | **100** | **91** | **82** |
| | # SUSC | 0 | 0 | 71 | 84 | 86 | 97 | 89 | 80 |
| | # TESTED | 97 | 97 | 97 | 97 | 97 | 97 | 97 | 97 |
| ≥ 17 years | **% SUSC** | **0** | **0** | **71** | **84** | **86** | **100** | **91** | **82** |
| | # SUSC | 0 | 0 | 60 | 71 | 73 | 84 | 89 | 69 |
| | # TESTED | 84 | 84 | 84 | 84 | 84 | 84 | 84 | 84 |

*Enterobacter, Citrobacter,* and *Serratia* species are intrinsically resistant to ampicillin, cefazolin, and cefuroxime and may develop resistance to broader-spectrum β-lactams during prolonged β-lactam therapy. Carbapenems are effective empiric options but a small proportion of these species (<10%) exhibit *in vitro* resistance to ertapenem, albeit susceptible to imipenem and meropenem.

| *Enterobacter aerogenes* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **AMP** | **FAZ** | **CRO** | **CIP** | **GEN** | **MERO** | **NIT** | **SXT** |
| ALL Ages | **% SUSC** | **0** | **0** | **74** | **93** | **100** | **96** | **1** | **100** |
| | # SUSC | 0 | 0 | 49 | 62 | 66 | 64 | 1 | 66 |
| | # TESTED | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 |
| ≥ 17 years | | **0** | **0** | **75** | **93** | **100** | **100** | **1** | **100** |
| | # SUSC | 0 | 0 | 45 | 56 | 60 | 58 | 1 | 60 |
| | # TESTED | 60 | 60 | 60 | 60 | 60 | 60 | 60 | 60 |

| *Enterobacter cloacae* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **AMP** | **FAZ** | **CRO** | **CIP** | **GEN** | **MERO** | **NIT** | **SXT** |
| **All Patients** | **% SUSC** | **0** | **0** | **73** | **95** | **98** | **99** | **29** | **92** |
| ALL Ages | # SUSC | 0 | 0 | 234 | 307 | 317 | 320 | 93 | 296 |
| | # TESTED | 320 | 320 | 320 | 321 | 321 | 321 | 319 | 321 |
| ≥ 17 years | **% SUSC** | **0** | **0** | **73** | **95** | **98** | **100** | **27** | **92** |
| | # SUSC | 0 | 0 | 198 | 259 | 268 | 271 | 73 | 251 |
| | # TESTED | 270 | 270 | 271 | 271 | 271 | 271 | 270 | 271 |
| < 17 years | **% SUSC** | **0** | **0** | **73** | **96** | **98** | **98** | **40** | **90** |
| | # SUSC | 0 | 0 | 36 | 48 | 49 | 49 | 20 | 45 |
| | # TESTED | 49 | 49 | 49 | 50 | 50 | 50 | 49 | 50 |

*Enterobacter, Citrobacter,* and *Serratia* species are intrinsically resistant to ampicillin, cefazolin, and cefuroxime and may develop resistance to broader-spectrum β-lactams during prolonged β-lactam therapy. Carbapenems are effective empiric options but a small proportion of these species (<10%) exhibit *in vitro* resistance to ertapenem, albeit susceptible to imipenem and meropenem.

| ***Escherichia coli* (including ESBLs)** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **AMP** | **CRO** | **CIP** | **GEN** | **MERO** | **NIT** | **SXT** |
| **All Patients** | **% SUSC** | **50** | **88** | **73** | **90** | **99** | **94** | **73** |
| ALL Ages | # SUSC | 1359 | 2380 | 1982 | 2434 | 2684 | 2526 | 1964 |
| | # TESTED | 2687 | 2681 | 2688 | 2688 | 2687 | 2686 | 2686 |
| | **% SUSC** | **51** | **87** | **68** | **89** | **99** | **93** | **73** |
| ≥ 17 years | # SUSC | 1060 | 1814 | 1417 | 1855 | 2073 | 1946 | 1520 |
| | # TESTED | 2077 | 2072 | 2077 | 2077 | 2076 | 2077 | 2075 |
| | **% SUSC** | **49** | **92** | **92** | **94** | **100** | **95** | **72** |
| < 17 years | # SUSC | 299 | 566 | 565 | 579 | 611 | 580 | 444 |
| | # TESTED | 610 | 609 | 611 | 611 | 611 | 609 | 611 |
| | **% SUSC** | **43** | **83** | **61** | **87** | **100** | **96** | **70** |
| **GSICU** | # SUSC | 24 | 46 | 34 | 48 | 55 | 53 | 39 |
| | # TESTED | 55 | 55 | 55 | 55 | 55 | 55 | 55 |
| | **% SUSC** | **57** | **93** | **72** | **89** | **100** | **95** | **73** |
| **CCI** | # SUSC | 58 | 94 | 73 | 90 | 101 | 96 | 74 |
| | # TESTED | 101 | 101 | 101 | 101 | 101 | 101 | 101 |

| ***Escherichia coli* - ESBL Producers Only** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **AMP** | **CRO** | **CIP** | **GEN** | **MERO** | **NIT** | **SXT** |
| | **% SUSC** | **0** | **0** | **18** | **66** | **99** | **87** | **44** |
| ALL Ages | # SUSC | 0 | 0 | 48 | 169 | 254 | 222 | 113 |
| | # TESTED | 255 | 255 | 255 | 255 | 255 | 255 | 255 |
| | **% SUSC** | **0** | **0** | **15** | **66** | **99** | **86** | **46** |
| ≥ 17 years | # SUSC | 0 | 0 | 34 | 145 | 218 | 190 | 101 |
| | # TESTED | 219 | 219 | 219 | 219 | 219 | 219 | 219 |

The extended-spectrum β-lactamase (ESBL) resistance phenotype confers resistance to all third-generation cephalosporins and, in many cases, piperacillin-tazobactam. The proportion of *E. coli* culture isolates that are ESBL-positive has increased steadily from 5% in 2010 to 9.5% in 2014. In 2014, the cross-resistance rates for ESBL-positive *E. coli* to the quinolones, aminoglycosides, and trimethoprim-sulfamethoxazole were 82%, 34%, and 66%, respectively.

| ***Klebsiella* species (Including ESBLs)** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **AMP** | **CRO** | **CIP** | **GEN** | **MERO** | **NIT** | **SXT** |
| **All Patients** | **% SUSC** | **0** | **94** | **95** | **97** | **99** | **31** | **90** |
| ALL Ages | # SUSC | 0 | 737 | 744 | 760 | 778 | 248 | 704 |
| | # TESTED | 780 | 780 | 780 | 780 | 780 | 780 | 780 |
| | **% SUSC** | **0** | **94** | **94** | **97** | **99** | **29** | **89** |
| ≥ 17 years | # SUSC | 0 | 627 | 630 | 651 | 663 | 199 | 596 |
| | # TESTED | 665 | 665 | 665 | 665 | 665 | 665 | 665 |
| | **% SUSC** | **0** | **95** | **99** | **94** | **100** | **42** | **93** |
| < 17 years | # SUSC | 0 | 110 | 114 | 109 | 155 | 49 | 108 |
| | # TESTED | 155 | 155 | 155 | 155 | 155 | 155 | 155 |
| | **% SUSC** | **0** | **97** | **90** | **100** | **100** | **30** | **83** |
| **GSICU** | # SUSC | 0 | 42 | 39 | 43 | 43 | 13 | 36 |
| | # TESTED | 43 | 43 | 43 | 43 | 43 | 43 | 43 |
| | **% SUSC** | **0** | **94** | **97** | **100** | **100** | **37** | **89** |
| **CCI** | # SUSC | 0 | 35 | 36 | 37 | 37 | 14 | 33 |
| | # TESTED | 37 | 37 | 37 | 37 | 37 | 37 | 37 |

| ***Klebsiella* species - ESBL Producers Only** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **AMP** | **CRO** | **CIP** | **GEN** | **MERO** | **NIT** | **SXT** |
| | **% SUSC** | **0** | **0** | **78** | **83** | **100** | **16** | **38** |
| ALL Ages | # SUSC | 0 | 0 | 33 | 35 | 42 | 7 | 16 |
| | # TESTED | 42 | 42 | 42 | 42 | 42 | 42 | 42 |

The extended-spectrum β-lactamase (ESBL) resistance phenotype confers resistance to all third-generation cephalosporins and, in many cases, piperacillin-tazobactam. The proportion of *K. pneumoniae* culture isolates that are ESBL-positive has remained at ~5% since 2007. Similar to *E. coli* ESBLs, resistance rates to other antibiotic classes are characteristically high but the overall annual recovery is low.

| *Haemophilus influenzae* | | | | |
|---|---|---|---|---|
| **All Specimen Sources** | | **AMP** | **CXM** | **SXT** |
| ALL Ages | **% SUSC** | **72** | **76** | **76** |
| | # SUSC | 154 | 48 | 46 |
| | # TESTED | 212 | 63 | 60 |
| ≥ 17 years | **% SUSC** | **73** | **73** | **70** |
| | # SUSC | 119 | 33 | 31 |
| | # TESTED | 162 | 45 | 44 |

| *Morganella morganii* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **AMP** | **CRO** | **CIP** | **GEN** | **MERO** | **NIT** | **SXT** |
| ALL Ages | **% SUSC** | **0** | **91** | **88** | **89** | **100** | **0** | **77** |
| | # SUSC | 0 | 61 | 59 | 60 | 67 | 0 | 51 |
| | # TESTED | 67 | 67 | 67 | 67 | 67 | 67 | 67 |
| ≥ 17 years | **% SUSC** | **0** | **91** | **88** | **88** | **100** | **0** | **76** |
| | # SUSC | 0 | 56 | 54 | 54 | 61 | 0 | 46 |
| | # TESTED | 61 | 61 | 61 | 61 | 61 | 61 | 61 |

| *Proteus mirabilis* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **AMP** | **CRO** | **CIP** | **GEN** | **MERO** | **NIT** | **SXT** |
| ALL Ages | **% SUSC** | **71** | **93** | **81** | **92** | **100** | **0** | **74** |
| | # SUSC | 163 | 212 | 185 | 210 | 227 | 0 | 170 |
| | # TESTED | 227 | 227 | 227 | 227 | 227 | 227 | 227 |
| ≥ 17 years | **% SUSC** | **71** | **93** | **79** | **93** | **100** | **0** | **74** |
| | # SUSC | 141 | 186 | 158 | 185 | 198 | 0 | 148 |
| | # TESTED | 198 | 198 | 198 | 198 | 198 | 198 | 198 |

| *Pseudomonas aeruginosa* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **AMK** | **CAZ** | **CIP** | **GEN** | **IMI** | **MERO** | **PIP** | **TOB** |
| **All Patients** | **% SUSC** | **86** | **89** | **82** | **82** | **80** | **86** | **79** | **90** |
| ALL Ages | # SUSC | 923 | 958 | 883 | 882 | 857 | 929 | 850 | 972 |
| | # TESTED | 1069 | 1070 | 1070 | 1069 | 1061 | 1069 | 1068 | 1070 |
| ≥ 17 years | **% SUSC** | **85** | **88** | **79** | **81** | **79** | **86** | **82** | **90** |
| | # SUSC | 715 | 741 | 668 | 685 | 662 | 727 | 692 | 762 |
| | # TESTED | 837 | 838 | 838 | 837 | 830 | 837 | 837 | 838 |
| < 17 years | **% SUSC** | **89** | **93** | **92** | **84** | **84** | **87** | **68** | **90** |
| | # SUSC | 208 | 217 | 215 | 197 | 195 | 202 | 158 | 210 |
| | # TESTED | 232 | 232 | 232 | 232 | 231 | 232 | 231 | 232 |
| **Non-CF Patients** | **% SUSC** | **90** | **88** | **81** | **85** | **80** | **85** | **77** | **92** |
| ALL Ages | # SUSC | 784 | 767 | 704 | 738 | 684 | 740 | 667 | 796 |
| | # TESTED | 863 | 864 | 864 | 863 | 855 | 863 | 862 | 864 |
| ≥ 17 years | **% SUSC** | **90** | **87** | **78** | **85** | **79** | **86** | **81** | **91** |
| | # SUSC | 623 | 607 | 543 | 586 | 543 | 593 | 562 | 633 |
| | # TESTED | 689 | 690 | 690 | 689 | 682 | 689 | 689 | 690 |
| < 17 years | **% SUSC** | **92** | **91** | **92** | **87** | **81** | **84** | **60** | **93** |
| | # SUSC | 161 | 160 | 161 | 152 | 141 | 147 | 105 | 163 |
| | # TESTED | 174 | 174 | 174 | 174 | 173 | 174 | 173 | 174 |
| **CF Patients** | **% SUSC** | **67** | **92** | **86** | **69** | **83** | **91** | **88** | **85** |
| ALL Ages | # SUSC | 139 | 191 | 179 | 144 | 173 | 189 | 183 | 176 |
| | # TESTED | 206 | 206 | 206 | 206 | 206 | 206 | 206 | 206 |
| ≥ 17 years | **% SUSC** | **62** | **90** | **84** | **66** | **80** | **90** | **87** | **87** |
| | # SUSC | 92 | 134 | 125 | 99 | 119 | 134 | 130 | 129 |
| | # TESTED | 148 | 148 | 148 | 148 | 148 | 148 | 148 | 148 |
| < 17 years | **% SUSC** | **81** | **98** | **93** | **77** | **93** | **94** | **91** | **81** |
| | # SUSC | 47 | 57 | 54 | 45 | 54 | 55 | 53 | 47 |
| | # TESTED | 58 | 58 | 58 | 58 | 58 | 58 | 58 | 58 |
| **GSICU** | **% SUSC** | **93** | **72** | **65** | **72** | **66** | **67** | **65** | **79** |
| | # SUSC | 40 | 31 | 28 | 31 | 28 | 29 | 28 | 34 |
| | # TESTED | 43 | 43 | 43 | 43 | 43 | 43 | 43 | 43 |

Resistance rates in *P. aeruginosa* have remained relatively unchanged over nine years of surveillance of patients with and without cystic fibrosis (adult and paediatric). Overall resistance in 2014 was 11% to ceftazidime, 18% to ciprofloxacin and gentamicin, 20% to imipenem, and 14% to meropenem.

| *Serratia marcescens* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **AMP** | **FAZ** | **CRO** | **CIP** | **GEN** | **MERO** | **NIT** | **SXT** |
| **All Patients** | **% SUSC** | **0** | **0** | **97** | **89** | **98** | **98** | **0** | **100** |
| ALL Ages | # SUSC | 0 | 0 | 128 | 117 | 129 | 129 | 0 | 131 |
| | # TESTED | 131 | 131 | 131 | 131 | 131 | 131 | 131 | 131 |
| | **% SUSC** | **0** | **0** | **97** | **86** | **98** | **98** | **0** | **100** |
| ≥ 17 years | # SUSC | 0 | 0 | 102 | 91 | 103 | 103 | 0 | 105 |
| | # TESTED | 105 | 105 | 105 | 105 | 105 | 105 | 105 | 105 |

*Enterobacter, Citrobacter,* and *Serratia* species are intrinsically resistant to ampicillin, cefazolin, and cefuroxime and may develop resistance to broader-spectrum β-lactams during prolonged β-lactam therapy. Carbapenems are effective empiric options but a small proportion of these species (<10%) exhibit *in vitro* resistance to ertapenem, albeit susceptible to imipenem and meropenem.

| *Stenotrophomonas maltophilia* | | | | |
|---|---|---|---|---|
| **All Specimen Sources** | | **CAZ** | **DOXY** | **SXT** |
| **All Patients** | **% SUSC** | **27** | **71** | **91** |
| ALL Ages | # SUSC | 95 | 257 | 330 |
| | # TESTED | 346 | 361 | 361 |
| | **% SUSC** | **28** | **66** | **89** |
| ≥ 17 years | # SUSC | 75 | 186 | 250 |
| | # TESTED | 267 | 278 | 278 |
| | **% SUSC** | **25** | **85** | **96** |
| < 17 years | # SUSC | 20 | 71 | 80 |
| | # TESTED | 79 | 83 | 83 |

| *Enterococcus faecalis* | | | | | | |
|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **AMP** | **GM500** | **LNZ** | **NIT** | **VAN** |
| **All Patients** | **% SUSC** | **99** | **73** | **98** | **98** | **100** |
| ALL Ages | # SUSC | 1291 | 952 | 1258 | 1280 | 1291 |
| | # TESTED | 1298 | 1296 | 1273 | 1295 | 1291 |
| | **% SUSC** | **99** | **70** | **98** | **98** | **100** |
| ≥ 17 years | # SUSC | 1041 | 732 | 1017 | 1032 | 1041 |
| | # TESTED | 1047 | 1045 | 1028 | 1044 | 1041 |
| | **% SUSC** | **99** | **87** | **98** | **98** | **100** |
| < 17 years | # SUSC | 250 | 220 | 241 | 248 | 250 |
| | # TESTED | 251 | 251 | 245 | 251 | 250 |
| | **% SUSC** | **100** | **61** | **100** | **100** | **100** |
| **CCI** | # SUSC | 47 | 29 | 44 | 47 | 47 |
| | # TESTED | 47 | 47 | 44 | 47 | 47 |

| *Enterococcus faecium* | | | | | | |
|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **AMP** | **GM500** | **LNZ** | **NIT** | **VAN** |
| | **% SUSC** | **13** | **78** | **99** | **22** | **97** |
| ALL Ages | # SUSC | 33 | 197 | 245 | 55 | 241 |
| | # TESTED | 250 | 250 | 247 | 250 | 247 |
| | **% SUSC** | **13** | **81** | **99** | **20** | **97** |
| ≥ 17 years | # SUSC | 31 | 190 | 229 | 48 | 225 |
| | # TESTED | 234 | 234 | 231 | 234 | 231 |

| ***Staphylococcus aureus* (Including MRSA)** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **CLIN** | **CLOX** | **ERY** | **LNZ** | **NIT** | **TET** | **SXT** | **VAN** |
| **All Patients** | **% SUSC** | **76** | **79** | **67** | **100** | **98** | **96** | **94** | **99** |
| ALL Ages | # SUSC | 1783 | 1863 | 1594 | 2355 | 2314 | 2262 | 2237 | 2348 |
| | # TESTED | 2325 | 2354 | 2354 | 2355 | 2351 | 2352 | 2355 | 2350 |
| | **% SUSC** | **75** | **79** | **65** | **100** | **98** | **95** | **95** | **99** |
| ≥ 17 years | # SUSC | 1346 | 1430 | 1187 | 1802 | 1768 | 1726 | 1716 | 1793 |
| | # TESTED | 1782 | 1801 | 1802 | 1802 | 1798 | 1799 | 1802 | 1795 |
| | **% SUSC** | **80** | **78** | **73** | **100** | **98** | **96** | **94** | **100** |
| < 17 years | # SUSC | 437 | 433 | 407 | 553 | 546 | 536 | 521 | 555 |
| | # TESTED | 543 | 553 | 552 | 553 | 553 | 553 | 553 | 555 |
| | **% SUSC** | **77** | **83** | **73** | **100** | **98** | **93** | **96** | **100** |
| **GSICU** | # SUSC | 100 | 109 | 95 | 130 | 128 | 122 | 125 | 129 |
| | # TESTED | 129 | 130 | 130 | 130 | 130 | 130 | 130 | 129 |
| | **% SUSC** | **73** | **85** | **61** | **100** | **97** | **97** | **97** | **100** |
| **3C2 Burn ward** | # SUSC | 25 | 29 | 21 | 34 | 33 | 33 | 33 | 34 |
| | # TESTED | 34 | 34 | 34 | 34 | 34 | 34 | 34 | 34 |
| | **% SUSC** | **83** | **90** | **76** | **100** | **94** | **98** | **97** | **100** |
| **CCI** | # SUSC | 60 | 64 | 55 | 72 | 68 | 71 | 70 | 72 |
| | # TESTED | 72 | 71 | 72 | 72 | 72 | 72 | 72 | 72 |

| ***Staphylococcus lugdunensis*** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **CLIN** | **CLOX** | **ERY** | **NIT** | **SXT** | **VAN** |
| | **% SUSC** | **86** | **98** | **85** | **100** | **100** | **100** |
| ALL Ages | # SUSC | 65 | 74 | 64 | 74 | 74 | 74 |
| | # TESTED | 75 | 75 | 75 | 74 | 74 | 74 |

| ***Staphylococcus* species, coagulase-negative** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **CLIN** | **CLOX** | **ERY** | **NIT** | **SXT** | **VAN** |
| **All Patients** | **% SUSC** | **51** | **45** | **39** | **99** | **65** | **100** |
| ALL Ages | # SUSC | 116 | 105 | 92 | 232 | 154 | 235 |
| | # TESTED | 224 | 233 | 235 | 234 | 235 | 235 |
| ≥ 17 years old | **% SUSC** | **54** | **45** | **40** | **98** | **64** | **100** |
| | # SUSC | 98 | 86 | 76 | 186 | 122 | 189 |
| | # TESTED | 180 | 188 | 189 | 188 | 189 | 189 |
| < 17 years old | **% SUSC** | **40** | **42** | **34** | **100** | **69** | **100** |
| | # SUSC | 18 | 19 | 16 | 46 | 32 | 46 |
| | # TESTED | 44 | 45 | 46 | 46 | 46 | 46 |

| **Viridans Group Streptococci** | | | | |
|---|---|---|---|---|
| **All Specimen Sources** | | **CRO** | **PEN** | **VAN** |
| ALL Ages | **% SUSC** | **98** | **68** | **100** |
| | # SUSC | 89 | 61 | 90 |
| | # TESTED | 90 | 89 | 90 |

| ***Streptococcus anginosus* group** | | | | |
|---|---|---|---|---|
| **All Specimen Sources** | | **CRO** | **PEN** | **VAN** |
| ALL Ages | **% SUSC** | **100** | **100** | **100** |
| | # SUSC | 45 | 44 | 42 |
| | # TESTED | 45 | 44 | 42 |

| ***Streptococcus pyogenes*** | | | | |
|---|---|---|---|---|
| **All Specimen Sources** | | **CLIN** | **ERY** | **PEN** |
| ALL Ages | **% SUSC** | **85** | **85** | **100** |
| | # SUSC | 41 | 40 | 45 |
| | # TESTED | 45 | 47 | 45 |

| ***Streptococcus pneumoniae*** | | M | NM | | | | M, PO | NM | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **All Specimen Sources** | | **CRO** | **CRO** | **DOXY** | **ERY** | **LEV** | **PEN** | **PEN** | **SXT** | **VAN** |
| **All Patients** | **% SUSC** | **86** | **97** | **67** | **73** | **100** | **79** | **98** | **85** | **100** |
| ALL Ages | # SUSC | 66 | 73 | 76 | 88 | 150 | 126 | 155 | 102 | 154 |
| | # TESTED | 76 | 75 | 112 | 120 | 150 | 158 | 157 | 120 | 154 |
| | **% SUSC** | **87** | **98** | **67** | **73** | **100** | **77** | **99** | **84** | **100** |
| ≥ 17 years old | # SUSC | 54 | 60 | 61 | 69 | 121 | 97 | 123 | 79 | 124 |
| | # TESTED | 62 | 61 | 90 | 94 | 121 | 125 | 124 | 94 | 124 |
| | **% SUSC** | **--** | **--** | **--** | **--** | **100** | **87** | **96** | **88** | **100** |
| < 17 years old | # SUSC | | | | | 30 | 29 | 32 | 23 | 30 |
| | # TESTED | | | | | 30 | 33 | 33 | 26 | 30 |

M, meningitis; NM, non-meningitis; PO, oral administration.

The susceptibility of *S. pneumoniae* to certain β-lactams is pharmacodynamically interpreted to direct appropriate therapy for meningeal (M) and non-meningeal (NM) infections, and for infections treated with oral penicillin V (PO). In 2014, resistance rates using meningeal and non-meningeal interpretations were 12% and 2% for penicillin, and 14% and 3% for ceftriaxone, respectively. Note, these rates do not reflect actual cases of pneumococcal meningitis. --, denotes insufficient isolates, susceptibility rates not calculated.

| ***Candida* species** | | | | | |
|---|---|---|---|---|---|
| **All Specimen Sources** | | **AMB** | **FLUC** | **VORI** | **MICA** |
| ***C. albicans*** | **% SUSC** | **100** | **99** | **99** | **100** |
| ALL Ages | # SUSC | 103 | 102 | 102 | 103 |
| | # TESTED | 103 | 103 | 103 | 103 |
| ***C. glabrata*** | **% SUSC** | **100** | **98** | **(98)** | **100** |
| ALL Ages | # SUSC | 49 | 48 | 48 | 49 |
| | # TESTED | 49 | 49 | 49 | 49 |

The susceptibility data for *C. glabrata* against voriconazole, shown in parentheses, is based on the established microbiological breakpoint of ≤0.5 mg/L. Currently, there is insufficient data to demonstrate a correlation of susceptibility testing and clinical outcome for *C. glabrata* infections treated with voriconazole.