



## Infection report

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### Uncommon pathogens involved in bacteraemia: England, Wales and Northern Ireland, 2010-2014

The analysis presented in this report is based on data extracted from the Public Health England (PHE) voluntary surveillance database, Second Generation Surveillance System, on 19 November 2015 for the period between 1 January 2010 to 31 December 2014 in England, Wales, and Northern Ireland. The reports made to PHE provide data on both community and hospital-acquired bacteraemia. This report describes uncommon pathogens (genera with fewer than 50 reports in 2014) identified from blood cultures or blood specimens where the diagnostic method was not stated. Data in this report may differ slightly from data in earlier publications due to inclusion of late reports.

A total of 114,276 bacterial isolates from blood samples were reported by laboratories in England, Wales, and Northern Ireland in 2014. Eighty eight uncommon genera causing bacteraemia were reported in 2014, comprising a total of 986 bacteraemic episodes (table 1). Gram-negative organisms accounted for 57.5% of these episodes. By definition of inclusion in this analysis, small numbers of reports preclude robust or meaningful analysis of trends, but of note are the general decreases in *Leuconostoc*, *Burkholderia* and *Elizabethkingia*, and increases in *Arcanobacterium*, *Bifidobacterium*, *Dermabacter*, *Eggerthella*, *Granulicatella*, *Kocuria*, *Rhodococcus*, *Brevundimonas*, *Capnocytophaga*, *Chryseobacterium*, *Eikenella*, *Gardnerella*, and *Roseomonas*.

## Discussion

The purpose of this review is to describe unusual bacterial genera not included in the monthly bacteraemia reports published in the Health Protection Report. Examining trends in these unusual pathogens can provide a means of identifying emerging or re-emerging infections [1], providing opportunities for preventative measures or education of frontline clinical staff.

There has been a general improvement in the identification of cultured organisms to the species level by increased use of automated biochemical identification systems, molecular techniques such as 16S ribosomal RNA, and the introduction of MALDI-TOF mass spectrometry in some laboratories. This has increased the accuracy of species identified, and permits robust trend analysis of hitherto difficult to identify species causing significant disease, such as identification of *Kocuria* spp that were previously identified as coagulase-negative staphylococci or micrococci. It should be borne in mind that findings by MALDI-TOF reflect organisms that are present in the database; therefore non-identification or identification at the genus level is expected to be improved with expansion of the database.

Although these bacteria only account for a very low proportion of total bacteraemia reports, they can be associated with important clinical consequences, such as endocarditis [2]. Infections imported from endemic regions, such as *Brucella* species [3] although rarely diagnosed in this country can cause severe illness in those affected. Others represent opportunistic pathogens causing infection in specific subpopulations, such as *Granulicatella* [4] in immunocompromised patients or are associated with specific exposures such as catheter-related bacteraemia due to *Brevibacterium* [5], non-cholera *Vibrio* due to exposure to contaminated salt water or infections due to *Erysipelothrix rhusiopathiae* in workers in contact with animals or handling animal products [6] Certain pathogens which primarily cause self-limiting gastrointestinal infections like *Shigella* spp, *Yersinia enterocolitica*, *Yersinia pseudotuberculosis* can rarely cause bacteraemias in specific hosts [7,8].

This year has seen a continuing increase in reports of bacteraemia caused by *Bifidobacterium* genus in the 5 year period (table 1). Reports of bacteraemia caused by species of the *Dermabacter* genus increased sharply in 2013 compared to previous years and rose further in 2014 (table 1). While *Dermabacter hominis* is commonly found on human skin, it has been isolated from a range of clinical specimens, such as blood cultures, abscesses, as well as wound and eye infections [9]. There has been a resurgence of reports of *Granulicatella* this year, largely due to increases in *Granulicatella adiacens*. Reports of *Kocuria* have doubled during the last year (possibly due to the increased accuracy of species identification) and similar trends have been observed in other countries [10].

Although reports of *Burkholderia* were sufficiently common in 2013 to warrant removal from the report, numbers have declined this year, principally due to decreases in *Burkholderia cepacia* (although the relatively high incidence of this species may reflect lack of speciation within the *Burkholderia cepacia* complex by some laboratories). Species belonging to the *B. cepacia* complex are relatively commonly found from the sputum of patients with cystic fibrosis, in whom

they (particularly *B. cenocepacia* genomovar IIIA) can be associated with ‘cepacia syndrome’ leading to a rapid decline and death [11]; the decline in numbers of these organisms causing bacteraemia suggests the incidence of this syndrome has decreased. *Ochrobactrum* were also reintroduced in 2014 due to a decrease in these organisms.

Reports of bacteraemia due to *Peptoniphilus* and *Psychrobacter* were noted for the first time in 2012 during the five year period [12]. The number of reports of *Peptoniphilus* has increased since then. Both of these have been reported to cause blood stream infections in patients with underlying morbidities [13, 14].

A number of new genera featured in this report, namely *Alloiococcus*, *Brevibacillus*, *Collinsella*, *Dermacoccus*, *Finegoldia*, *Calymmatobacterium*, *Herbasprillum*, *Leminorella*, *Massilia*, *Methylobacterium*, *Pandoraea*, *Parabacteroides*, *Sneathia*. Some of these genera have previously been associated with bacteraemia [15-21].

Whilst the bacteraemia reported to this voluntary surveillance system should, according to national reporting guidelines, reflect clinically significant disease, it should be borne in mind that some of these reports may reflect skin colonisers or contaminants due to difficulties in blood culture sampling or contamination in laboratory processing [22, 23]. Inclusion of reports with diagnostic method recorded in the database as unknown should be taken into account in interpreting these data as some of these reports may not represent bloodstream infections. Improvements in laboratory reporting of diagnostic methods would allow the exclusion of these reports without artificially decreasing the number of genuine bacteraemia infections.

If confirmation of unusual bacterial pathogens is required, isolates can be sent to the relevant laboratory within the Bacteriology Reference Department, Reference Microbiology Services, PHE Colindale.

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Appendix/Table 1: Uncommon pathogens associated with bacteraemia in England, Wales and N. Ireland: 2010-14\*

Genus	Species	Number of bacteraemia reports				
		2010	2011	2012	2013	2014
<b>Gram positive bacteria</b>						
<b><i>Abiotrophia</i> spp</b>		<b>9</b>	<b>17</b>	<b>23</b>	<b>17</b>	<b>24</b>
	<i>Abiotrophia defectiva</i>	5	8	17	12	21
	<i>Abiotrophia</i> other named	0	2	2	1	1
	<i>Abiotrophia</i> sp	4	7	4	4	2
<b><i>Actinobaculum</i> spp</b>		<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>2</b>
	<i>Actinobaculum schaalii</i>	0	1	1	1	2
<b><i>Alloiococcus</i> spp</b>		<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>2</b>
	<i>Alloiococcus otitis</i>	0	0	1	0	2
<b><i>Anaerococcus</i> spp</b>		<b>7</b>	<b>11</b>	<b>7</b>	<b>4</b>	<b>11</b>
	<i>Anaerococcus (peptostreptococcus) prevotti</i>	7	11	7	3	6
	<i>Anaerococcus</i> sp	0	0	0	0	5
	<i>Anaerococcus tetradius</i>	0	0	0	1	0
<b><i>Arcanobacterium</i> spp</b>		<b>18</b>	<b>11</b>	<b>10</b>	<b>14</b>	<b>25</b>
	<i>Arcanobacterium haemolyticum</i>	18	11	10	14	25
<b><i>Arthrobacter</i> spp</b>		<b>4</b>	<b>4</b>	<b>9</b>	<b>5</b>	<b>12</b>
	<i>Arthrobacter</i> sp	4	4	9	5	12
<b><i>Atopobium</i> spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>2</b>
	<i>Atopobium rimae</i>	0	0	0	1	1
	<i>Atopobium vaginae</i>	0	0	0	0	1
<b><i>Bifidobacterium</i> spp</b>		<b>4</b>	<b>7</b>	<b>11</b>	<b>20</b>	<b>31</b>
	<i>Bifidobacterium</i> named	0	0	3	3	16
	<i>Bifidobacterium</i> sp	4	7	8	17	15
<b><i>Brevibacillus</i> spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>4</b>
	<i>Brevibacillus borstelensis</i>	0	0	0	0	4
<b><i>Brevibacterium</i> spp</b>		<b>21</b>	<b>19</b>	<b>36</b>	<b>41</b>	<b>40</b>
	<i>Brevibacterium casei</i>	0	0	0	0	2
	<i>Brevibacterium</i> other named	6	1	5	19	19
	<i>Brevibacterium</i> sp	15	18	31	22	19
<b><i>Cellulomonas</i> spp</b>		<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<i>Cellulomonas</i> sp	1	0	0	0	0
<b><i>Collinsella</i> spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>8</b>
	<i>Collinsella aerofaciens</i>	0	0	0	1	8
<b><i>Dermabacter</i> spp</b>		<b>2</b>	<b>1</b>	<b>4</b>	<b>16</b>	<b>21</b>
	<i>Dermabacter hominis</i>	2	1	4	16	21
<b><i>Dermacoccus</i> spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
	<i>Dermacoccus</i> sp	0	0	0	0	1
<b><i>Eggerthella</i> spp</b>		<b>7</b>	<b>12</b>	<b>30</b>	<b>32</b>	<b>36</b>
	<i>Eggerthella lenta (eubacterium lentum)</i>	7	12	30	32	35
	<i>Eggerthella</i> sp	0	0	0	0	1

<b>Erysipelothrix spp</b>		<b>7</b>	<b>4</b>	<b>11</b>	<b>3</b>	<b>3</b>
	<i>Erysipelothrix</i> other named	0	0	0	1	0
	<i>Erysipelothrix rhusiopathiae</i> ( <i>insidiosa</i> )	7	3	10	2	2
	<i>Erysipelothrix</i> sp	0	1	1	0	1
<b>Eubacterium spp</b>		<b>5</b>	<b>9</b>	<b>13</b>	<b>8</b>	<b>6</b>
	<i>Eubacterium</i> other named	2	5	9	4	4
	<i>Eubacterium</i> sp	3	4	4	4	2
<b>Facklamia spp</b>		<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>
	<i>Facklamia hominis</i>	0	0	0	0	1
	<i>Facklamia ignava</i>	0	1	0	0	0
	<i>Facklamia languida</i>	0	0	0	1	0
<b>Finegoldia spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>5</b>
	<i>Finegoldia</i> sp	0	0	0	0	5
<b>Flavonifractor spp</b>		<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<i>Flavonifractor plautii</i>	0	1	0	0	0
<b>Globicatella spp</b>		<b>4</b>	<b>3</b>	<b>0</b>	<b>4</b>	<b>5</b>
	<i>Globicatella sanguinis</i>	4	3	0	3	4
	<i>Globicatella sulfidifaciens</i>	0	0	0	1	1
<b>Gordonia spp</b>		<b>0</b>	<b>0</b>	<b>1</b>	<b>2</b>	<b>5</b>
	<i>Gordonia bronchialis</i> ( <i>rhodococcus</i> <i>bronchialis</i> )	0	0	1	1	1
	<i>Gordonia polyisoprenivorans</i>	0	0	0	0	1
	<i>Gordonia</i> sp	0	0	0	1	3
<b>Granulicatella spp</b>		<b>7</b>	<b>13</b>	<b>24</b>	<b>20</b>	<b>42</b>
	<i>Granulicatella adiacens</i> ( <i>abiotrophia</i> <i>adiacens</i> )( <i>strep adiacens</i> )	7	13	23	19	38
	<i>Granulicatella elegans</i>	0	0	1	1	1
	<i>Granulicatella</i> sp	0	0	0	0	3
<b>Helcococcus spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>
	<i>Helcococcus kunzii</i>	0	0	0	2	0
<b>Janibacter spp</b>		<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>
	<i>Janibacter anophelis</i>	0	0	1	0	0
<b>Kocuria spp</b>		<b>1</b>	<b>0</b>	<b>8</b>	<b>13</b>	<b>27</b>
	<i>Kocuria kristinae</i>	0	0	1	4	6
	<i>Kocuria rhizophila</i>	0	0	0	1	4
	<i>Kocuria rosea</i>	0	0	3	2	9
	<i>Kocuria</i> sp	1	0	4	6	8
<b>Kurthia spp</b>		<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<i>Kurthia</i> other named	1	0	0	0	0
<b>Leuconostoc spp</b>		<b>34</b>	<b>34</b>	<b>42</b>	<b>41</b>	<b>23</b>
	<i>Leuconostoc</i> sp	34	34	42	41	23
<b>Microbacterium spp</b>		<b>0</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>5</b>
	<i>Microbacterium imperiale</i>	0	0	0	1	0
	<i>Microbacterium luteolum</i>	0	0	0	1	1
	<i>Microbacterium</i> sp	0	1	0	2	4

<b>Mobiluncus spp</b>		<b>2</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>
	<i>Mobiluncus curtisii</i>	1	0	0	0	0
	<i>Mobiluncus sp</i>	1	1	0	1	0
<b>Nocardia spp</b>		<b>5</b>	<b>4</b>	<b>1</b>	<b>3</b>	<b>5</b>
	<i>Nocardia asteroides</i>	1	0	0	0	0
	<i>Nocardia farcinica</i>	0	0	0	0	1
	<i>Nocardia other named</i>	2	2	0	1	1
	<i>Nocardia sp</i>	2	2	1	2	3
<b>Oerskovia spp</b>		<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>
	<i>Oerskovia sp</i>	0	0	1	0	0
<b>Paenibacillus spp</b>		<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>4</b>
	<i>Paenibacillus sp</i>	0	0	1	1	4
<b>Parvimonas spp</b>		<b>1</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>8</b>
	<i>Parvimonas micra</i>	1	1	3	3	8
<b>Pediococcus spp</b>		<b>6</b>	<b>2</b>	<b>3</b>	<b>3</b>	<b>11</b>
	<i>Pediococcus other named</i>	2	2	2	1	4
	<i>Pediococcus sp</i>	4	0	1	2	7
<b>Peptococcus spp</b>		<b>14</b>	<b>13</b>	<b>16</b>	<b>6</b>	<b>17</b>
	<i>Peptococcus named</i>	5	3	2	1	6
	<i>Peptococcus sp</i>	9	10	14	5	11
<b>Peptoniphilus spp</b>		<b>0</b>	<b>0</b>	<b>3</b>	<b>5</b>	<b>10</b>
	<i>Peptoniphilus harei</i> ( <i>peptostreptococcus harei</i> )	0	0	1	3	5
	<i>Peptoniphilus sp</i>	0	0	2	2	5
<b>Rhodococcus spp</b>		<b>10</b>	<b>11</b>	<b>12</b>	<b>10</b>	<b>18</b>
	<i>Rhodococcus equi (corynebacterium equi)</i>	0	0	2	0	1
	<i>Rhodococcus other named</i>	0	1	0	1	1
	<i>Rhodococcus sp</i>	10	10	10	9	16
<b>Robinsoniella spp</b>		<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<i>Robinsoniella peoriensis</i>	1	0	0	0	0
<b>Ruminococcus spp</b>		<b>0</b>	<b>1</b>	<b>0</b>	<b>2</b>	<b>1</b>
	<i>Ruminococcus gnavus</i>	0	1	0	2	1
<b>Slackia spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>
	<i>Slackia exigua</i>	0	0	0	1	0
<b>Stomatococcus spp</b>		<b>6</b>	<b>1</b>	<b>5</b>	<b>4</b>	<b>4</b>
	<i>Stomatococcus mucilaginosus</i>	4	0	4	0	4
	<i>Stomatococcus sp</i>	2	1	1	4	0
<b>Streptomyces spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>
	<i>Streptomyces other</i>	0	0	0	1	0
<b>Trueperella spp</b>		<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>
	<i>Trueperella bernardiae</i>	0	0	1	0	0
<b>Vagococcus spp</b>		<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>
	<i>Vagococcus fluvialis</i>	0	0	1	0	0
<b>Total Gram positive bacteria</b>		<b>177</b>	<b>183</b>	<b>279</b>	<b>290</b>	<b>419</b>



<b>Gram negative bacteria</b>						
<b><i>Actinobacillus</i> spp</b>		<b>3</b>	<b>6</b>	<b>9</b>	<b>3</b>	<b>2</b>
	<i>Actinobacillus</i> other named	3	2	6	1	2
	<i>Actinobacillus</i> sp	0	3	2	2	0
	<i>Actinobacillus ureae</i>	0	1	1	0	0
<b><i>Aggregatibacter</i> spp</b>		<b>1</b>	<b>2</b>	<b>5</b>	<b>7</b>	<b>9</b>
	<i>Aggregatibacter (haemophilus) segnis</i>	0	1	0	3	1
	<i>Aggregatibacter actinomycetemcomitans</i>	1	1	3	1	6
	<i>Aggregatibacter</i> sp	0	0	2	3	2
<b><i>Agrobacterium</i> spp</b>		<b>4</b>	<b>2</b>	<b>3</b>	<b>1</b>	<b>4</b>
	<i>Agrobacterium</i> other named	2	0	1	1	4
	<i>Agrobacterium</i> sp	2	2	2	0	0
<b><i>Alcaligenes</i> spp</b>		<b>25</b>	<b>23</b>	<b>21</b>	<b>17</b>	<b>19</b>
	<i>Alcaligenes denitrificans</i>	0	0	1	0	0
	<i>Alcaligenes faecalis</i>	13	12	12	13	13
	<i>Alcaligenes</i> other named	1	0	0	0	1
	<i>Alcaligenes</i> sp	6	8	4	2	0
	<i>Alcaligenes xylooxidans xylooxidans</i>	5	3	4	2	5
<b><i>Alistipes</i> spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>
	<i>Alistipes finegoldii</i>	0	0	0	1	0
<b><i>Anaerobiospirillum</i> spp</b>		<b>4</b>	<b>2</b>	<b>2</b>	<b>9</b>	<b>15</b>
	<i>Anaerobiospirillum</i> other named	3	2	2	6	7
	<i>Anaerobiospirillum</i> sp	1	0	0	2	8
	<i>Anaerobiospirillum succiniciproducens</i>	0	0	0	1	0
<b><i>Arcobacter</i> spp</b>		<b>0</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>
	<i>Arcobacter butzleri</i>	0	1	0	0	0
	<i>Arcobacter</i> sp	0	0	1	0	0
<b><i>Aurantimonas</i> spp</b>		<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>
	<i>Aurantimonas altamirensis</i>	1	0	0	0	2
<b><i>Azospirillum</i> spp</b>		<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<i>Azospirillum brasilense</i>	0	1	0	0	0
<b><i>Bilophila</i> spp</b>		<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>
	<i>Bilophila</i> sp	0	0	0	0	1
	<i>Bilophila wadsworthia</i>	0	1	0	1	0
<b><i>Bordetella</i> spp</b>		<b>6</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>7</b>
	<i>Bordetella bronchiseptica</i>	1	2	0	1	1
	<i>Bordetella</i> other named	1	0	3	0	2
	<i>Bordetella parapertussis</i>	0	0	1	1	1
	<i>Bordetella</i> sp	4	2	0	0	3
<b><i>Borrelia</i> spp</b>		<b>2</b>	<b>5</b>	<b>5</b>	<b>7</b>	<b>3</b>
	<i>Borrelia</i> other named	0	1	1	1	1
	<i>Borrelia</i> sp	2	4	4	6	2

<b>Branhamella spp</b>		<b>2</b>	<b>1</b>	<b>3</b>	<b>0</b>	<b>0</b>
	<i>Branhamella sp</i>	2	1	3	0	0
<b>Brevundimonas spp</b>		<b>28</b>	<b>26</b>	<b>27</b>	<b>30</b>	<b>42</b>
	<i>Brevundimonas diminuta</i>	8	9	7	11	13
	<i>Brevundimonas sp</i>	3	9	7	9	12
	<i>Brevundimonas vesicularis</i>	17	8	13	10	17
<b>Brucella spp</b>		<b>4</b>	<b>8</b>	<b>8</b>	<b>4</b>	<b>10</b>
	<i>Brucella melitensis</i>	3	7	6	4	9
	<i>Brucella sp</i>	1	1	2	0	1
<b>Burkholderia spp</b>		<b>45</b>	<b>45</b>	<b>46</b>	<b>50</b>	<b>27</b>
	<i>Burkholderia cenocepacia</i>	4	2	2	2	1
	<i>Burkholderia cepacia</i>	37	37	36	33	20
	<i>Burkholderia gladioli</i>	0	2	1	0	0
	<i>Burkholderia multivorans</i>	1	1	2	6	1
	<i>Burkholderia other named</i>	0	1	2	3	0
	<i>Burkholderia pseudomallei</i>	2	1	0	2	3
	<i>Burkholderia sp</i>	1	1	3	4	2
<b>Buttiauxella spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>
	<i>Buttiauxella agrestis</i>	0	0	0	1	0
<b>Calymmatobacterium spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
	<i>Calymmatobacterium sp</i>	0	0	0	0	1
<b>Capnocytophaga spp</b>		<b>12</b>	<b>7</b>	<b>13</b>	<b>20</b>	<b>34</b>
	<i>Capnocytophaga ochracea</i>	1	0	0	1	0
	<i>Capnocytophaga other named</i>	7	2	3	11	18
	<i>Capnocytophaga sp</i>	4	5	10	8	16
<b>Cardiobacterium spp</b>		<b>4</b>	<b>6</b>	<b>3</b>	<b>11</b>	<b>5</b>
	<i>Cardiobacterium hominis</i>	2	4	2	11	4
	<i>Cardiobacterium other named</i>	1	1	1	0	1
	<i>Cardiobacterium sp</i>	1	1	0	0	0
<b>Cedecea spp</b>		<b>2</b>	<b>3</b>	<b>1</b>	<b>0</b>	<b>0</b>
	<i>Cedecea neteri</i>	0	1	0	0	0
	<i>Cedecea sp</i>	2	2	1	0	0
<b>Chromobacterium spp</b>		<b>1</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>0</b>
	<i>Chromobacterium other named</i>	0	0	1	0	0
	<i>Chromobacterium sp</i>	0	0	1	0	0
	<i>Chromobacterium violaceum</i>	1	0	0	2	0
<b>Chryseobacterium spp</b>		<b>16</b>	<b>20</b>	<b>31</b>	<b>28</b>	<b>35</b>
	<i>Chryseobacterium gleum</i>	0	0	1	1	1
	<i>Chryseobacterium indologenes</i>	14	17	22	19	28
	<i>Chryseobacterium sp</i>	2	3	8	8	6
<b>Chryseomonas spp</b>		<b>1</b>	<b>6</b>	<b>2</b>	<b>1</b>	<b>0</b>
	<i>Chryseomonas sp</i>	1	6	2	1	0

<b>Comamonas spp</b>		<b>10</b>	<b>15</b>	<b>7</b>	<b>6</b>	<b>12</b>
	<i>Comamonas</i> other named	1	1	3	1	2
	<i>Comamonas</i> sp	2	4	1	0	3
	<i>Comamonas testosteroni</i>	7	10	3	5	7
<b>Delftia spp</b>		<b>9</b>	<b>7</b>	<b>4</b>	<b>3</b>	<b>10</b>
	<i>Delftia acidovorans</i> ( <i>comamonas acidovorans</i> )	9	7	4	3	10
<b>Desulfovibrio spp</b>		<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>1</b>
	<i>Desulfovibrio desulfuricans</i>	0	0	0	1	0
	<i>Desulfovibrio fairfieldensis</i>	0	0	1	0	0
	<i>Desulfovibrio</i> sp	0	0	0	0	1
<b>Dialister spp</b>		<b>1</b>	<b>3</b>	<b>3</b>	<b>3</b>	<b>2</b>
	<i>Dialister microaerophilus</i>	0	1	1	0	0
	<i>Dialister pneumosintes</i>	1	2	2	3	2
<b>Edwardsiella spp</b>		<b>2</b>	<b>3</b>	<b>2</b>	<b>1</b>	<b>0</b>
	<i>Edwardsiella</i> other named	2	0	1	1	0
	<i>Edwardsiella</i> sp	0	0	1	0	0
	<i>Edwardsiella tarda</i>	0	3	0	0	0
<b>Eikenella spp</b>		<b>8</b>	<b>8</b>	<b>8</b>	<b>7</b>	<b>18</b>
	<i>Eikenella corrodens</i>	8	7	8	7	18
	<i>Eikenella</i> sp	0	1	0	0	0
<b>Elizabethkingia spp</b>		<b>5</b>	<b>11</b>	<b>4</b>	<b>5</b>	<b>3</b>
	<i>Elizabethkingia meningoseptica</i>	5	11	4	4	2
	<i>Elizabethkingia</i> sp	0	0	0	1	1
<b>Empedobacter spp</b>		<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
	<i>Empedobacter brevis</i>	2	0	0	0	1
<b>Erwinia spp</b>		<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<i>Erwinia</i> other named	1	0	0	0	0
	<i>Erwinia</i> sp	1	0	0	0	0
<b>Ewingella spp</b>		<b>1</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>0</b>
	<i>Ewingella americana</i>	1	1	0	1	0
<b>Flavobacterium spp</b>		<b>4</b>	<b>3</b>	<b>8</b>	<b>8</b>	<b>4</b>
	<i>Flavobacterium</i> other named	2	0	0	3	2
	<i>Flavobacterium</i> sp	2	3	8	5	2
<b>Gardnerella spp</b>		<b>10</b>	<b>6</b>	<b>6</b>	<b>15</b>	<b>20</b>
	<i>Gardnerella</i> other named	1	0	0	3	1
	<i>Gardnerella</i> sp	0	1	0	0	2
	<i>Gardnerella vaginalis</i>	9	5	6	12	17
<b>Hafnia spp</b>		<b>38</b>	<b>27</b>	<b>37</b>	<b>35</b>	<b>39</b>
	<i>Hafnia alvei</i>	38	26	37	35	39
	<i>Hafnia</i> sp	0	1	0	0	0
<b>Herbasprillum spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
	<i>Herbasprillum huttiense</i>	0	0	0	0	1
<b>Janthinobacterium spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>
	<i>Janthinobacterium lividum</i>	0	0	0	1	0

<b>Kingella spp</b>		<b>6</b>	<b>9</b>	<b>12</b>	<b>16</b>	<b>14</b>
	<i>Kingella denitrificans</i>	0	1	1	0	0
	<i>Kingella kingae</i>	5	6	10	15	12
	<i>Kingella sp</i>	1	2	1	1	2
<b>Kluyvera spp</b>		<b>21</b>	<b>12</b>	<b>26</b>	<b>30</b>	<b>26</b>
	<i>Kluyvera ascorbata</i>	1	1	2	2	0
	<i>Kluyvera sp</i>	20	11	24	28	26
<b>Koserella spp</b>		<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<i>Koserella trabulsii</i>	1	0	0	0	0
<b>Leclercia spp</b>		<b>12</b>	<b>5</b>	<b>4</b>	<b>4</b>	<b>8</b>
	<i>Leclercia adecarboxylata</i>	12	5	4	4	8
<b>Legionella spp</b>		<b>1</b>	<b>1</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<i>Legionella pneumophila</i>	1	1	0	0	0
<b>Leminorella spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
	<i>Leminorella sp</i>	0	0	0	0	1
<b>Leptospira spp</b>		<b>3</b>	<b>8</b>	<b>6</b>	<b>4</b>	<b>7</b>
	<i>Leptospira autumnalis</i>	0	0	1	0	0
	<i>Leptospira interrogans</i>	0	0	0	0	1
	<i>Leptospira other named</i>	1	0	0	0	0
	<i>Leptospira sp</i>	2	8	5	4	6
<b>Leptotrichia spp</b>		<b>3</b>	<b>3</b>	<b>3</b>	<b>5</b>	<b>8</b>
	<i>Leptotrichia buccalis</i>	1	1	1	3	1
	<i>Leptotrichia sp</i>	2	2	2	2	7
<b>Luteimonas spp</b>		<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>
	<i>Luteimonas sp</i>	0	0	1	0	0
<b>Massilia spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
	<i>Massilia timonae</i>	0	0	0	0	1
<b>Methylobacterium spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
	<i>Methylobacterium sp</i>	0	0	0	0	1
<b>Myroides spp</b>		<b>2</b>	<b>1</b>	<b>3</b>	<b>3</b>	<b>2</b>
	<i>Myroides odoratus</i>	0	0	2	0	0
	<i>Myroides sp</i>	2	1	1	3	2
<b>Ochrobactrum spp</b>		<b>26</b>	<b>38</b>	<b>53</b>	<b>49</b>	<b>43</b>
	<i>Ochrobactrum anthropi</i>	26	35	51	43	40
	<i>Ochrobactrum sp</i>	0	3	2	6	3
<b>Oligella spp</b>		<b>2</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>2</b>
	<i>Oligella ureolytica</i>	2	1	0	0	0
	<i>Oligella urethralis</i>	0	0	1	0	2
<b>Pandoraea spp</b>		<b>0</b>	<b>0</b>	<b>2</b>	<b>0</b>	<b>1</b>
	<i>Pandoraea apista</i>	0	0	1	0	0
	<i>Pandoraea sp</i>	0	0	1	0	0
	<i>Pandoraea sputorum</i>	0	0	0	0	1
<b>Parabacteroides spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>6</b>
	<i>Parabacteroides distasonis</i>	0	0	0	0	6
<b>Paracoccus spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>1</b>
	<i>Paracoccus yeei</i>	0	0	0	1	1

<b><i>Plesiomonas</i> spp</b>		<b>0</b>	<b>2</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<i>Plesiomonas shigelloides</i>	0	2	0	0	0
<b><i>Porphyromonas</i> spp</b>		<b>4</b>	<b>5</b>	<b>3</b>	<b>0</b>	<b>1</b>
	<i>Porphyromonas asaccharolytica</i>	0	3	1	0	1
	<i>Porphyromonas</i> sp	4	2	2	0	0
<b><i>Psychrobacter</i> spp</b>		<b>0</b>	<b>0</b>	<b>1</b>	<b>6</b>	<b>3</b>
	<i>Psychrobacter phenylpyruvicus</i> ( <i>moraxella phenylpyruvica</i> )	0	0	1	5	0
	<i>Psychrobacter sanguinis</i>	0	0	0	1	3
<b><i>Rahnella</i> spp</b>		<b>4</b>	<b>5</b>	<b>1</b>	<b>2</b>	<b>3</b>
	<i>Rahnella</i> named	3	4	1	2	3
	<i>Rahnella</i> sp	1	1	0	0	0
<b><i>Ralstonia</i> spp</b>		<b>17</b>	<b>2</b>	<b>6</b>	<b>8</b>	<b>10</b>
	<i>Ralstonia insidiosa</i>	0	0	0	1	0
	<i>Ralstonia pickettii</i>	17	2	6	7	10
<b><i>Rhizobium</i> spp</b>		<b>32</b>	<b>18</b>	<b>33</b>	<b>32</b>	<b>30</b>
	<i>Rhizobium radiobacter</i> ( <i>agrobacterium tumefaciens</i> )	32	18	33	31	30
	<i>Rhizobium</i> sp	0	0	0	1	0
<b><i>Roseomonas</i> spp</b>		<b>3</b>	<b>9</b>	<b>23</b>	<b>21</b>	<b>33</b>
	<i>Roseomonas gilardii</i>	2	4	12	8	16
	<i>Roseomonas</i> sp	1	5	11	13	17
<b><i>Shewanella</i> spp</b>		<b>2</b>	<b>3</b>	<b>2</b>	<b>4</b>	<b>2</b>
	<i>Shewanella putrefaciens</i> ( <i>pseudomonas putrefaciens</i> )	2	2	1	3	2
	<i>Shewanella</i> sp	0	1	1	1	0
<b><i>Shigella</i> spp</b>		<b>5</b>	<b>5</b>	<b>7</b>	<b>8</b>	<b>7</b>
	<i>Shigella boydii</i>	0	0	0	1	2
	<i>Shigella flexneri</i>	2	1	1	3	2
	<i>Shigella sonnei</i>	1	2	2	1	3
	<i>Shigella</i> sp	2	2	4	3	0
<b><i>Sneathia</i> spp</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>
	<i>Sneathia sanguinegens</i>	0	0	0	0	1
<b><i>Sphingobacterium</i> spp</b>		<b>4</b>	<b>10</b>	<b>7</b>	<b>5</b>	<b>9</b>
	<i>Sphingobacterium multivorum</i>	2	3	1	4	1
	<i>Sphingobacterium</i> sp	1	3	3	1	2
	<i>Sphingobacterium spiritivorum</i>	0	3	1	0	5
	<i>Sphingobacterium thalpophilum</i>	1	1	2	0	1
<b><i>Sphingomonas</i> spp</b>		<b>2</b>	<b>1</b>	<b>4</b>	<b>3</b>	<b>8</b>
	<i>Sphingomonas</i> sp	2	1	4	3	8
<b><i>Streptobacillus</i> spp</b>		<b>0</b>	<b>1</b>	<b>0</b>	<b>1</b>	<b>1</b>
	<i>Streptobacillus moniliformis</i>	0	0	0	1	0
	<i>Streptobacillus</i> sp	0	1	0	0	1

<b><i>Vibrio</i> spp</b>	<b>0</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>1</b>
<i>Vibrio cholerae</i>	0	1	0	0	0
<i>Vibrio fluvialis</i>	0	0	0	0	1
<i>Vibrio hollisae</i>	0	1	0	0	0
<i>Vibrio parahaemolyticus</i>	0	0	0	1	0
<i>Vibrio</i> sp	0	0	2	0	0
<b><i>Weeksella</i> spp</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>	<b>0</b>
<i>Weeksella virosa</i>	0	0	1	0	0
<b><i>Wolinella</i> spp</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>0</b>
<i>Wolinella</i> sp	0	0	0	1	0
<b><i>Yersinia</i> spp</b>	<b>13</b>	<b>8</b>	<b>6</b>	<b>10</b>	<b>10</b>
<i>Yersinia enterocolitica</i>	9	8	3	8	7
<i>Yersinia pseudotuberculosis</i>	4	0	3	2	3
<b>Total- Gram negative bacteria</b>	<b>416</b>	<b>402</b>	<b>473</b>	<b>495</b>	<b>567</b>
<b>Total- Gram positive and Gram negative bacteria</b>	<b>593</b>	<b>585</b>	<b>752</b>	<b>785</b>	<b>986</b>

\* Uncommon genera are identified on the basis of less than 50 reports from blood samples and diagnosed by culture or unknown methods in 2014.