

Online Research @ Cardiff

This is an Open Access document downloaded from ORCA, Cardiff University's institutional repository: <http://orca.cf.ac.uk/94133/>

This is the author's version of a work that was submitted to / accepted for publication.

Citation for final published version:

Sands, Kirsty M., Wilson, Melanie J., Lewis, Michael A. O., Wise, Matt P., Palmer, Nicki, Hayes, Anthony J., Barnes, Rosemary A. and Williams, David W. 2017. Respiratory pathogen colonisation of dental plaque, the lower airways and endotracheal tube biofilms during mechanical ventilation. *Journal of Critical Care* 37 , pp. 30-37. 10.1016/j.jcrc.2016.07.019 filefilefile

Publishers page: <http://dx.doi.org/10.1016/j.jcrc.2016.07.019>
<<http://dx.doi.org/10.1016/j.jcrc.2016.07.019>>

Please note:

Changes made as a result of publishing processes such as copy-editing, formatting and page numbers may not be reflected in this version. For the definitive version of this publication, please refer to the published source. You are advised to consult the publisher's version if you wish to cite this paper.

This version is being made available in accordance with publisher policies. See <http://orca.cf.ac.uk/policies.html> for usage policies. Copyright and moral rights for publications made available in ORCA are retained by the copyright holders.



| Patient | | Antibiotic | | | | | | | | | | | |
|---------|--------|------------|-----------|-------------|---------------|-------------|--------------|--------------|------------|-----------|------------|------------|------------|
| Patient | Sample | Cefepime | Cefoxitin | Ceftazidime | Ciprofloxacin | Clindamycin | Erythromycin | Fusidic Acid | Gentamicin | Meropenem | Penicillin | Tobramycin | Vancomycin |
| PN004 | SUB | 25 | 0 | 20 | 35 | 0 | 0 | 0 | 26 | 26 | 0 | 22 | 0 |
| PN005 | DP | 28 | 29 | 16 | 28 | 0 | 0 | 30 | 24 | 34 | 16 | 22 | 16 |
| PN005 | DP | 27 | 29 | 19 | 28 | 0 | 0 | 36 | 24 | 38 | 17 | 23 | 16 |
| PN007 | DP | 27 | 30 | 20 | 20 | 27 | 26 | 30 | 22 | 34 | 40 | 22 | 17 |
| PN007 | DP | 28 | 29 | 18 | 21 | 36 | 25 | 36 | 22 | 36 | 16 | 22 | 16 |
| PN007 | DP | 24 | 28 | 18 | 21 | 22 | 26 | 31 | 24 | 32 | 29 | 21 | 16 |
| PN007 | DP | 27 | 0 | 28 | 35 | 0 | 0 | 24 | 23 | 35 | 0 | 22 | 0 |
| PN009 | DP | 24 | 29 | 18 | 27 | 20 | 24 | 33 | 23 | 36 | 42 | 20 | 18 |
| PN009 | NBL | 22 | 28 | 17 | 24 | 30 | 24 | 33 | 23 | 33 | 33 | 23 | 16 |
| PN009 | DP | 23 | 29 | 16 | 22 | 30 | 18 | 32 | 22 | 31 | 28 | 22 | 16 |
| PN015 | DP | 28 | 0 | 27 | 35 | 0 | 0 | 0 | 23 | 36 | 0 | 25 | 0 |
| PN021 | ETT | 26 | 31 | 14 | 21 | 29 | 21 | 35 | 24 | 36 | 17 | 21 | 16 |
| PN021 | DP | 27 | 29 | 17 | 20 | 30 | 24 | 36 | 23 | 39 | 16 | 19 | 16 |
| PN021 | NBL | 28 | 30 | 18 | 20 | 30 | 25 | 35 | 22 | 36 | 15 | 23 | 16 |
| PN021 | DP | 24 | 29 | 17 | 22 | 28 | 21 | 30 | 22 | 32 | 29 | 21 | 17 |
| PN024 | SUB | 26 | 30 | 19 | 21 | 28 | 26 | 30 | 23 | 31 | 15 | 21 | 16 |
| PN024 | NBL | 25 | 29 | 19 | 22 | 27 | 26 | 30 | 22 | 30 | 17 | 22 | 16 |
| PN024 | ETT | 24 | 29 | 18 | 22 | 27 | 23 | 29 | 23 | 33 | 30 | 22 | 18 |
| PN024 | DP | 23 | 30 | 19 | 26 | 30 | 23 | 31 | 22 | 30 | 39 | 20 | 18 |
| PN024 | NBL | 27 | 28 | 16 | 28 | 29 | 22 | 32 | 23 | 33 | 36 | 21 | 19 |
| PN025 | DP | 25 | 30 | 17 | 27 | 28 | 24 | 30 | 23 | 32 | 30 | 21 | 16 |
| PN025 | NBL | 27 | 30 | 18 | 28 | 30 | 24 | 31 | 22 | 31 | 34 | 22 | 17 |
| PN025 | NBL | 27 | 29 | 17 | 27 | 28 | 25 | 30 | 22 | 30 | 40 | 22 | 16 |
| PN025 | ETT | 26 | 29 | 18 | 26 | 27 | 25 | 32 | 23 | 32 | 29 | 21 | 18 |

| | | | | | | | | | | | | | |
|-------|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| PN027 | NBL | 28 | 29 | 28 | 34 | 29 | 23 | 30 | 24 | 31 | 40 | 21 | 17 |
| PN027 | NBL | 25 | 29 | 16 | 0 | 29 | 24 | 30 | 22 | 30 | 30 | 23 | 17 |
| PN027 | ETT | 23 | 30 | 18 | 0 | 22 | 0 | 30 | 22 | 10 | 0 | 21 | 17 |
| PN028 | ETT | 0 | 9 | 0 | 24 | 23 | 0 | 30 | 25 | 0 | 0 | 19 | 14 |
| PN028 | SUB | 0 | 10 | 0 | 12 | 29 | 0 | 33 | 22 | 13 | 7 | 22 | 16 |
| PN028 | NBL | 0 | 11 | 0 | 0 | 31 | 0 | 30 | 22 | 12 | 0 | 22 | 17 |
| PN037 | DP | 24 | 30 | 18 | 26 | 28 | 18 | 31 | 25 | 30 | 17 | 20 | 18 |
| PN037 | NBL | 25 | 30 | 19 | 27 | 24 | 27 | 30 | 23 | 30 | 17 | 21 | 17 |
| PN037 | NBL | 31 | 30 | 20 | 25 | 28 | 26 | 30 | 24 | 30 | 19 | 19 | 18 |
| PN037 | NBL | 24 | 30 | 17 | 24 | 28 | 22 | 30 | 24 | 30 | 20 | 20 | 20 |
| PN042 | DP | 24 | 30 | 18 | 24 | 28 | 23 | 30 | 24 | 30 | 20 | 20 | 20 |
| PN042 | NBL | 24 | 30 | 18 | 25 | 24 | 23 | 30 | 24 | 30 | 20 | 19 | 18 |
| PN042 | SUB | 16 | 0 | 0 | 25 | 13 | 26 | 30 | 24 | 18 | 0 | 14 | 15 |
| PN042 | ETT | 24 | 30 | 18 | 25 | 28 | 22 | 30 | 22 | 30 | 30 | 19 | 19 |
| PN043 | DP | 24 | 30 | 18 | 24 | 28 | 22 | 30 | 24 | 30 | 18 | 18 | 18 |
| PN045 | DP | 22 | 29 | 19 | 23 | 30 | 23 | 30 | 22 | 32 | 21 | 22 | 19 |
| PN046 | DP | 24 | 30 | 18 | 25 | 28 | 22 | 30 | 22 | 30 | 28 | 19 | 19 |
| PN046 | NBL | 24 | 30 | 18 | 25 | 28 | 22 | 30 | 22 | 30 | 28 | 19 | 19 |
| PN046 | DP | 25 | 30 | 19 | 24 | 28 | 22 | 30 | 22 | 30 | 28 | 18 | 14 |
| PN046 | NBL | 27 | 30 | 20 | 27 | 25 | 19 | 29 | 22 | 29 | 21 | 22 | 18 |
| PN046 | ETT | 24 | 30 | 18 | 24 | 28 | 22 | 28 | 23 | 30 | 28 | 18 | 21 |
| PN046 | DP | 22 | 30 | 20 | 23 | 30 | 22 | 29 | 0 | 31 | 18 | 20 | 18 |
| PN048 | NBL | 25 | 30 | 18 | 24 | 24 | 18 | 30 | 22 | 30 | 28 | 20 | 20 |
| PN049 | DP | 22 | 30 | 19 | 25 | 21 | 20 | 30 | 19 | 29 | 19 | 22 | 20 |
| PN049 | NBL | 20 | 30 | 20 | 24 | 21 | 23 | 29 | 25 | 32 | 29 | 24 | 0 |
| PN049 | DP | 25 | 0 | 18 | 11 | 10 | 22 | 19 | 20 | 30 | 20 | 14 | 0 |
| PN050 | DP | 22 | 30 | 19 | 25 | 28 | 20 | 30 | 22 | 30 | 28 | 19 | 20 |

| | | | | | | | | | | | | | |
|-------|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| PN050 | NBL | 22 | 29 | 20 | 24 | 28 | 19 | 29 | 19 | 30 | 19 | 20 | 20 |
| PN050 | ETT | 23 | 30 | 20 | 22 | 29 | 19 | 29 | 23 | 30 | 28 | 20 | 20 |
| PN051 | DP | 23 | 30 | 19 | 0 | 28 | 0 | 29 | 19 | 30 | 28 | 24 | 20 |
| PN051 | DP | 20 | 30 | 20 | 22 | 21 | 19 | 30 | 22 | 29 | 22 | 24 | 21 |
| PN052 | DP | 24 | 31 | 18 | 24 | 0 | 0 | 29 | 22 | 30 | 28 | 22 | 19 |
| PN052 | NBL | 23 | 30 | 19 | 24 | 30 | 23 | 29 | 22 | 30 | 29 | 21 | 4 |
| PN052 | ETT | 21 | 30 | 19 | 22 | 21 | 22 | 29 | 22 | 30 | 20 | 20 | 11 |
| PN054 | NBL | 23 | 30 | 20 | 24 | 22 | 23 | 30 | 22 | 30 | 21 | 19 | 19 |
| PN056 | DP | 23 | 30 | 20 | 22 | 29 | 19 | 29 | 22 | 30 | 19 | 22 | 19 |
| PN056 | NBL | 23 | 30 | 20 | 22 | 29 | 19 | 30 | 24 | 30 | 29 | 19 | 21 |
| PN056 | DP | 19 | 29 | 21 | 22 | 22 | 23 | 30 | 18 | 30 | 29 | 21 | 19 |
| PN056 | NBL | 20 | 30 | 19 | 22 | 29 | 23 | 30 | 24 | 29 | 28 | 21 | 19 |
| PN056 | SUB | 19 | 30 | 21 | 22 | 21 | 23 | 30 | 18 | 30 | 28 | 22 | 20 |
| PN056 | SUB | 19 | 30 | 21 | 23 | 21 | 22 | 30 | 18 | 28 | 21 | 21 | 21 |
| PN057 | NBL | 19 | 29 | 20 | 23 | 22 | 22 | 30 | 22 | 30 | 19 | 21 | 22 |
| PN057 | ETT | 20 | 30 | 18 | 23 | 22 | 19 | 29 | 23 | 30 | 21 | 21 | 21 |
| PN058 | SUB | 19 | 29 | 20 | 21 | 22 | 22 | 29 | 18 | 30 | 30 | 22 | 0 |
| PN063 | NBL | 20 | 29 | 18 | 22 | 22 | 19 | 29 | 18 | 30 | 30 | 22 | 0 |
| PN068 | DP | 21 | 30 | 20 | 0 | 9 | 0 | 30 | 20 | 30 | 30 | 20 | 0 |
| PN068 | NBL | 22 | 30 | 20 | 22 | 28 | 0 | 26 | 21 | 29 | 28 | 0 | 28 |
| PN068 | DP | 22 | 30 | 19 | 21 | 28 | 28 | 11 | 21 | 30 | 29 | 21 | 19 |
| PN077 | NBL | 22 | 29 | 19 | 21 | 27 | 22 | 29 | 20 | 21 | 22 | 19 | 19 |
| PN077 | DP | 22 | 30 | 19 | 26 | 28 | 22 | 30 | 20 | 32 | 23 | 20 | 0 |
| PN077 | NBL | 21 | 30 | 20 | 22 | 28 | 22 | 30 | 20 | 30 | 29 | 21 | 19 |
| PN080 | SUB | 0 | 14 | 0 | 10 | 28 | 0 | 30 | 10 | 20 | 0 | 10 | 21 |
| PN080 | DP | 0 | 13 | 0 | 0 | 32 | 0 | 30 | 10 | 21 | 0 | 10 | 21 |
| PN080 | DP | 0 | 15 | 0 | 0 | 33 | 0 | 33 | 11 | 21 | 0 | 0 | 21 |

| | | | | | | | | | | | | | |
|-------|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| PN081 | NBL | 0 | 0 | 0 | 0 | 28 | 23 | 10 | 27 | 30 | 0 | 20 | 0 |
| PN081 | SUB | 0 | 0 | 0 | 0 | 32 | 26 | 29 | 23 | 7 | 0 | 20 | 9 |
| PN081 | DP | 0 | 9 | 0 | 0 | 33 | 29 | 31 | 24 | 14 | 0 | 23 | 18 |
| PN081 | DP | 0 | 8 | 0 | 0 | 30 | 27 | 21 | 24 | 9 | 0 | 22 | 17 |
| PN086 | NBL | 23 | 30 | 19 | 23 | 28 | 22 | 29 | 22 | 29 | 21 | 22 | 20 |
| PN087 | ETT | 21 | 30 | 19 | 23 | 28 | 19 | 30 | 24 | 29 | 21 | 24 | 20 |
| PN087 | NBL | 25 | 20 | 16 | 21 | 29 | 8 | 29 | 22 | 29 | 17 | 23 | 20 |
| PN087 | SUB | 24 | 30 | 19 | 24 | 22 | 0 | 30 | 22 | 30 | 28 | 22 | 20 |
| PN087 | DP | 23 | 30 | 20 | 22 | 28 | 0 | 30 | 22 | 29 | 29 | 21 | 20 |
| PN089 | NBL | 23 | 30 | 20 | 24 | 28 | 22 | 30 | 24 | 30 | 29 | 21 | 19 |
| PN089 | SUB | 23 | 29 | 21 | 22 | 21 | 22 | 29 | 22 | 30 | 28 | 20 | 21 |
| PN089 | NBL | 25 | 30 | 22 | 23 | 28 | 24 | 29 | 23 | 29 | 31 | 20 | 20 |
| PN089 | DP | 21 | 30 | 21 | 24 | 28 | 22 | 29 | 23 | 29 | 28 | 21 | 19 |
| PN092 | DP | 23 | 30 | 22 | 0 | 21 | 23 | 30 | 22 | 27 | 24 | 21 | 20 |
| PN092 | NBL | 21 | 30 | 20 | 23 | 21 | 24 | 29 | 23 | 29 | 29 | 22 | 20 |
| PN094 | NBL | 24 | 29 | 21 | 22 | 28 | 23 | 30 | 22 | 29 | 29 | 21 | 19 |
| PN095 | DP | 21 | 29 | 21 | 22 | 0 | 0 | 29 | 22 | 29 | 32 | 21 | 20 |
| PN095 | NBL | 29 | 32 | 17 | 22 | 0 | 0 | 17 | 25 | 35 | 29 | 22 | 19 |
| PN095 | SUB | 26 | 30 | 14 | 24 | 0 | 0 | 19 | 24 | 33 | 29 | 18 | 18 |
| PN095 | DP | 22 | 30 | 18 | 24 | 0 | 0 | 19 | 23 | 29 | 18 | 21 | 0 |
| PN097 | NBL | 23 | 30 | 21 | 24 | 24 | 23 | 30 | 21 | 31 | 31 | 22 | 18 |
| PN099 | DP | 20 | 29 | 23 | 24 | 28 | 22 | 30 | 23 | 30 | 28 | 21 | 21 |
| PN099 | DP | 23 | 30 | 19 | 22 | 27 | 19 | 29 | 23 | 30 | 29 | 21 | 18 |
| PN102 | DP | 23 | 30 | 19 | 23 | 25 | 22 | 29 | 22 | 33 | 29 | 19 | 19 |
| PN102 | DP | 20 | 29 | 22 | 21 | 0 | 0 | 30 | 22 | 34 | 30 | 21 | 20 |
| PN104 | DP | 21 | 30 | 24 | 23 | 28 | 24 | 30 | 24 | 30 | 21 | 21 | 17 |
| PN104 | NBL | 21 | 30 | 21 | 23 | 21 | 25 | 30 | 24 | 30 | 29 | 22 | 18 |

| | | | | | | | | | | | | | |
|-------|-----|----|----|----|----|----|----|----|----|----|----|----|----|
| PN104 | DP | 20 | 30 | 22 | 24 | 21 | 23 | 30 | 23 | 30 | 28 | 20 | 21 |
| PN105 | NBL | 20 | 30 | 21 | 20 | 28 | 23 | 30 | 23 | 30 | 31 | 22 | 19 |
| PN105 | ETT | 24 | 30 | 22 | 21 | 21 | 24 | 30 | 23 | 29 | 29 | 20 | 18 |
| PN106 | ETT | 22 | 30 | 23 | 21 | 28 | 23 | 29 | 23 | 30 | 30 | 21 | 19 |
| PN108 | DP | 20 | 30 | 22 | 23 | 21 | 23 | 30 | 23 | 30 | 28 | 19 | 20 |
| PN108 | NBL | 24 | 30 | 19 | 23 | 28 | 22 | 29 | 22 | 29 | 28 | 21 | 20 |
| PN108 | ETT | 21 | 30 | 16 | 23 | 29 | 22 | 31 | 24 | 30 | 28 | 20 | 19 |
| PN109 | DP | 20 | 30 | 17 | 24 | 24 | 22 | 32 | 22 | 32 | 30 | 20 | 17 |
| PN110 | NBL | 0 | 0 | 0 | 10 | 32 | 0 | 25 | 12 | 0 | 0 | 12 | 20 |

| | |
|-----------|--|
| Resistant | |
|-----------|--|