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Cystic Fibrosis Research News

Title:

STRUCTURED SURVEILLANCE OF ACHROMOBACTER, PANDORAEA AND RALSTONIA SPECIES FROM PATIENTS IN ENGLAND WITH CYSTIC FIBROSIS

Authors:

Amy Coward[1], Dervla T.D. Kenna[1], Neil Woodford[1], Jane F. Turton[1], Malcolm Armstrong[2], Cressida Auckland[3], Ian Bowler[4], Phillipa Burns[2], James Cargill[5], Mary Carroll[6], William Flight[4], Michelle Graver[7], Heather Green[8], Carolyne Horner[9], Andrew Jones[10], Andrew M. Jones[8], Graeme Jones[6], Sarah Mayell[5], Jeorge Orendi[11], Audrey Perry[12], Ali Robb[12], Natasha Tucker[6], David Waine[13], Trevor Winstanley[14] and Nick Withers[3].

Affiliations:

[1]Antimicrobial Resistance and Healthcare Associated Infections (AMRHAI) Reference Unit, National Infection Service, Public Health England, London, NW9 5EQ.
[2]Manchester Royal Infirmary, Manchester, M13 9WL.
[3]Royal Devon and Exeter Hospital, Exeter, EX2 5AD.
[4]John Radcliffe Hospital, Oxford, OX3 9DU.
[5]Alder Hey Hospital, Merseyside, L12 2AP.
[6]Southampton General Hospital, Southampton, SO16 6YD.
[7]King's College Hospital, London, SE5 9RS.
[8]Wythenshawe Hospital, Wythenshawe, M23 9LT.
[9]Leeds General Infirmary, Leeds, LS1 3EX.
[10]Royal Brompton Hospital, London, SW3 6NP.
[11]Royal Stoke University Hospital, Stoke-on-Trent, ST4 6QG.
[12]The Freeman Hospital, Newcastle-upon-Tyne, NE7 7DN.
[13]Derriford Hospital, Plymouth, PL6 8DH.
[14]Northern General Hospital, Sheffield, S5 7AU

What was your research question?

We set up a surveillance study to assess the appearance (incidence) of *Achromobacter*, *Pandoraea* and *Ralstonia* among people with CF in England, as these may be bacteria emerging in people with CF. We also wanted to examine shared strains/types in CF clinics and to find out information about resistance to antibiotics in these bacteria.

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Why is this important?

As a reference laboratory we test for bacterial species that are difficult for hospitals to identify. However, we only receive samples from some hospitals, making it difficult to evaluate how common certain CF bacteria are. A structured surveillance approach meant that participating hospitals sent us a single sample of any *Achromobacter*, *Pandoraea* and *Ralstonia* species from each person with CF collected during the survey period. We were then able to assess how common these bacteria were, and whether people attending the same hospital had different strains/types of these bacteria.

What did you do?

We asked 13 hospitals in England to send one bacterial sample per person of *Achromobacter*, *Pandoraea* and *Ralstonia* over the seven-month study period to our reference laboratory in Public Health England. We identified the samples using a technique to look at the DNA of the bacteria, called "DNA sequencing", and used "DNA fingerprinting/molecular typing" to look at the range of different strains/types. We also put together the information on antibiotic susceptibility testing (a procedure used to determine which **antibiotics** a specific organism or group of organisms are **susceptible** to) provided by the hospitals to examine how easy or difficult these infections might be to treat.

What did you find?

Our study showed that of 176 samples tested, 78.4% were *Achromobacter*, 16.5% were *Pandoraea* and only 5.1% were *Ralstonia*. We identified several examples of what are likely to be new *Achromobacter* and *Pandoraea* species. *Pandoraea* were found to be particularly resistant to antibiotics. Comparison of DNA fingerprints for each bacterial sample found that individuals mostly had their own individual strain/type. Two small "clusters" of highly similar strains of *Achromobacter* and one of *Pandoraea* were found. In a small number of cases this may have been due to cross-infection between patients, but for other examples no patient link could be found.

What does this mean and reasons for caution?

Our survey showed us that by including six hospitals that do not normally send us these bacteria we could identify potentially new species of *Achromobacter* and *Pandoraea* species, which may help us to develop a better understanding of any differences between these species for CF people in the future. DNA fingerprinting suggested that most individuals have their own unique bacterial strain, and that cross-infection within clinics was relatively limited. The provision of data from hospitals relating to antibiotic resistance suggested that

Pandoraea was particularly resistant, however, testing methods differed between hospitals making it difficult to accurately evaluate this.

What's next?

A structured surveillance approach highlighted the existence of likely new species, revealed information about antibiotic testing and resistance, and detected some "clusters" of similar strains that might otherwise not have been found. We hope to conduct further surveillance studies in the future, working closely with clinical colleagues to investigate bacteria that may be particularly relevant to those with CF.

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