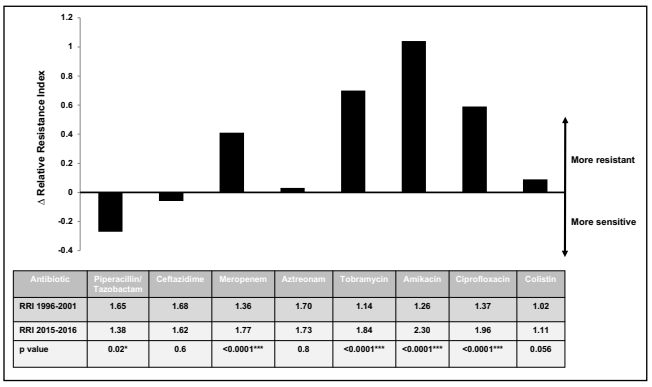
Letters

INCREASING BURDEN OF ANTIMICROBIAL RESISTANCE IN *PSEUDOMONAS AERUGINOSA* FROM ADULT PATIENTS WITH CYSTIC FIBROSIS (CF) IN NORTHERN IRELAND: THEN AND NOW

Editor,

Cystic fibrosis (CF) is characterised by defective mucociliary clearance and chronic airway infection.[1] The most commonly isolated pathogen from CF airways is a Gram-negative bacterium, *Pseudomonas aeruginosa* (PA).[2] Chronic PA infection is associated with significant morbidity and mortality in CF patients[3] and necessitates multiple antibiotic courses.[2] Antimicrobial resistance (AMR) in PA may be driven by the exposure of bacterium to antibiotic, either in the acute setting or during anti-pseudomonal chronic suppressive therapy. We examined AMR from PA isolates from a single adult CF centre, by comparing antibiotic susceptibility from contemporary isolates with a collection from 13 years ago.



Antibiotic	Piperacillin/ Tazobactam	Ceftazidime	Meropenem	Aztreonam	Tobramycin	Amikacin	Ciprofloxacin	Colistin
RRI 1996-2001	1.65	1.68	1.36	1.70	1.14	1.26	1.37	1.02
RRI 2015-2016	1.38	1.62	1.77	1.73	1.84	2.30	1.96	1.11
p value	0.02*	0.6	<0.0001***	0.8	<0.0001***	<0.0001***	<0.0001***	0.056

Fig 1. Change in mean Relative Resistance Index [RRI] over a 13 year period with respect to Pseudomonas aeruginosa isolates (n=200) from the sputum of adult CF patients

Two collections of PA isolates were examined, each consisting of 100 non-duplicated organisms, which had isolated from the sputum of adult CF patients attending the Northern Ireland Adult Cystic Fibrosis Centre, Belfast City Hospital. Collection A was isolated during the period 1996-2001 and Collection B (2015-2016). Microbiological isolation of PA was performed from freshly expectorated sputum, by employment of selective culture for 24-48h, followed by biochemical confirmation with API20NE identication strips (Biomerieux Ltd, UK). Antibiotic susceptibility was performed on each isolate by standard disk diffusion assay and resulting zone sizes were interpreted against published CLSI criteria. Eight antibiotics from three classes of antibiotics were examined, including beta-lactams, fluoroquinolone and polymyxin, as detailed in Figure 1. Antibiotic susceptibility was quantified by employment of a novel marker, Relative Resistance Index [RRI], as recently described.[4] Briefly, qualitative "sensitive", "moderately resistant" and "resistant" data were converted into a quantitative RRI value, through employment of an algorithm.[4] An unpaired two-tailed t-test was used for comparison of trends between these two periods and a probability (p) value of less than 5% ($p<0.5$) was considered statistically significant. There were no differences in the microbiological isolation methodology nor with the antibiotic susceptibility methodology between these two collection periods.

A comparison of RRI scores between the two collection periods is shown (Figure 1). RRI and AMR increased significantly for ciprofloxacin ($p<0.0001$)***, aminoglycosides (both amikacin and tobramycin, $p<0.0001$)*** and meropenem ($p<0.0001$)*** for PA isolates from 1996-2001 to 2015-2016. There was reduction in AMR during this period with piperacillin/tazobactam and ceftazidime.

Overall, this study showed markedly greater resistance in the 2015-2016 PA cohort. Increase in AMR may reflect chronic exposure of PA to several classes of antibiotics used in the management of CF airways infection. Until now, it has been relatively difficult to perform comparative studies on AMR in CF, due to the reliance on generating largely qualitative data (S, I &R) from disk diffusion assay. However, RRI may help tracking changes in resistance patterns either at a population level or at an individual patient level, either with a single antibiotic agent, several agents within a single class or collectively between antibiotic classes.

This approach may be useful in helping to track emergence in AMR epidemiologically, those agents which display the greatest shift in AMR, as well as helping to guide antimicrobial stewardship practices and policies in CF.

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'DISCHARGE LETTER QUALITY; HOW TO HELP BOTH JUNIOR DOCTORS AND GPS?'

Editor,

Discharge letters are an important communication enabling the safe transfer of a patient from secondary to primary care. Research has shown that many junior doctors feel inadequately trained in the process of writing discharge letters[1]. The authors of this work noted a wide variation in how long it took junior doctors to complete letters. A survey of UK GPs noted that they too are unhappy with the standard of letters they receive. They highlight accuracy, clarity and timeliness of receiving letters as causes for concern [2]. This team has completed a quality improvement project aiming to reduce time spent writing discharge letters and improve their clarity.

METHODS

Baseline data was collected on how long it took 4 junior doctors to complete 1 weeks-worth of discharge letters working across 4 medical wards of the Ulster Hospital, Northern Ireland in January 2017. Two complete Deming 'plan-do-study-act' (PDSA) cycles were then performed. In cycle 1 (March 2017) an educational intervention was introduced to the 4 junior doctors. This consisted of a 1-hour teaching session by medical consultants, with GP input on how to write an efficient and effective discharge letter. In cycle 2 (August-October 2017), an educational intervention was delivered by one of the original junior doctors to all incoming junior doctors to Northern Ireland at their regional induction day.

RESULTS

Baseline data showed that the mean time taken to complete 31 discharge letters was 25.9 minutes, with a range of 58 minutes (*Table 1*). After cycle 1, mean time spent completing 43 discharge letters fell by 43.2% ($p<0.001$) to 14.7 minutes, with a range of 25 minutes. GP and consultant feedback indicated that letters written after education had increased clarity. After cycle 2, mean time completing 34 letters was 21 minutes, with a range of 31 minutes. This is a 19% reduction relative to baseline ($p<0.05$).

TABLE 1.

Time taken to complete discharge letters over a one-week period by four junior doctors at baseline and after PDSA cycle one and two educational interventions.

	Baseline Data	PDSA 1	PDSA 2
Mean Time (min)	25.9	14.7	21
Median Time (min)	24	15	21
Range (min)	58	25	31

DISCUSSION

Over the course of a typical week, the change brought about through PDSA cycle 1 could save a junior doctor 2 hours and 45 minutes. This could free doctors to increase exposure to other facets of healthcare provision and training opportunities. Despite our findings and evidence showing that small group based teaching sessions provided to junior doctors can improve the speed of completion and quality of discharge letters, many medical schools do not incorporate extensive teaching[3]. Cycle 2, which increases the scale and sustainability of our project reduced time spent completing discharge letters, but was not as effective as cycle 1.

Discussion with local GPs revealed that they receive large volumes of letters and examination results from secondary and tertiary care centres each day. This team proposes the introduction of educational sessions to junior doctors focussing on how to complete efficient and effective discharge letters to improve clarity of communication and decrease time spent on letter composition.

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POINT OF DECISION PROMPTS AND SIGNPOSTING FOOTPRINTS IMPROVE STAIR USE IN A UK CITY CENTRE OFFICE

Editor,

Physical inactivity is a public health priority, with sedentary behaviour and lack of physical movement major contributory factors to serious illness, including coronary heart disease (CHD), stroke, Type 2 diabetes and breast and bowel cancer