

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 patients³ 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.

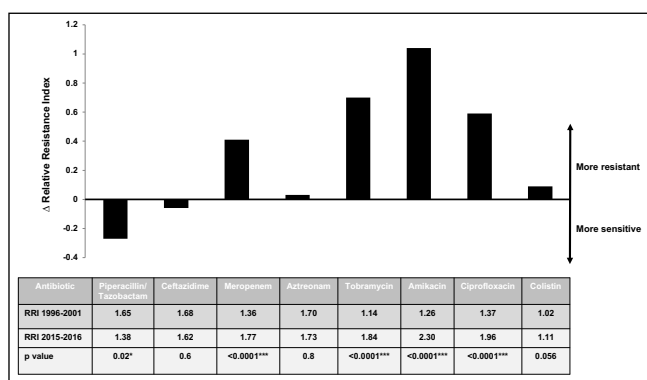


Fig 1. Change in mean Relative Resistance Index [RRI] over a 13 year period with respect to *Pseudomonas aeruginosa* isolates (n=200) from the sputum of adult CF patients

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 identification strips (Biomérieux 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 letters¹. 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 concern². 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 teaching³. 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



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(1). Small bouts of physical activity may be an effective way to reach recommended physical activity levels (2). Stair use is easily integrated into daily activities and associated with health benefits (3). We compared upward and downward stair and elevator journeys before and after the introduction of a multicomponent intervention consisting of point-of-decision prompts (PODPs) and signposting footprints at a city centre office in Northern Ireland.

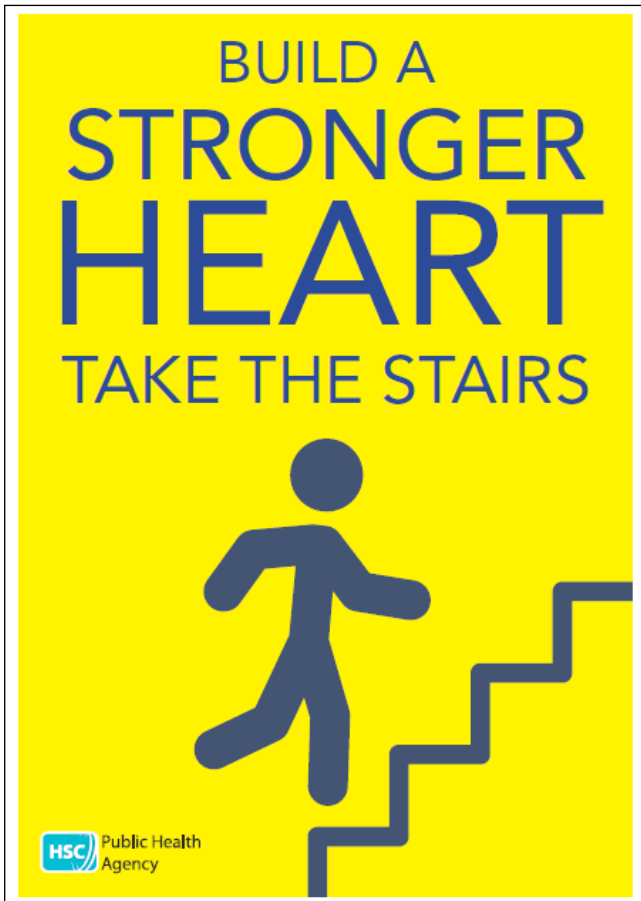


Fig 1. Example of Point of Decision Prompt (PODP) used above elevator call buttons.

Using a before-and-after study design, measurement of people using the elevator and stairs originating or terminating on the ground floor were made for a period of a working day (9 hours 10 minutes) over three days (Monday 8am-1pm, Thursday 1pm-3pm and Tuesday 3pm-5.10pm) during a typical working week prior to the intervention. Measurements were repeated under identical circumstances four weeks and six months after introduction of the intervention. The setting was a six-story office building in the city centre of Belfast, Northern Ireland. Seven PODPs with simple messages, bright colours and bold text were designed and placed 10cm above the two elevator call buttons on each floor (Figure 1). Green footprints with a "Take the Stairs" message were stuck to the floor and stairwell entry door to increase visibility of the stairs and direct staff to take the stairs (Figure 2). Absolute and relative differences between pre-and post-intervention elevator and stair use were

determined and chi-squared tests used to test for significant differences.

There were 6383 total observations, 2205 prior to intervention and 2179 four weeks post-intervention and 1999 six months post-intervention. Total stair journeys increased significantly from 16.6% to 30.2% (82% relative, 14% absolute increase, $p < 0.0001$) four weeks post-intervention and remained significantly higher at 29.2% six months post intervention (77% relative, 13% absolute increase, $p < 0.0001$). There was no significant reduction in total stair journeys between four weeks (30.2%) and six months post intervention (29.2%) ($p = 0.49$). Staff were over twice as likely to use the stairs four weeks after the intervention (Odds Ratio total journeys 2.2 [1.9 - 2.5]) and six months after the intervention (Odds Ratio total journeys 2.1 [1.8 - 2.4]) compared to pre-intervention.



Fig 2. Signposting footprints used on the floor and stairwell door.

Most previous studies on interventions to increase stair use in workplaces involve PODPs alone with stair climbing increasing between 0.3% and 10.6% following introduction

(4). There are few studies of multicomponent interventions involving motivational POPDs and directional signs (e.g. footprints) in UK workplaces. We found a simple, inexpensive multicomponent intervention comprising motivational POPDs and floor-based directional footprints produced significant increases in stair use in a UK office building. The relative increase (82%) was much greater, and the absolute increase similar (11.8%), to previous studies (2). Journeys were over twice as likely to be taken using the stairs post-intervention. This simple effective intervention has potential for use in other buildings.

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Competing interests: None.

Ethical Approval: This study did not require Research Ethics Committee approval as it was an evaluation of a service change. We reached this decision using the Health Research Authority decision aid (<http://www.hra-decisiontools.org.uk/research/>). We assessed that we did not need to obtain informed consent because we did not collect any identifiable information about individuals. The study was approved by the Public Health Agency Staff Health and Wellbeing Group and the Public Health Agency Management Team, which provided corporate oversight and governance.

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PATIENT SAFETY INCIDENTS AMONG FOUNDATION DOCTORS

Editor,

Unfortunately, patient safety incidents (PSI) occur in our complex health care systems. These can have a negative effect both on the patient and the doctor involved.^{1,2} Apart from the usual feeling of guilt, doctors also experience problems with job satisfaction, their relationship with colleagues, depression, inability to sleep, fear of going to work and low self-esteem.^{3,4} There is limited data on the extent of this problem, especially among junior doctors. Getting support after errors may be difficult for senior physicians, let alone for junior ones. There is data to suggest that discussing such events with supervisors giving constructive criticism leads to better doctor outcomes.⁵

Times during when Patient Safety Incidents Occurred

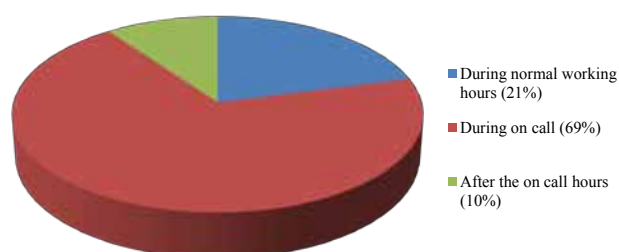


Fig 1. Time of PSI occurrence

The aims of our study were to determine how often foundation doctors are involved in PSIs and which are the most common incidents. An anonymous online questionnaire was distributed amongst Foundation Doctors working within the Malta and Severn (UK) Foundation schools, and 140 doctors completed the survey. There were no differences in the results between the 2 schools. Involvement in at least 1 PSI occurred in 58.5% of doctors. The remainder, (41.5%) claimed that they were never involved in such an event.

In most cases (48.9%), the PSI was identified by the doctor performing it. Doctors expressed different reactions after such events including; concern about the patient's health (25.6%), need for self-improvement (24.2%), disappointment (17%), shame (13.5%), guilt (12.5%) and desire to quit (4.9%). Only 1.35% did not demonstrate any apparent concern. The time of occurrence (Figure 1) and the type of PSI's (Figure 1) are demonstrated below.

In terms of learning events, 31.2% noted the importance of good communication between doctors and patients, re-confirming patient identity prior to any intervention (27.7%), the need to give more attention to clinical practice guidelines (22%), re-check drug allergies (9.9%) and check blood results thoroughly (9.2%).

In 80.8% of PSI's, doctors claimed there were no patient consequences. The rest did not give any answer. They considered fatigue (57.7%), time restriction (49%), doctor



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–doctor (12.5%) and doctor to other healthcare professional miscommunication (22.1%) as possible reasons for such events. Furthermore, 86.1% of those involved in a PSI, thought that it was avoidable.

The majority of doctors (67%) claimed that they had not been trained in how to communicate effectively when it comes to apologising. The remainder (33%) claimed that they feel confident to communicate effectively when it comes to apologising.

Types of Patient Safety Incident

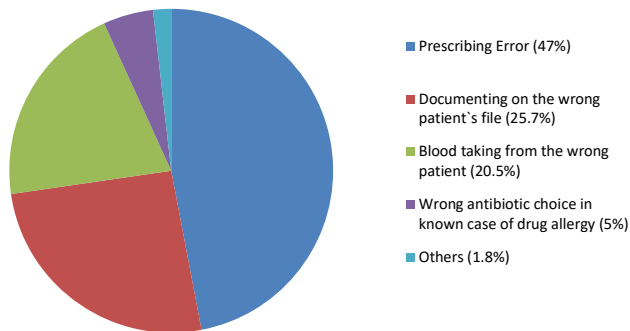


Fig 2. Types of Patient Safety Incident

Support and advice from a more experienced person was required in 74.2% of cases, with 26.7% of them mentioning that they would benefit from psychological support after a PSI.

This data demonstrates that most junior doctors experience emotional distress following PSIs. Formal training in communication skills, disclosure of information and the offer of counseling with therapists and physicians (including Lead Physicians) with personal experiences of medical errors could be provided to help doctors understand how to cope well after such events. Ineffective coping strategies may be adopted if doctors are provided with inadequate support and thus become the “secondary victims” of such events.

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VOLAR DISLOCATION OF THE FIFTH CARPOMETACARPAL JOINT

Editor,

A 25-year-old right-handed housewife presented with severe left hand pain resulting from a fall from standing height. Tenderness and swelling was present over the ulnar side of the injured hand and the little finger appeared foreshortened. No neurological deficit was noted. Radiographs of the injured hand demonstrated a volar–ulnar dislocation of the 5th metacarpal base (Figure 1 panels a and b). Under general anaesthesia, closed reduction and percutaneous wire fixation restored congruence and stability to the dislocated 5th carpometacarpal (CMC) joint (Figure 2). Six weeks post-surgery the wires were removed and hand therapy initiated. Clinically, the patients left 5th CMC joint was stable and radiographs demonstrated joint congruency. The patient regained full function of her injured hand within 6 months.



Fig 1. (panels A&B): Posteroanterior radiograph (a) demonstrating dislocation of the 5th CMC joint with loss of convergence of the metacarpal cascade lines (4 white lines – only 3 converge); true lateral radiograph (b) demonstrating anterior displacement of the 5th metacarpal base (white arrow).

CMC joint dislocations most commonly involve the 5th CMC joint and are usually dorsal.¹ Isolated volar dislocation of the 5th CMC joint is a rare injury with sporadic cases reported in the literature.¹ The injury is thought to result from a direct blow transmitted to the dorso-ulnar aspect of the 5th metacarpal base resulting in disruption of the supporting peri-articular soft tissues.² The deep motor branch of the ulnar nerve lies volar to the 5th CMC joint as it courses around the hook of the hamate and is vulnerable to injury in volar dislocations.³ A careful neurological assessment of the injured hand is therefore essential.

CMC joint dislocations can be easily missed and failure to diagnose this injury may predispose the patient to pain and weakness of grip.¹ Careful radiographic evaluation is paramount. Postero-anterior (PA), oblique and true lateral views of the injured hand should be obtained. Loss of convergence of the metacarpal cascade lines on the PA view is a key radiographic sign (see Figure 1a). The intermetacarpal angle, i.e. the angle between best-fit lines drawn down the medullary canals of the 2nd, 3rd and 5th metacarpals, is normal in volar dislocations and should not be used in isolation to exclude these injuries.¹ If clinically suspicious, additional views should be obtained with the forearm rotated to identify any displacement of the 5th metacarpal base obscured by superimposition of the central metacarpals.⁴

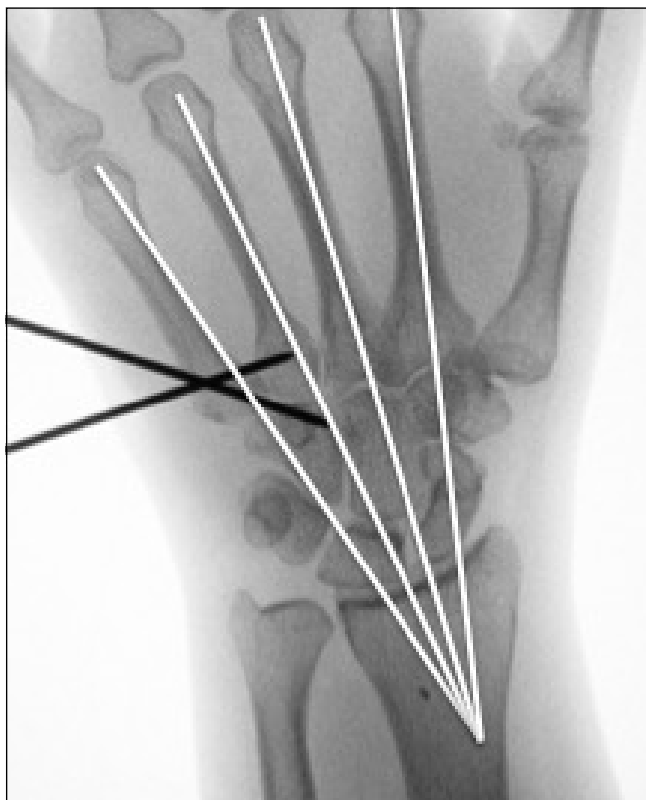


Fig 2. Intra-operative screening image demonstrating reduction and wire fixation of the 5th CMC joint with restoration of convergence of the metacarpal cascade lines (4 converging white lines).

Closed reduction of the dislocated 5th CMC joint and cast immobilisation is an option, however due to the degree of soft tissue disruption the injured joint is often unstable, as in our case, and temporary percutaneous wire fixation is required to restore joint stability and facilitate soft tissue healing.^{1,2,5} Open reduction may be required where there is soft tissue interposition preventing closed reduction of the dislocated joint or in cases of delayed diagnosis.

In summary, isolated volar dislocation of the 5th CMC joint is a rare injury. Careful analysis of the injury radiographs and further views of the injured hand can reduce the risk of a missed dislocation. Reduction and temporary wire stabilisation of the injured joint is recommended.

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DO ALL PATIENTS WITH SALMONELLA INFECTIONS REQUIRE A 'PET' SCAN?

Editor,

A 70-year-old gentleman with Diffuse Large B Cell Lymphoma (DLBCL) was admitted to the haematology unit with neutropenic sepsis. He had a background of Benign Prostatic Hyperplasia, IHD, Duodenal Ulcers and previous cataract surgery. He was diagnosed with DLBCL 3 months previously and had undergone 3 cycles of RCHOP and one course of intrathecal methotrexate. The patient felt warm and sweaty at home, but had no other infective symptoms. On arrival the patient had a temperature of 38.0 °c. His clinical examination was normal, chest X-ray and urinalysis were also normal. The patient's bloods were as follows; HB 90, WCC 0.3, Plts 116, Neuts 0.1, CRP 123. The patient was diagnosed as having neutropenic sepsis and treated with IV Tazocin and given a STAT dose of IV Gentamicin. This was the patient's second admission in three weeks with neutropenic sepsis. Initially during his first admission blood cultures were positive for Salmonella enteritidis and the patient had a 7 day course of IV Meropenem, and with clinical improvement he went home on an oral course of amoxicillin.

On this occasion, the patient's peripheral blood cultures once again grew Salmonella enteritidis. The Microbiology team advised to stop IV Tazocin and instead give a six week course of Intravenous Ceftriaxone. He continued to have temperatures for the first 10 days of his admission, however these subsequently settled. They also advised imaging of his aortic arch to ensure that there was no endovascular origin of the infection. He had a CT scan of his chest, abdomen and pelvis and this had no evidence of mycotic aneurysm



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or any other source of infection. An Echocardiogram did not reveal any vegetations. The patient had not been on any recent holidays and he had not been in contact with anyone who was unwell. It was unclear as to why this immunocompromised patient had two episodes of Salmonella associated neutropenic sepsis.

The patient's daughter, had been doing some research into Salmonella infections and noted a link with reptiles. It transpired that the patient had been living with his son, who kept pet snakes. Salmonella can be found in the gut of reptiles, and they 'shed the bacteria in their droppings'.⁽¹⁾ The bacteria, via the droppings can 'spread over the reptile's skin' and therefore contaminate any surface or person coming into contact with it.⁽²⁾ Furthermore snakes (as in this case) are often fed frozen rats, another source of salmonella.

The patient finished his course of Ceftriaxone and recovered well. His interim PET scan showed an excellent response and he went on to complete therapy - 6 cycles of RCHOP, 4 cycles of intrathecal methotrexate followed by radiotherapy to the contralateral testes. All the snakes have been moved

from his house and it has received a 'deep clean'. Furthermore his son has promised to ensure good hand hygiene and to change his clothes after contact with the snakes and their food. This fascinating case highlights a rare but important cause of recurrent infections in an immunocompromised patient. We propose that medical staff should remember to carry out a 'PET scan' when coming across Salmonella infections.

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