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RESEARCH LETTER

Improved anaphylaxis referral rates to specialized services from an Emergency Department

To the Editor,

The UK has high allergy prevalence rates, with 30%-40% of the population affected by allergy. Hospital admissions for anaphylaxis, its most severe manifestation, have increased sevenfold since 1990.[1] It has long been thought by many that most patients attending hospital as an emergency with anaphylaxis are not referred for specialist evaluation to determine its cause.[2] This is important in order to identify causative allergens that should be avoided and formulate a plan for managing reactions including training in adrenaline self-administration.[3,4] Evaluating such patients is a function of a specialized allergy service as delineated in the UK by the Department of Health Specialised Services Definition set No 17.

Cardiff and Vale University Health Board hosts the only Specialised Adult Allergy Service (SAAS) for adults in Wales. We performed an audit in 2007 to determine how many patients attending the Health Board's Accident and Emergency Department (A&E) with anaphylaxis were referred and subsequently seen in the SAAS. We found that 77 patients attended A&E with anaphylaxis in a 6-month period in 2007 but none of these were referred to the SAAS.[5] In December 2011, the National Institute for Clinical Excellence (NICE) published guidelines advising that after emergency treatment for suspected anaphylaxis all patients should be offered referral to a SAAS and an appropriate adrenaline injector as an interim measure before the specialist appointment.[6] In 2012 and 2013, both Departments implemented a streamlined referral pathway for these patients and we now report on the effect of these changes.

On arrival at A&E, patients are triaged and treated appropriately and a decision made whether to admit or discharge patients who have had anaphylaxis. In response to the NICE guidelines, the A&E Department introduced in 2013 a comprehensive pro forma document for completion by A&E staff that detailed clinical aspects of patients' presentation with anaphylaxis and its urgent management that incorporated a referral form to the Department of Immunology and Allergy for direct patient referral to the SAAS if indicated.

The Department of Immunology and Allergy wrote a 3-page document (Supplementary information) that defined anaphylaxis, listed its major causes and indicated what long-term changes to patients' treatments should be made immediately, which patients should be referred to the SAAS and which should be followed up in primary care. It was written to distinguish isolated urticaria and angioedema clearly from anaphylaxis (in order to solicit referral only of patients who had had anaphylaxis) and concisely listed major causes of these conditions and their appropriate management. A request was made for this to be given to the patient to give to their GP (in the case of patients who did not require hospital admission or specialist follow-up, for example when a drug might be stopped or changed if causing drug-induced anaphylaxis) to help inform onward primary care management.

We also established in January 2012 a monthly rapid access outpatient allergy clinic so that all patients referred from A&E with anaphylaxis could be seen within 6 weeks.

The medical records of all patients attending A&E are encoded in an electronic database. In the initial audit, patients attending A&E with anaphylaxis during the 6-month period 1 April to 30 September 2007 were identified by searching the electronic database using the likely keywords: *allergic*, *allergy*, *anaphylaxis*, *anaphylactic*, *rash*, *swelling*, *breathing difficulties*, *vasovagal episode/attack*, *convulsion*, *bite*, *sting*, *local infection*, *insect*, *bruise*, *abdominal pain*, *asthma*, *reaction* or *pyrexia*. These identified 200 patients whose full A&E records were retrieved for further scrutiny, among whom 77 patients with anaphylaxis requiring specialist assessment were identified. In the re-audit of patients attending during the same 6-month period from 1 April 2016 to 30 September 2016, the (same) keywords were used, and the keywords *nut and food* were added in order to increase the likelihood of identifying patients. Each full A&E record of patients identified was scrutinized carefully to ascertain exactly which patients should have been referred to the SAAS. The work was approved by the Health Board's Clinical Audit Department.

The SAAS database was searched to ensure that all patients referred to the allergy service during the period of the audit would have been identified, even if they had been wrongly given a routine rather than a rapid access clinic appointment.

In the 2007 audit, 3500 A&E patient records were identified from the keyword search and 77 cases of anaphylaxis identified, none of whom were referred to the SAAS. In the 2016 re-audit, 6590 records were identified and only 41 patients were identified as having had anaphylaxis indicating that they should have been referred to the SAAS. Only 18 of these 41 patients were actually referred. All were given urgent appointments, and 17 attended (Figure 1).

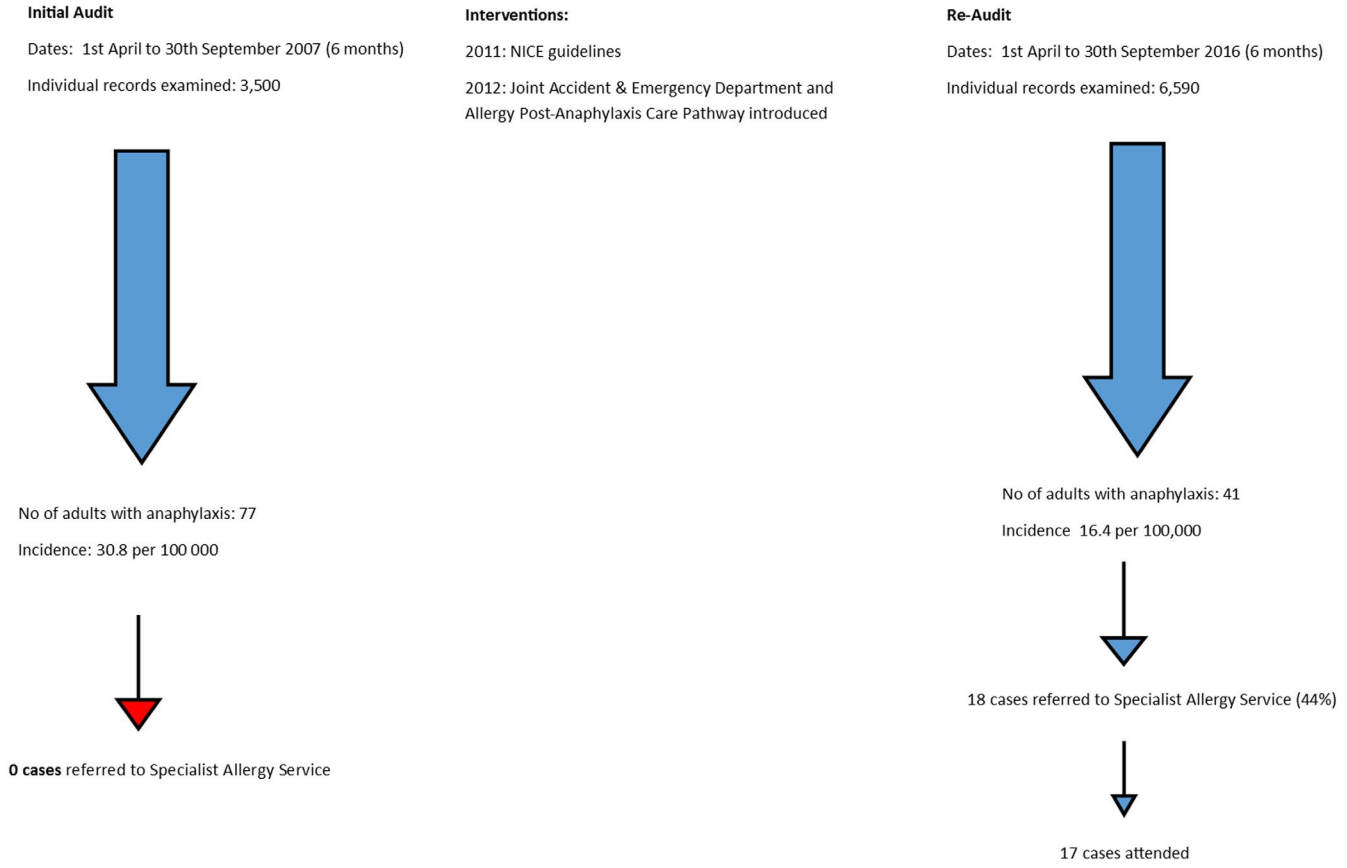

FIGURE 1 Number of A&E records scrutinised, cases identified and referred before (2007) and after (2016) introducing guiding document and patient referral pathway

The 18 patients referred (R) and the 23 patients not referred (NR) were similar in the A&E assessment of the number that had had reactions to food (12R, 10NR), medications (4R, 3NR), insects (0R, 1NR) or plants (0R, 1NR). Suspected precipitants in 10 patients (2R, 8NR) were not documented. Epinephrine for self-administration devices were required for 17 of the 41 patients who required referral and were prescribed by A&E to 14 of those patients (82%), not having been recorded as being prescribed to 3 patients with food allergy (2 to nuts, 1 to egg). Epinephrine was not prescribed to 16 patients (9R, 7NR) at discharge from A&E whose symptoms were due to side effects of NSAIDs, salicylates, other drugs or oral allergy syndrome or who had mild wheezing only, in whom drug therapy was appropriately changed and avoidance of the identified precipitant advised. In the remaining 8 patients not referred to the SAAS, the A&E records were not sufficiently detailed to ascertain if epinephrine device prescription was indicated.

More A&E attendees were identified in 2016 (6590) than in 2007 (3500) indicating the increase in number of patients without anaphylaxis attending A&E. The changes were made in the documentation and patient referral pathway was associated with an improvement in the rate of referral of patients to the SAAS from 0/77 = 0% in 2007 to 18/41 = 44% in 2016. This is a significant improvement in performance, although there is room for further improvement.

World Allergy Organisation anaphylaxis guidelines in 2011 recommended that at the time of discharge from a healthcare setting such patients should be equipped with epinephrine for self-administration and taught why, when and how to administer it, given a written personalized anaphylaxis emergency action plan stating the common symptoms and signs of anaphylaxis, and medical identification.[7] We wrote our document to guide the onward management of these patients by referral to the SAAS or to their GP to facilitate immediate changes in drug treatment if required, and to aid the management of patients with spontaneous urticaria or angioedema who might be more appropriately managed in primary care.

The incidence of anaphylaxis has been reported in 2008 to vary from 3.2 to 20 per 100 000 [8] or to 49.8 per 100 000 when reliance was not placed upon hospital coding systems.[9] Despite the reported rising incidence of anaphylaxis,[1] we found a lower incidence in 2016 (41 patients in 6-months = 16.4 per 100 000) than in 2007 (77 patients = 30.8 per 100 000) which we cannot explain. We think it unlikely that patients may have preferentially presented to A&E departments elsewhere outside our Health Board or were misclassified on the A&E coding system, which was unchanged from 2007 to 2016. We think it unlikely that patients may have preferentially seen their GPs first and then been referred by them to hospital Medical Assessment Units (MAU) as patients with acute anaphylaxis are much more likely to attend

TABLE 1 Post-anaphylaxis management

Identifying likely precipitant
Stop suspected drugs (eg ACE inhibitors, A2R antagonists, Amlodipine, NSAIDs, SSRIs, SNRIs, PPIs, Bisphosphonates, Tetracyclines, Statins, Finasteride, and Tamsulosin) even if tolerated for many years, start regular oral antihistamines and arrange GP follow-up
GP follow-up for known nut allergy, and for Oral Allergy Syndrome and specific food allergy if no epinephrine required
Allergy service referral if previously unknown nut allergy, idiopathic anaphylaxis, exercise ± wheat/other food induced anaphylaxis, stinging insect anaphylaxis or if epinephrine required for oral allergy syndrome or reaction to other specific food
Prescribe self-injectable epinephrine for anaphylaxis due to allergy to nuts, other food that is difficult to avoid (eg milk), insect venom, exercise-induced or idiopathic anaphylaxis

A&E immediately than consult their GP first. The post-anaphylaxis management document was sent to all MAUs in Wales in late 2015 and so was available for use at each MAU from that time. Furthermore, a detailed search of the SAAS database failed to identify any patient referred from a MAU during the audit period. It seems unlikely that the lower incidence reflects patients who have previously had anaphylaxis and are treating further episodes at home and not attending A&E afterwards, as it is the minority of patients who experience recurrent anaphylaxis.[10] We think it unlikely that many patients presenting to A&E with anaphylaxis may have been misdiagnosed in 2016 compared with 2007 in view of the increased awareness of anaphylaxis, the publication of the 2011 NICE guidelines and our response to these guidelines.

None of the 41 patients identified as having anaphylaxis at A&E were previously known to the allergy service. Eighteen (44%) were referred to the SAAS, and no statements were made in any of the A&E records of the 23 patients not referred indicated explicitly why they were not referred. Suspected precipitants in 10 patients were not documented, and as only 2 of these were referred and 8 not referred, it is possible that inability to identify a suspected precipitant may predispose to non-referral. All UK A&E departments are extremely busy and it seems most likely that the remaining 56% were not referred because of the pressure under which all A&E staff work. Although all A&E junior doctors receive full and appropriate instruction about anaphylaxis during their induction, the constantly increasing number of patients attending A&E, chronic understaffing, high frequency of junior doctor rotation through A&E (4-6 monthly), the 4-hour waiting time target and IT access limitations may all contribute to some post-emergency management arrangements being incomplete.

Adrenaline for self-administration was prescribed by A&E staff at the time of discharge to 14 of the 17 patients who required this. Adrenaline prescription was not recorded in the remaining 3, two of whom had known food allergy. Adrenaline autoinjectors were in our view justifiably not prescribed by A&E staff to 16 patients who had symptoms from side effects of drugs, oral allergy syndrome or mild wheezing, in whom appropriate changes in drug therapy and food avoidance was advised. These are reassuring findings and indicate appropriately discriminatory prescribing by A&E staff. Current resources are insufficient for A&E staff to meet all demands in all areas, and redistribution of existing resources within A&E departments is unlikely to improve post-anaphylaxis management. We think that the employment of more advanced nurse practitioners who could review such patients following recovery in a dedicated 24-hour stay facility and more reliably refer them to the SAAS as per written protocol is the most likely way of improving the post-anaphylaxis management of these patients.

In view of the encouraging improvement in referral rates, we have not changed the post-anaphylaxis patient referral pathways suggested. As an initial step, we have however prepared an abbreviated document shown in the Table 1 that may be easier for busy junior doctors to use (full version used shown in Appendix S1). This A&E activity is an area that needs to be more actively targeted by clinical allergy specialists. We hope that other allergy specialists and A&E departments might find this to be a useful document to adapt and customize for their own particular situation.

KEYWORDS

anaphylaxis, audit, emergency, referral pathway

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CONFLICT OF INTEREST

The authors declare no conflict of interest.

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SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section.