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Article:

Egner, W. orcid.org/0000-0002-2654-9881, Cook, T., Harper, N. et al. (8 more authors) (2017) Specialist Peri-Operative Allergy Clinic Services in the UK 2016: Results from the Royal College of Anaesthetists Sixth National Audit Project (NAP6). *Clinical and Experimental Allergy*. ISSN 0954-7894

<https://doi.org/10.1111/cea.12993>

This is the peer reviewed version of the following article: Egner, W. et al, Specialist Peri-Operative Allergy Clinic Services in the UK 2016: Results from the Royal College of Anaesthetists Sixth National Audit Project (NAP6). *Clin Exp Allergy*., which has been published in final form at <https://doi.org/10.1111/cea.12993>. This article may be used for non-commercial purposes in accordance with Wiley Terms and Conditions for Self-Archiving.

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Specialist Peri-Operative Allergy Clinic Services in the UK 2016: Results from the Royal College of Anaesthetists Sixth National Audit Project (NAP6).

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Abbreviations

Royal College of Anaesthetists

RCoA

6 th National Audit Project	NAP6
British Society for Allergy and Clinical Immunology	BSACI
National Institute for Clinical Excellence	NICE
Association of Anaesthetists of Great Britain and Ireland	AAGBI
British Society for Immunology	BSI

ABSTRACT

Background

Guidelines for investigation of perioperative drug allergy exist, but the quality of services is unknown. Specialist perioperative anaphylaxis services were surveyed through the Royal College of Anaesthetists 6th National Audit Project.

Objectives

We compare self-declared UK practice in specialist perioperative allergy services with national recommendations.

Methods

A SurveyMonkey™ questionnaire was distributed to providers of allergy services in the UK. Responses were assessed for adherence to the best practice recommendations of the British Society for Allergy and Clinical Immunology, the Association of Anaesthetists of Great Britain and Ireland and the National Institute for Health and Care Excellence (NICE) Guidance on Drug Allergy - CG183.

Results

Over 1200 patients were evaluated in 44 centres annually. Variation in workload, waiting times, access, staffing and diagnostic approach was noted. Paediatric centres had the longest routine waiting times (most wait >13 weeks) in contrast to adult centres (most wait <12 weeks). Service leads are allergists/immunologists (91%) or anaesthetists (7%).

Potentially important differences were seen in: *testing repertoire* [10/44 (23%) lacked BSACI compliant NMBA panels and 17/44 (39%) lacked a NAP6-defined extended panel; many failed to screen all cases for chlorhexidine 19/44 (43%) or latex 21/44 (48%)], *staffing* [only 26/44 (59%) had specialist nurses and 18/44 (41%) an anaesthetist], and *provision of information* [18/44 (41%) gave immediate information in clinic, and 5/44 (11%) on support groups].

Most centres were able to provide *diagnostic challenges* to antibiotics [40/44 (91%)] and local anaesthetics [41/44 (93%)].

Conclusions and Clinical Relevance

Diagnostic testing is not harmonised, with marked variability in the NMBA panels used to identify safe alternatives. Chlorhexidine and latex are not part of routine testing in many centres.

Poor access to services and patient information provision require attention. Harmonisation of diagnostic approach is desirable, particularly with regard to a minimum NMBA panel for identification of safe alternatives.

INTRODUCTION

National Guidelines exist for the investigation and management of drug allergy, including in the perioperative setting [1] [2] [3]. The incidence of perioperative anaesthetic anaphylaxis is uncertain, and access to Specialist allergy services in the UK outside of London and the South East of England has been noted to be patchy and poorly harmonised in the approach to diagnosis and management [4]. There are also NHS national specialist services definitions for allergy B9 and E09 [5][6]. This survey of the provision of specialist perioperative allergy centres was conducted as part of the Royal College of Anaesthetists (RCOA) 6th National Audit Project (NAP6), studying perioperative anaphylaxis. It aims to describe the provision and practice of specialist allergy services for perioperative anaphylaxis in the UK.

METHODS

A SurveyMonkey™ questionnaire to ascertain availability, workload and practice in centres providing the specialist assessment of perioperative allergy in the UK was devised (Supplementary material 1) and distributed to all potential providers of perioperative allergy services in the UK. Sixty-five potential providers were contacted through triangulation of clinic lists from the British Society for Allergy and Clinical Immunology (BSACI), the British Society for Immunology (BSI), Allergy UK, the Anaphylaxis Campaign, both Royal Colleges of Pathologists and Physicians, the professional networks known to the panel and the UK Immunology and Allergy Nursing Group. Of these, 44 separate centres declared such activity and there are no other known UK specialist clinics with a significant workload who have not responded yet are known to the panel. This survey was distributed between December 2015 and April 2016 and services were asked to provide data relating to the previous 12 months. Where discrepancies or uncertainties were identified in the data, the centres were contacted again for clarification by email.

The SurveyMonkey™ data were exported to a spread sheet for descriptive analysis. No formal statistical analysis was undertaken. Where necessary, additional clarification of responses was sought from centres subsequently.

Based on responses, adherence to recommendations derived from the BSACI [1], the Association of Anaesthetists of Great Britain and Ireland (AAGBI) and the National Institute for Clinical Excellence (NICE) CG183 [3] guidance was assessed as follows:

National Institute for Clinical Excellence (NICE) G183 Recommendations (N)

N1 Allergy specialists should give the following written information to people who have undergone specialist drug allergy investigation:

N1.1 the diagnosis – whether they had an allergic or non-allergic reaction

N1.2 the drug name and a description of their reaction

N1.3 the investigations used to confirm or exclude the diagnosis

N1.4 drugs or drug classes to avoid in future

N1.5 any safe alternative drugs that may be used

N2 Providing information and support to patients

N2.1 provide structured written information on person's suspected drug allergy.

British Society for Clinical Immunology and Allergy (BSACI) Recommendations (B)

B1 Referral should be made to a major allergy centre with expertise in drug allergy and high throughput of anaesthetic anaphylaxis because of the need for experience in interpreting tests and the serious consequences of diagnostic error.

B2 The centre should be able to investigate all potential causes. This involves a range of drug classes/substances including:

B2.1 neuromuscular blocking agents (NMBAs)

B2.2 intravenous anaesthetics

B2.3 antibiotics

B2.4 opioid analgesics

B2.5 non-steroidal anti-inflammatory drugs (NSAIDs)

B2.6 local anaesthetics (LAs)

B2.7 latex

B2.8 skin antiseptics (we used chlorhexidine as a surrogate for this)

B3 Investigation should be in a dedicated drug allergy clinic

B4 Stepwise investigation is necessary and depends on the likely cause, but a suspected IgE-mediated reaction (e.g. NMBAs, i.v. anaesthetics, antibiotics, latex) requires

B4.1 skin testing and

B4.1 in some cases drug challenge

B5 The aim of the investigation should be to identify the cause of anaphylaxis and to recommend a range of drugs/agents likely to be safe for future use.

B6 The allergist is responsible for a detailed report to the referring doctor and GP, and a shorter report and provision of 'medical alert' wording to the patient

B7 Role of the anaesthetist - Report to MHRA

B8 Role of the allergist

B8.1 Identify the cause of the reaction

B8.2 Identify drugs likely to be safe for future anaesthesia

B8.3 Provide a written report to referring consultant, copied to GP and surgeon

B8.4 Provide patient with a brief 'to whom it may concern' letter (listing the above)

B8.5 Provide patient with an 'Alert' application and the specific wording to be inscribed

B8.6 Report to MHRA

B9 The presence of a clinic nurse with specialist allergy experience

AAGBI Recommendations (A)

A1 Cases of anaphylaxis occurring during anaesthesia should be reported to the Medicines Control Agency (Note: MHRA is now superseded by the Medicines Control Agency (MCA))

We arbitrarily defined 'larger' adult centres as those seeing ≥ 20 patients referred for investigation of perioperative hypersensitivity per year and 'smaller' centres as those seeing <20 , to examine whether there were any differences in the services provided that clearly correlated with workload for standard B1.

Some of the text of the guideline recommendations above are open to interpretation. The guidelines state that the clinic should be able to investigate all causes, but are not specific about whether testing should occur in all cases to demonstrate lack of sensitisation or detect potential hidden exposure. Therefore, the NAP6 panel agreed that for antiseptics (chlorhexidine in most cases) the compliant clinic would be able to test, but we have also noted where the testing was applied to all, or only selected cases since this is often a hidden allergen. The same approach was used for latex testing. We have noted where centres were able to test to B2.1 -2.8 inclusively as evidence of full repertoire testing.

Similarly, where NMBA use was assessed (standard B2.1), the centre was deemed compliant where the ability to test for NMBAs was offered, and we separately assessed if panels of NMBAs included all of the following (the agreed NAP6 minimum panel (see below) and referenced to standard N1.4, N1.5, B2.1, B5, B8.2).

The "NAP6 minimum panel " was defined as: the suspected NMBA; at least one alternative in the same class; inclusion of suxamethonium and rocuronium (to identify a safe agent for rapid sequence induction); inclusion of atracurium or cis-atracurium. If the suspected culprit drug is one of those agents, then the minimum panel would consist of 4 agents. Vecuronium, pancuronium and

mivacurium have either not been available at times during the survey period or are so infrequently used that their use was not deemed mandatory for compliance with the “NAP6 panel”.

For MDT related data (mandated in the National Specialist Services Contracts for Allergy B9 and E9) [5, 6], we defined an MDT as a face-to-face or telephonic/video-conferenced multidisciplinary meeting with at least two medical and/or nursing specialties present. We did not count clinics where two or more specialties were present but where the respondents did not report an MDT in the MDT specific question.

RESULTS

We identified approximately 50 centres providing adult, paediatric or mixed perioperative allergy testing services. The survey was sent to all centres and evaluable responses were received from 47. One respondent submitted no data so was excluded from analysis, and two other services submitted duplicate entries, which were excluded, leaving 44 evaluable responses. Eleven services provided paediatric services alone. Adult services were available in 33 centres, of which five also saw a small number of children.

Workload

Sixteen adult centres and two paediatric centres reported actual numbers of patients seen and other centres estimated activity for the previous 12 months.

Adult Centre Workload

The 33 adult centres evaluated an estimated 1271 adult patients in the previous 12 months. Of these; 21 (64%) investigated ≥ 20 patients per year (range 21-136; median 57 cases) and 12 (36%) saw < 20 (median 10). Eleven (33%) adult centres saw ≥ 50 patients per year.

Ninety percent 1149/1271 of adult cases were investigated in larger centres (> 20) and 10% (122/1237) in smaller centres (< 20).

Paediatric Centre Workload

All paediatric centres saw < 20 patients per year, with a median of 4 (range 1-9). Fifty-three children were investigated for suspected perioperative anaphylaxis over the previous 12 months – 46 in specialist paediatric centres and seven in the five combined adult/paediatric centres.

Access

Considerable geographical variability in distribution of services is shown in **Error! Reference source not found.** Regional variation in the number of services and referral patterns related to population size and density in Figure 1b.

Compliance with standards

Compliance with published standards for each aspect of patient care is presented in (Figure 2a-c). Overall the results showed little difference in compliance between larger, smaller or paediatric centres (Figure 2a-c) for most elements, but notable differences in approach to paediatric cases due to a perception of rarity of NMBA allergy in paediatric cases in some or a wish to avoid or limit distressing testing (like IDT) in most. As a result, few paediatric centres would strictly meet the BSACI standard of investigating all administered drugs or identifying several or a range of (herein assumed to be at least 2) alternatives.

Standards with greatest variations in practice were the use of NMBA panels and anaesthetists in paediatric clinics, issuing of patient written and verbal information at the clinic visit, provision of information on patient support groups, availability of blood testing for drug specific IgE, routine use of testing to latex or chlorhexidine and direct reporting to MHRA by the clinic.

Waiting Times

Waiting times are shown in Figures 3a-c.

Adult Centres

Urgent appointments were available to most within five weeks (Figure 3a & b). Most adults were seen within 12 weeks routinely. Two centres breached current national waiting time targets of 18 weeks – both were larger centres.

There were no major differences in waiting times between larger and smaller centres.

Paediatric Centres

Urgent appointments were available to most within eight weeks. Routine paediatric appointment waiting times were longer than adults with most waiting >13 weeks (Figure 3c).

One centre breached current national targets with a wait of >18 weeks.

Staffing

Leadership

Adult Centres

The majority of services (28/33) are led by an allergist or immunologist, with three led by an anaesthetist, one by a respiratory physician and one did not declare a specialty lead.

Of the 21 larger adult centres, 18 were allergist/immunologist-led, and three led by an anaesthetist with drug allergy experience. Of the 12 smaller adult centres, nine are allergist/immunologist-led, one led by an anaesthetist with allergy experience and one by a respiratory physician experienced in allergy and one did not declare a specialty lead.

Paediatric Centres

All eleven centres are led by a paediatric allergist.

Involvement of an anaesthetist

Adult Centres

Nine of 21 larger centres and five of 12 smaller centres reported involvement of an allergy-experienced anaesthetist in the clinic. A total of 675/1271 (53%) adults were seen in a clinic including an allergy-experienced anaesthetist, of whom 626 (93%) were seen in the nine larger

centres. Two further centres (both larger centres) had an anaesthetist without extensive anaphylaxis experience and one reported both.

Paediatric Centres

One of eleven paediatric centres reported the involvement of an allergy-experienced anaesthetist.

Overall, eighteen of 44 (41%) centres can be deemed to have appropriate anaesthetist involvement.

Involvement of a nurse with drug allergy experience

Sixty percent of all centres (26/44) had at least one nurse with drug allergy experience.

Adult Centres

Thirteen of 21 larger adult and six of 12 smaller adult centres had an experienced nurse.

Paediatric Centres

Seven of eleven paediatric centres had an experienced nurse.

Involvement of a pharmacist to prepare drug dilutions

Four centres reported the availability of pharmacy-led drug preparation for clinical investigations; in three larger adult centres and one paediatric centre.

Operation of the service

Adult Centres

Face-to-face multi-disciplinary team meetings (MDTs) were more common in larger centres (12/21, 57%) than smaller centres (4/12, 33%). Two centres (one larger, one smaller) had an alternative arrangement to ensure MDT discussion (e.g. a telephone MDT before, during or after the clinic).

Three larger and one smaller adult centres reported presence of an anaesthetist in clinic, but no formal MDT.

While 55% complied with a face-to-face or telephone MDT, if the presence of two specialties in a clinic is judged to be equivalent to an MDT then overall provision rises to 67%.

Paediatric Centres

Five paediatric centres had a face-to-face MDT arrangement (5/11, 45%). Two additional services performed clinics jointly with a paediatric allergist. Only one clinic was staffed by an anaesthetist experienced in drug allergy.

Overall compliance with a face-to-face MDT standard in paediatric clinics was 45% and if the presence of two specialties in a clinic is judged to be equivalent to an MDT then overall compliance rises to 64%.

Clinic Assessment

Most adult patients (1262/1271, 99%) and all 53 paediatric cases were assessed by face-to-face clinic visits.

Some larger centres offered additional remote diagnostic interpretation and triaging of cases. Two larger adult centres reported additional initial laboratory interpretative investigation of acute reactions for 203 patients, some of whom may have subsequently been triaged to face-to-face clinic visits (information not available).

Database

Sixty-four percent of all centres reported keeping a database of anaesthetic adverse reaction cases: thirteen larger adult centres (62%), eight smaller adult centres (67%) and seven paediatric centre (64%).

Referral pathways

All but one clinic reported that they accept consultant-to-consultant referrals to enable rapid and direct assessment.

Investigations

Considerable variation in practice was revealed both in the repertoire and testing modalities across the survey centres. Centres should be able to investigate all potential culprits in line with the standards above.

Pholcodine testing

Six larger adult centres, one smaller centre and one paediatric centre routinely query pholcodine exposure (8/44, 18%). There is no specific standard for testing against pholcodine, but it would be expected to be part of an expert centre's repertoire.

Chlorhexidine testing

Fifty-seven percent (25/44) of centres reported testing for chlorhexidine in all cases. A further 16 (36%) reported testing only those with known exposure. Thus, 93% were compliant with the guidance for being able to assess this antiseptic. Compliance is summarised in Figure 2.

Fourteen (67%) larger adult centres routinely tested for chlorhexidine and seven in selected cases only. Six smaller (50%) adult centres routinely tested for chlorhexidine and four in selected cases only. Five (45%) paediatric centres routinely tested and five only in selected cases.

Reported testing protocols (Figure 4) varied. Skin prick testing (SPT) was the most common first-line test (26/44) followed by serum specific immunoglobulin E (sIgE) (9/44), with intradermal testing (IDT) or sIgE commonly used for second-line testing in adults (IDT was rarely used in children). One centre reported performing chlorhexidine challenges. Nine centres reported the use of

chlorhexidine sIgE blood tests as a first-line test (seven of which would then do SPT as a second-line test). Only one larger adult clinic used IDT as a first-line test (with sIgE test as a second-line test).

Latex

Twenty-three adult centres (14 larger; nine smaller, 70% overall) reported always testing for latex and nine more in selected cases. SPT was the preferred first test for 20 (16 larger; four smaller) and sIgE for five (three larger; two smaller) centres. Secondary testing was predominantly sIgE (eight centres) and IDT (three centres). Only larger adult centres used IDT for latex. Compliance is summarised in Figure 2.

Nine of eleven paediatric centres reported that they always test for latex and two in selected cases. Ten reported using SPT as first line testing; six reported using sIgE as a second line test and none reported using IDT. Five apparently only use a single modality of testing (four SPT, one sIgE) (Figure 5).

Neuromuscular Blocking Agents (NMBA)

Panel testing and safe identification of alternative NMBA

Practice was highly variable. Compliance is summarised in Figure 2 and Table 1.

Adult Centres

Most adult centres (32/33) reported using a 'panel' of agents containing many of the routinely available drugs when testing for NMBA allergy (Table 1) but the majority would only do so where the suspected NMBA was positive in initial skin testing. There is no definition of an appropriate panel in existing guidance, but the NAP6 authors agreed a harmonised "NAP6 Panel" definition to meet the requirement of safe identification of alternative agents (see methods).

Compliance is summarised in Figure 2 and Table 1. Most adult centres initially test to the suspected culprit agent only, and all reported use of a panel of NMBAs, however one specifically would only

test to a couple of alternatives rather than the full panel or the NAP6 minimum panel. A small number of larger centres reported that they routinely test extended NMBA panels in all, but most appeared to only use the panel where one of the suspected culprits was positive on initial screening.

The agents reported to be used routinely in panels are summarised in Table 1 and is broadly comprehensive.

Paediatric centres

Five of eleven paediatric centres initially test to the suspected culprit agent only, while six reported use of a limited panel of NMBAs sequentially, of which only two included rocuronium and suxamethonium routinely. However, all would only proceed to use the panel where the initial test was positive, and one centre specifically stated that NMBAs were rarely tested in children.

Compliance is summarised in Figure 2.

Suxamethonium was routinely used in panels by five paediatric centres but another commented that suxamethonium is rarely used in children and is therefore rarely part of the panel (Table 1).

Testing strategies appeared consistent for NMBAs, with most reporting use of SPT first and then IDT if negative; one specified SPT only (Figure 6). Several centres noted the need to minimise distressing IDT testing in children. Few centres used sIgE to thiocholine (suxamethonium, and quaternary ammonium groups). One centre reported using sIgE followed by sequential SPT and IDT.

Drug Challenges

No centre performed challenges to NMBAs. Twenty-five of 44 (57%) centres perform challenges to antiemetics; eleven (25%) to hypnotics; 24 (55%) to anxiolytics; 34 (77%) to NSAIDs; 29 (66%) to opioids and 41 (93%) to local anaesthetics.

Other challenges on offer include: heparin, latex, chlorhexidine, and paracetamol.

All paediatric centres offered NSAID and local anaesthetic challenges.

Antibiotic Challenges

Forty centres (91%) provide antibiotic challenges (20/21 larger adults centres; 8/12 smaller centres; 11/11 paediatric centres).

Waiting times for antibiotic challenges were reported to be under nine weeks for 21/44 (48%), more than three months in 12/43 (28%) of centres and were similar in all types of centre (Figure 7).

Information

Adherence to relevant guidelines is shown in Figure 2.

Only half of adult centres give immediate information to the patient (10/21 larger, 5/12 smaller and 3/11 paediatric centres). All centres, however, stated that the patient receives a copy of the clinic letter. Only five of 44 centres (11%) reported giving additional information on patient support groups (two smaller adult centres and three larger ones).

Thirty-nine (89%) centres (19/21 larger adult; 11/12 smaller adult; 9/11 paediatric) issued Medical alert/hazard warning information to the patient.

All adult and paediatric centres sent a clinic letter to the referring clinician, and all also sent this to the general practitioner.

Copy letters to the surgeon where applicable (Figure 2a) were sent by 36 (82%) centres (18/21 larger; 10/11 smaller; 8/11 paediatric centres).

All centres reported that the clinic letter identified the culprit drug when found and all but one identified the nature of the reaction (Figure 2a and b). Two (5%) centres did not routinely describe the clinical features of the reaction or the clinical tests performed in the clinic letters (Figure 2b).

All adult clinic centres reported identifying the drugs or drug groups to avoid and suitable alternatives.

Only six centres reported that they provide details of the alternative diagnosis where IgE-mediated allergy was excluded (Figure 2b).

MHRA reporting

Eleven (25%) centres overall (5/21 larger adult, 3/12 smaller adult and 3/11 paediatric) reported directly to MHRA, the rest relying on the referring clinician to do this (Figure 2c).

DISCUSSION

This is the first UK survey specialist allergy centres evaluating perioperative anaphylaxis and provides important information on the availability and self-reported practice in these services, prior to NAP6 case data collection. Where possible, practice has been mapped to UK recommendations [3] [1] [2]. Most activity occurred in adult centres, but we do not know if this reflects differences in adult or paediatric referral patterns or incidence of anaphylaxis or surgery. Future analysis of cases reported to NAP6 will provide data on this.

Forty-four widely distributed UK centres (33 adult and 11 paediatric) were identified, of which 21 saw more than 20 adult patients per year, but paediatric services were small and inequitably distributed. Two smaller adult centres subsequently ceased providing service in 2017 due to staff retirements (workload approximately 30 patients per annum) and one more may also have ceased operation. There was wide variation in the number of cases seen in each region with respect to total regional population and population density (Figure 1).

London and the Midlands have the greatest concentration of services and, in contrast to many other reports on allergy services, the urban areas of northern England appear to be well served.

Provision of services is limited in Northern Ireland, Wales, Scotland, the East of England, the South West, the South East of England and the West Midlands. Scotland has three adult centres and Wales and Northern Ireland only one each. Wales and Scotland appear to have only one paediatric centre

and Northern Ireland none. No services submitted paediatric returns from the Southwest or East of England.

Paediatric centres and a few larger adult centres reported the greatest problems with access waiting times and therefore the relationship of staffing and resources appropriate to the workload may need to be explored further. Two thirds of children had to wait more than 12 weeks to be seen, while more than half of adults waited more than eight weeks to be seen which may impact on test sensitivity. Drug sensitisation to chlorhexidine is known to be transient [7] so these delays in assessment run the risk of missing important sensitisations and compromising the diagnostic algorithm.

Access to drug challenge services was also poor, with fewer than half the centres able to challenge to antibiotics within eight weeks.

Both BSACI and AAGBI guidance mandate a sufficient workload to maintain expertise and 20 cases was designated by our NAP6 panel to be a reasonable minimum to achieve this [1] [2]. Future guidelines should agree a definition of the minimum workload. Our pragmatic definition enabled a review of compliance with recommendations, by workload. Only one third of centres see more than 50 patients each year. No paediatric service saw more than ten cases in a year. Of note, we found no clear evidence that self-reported compliance with published guidance varied markedly between adult centres with larger and smaller workload except for the less frequent use of extended NMBA panels, or between adult and paediatric centres, with the exception of the provision of more limited range of testing in smaller centres and the fact that testing is limited in children to minimise painful investigations like IDT as well as the perception that NMBA allergy is rare in children. NMBA panel use is the exception rather than the rule. Separate paediatric guidance may be needed in future, since most centres would therefore not be adherent to the suggested NAP6 minimum panel.

The NHS England National Specialist Service Definitions for allergy (B09 and E09) mandate hub and spoke networking, accreditation and working to NICE, BSACI, RCPCH and AAGBI guidance. Smaller clinics and all paediatric clinics might benefit from being part of these governance networks where this is not already the case.

As almost two thirds of centres already keep a record of their cases in a spreadsheet or database (a requirement of the Specialist Allergy Service Specifications), this provides the opportunity to support research in allergy. A minimum dataset could usefully be defined by professional societies.

Improved co-ordination of data collected would offer the opportunity of improved research in specialist allergy.

Adherence to guidelines for testing modalities appears good overall in adults and most services appeared comprehensive in repertoire, consistent with current recommendations. However, there was room for harmonisation of approach to NMBA, Latex and Chlorhexidine testing, and better patient information. The current guidelines are not very specific regarding minimal acceptable test repertoire and the authors analysed several additional requirements (NAP6 NMBA panel and routinely testing for chlorhexidine) specifically to enable robust evaluation. Future iterations of guidelines should consider being more specific to advance harmonisation of practice.

The purpose of perioperative drug allergy testing is to identify the culprit drug, plus any cross-reacting drugs to which the patient may also be allergic, thereby to identify safe drugs, particularly when several drugs were co-administered. This should enable the centre to provide a list of drugs to avoid, a list of safe alternatives and a list of drugs that have been excluded as the cause of the allergic reaction. Not all centres used harmonised protocols for NMBA and routine testing for chlorhexidine and latex, but paediatric centres may have some valid reasons for differences.

We noted marked variability in the adequacy of the NMBA panels used [3] [1] [2] when judged against the NAP6 minimum panel suggestions and this may raise concerns about adequacy of testing

– especially the identification of safe alternative NMBAs for rapid sequence induction of anaesthesia. Most centres reported they would only test an extended panel if the putative culprit was positive, consistent with current guidance, but this may create a risk of failure to identify NMBA allergy through false-negative testing should all other culprits be negative, or if the clinical picture was highly suspicious for NMBA allergy. It was not clear if all would proceed to panel testing if the original suspected culprit was negative, but several centres specifically commented that they would do so in those circumstances.

Half of the centres apparently omitted some common drugs (particularly cis-atracurium and suxamethonium). This could be a risk to patients, since not testing prevents detection of relevant sensitisations or cross-reactivity to select safe alternatives, or restricts future anaesthetic options for rapid sequence induction. Practice in children may however be different, for practical reasons, and separate guidance may be needed.

It is likely that specific guidance on this matter would be of benefit in future for adults too. The NAP6 panel developed a minimum NMBA panel definition (NAP6 NMBA Panel) that met the requirements of safe future anaesthesia in all circumstances. Only 18% of paediatric, 56% of smaller adult and 86% of larger adult centres met the NAP6 minimal panel definition. This panel could be considered for future adoption (potential culprit, an NMBA from a different class, and two agents with specific utility: rocuronium and suxamethonium).

Auditing and understanding the best diagnostic algorithm will require harmonised practice in future.

Communication with colleagues appears generally good. Communication with patients may be less good. Most centres reported that they were fully compliant with the recommendations of NICE CG183 regarding specific written information, however supply of immediate information to patients, written information to patients and information on patient support groups was incomplete on their returns (Figure 2b).

Reporting of allergy testing results to the MHRA by clinics is rare and this is usually deferred to the anaesthetist (Figure 2c).

While MDT working is not in guidelines it is a national specialist commissioning standard. Only half of the services had a face-to-face MDT to discuss cases. Of concern, anaesthetists were involved in fewer than half of the specialist centres and very rarely in paediatric clinics. Three adult services were led by anaesthetists. Anaesthetists have a key role in detecting non-allergic causes for the clinical presentations, understanding the normal adverse event profile of the drugs given, the confounding effects of polypharmacy and patient co-morbidity, advising on suitable future strategies for anaesthesia and ensuring that all likely causes have been considered [2]. More anaesthetists with an interest in allergy are needed, to promote learning and enhance service quality.

Networking arrangements could be used to ensure anaesthetist involvement in MDT case discussions.

The staffing of clinic services was very variable and may not meet specialist service recommendations and guidance. Specialist nurses with allergy experience were missing in 36-50% of clinics. Pharmacist involvement in preparation of drug dilutions for skin tests or challenges was very infrequent, but would be desirable.

Diagnostic testing practice must be harmonised. Definitive and translatable predictive values for any testing strategy or sequence remain unknown. Skin prick testing remains the initial test of choice for most centres, but follow-up testing and the indications to do so are variable. Intradermal testing appears to be under-used in comparison to international recommendations overall [1] [8] [9] and this was particularly so in paediatric centres.

Chlorhexidine appeared to be under-investigated and not part of routine testing in many centres, in spite of its ubiquitous (and at times unrecognised) presence in the perioperative environment.

Despite many publications and a suspicion of increasing prevalence of this potentially hidden allergen, many centres did not screen routinely, although all claimed to assess potential exposures.

No guideline explicitly states that chlorhexidine testing is mandatory in the investigation of perioperative anaphylaxis, but the variability in testing and the ubiquity of chlorhexidine make this worthy of consideration. In contrast, latex allergy may be becoming less prevalent, yet is still routinely included by most.

From a patient's and clinician's perspective, variability of care is a concern. Our patient representative authors were concerned about low-volume services that rarely see this type of event, or services that do not have harmonized protocols in place for testing of culprit agents and safe alternatives. It was reassuring that no major differences were noted that obviously correlated with service size other than breadth of NMBA panel and fewer MDT discussions. However, this survey did not evaluate differences in the diagnostic accuracy or quality of advice provided by centres, more data on this will be available through NAP6 data analysis. Therefore, the recommendations regarding hub and spoke networking to improve harmonisation and quality assurance merit consideration. As recommended in NICE CG183 [3], it was noted that consultant-to-consultant referrals remain an important source of referral.

This survey provides an important snapshot of UK provision and practice in perioperative allergy testing before the main phases of NAP6.

Acknowledgements

RCoA Team: Laura Farmer, Jose Lourtie, James Goodwin for compiling and managing the SurveyMonkey™ survey.

Contributions

WE lead Author – survey design, data analysis, writing, editing and reviewing manuscript
NH, SM, TG, TC, KK, AW, JH, SN, MT survey design, editing and reviewing manuscript.

Conflicts of Interest

None reported.

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