

# The RCPCH care pathway for children with venom allergies: an evidence and consensus based national approach

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## ABSTRACT

**Aims** The Royal College of Paediatrics and Child Health (RCPCH) Science & Research Department was commissioned by the Department of Health to develop national care pathways for children with allergies; the venom allergy pathway is the seventh pathway. The pathways focus on defining the competences to improve the equity of care received by children with allergic conditions.

**Method** The RCPCH venom allergy pathway was developed by a multidisciplinary working group and was based on a comprehensive review of evidence. The pathway was reviewed by a broad group of stakeholders including the public and approved by the Allergy Care Pathways Project Board and the RCPCH Clinical Standards Committee.

**Results** The pathway results are presented in four parts: evidence review, mapping, external review and core knowledge documents. The entry points are defined and the ideal pathway of care is described from self-care through to follow-up. The evidence highlighted that venom immunotherapy is safe and effective for bee and wasp allergy and that there are real quality of life benefits for patients. The review also highlighted the value of measuring serum tryptase after reactions.

**Conclusions** The venom allergy pathway provides a guide for training and development of services to facilitate improvements in delivery as close to the patient's home as possible. The authors recommend that this pathway should be implemented locally by a multidisciplinary team with a focus on creating networks between primary, secondary and tertiary care to improve services for children with allergic conditions.

## INTRODUCTION

Allergic reaction to the venom of bees and wasps are the most important venom allergies in children in the UK. Severe allergic reactions to wasp and bee sting can be fatal and the risk of recurrence can persist for decades. The prevalence of systemic allergic reactions in Europe varies between 0.3% and 7.7%.<sup>1</sup> There is no published evidence on the prevalence of venom allergy in the UK, but in a 10-year study of UK fatal anaphylaxis, 47 of 214 deaths from anaphylaxis were ascribed to bee or wasp venom.<sup>2</sup> Systemic reactions have an onset in minutes and include all the common signs of immediate allergy

(eg, urticaria, angio-oedema, anaphylaxis). Sixty per cent of systemic reactions to insect venom in children are mild cutaneous (generalised urticaria) and remain mild on re-sting.<sup>3</sup> Children with moderate to severe systemic reactions involving cardiorespiratory symptoms have a 30% risk of recurrence on re-sting.<sup>1</sup> Large local reactions, due to late-phase IgE-mediated allergic inflammation which increase in size over 24–48 h and persist for several days, are more common. Although there is a 5–15% risk of further systemic reaction on re-sting following a large local reaction,<sup>4</sup> these reactions are usually mild.

Children at risk of further severe reactions should be identified and referred to a specialist allergy clinic for diagnosis, assessment of risk of further severe reaction, advice on emergency management and consideration of venom immunotherapy (VIT). Confirmation of diagnosis includes accurate history and the demonstration of specific IgE to bee or wasp venom by skin testing and serum-specific IgE.

Children with systemic mastocytosis are at particular risk of anaphylaxis and should be identified by elevated serum tryptase.<sup>5</sup> The children of beekeepers are at increased risk of bee venom allergy.<sup>6</sup>

VIT is a safe and highly effective (75–98% success in preventing sting anaphylaxis in adults) treatment.<sup>7</sup> After 3–5 years of treatment in children, most were still immune 10–20 years later. VIT is indicated in children who have had a severe systemic reaction to venom.<sup>8</sup> Cutaneous systemic reactions and large local reactions may be managed symptomatically and do not require immunotherapy.<sup>9</sup>

This pathway addresses the care of children presenting with allergic reaction to honey bee and common wasp venom, which are the main stinging insect allergies in the UK. This pathway does not include the management of allergic reactions to other insects.

## METHOD

The full methodology is outlined elsewhere.<sup>10</sup>

## RESULTS

The pathway results are presented in four parts: evidence review, mapping, external review and core knowledge documents.

## Evidence review

A total of 162 titles and abstracts were screened by the project manager and DVLWG (Drug Venom Latex Allergies Working Group) Chair (figure 1). Eleven reviews and/or primary papers and three guidelines were identified for appraisal; hand searching the reference lists of appraised papers did not identify any additional papers. The full critical appraisal resulted in the inclusion of eight systematic reviews and/or primary papers and three clinical practice guidelines.

The evidence review found that VIT is safe and effective for bees<sup>7 11–13</sup> and wasps<sup>7 12 13</sup> and that there are real quality of life benefits for patients.<sup>14 15</sup> The review also highlighted the value of measuring serum tryptase.<sup>5</sup> Health professionals should take note that one higher risk group includes beekeepers and their families.<sup>6</sup>

## Mapping

The Royal College of Paediatrics and Child Health (RCPCH) national care pathway for children with venom allergy can be downloaded from the website: <http://www.rcpch.ac.uk/allergy/venomallergy>. For the purposes of this pathway, venom allergy is defined as an immune-mediated (immediate-onset) reaction to insect venom. This pathway covers bee and wasp venom allergy, which are the most common insect allergies in the UK.

## External review

This pathway was made available with the latex allergy and drug allergy pathways on the RCPCH website and emailed to a general allergy stakeholder list. A total of 9/57 (16%) of the invited organisations responded, providing 32 comments.

## Core knowledge documents

The working group did not identify key guidelines (core knowledge documents) supporting the skills required to deliver this pathway.

## DISCUSSION

There is wide regional variation across the UK in the provision of care for patients with allergic conditions. In a 2010 follow-up report to the 2007 House of Lords Science and Technology inquiry into the provision of allergy services, the Royal College of Physicians found that allergy services remain chronically under-resourced and delivered by healthcare professionals from a variety of training backgrounds, with many having no specific training in allergy.<sup>16 17</sup> VIT is the recommended treatment for children with moderate to severe systemic allergic reactions to bee and wasp venom, but there is wide variation in the practice of VIT across the UK.<sup>18</sup> Points of entry into the pathway are based on symptoms and signs at presentation and recognition of the relevance of these symptoms in whatever setting the child first presents, including self-care, community settings, hospital emergency departments, general paediatric settings and specialist allergy clinics.

By defining competences rather than criteria for onward referral by disease manifestation and severity, this national care pathway aims to recognise the regional variation in care delivery, knowledge and skills and to allow flexibility in provision of care. To this end, the competences have intentionally not been allocated to specific health professionals. This will allow flexibility of service delivery with health professionals able to assess their own competence in managing venom allergies in children and onward referral to appropriate local services. The pathway provides guidance for training and the development of services to ensure that patients receive optimal care as close to home as possible. The importance of establishing local care networks for the management of allergy in children is stressed, as is the need for access to treatment centres able to provide VIT to children identified as likely to benefit from this. Severe or life-threatening allergic reactions to venom require emergency treatment in accordance with evidence-based guidelines and the management is covered in the anaphylaxis pathway.<sup>19</sup> Once the child is stable following a severe allergic reaction to

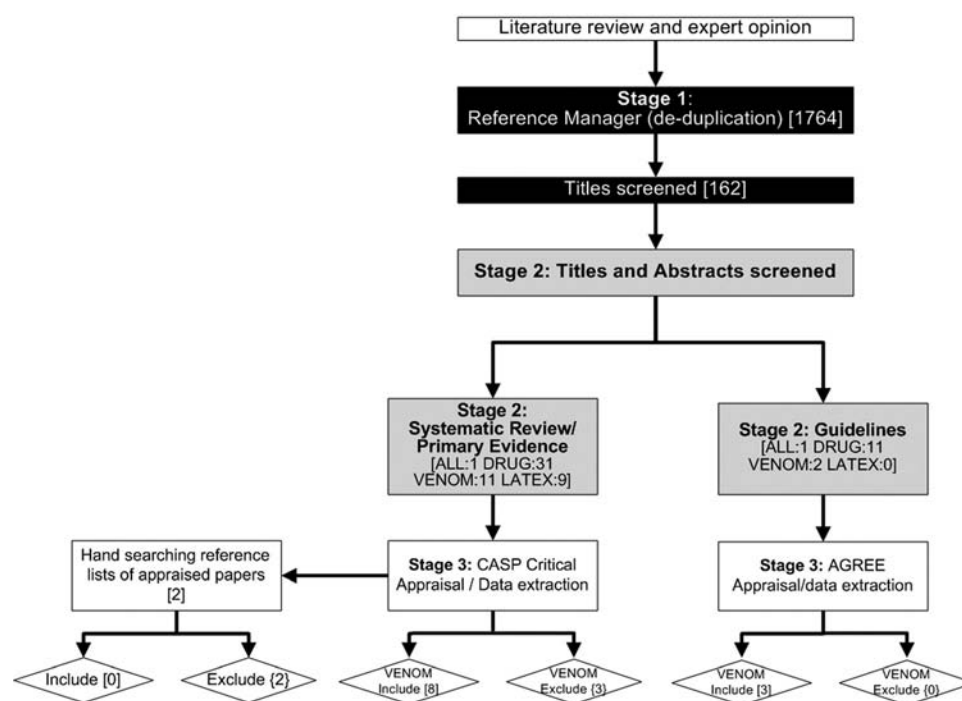


**Figure 1** Methodology of evidence review. CASP, Critical Appraisals Skills Program; AGREE, Appraisal of Guidelines Research and Evaluation.

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insect venom, or for a child presenting with a milder allergic reaction including a large local reaction to insect venom, a full review of the child's venom allergy is indicated following a single pathway from this point. This highlights the importance of the emergency practitioner recognising and addressing ongoing management of the allergy with appropriate management advice and ongoing referral as needed.

Patient management consists of a package of care that includes accurate diagnosis, initial treatment, ongoing advice on avoiding stings, an emergency management plan for future stings, including advice on epinephrine injectors if indicated and identification of children likely to benefit from VIT to reduce the risk of further life-threatening reactions. For children with mild reactions, or large local reactions to venom, provision of a management plan and reassurance of the low risk of future severe allergic reactions may alleviate some of the anxiety associated with venom allergy.

The strength of this pathway is that the input was collated from a large multidisciplinary group that included a representative from a national patient support charity. The pathway emphasises the need for partnership between allergic patients, their carers and health professionals in developing a management plan (concordance). Effective communication is key to the pathway. Concordance or the agreement between the child/family and health professional to follow a management plan should be established clearly and adherence to the joint agreed plan should be reviewed at follow-up appointments.

The venom allergy pathway does not define where or by whom care should be provided, but describes the competences required by the relevant health professional(s) to deliver optimal care. For example, 'further assessment and management' may require specialised investigation or treatment skills. It is independent of conventional 'primary' versus 'secondary' versus 'tertiary care' terminology, although in practice specific treatments such as immunotherapy are likely to be restricted to specialist centres.

The competences use an evidence base to summarise the required knowledge and skills for each pathway step. The competence-based model has the advantage of flexible provision of allergy care, but there are a number of implications for clinical services. The pathway emphasises the importance of a detailed clinical history which needs adequate appointment time. Health professionals must demonstrate competence at the levels outlined in the pathway steps. This will require input into and revision of training programmes for the management of venom allergy in childhood. Effective communication between all involved health professionals, patients, carers and community services (schools, colleges, early years settings) is the key to a successful pathway. Opportunities for training and systems to address communication and patient follow-up needs (including transitional care) will require broader NHS support and resource if we are to provide the ideal pathway of care that our children deserve.

The venom allergy pathway presents the steps for the ideal care of children presenting with acute or severe life-threatening reactions, non-life-threatening reactions and situations where allergy to insect venom is suspected and provides the opportunity to improve the lives of children with venom allergy. While there is good evidence for the efficacy and safety of VIT, there is a paucity of good quality evidence on other aspects of insect venom allergy. Research recommendations identified by the DVLWG are currently the subject of a Delphi Consensus.

Suggestions for future study of venom allergy include the prevalence of bee and wasp allergy in UK children, the risk of bee/wasp sting compared with warmer countries, the optimal duration of maintenance treatment in VIT in children and biomarkers to assess that subcutaneous immunotherapy has induced tolerance.

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## REFERENCES

1. **Bilò BM**, Bonifazi F. Epidemiology of insect-venom anaphylaxis. *Curr Opin Allergy Clin Immunol* 2008;**8**:330–7.
2. **Pumphrey RS**. Fatal anaphylaxis in the UK, 1992–2001. *Novartis Found Symp* 2004;**257**:116–28; discussion 128–32, 157–60, 276–85.
3. **Antonicevic L**, Bilò MB, Bonifazi F. Epidemiology of Hymenoptera allergy. *Curr Opin Allergy Clin Immunol* 2002;**2**:341–6.
4. **Fernandez J**, Blanca M, Soriano V, et al. Epidemiological study of the prevalence of allergic reactions to Hymenoptera in a rural population in the Mediterranean area. *Clin Exp Allergy* 1999;**29**:1069–74.
5. **Ruëff F**, Przybilla B, Bilò MB, et al. Predictors of severe systemic anaphylactic reactions in patients with Hymenoptera venom allergy: importance of baseline serum tryptase—a study of the European Academy of Allergology and Clinical Immunology Interest Group on Insect Venom Hypersensitivity. *J Allergy Clin Immunol* 2009;**124**:1047–54.
6. **Müller UR**. Bee venom allergy in beekeepers and their family members. *Curr Opin Allergy Clin Immunol* 2005;**5**:343–7.
7. **Ross RN**, Nelson HS, Finegold I. Effectiveness of specific immunotherapy in the treatment of hymenoptera venom hypersensitivity: a meta-analysis. *Clin Ther* 2000;**22**:351–8.
8. **Golden DB**, Kagey-Sobotka A, Norman PS, et al. Outcomes of allergy to insect stings in children, with and without venom immunotherapy. *N Engl J Med* 2004;**351**:668–74.
9. **Valentine MD**, Schuberth KC, Kagey-Sobotka A, et al. The value of immunotherapy with venom in children with allergy to insect stings. *N Engl J Med* 1990;**323**:1601–3.
10. RCPCH Allergy Care Pathways Project Methodology: Drug Venom and Latex Allergy Care Pathways. <http://www.rcpch.ac.uk/allergy>
11. **Goldberg A**, Confino-Cohen R. Bee venom immunotherapy—how early is it effective? *Allergy* 2010;**65**:391–5.
12. **Bilò MB**, Severino M, Cilia M, et al. The VIST trial: Venom Immunotherapy Safety and Tolerability with purified vs nonpurified extracts. *Ann Allergy Asthma Immunol* 2009;**103**:57–61.
13. **Golden DB**, Kagey-Sobotka A, Lichtenstein LM. Survey of patients after discontinuing venom immunotherapy. *J Allergy Clin Immunol* 2000;**105**:385–90.
14. **Oude Elberink JN**, De Monchy JG, Van Der Heide S, et al. Venom immunotherapy improves health-related quality of life in patients allergic to yellow jacket venom. *J Allergy Clin Immunol* 2002;**110**:174–82.
15. **Oude Elberink JN**, van der Heide S, Guyatt GH, et al. Analysis of the burden of treatment in patients receiving an EpiPen for yellow jacket anaphylaxis. *J Allergy Clin Immunol* 2006;**118**:699–704.
16. House of Lords. *Science and Technology—Sixth Report: Allergy*. London: House of Lords, 2007.
17. Royal College of Physicians. *Allergy Care: Still Not Meeting the Unmet Need*. London: RCP, 2010.
18. **Diwakar L**, Noorani S, Huissoon AP, et al. Practice of venom immunotherapy in the United Kingdom: a national audit and review of literature. *Clin Exp Allergy* 2008;**38**:1651–8.
19. RCPCH Allergy Care Pathways: Anaphylaxis. [www.rcpch.ac.uk/allergy/anaphylaxis](http://www.rcpch.ac.uk/allergy/anaphylaxis)



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