Senate Inquiry into Red Imported Fire Ants in Australia

Calls to action: Research and clinical priorities

National allergy bodies – the National Allergy Centre of Excellence and Allergy and Anaphylaxis Australia – call for a widespread eradication program to reduce allergy risks from red imported fire ants. In addition to appearing at the public hearing in Newcastle on March 5, allergy experts also outline:

An urgent need to ramp up RIFA eradication measures:

- The existing fire ant eradication program must be immediately expanded.
- Permanent biosecurity surveillance should be enacted to identify new red fire ant incursions.

Preparation for better patient care is required:

- Up to 174,000 Australians may develop severe allergic reactions (anaphylaxis) if RIFA reach an endemic scale.
- Australia needs improved healthcare to better treat and manage patients, including the development of safe and more effective RIFA venom immunotherapy.
- A cost-benefit analysis of the RIFA eradication program versus the averted health and economic costs caused by endemic RIFA for the Australian context.
- The establishment of a RIFA registry to improve our knowledge of how, where and why attacks occur, including allergic reactions. This could leverage the Jack Jumper Ant registry being established with the support of the NACE.

Access to health care must be improved:

- Accessing a GP and a clinical immunology/allergy specialist is difficult in metropolitan areas, and even worse in rural and remote locations.
- Treatment and advice from doctors can also vary. Sometimes people do not receive appropriate allergy education or are not prescribed emergency medication in a timely manner.
- Waiting lists are often long and people may have to travel long distances.
    - We are aware of people not following through with referrals due to wait times, location and cost.
    - It is vital to retain the initial telehealth consultation and telehealth consultations in general, especially for rural and remote communities.
    - We need increased support for nurse educators to provide credible information for insect allergy management, including how and when to use adrenaline injector.

Public awareness campaigns are critical:

- While adrenaline is the only known effective treatment for anaphylaxis, some people at risk do not have adrenaline injectors or have not received appropriate education on when and how to use

them. A&AA has developed a series of educational animations available at: https://allergyfacts.org.au/resources/videos-from-a-aa

- Momentum is building with NACE and A&AA media coverage about the RIFA Senate inquiry reaching more than 14 million people (source: 2024 Meltwater). Insect allergy experts will also present the latest RIFA information for clinicians and researchers at the national allergy conference in September – ASCIA 2024.
- Innovative public awareness initiatives should be expanded (Australia's peak allergy bodies - the NACE, A&AA and ASCIA (the Australasian Society of Clinical Immunology and Allergy), could play an important role.

Australia could lead the development of treatment therapies with further research investment:

Developing better treatment therapy for RIFA venom allergy:

- The expertise for developing an innovative immunotherapy agent ("RIFAvax") exists here in Australia.
- Currently, fire ant venom made from whole fire ants is available commercially in the USA and in Australia by Individual Patient Use approval from the Therapeutic Goods Administration. However, this is not widely available.
- Venom immunotherapy includes painstakingly extracting venom from the insect venom sacs and diluting it with saline. This solution is injected under the skin of the patient at increasing intervals, for at least five years.
- The evidence is that this crude insect extract is reasonably effective, however, a sizeable proportion (2.9% equivalent to the proportion of those stung) of patients have a systemic reaction to the treatment, which diminishes its effectiveness as patients who suffer these are likely to abandon the immunotherapy program.
- An Australian-led, innovative immunotherapy agent could be more effective, safe and accessible – particularly to areas where occupational exposure is high. Without better protection some workers might be forced to leave their job, which would affect productivity in several industries.

For better prevention strategies, we need support for:

- Australian entomologists to foster research aimed at identifying scientifically based RIFA repellent, avoidance and/or killing strategies for when RIFA attacks happen.

For improved treatment solutions, we need:

- A feasibility assessment of expanding treatment options, including a T-cell RIFA vaccine or Venom Immunotherapy program in Australia.

Finishing remarks:

It is clear there is an urgent need to address the country's RIFA invasion threat, and that communities, health authorities, and researchers work collaboratively to address this challenge.

National Allergy Centre of Excellence

Allergy & Anaphylaxis Australia
Your trusted charity for allergy support

Frequently asked questions

How quickly might RIFA spread across Australia?

- Scanlan's models predicted that *S. invicta* would infest 763,000–4,066,000 km^2 by the year 2035 (ca. at the rate of 25,000–130,000 km^2/year) and would be found at 200 separate locations around Australia by 2017–2027, depending on the rate of spread, if no control measures were taken.

When to seek medical treatment?

- Symptoms of anaphylaxis after being stung by a fire ant are similar to those after being stung by other insects. Symptoms include difficulty talking or breathing, noisy breathing, swelling of the face (including lips, eyes or tongue), tightness in the throat, with difficulty swallowing, dizziness, collapse.
- There may also be a spreading red rash (hives or welts). If someone experiences any of these symptoms, they should seek immediate medical assistance. This may include calling 000 and using an adrenaline injector.
- Our concern is there are many people at risk of fire ant stings, who do not have adrenaline injectors or who have not received appropriate education about when and how to use them.

What's an allergy (or venom allergy)?

- An allergy is an abnormal immune response to a substance that is typically harmless to most people. Venom allergy is an abnormal immune response to a specific venom (frequently related to the protein component).
- Australia is considered the allergy capital of the world with one in five people living with drug, food insect and respiratory allergies.
- To help address Australia's allergy epidemic and following the earlier Parliamentary Inquiry into Allergies and Anaphylaxis, the Australian Government funded the establishment of the National Allergy Centre of Excellence and National Allergy Council.

What factors determine the development of allergic reactions?

- The development of allergic reactions is most likely due to an interplay of genetic, environmental, and immunological factors.
- As listed in the NACE Allergy Studies Directory (https://www.nace.org.au/allergy-studies-directory/) allergy researchers across Australia are working hard to plug our knowledge gaps, which will help lead to new prevention and treatment solutions.

Does a person need to be stung once by RIFA to be allergic?

- Previous exposure to allergens is a crucial factor for developing allergies. The immune system may become sensitized to certain substances upon exposure, and subsequent encounters can trigger allergic reactions. Due to cross-reactivity (different allergens with similar structure lead to allergic reactions) - as a result of shared allergens in various wasp venom - a person does not necessarily need to be stung by RIFA previously to develop an allergy to it.

What does cross-reactivity mean?

- Cross-reactivity refers to the situation when allergy to one substance can determine an allergic reaction to a similar substance, in other words antibodies produced against one allergen can react with a similar or structurally related allergen. For example, wasp venom allergy could translate to RIFA venom allergy without previous RIFA venom exposure.

What's sensitisation?

- The process by which the immune system becomes hypersensitive or reactive to a specific allergen. This is when someone develops specific antibodies to the allergen.

Why is it that someone who is sensitised to fire ants' venom doesn't always develop an allergic reaction?

- Sensitisation to fire ant venom does not guarantee that someone will always experience an allergic reaction upon subsequent exposures. The development of an allergic reaction involves a complex interplay of factors such as seasonality and predisposing factors (like age and genetics) which may affect the development and persistence of venom-specific immunoglobulin E.

Why is it that someone who is sensitised to fire ants' venom can develop different levels of allergic reaction?

- Allergic reactions can vary in severity based on factors related to the person's immune system, the nature of the exposure, and other environmental factors. The development of an allergic reaction involves a complex interplay of factors such as seasonality and predisposing factors (like age and genetics) which may affect the extent of the reaction.

What's the difference between systemic reaction and anaphylactic reaction?

- The terms "systemic reaction" and "anaphylactic reaction" are related, but they are not necessarily interchangeable. All anaphylactic reactions are systemic reactions, but not all systemic reactions reach the level of anaphylaxis. Anaphylaxis is a specific subset of systemic reactions characterized by its rapid onset, severity, and the potential for life-threatening consequences.

Are all anaphylactic reactions life-threatening?

- While all allergic reactions can progress to be life threatening (i.e. anaphylaxis), most are mild or moderate and do not progress to severe reactions. Of the individuals that do have anaphylaxis, most recover with emergency administration of epinephrine (adrenaline) and rapid transport to hospital for a minimum of 4 hours observation. Death is a rare outcome; however, health professionals find it difficult to predict who is at greatest risk of severe anaphylaxis and death. For that reason, all cases of anaphylaxis are treated as potentially life-threatening events.

Is there any way of knowing if someone is likely to have severe allergic reactions to RIFA stings?

- People are more likely to experience severe allergic reactions if they have had previous allergic reactions, have a history of general allergies, or have a family history of allergies. Age and health status, as well as multiple stings/venom load can also be factors.

If a third of the exposed/stung population gets stung/allergies each year, does that mean that the whole exposed population gets stung/allergies after X years? (Incidence vs prevalence)

- Not necessarily. This scenario suggests a yearly occurrence where a third of the exposed population gets stung/experiences allergies. It's possible for some people to never experience stings/allergies even after many years of exposure, while others may be affected more frequently.

How did you arrive at the percentage of stings/allergic sensitised/large local reactions/anaphylaxis?

- We undertook a comprehensive literature review to assess the potential health consequences associated with RIFA. We carefully synthesised the available evidence to arrive at reasonable estimates of the health impact estimates based on what has been reported before in endemic areas.

The report states that up to 7.5% of stung individuals will search for medical assistance. What type of medical assistance would they need?

- Most of those who seek medical attention do so due to local reactions, which can usually be managed by a GP or pharmacist, and about 16% do so due to systemic reactions, which may require ambulance and hospital treatment, including the use of an adrenaline injector.

What would be the cost of treating Local reactions due to RIFA stings?

- Treatment by pharmacist or GP, and other allied health consultation fees.

What would be the cost of treating systemic reactions due to RIFA stings?

- Ambulance service use, emergency department care, hospitalization, and out-of-hospital health care (physician visits, specialist visits, pathology tests and prescriptions, including provision of two ongoing adrenaline injector) costs. Also, time off work and the net value of the lost wellbeing.

Are there prevention/treatment strategies for RIFA anaphylaxis?

- Prevention: We believe there may be an opportunity to develop a novel T-cell RIFA vaccine in Australia. There is expertise and knowledge in this area, Australian researchers have already developed a T cell immunotherapy treatment which reduces peanut allergy symptoms in children and teens. (https://www.nace.org.au/knowledge-hub/news/2023/new-trial-testing-whether-an-immunotherapy-reduces-peanut-allergy-symptoms-in-children-and-teens/)
- Treatment is the same as in other anaphylaxis cases. Adrenaline (epinephrine) is the first line treatment of anaphylaxis and acts to reduce airway mucosal oedema, induce bronchodilation, induce vasoconstriction and increase the strength of cardiac contraction. The dosage of adrenaline depends on the weight of the person.

What is RIFA venom immunotherapy?

- Venom immunotherapy is a form of allergy treatment that involves exposing a person to gradually increasing amounts of the allergen—in this case, fire ant venom—with the goal of desensitising the immune system under the supervision of a qualified allergist or immunologist.
- This allergy treatment requires monthly injections and takes around 3 to 5 years. The treatment typically begins with very small doses of the allergen and gradually increases to a maintenance dose. This process helps the immune system become less reactive to the venom, reducing or preventing allergic reactions upon subsequent exposure to fire ant stings.

The report states that the anaphylaxis rates are 0.5% to 2% of everyone who was stung per year. This rate seems very high; you would expect that in South America or endemic countries (i.e., the US), there would be collapsed health services and/or higher media coverage. Would you like to comment on this point?

- As RIFA originated from South America, its expansion is controlled by natural predators. Also, other contextual factors may modify the impact of anaphylaxis:

Underreporting: Anaphylaxis cases may be underreported in some regions or may not always result in collapse of health services or heightened media coverage. The severity of reactions can range from mild to severe, and not all cases may receive significant attention.

Localised Impact: The impact of RIFA stings, including anaphylaxis rates, may be more localised, and the affected regions might have adapted healthcare systems to handle these incidents. This might be different from more endemic areas where such incidents are more common.

Public Awareness: Public awareness and education campaigns about RIFA stings and anaphylaxis might contribute to better recognition and management of allergic reactions. This could, in turn, lead to a more efficient response by health services.

Healthcare Infrastructure: Countries like the United States, where RIFA is present, generally have robust healthcare infrastructures that were adapted to handle these medical emergencies effectively.

What's the number of anaphylaxis cases for any reason per year in Australia? Is it higher than the projected number of RIFA anaphylaxis?

- With the exception of Victoria, Australia lacks a structured reporting system to capture data on the incidence of anaphylaxis; therefore, the true incidence of anaphylaxis is unknown. Dr Mullins examined the increasing rates of Australian anaphylaxis admission rates: unpublished analysis for the year ending June 2018 shows rates of 46 and 53.2 per 100,000 population for children aged 0-4 years, respectively. Source: the Overview of Allergies and Anaphylaxis in Australia inquiry in 2019.