Why adrenaline autoinjectors are still carried less often than prescribed

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Anaphylaxis remains a life-threatening emergency, demanding immediate intervention. Adrenaline autoinjectors (AAIs) are the cornerstone of pre-hospital management, designed to be readily available for patients at risk. But the persistent gap between prescription and consistent carriage of these devices continues to challenge clinicians and endanger patients.

KEY TAKEAWAYS

- The Pivot: Despite widespread prescription, adherence to carrying adrenaline autoinjectors remains suboptimal across patient populations.
- The Data: A significant proportion of patients do not consistently carry their prescribed devices, with various factors influencing this behaviour.
- The Action: Clinicians must move beyond simple prescription to address the practical, psychological, and educational barriers to consistent AAI carriage.

Anaphylaxis, a severe, potentially fatal systemic allergic reaction, necessitates rapid administration of adrenaline. For individuals with a history of anaphylaxis or those at high risk, such as patients with severe food allergies, insect venom allergies, or idiopathic anaphylaxis, an adrenaline autoinjector is a critical, often life-saving, medical device. Guidelines consistently recommend that these patients carry two autoinjectors at all times. The rationale is straightforward: early adrenaline administration can halt the progression of anaphylaxis, preventing severe complications and reducing mortality. Despite this clear clinical imperative and widespread prescribing, adherence to carrying these devices remains a significant public health concern.

The mechanism of anaphylaxis involves a rapid, systemic release of inflammatory mediators, primarily from mast cells and basophils, triggered by an allergen. This cascade leads to widespread vasodilation, increased vascular permeability, bronchoconstriction, and smooth muscle contraction. Clinically, this manifests as urticaria, angioedema, respiratory distress (wheezing, stridor), cardiovascular collapse (hypotension, tachycardia), and gastrointestinal symptoms. Adrenaline acts rapidly to reverse these effects by stimulating alpha- and beta-adrenergic receptors. Alpha-receptor stimulation causes vasoconstriction, increasing peripheral vascular resistance and blood pressure, and reducing mucosal oedema. Beta-receptor stimulation leads to bronchodilation, alleviating respiratory symptoms, and also has positive inotropic and chronotropic effects on the heart, supporting cardiac output. The autoinjector format is designed for ease of use, allowing rapid, intramuscular injection by the patient or a caregiver, even in stressful situations, without the need for drawing up medication from a vial.

Understanding the Adherence Gap

The discrepancy between prescription rates and actual carriage of adrenaline autoinjectors is a complex issue, influenced by a confluence of patient-specific, device-related, and systemic factors. Patient-reported surveys and observational studies consistently show that a substantial percentage of individuals, sometimes as high as 50% or more, do not always carry their prescribed devices. This non-adherence is not uniform; it varies significantly based on age, perceived risk, and prior experience with anaphylaxis. Younger patients, particularly adolescents, often exhibit lower adherence rates, possibly due to social stigma or a sense of invincibility. Adults who have not experienced an anaphylactic reaction recently may also underestimate their ongoing risk, leading to complacency.

One primary barrier is the perceived burden of carrying the device. AAIs are relatively bulky, making them inconvenient to carry discreetly, especially for children and adolescents who may feel self-conscious. The need to carry two devices further compounds this issue. Patients often report forgetting their autoinjectors at home, leaving them in a different bag, or simply choosing not to carry them due to their size. This practical inconvenience is a pervasive problem that device manufacturers have attempted to address with more compact designs, but the fundamental challenge of portability persists. The reasons why compelling health claims often fail patients extend beyond the clinical efficacy of a drug to its practical integration into daily life.

Psychological factors also play a significant role. The fear of anaphylaxis itself can be overwhelming, and carrying an AAI serves as a constant reminder of this life-threatening potential. Some patients may engage in avoidance behaviours, subconsciously or consciously choosing not to carry the device as a way to distance themselves from the anxiety associated with their condition. Conversely, others may develop a false sense of security, believing that if they avoid known allergens, they will not need the device. This misperception of risk is particularly dangerous, as accidental exposures are common and often unpredictable. The psychological burden of a chronic, life-threatening condition, even one managed by an emergency device, should not be underestimated.

Educational Deficits and Practical Challenges

Despite the critical nature of AAI use, educational deficits persist among patients and their caregivers. Many individuals do not fully understand when and how to use their autoinjector correctly. Studies have shown that a significant proportion of patients and even healthcare professionals make errors when demonstrating AAI use, such as failing to hold the device in place long enough, not pressing hard enough, or injecting into an incorrect site. This lack of confidence in using the device can contribute to reluctance in carrying it. If a patient is unsure they can use it effectively, the perceived benefit of carrying it diminishes. Clinicians must ensure that practical, hands-on training is provided at the time of prescription and reinforced at subsequent appointments. This training should ideally involve demonstration with a trainer device and verbal instruction, ensuring both the patient and their immediate family or caregivers are proficient.

The cost of AAIs can also be a barrier, particularly in healthcare systems where patients bear a significant portion of the expense. While adrenaline itself is inexpensive, the autoinjector delivery system adds considerable cost. For patients requiring multiple devices or frequent replacements due to expiry, the financial burden can be substantial, leading some to ration their devices or delay replacement. This economic factor disproportionately affects lower-income patients, exacerbating health inequalities. Policy interventions aimed at reducing the cost of these essential devices are critical to improving access and adherence. The expiry dates of AAIs require regular replacement, which can be an administrative burden for patients and a financial strain. Reminders and accessible replacement programs are vital.

Systemic issues within healthcare also contribute to the problem. Inconsistent messaging from healthcare providers, lack of follow-up, and insufficient time during consultations to provide comprehensive education can all undermine adherence. General practitioners, while often the initial prescribers, may not have the specialist knowledge or time to provide detailed training on AAI use and storage. Referral to allergy specialists or dedicated allergy nurses for comprehensive education and ongoing support can improve outcomes. But access to such specialists varies widely across regions, creating disparities in care. The reasons why early diagnosis is often missed in other conditions also apply here; a lack of consistent, clear communication from the point of diagnosis through ongoing management can have serious consequences.

Addressing the Problem

Improving AAI carriage rates requires an approach that addresses these various barriers. Educational interventions need to be ongoing, practical, and tailored to the patient's age and learning style. This includes not only demonstrating correct usage but also discussing the importance of carrying two devices, proper storage, and recognizing the signs of anaphylaxis. Digital tools, such as smartphone apps that provide reminders for carrying devices, expiry date tracking, and instructional videos, could augment traditional education. Peer support groups and school-based education programs for children and adolescents can also help normalize AAI carriage and reduce stigma.

Device innovation is another avenue. While current AAIs are effective, further improvements in size, weight, and user-friendliness could enhance adherence. Research into alternative delivery methods or more compact designs that are less intrusive to daily life could make a significant difference. But any new device must maintain the reliability and rapid delivery characteristics of existing autoinjectors. The challenge lies in balancing portability with the necessary dose and needle length for effective intramuscular administration across a range of patient body types. For clinicians, a comprehensive reference like the Oxford Handbook of Clinical Immunology and Allergy can provide up-to-date guidance on management strategies, including patient education for AAI use.

Policy changes are also necessary to reduce financial barriers and ensure equitable access. Subsidies, insurance coverage mandates, or bulk purchasing agreements could lower the cost of AAIs for patients. National registries for patients prescribed AAIs could facilitate targeted educational campaigns and reminder systems for device replacement. The lack of consistent carriage is not merely a patient compliance issue; it reflects systemic failures in education, access, and support. Until these underlying issues are comprehensively addressed, patients will continue to face unnecessary risks. The trial was not powered to detect differences in adherence rates across various socioeconomic groups, and that gap matters. The data often lumps all patients together, obscuring the specific challenges faced by vulnerable populations. Whether benefits of educational interventions extend to broader groups with limited healthcare access remains unclear.

> **CLINICAL IMPLICATIONS**
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> The persistent failure of patients to consistently carry adrenaline autoinjectors, despite clear clinical guidelines, represents a critical gap in anaphylaxis management. Prescribing an AAI is only the first step; clinicians must recognize that the real work begins with ensuring patients understand not just how to use it, but why it must be carried at all times, and how to overcome the practical and psychological barriers to doing so. A simple prescription without robust, repeated education and support is essentially an incomplete intervention.
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> This issue highlights a broader challenge in medicine: the disconnect between evidence-based

recommendations and real-world patient adherence. It is not enough to have an effective treatment if patients cannot or will not use it as intended. The onus falls on the healthcare system to move beyond a transactional model of care to one that actively supports patient self-management through comprehensive education, accessible resources, and ongoing follow-up. This includes addressing the financial burden of these devices, which can be a significant deterrent for many.

For specialists and general practitioners alike, this means dedicating more time to hands-on training with trainer devices, engaging caregivers, and leveraging digital tools for reminders and reinforcement. We must also advocate for policies that reduce the cost of AAIs and improve access to specialist allergy services. Until we tackle these systemic and individual hurdles, patients will remain unnecessarily vulnerable to severe anaphylaxis, undermining the very purpose of these life-saving devices.

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