

Correspondence

Increasing cost of epinephrine autoinjectors

To the Editor:

Epinephrine autoinjectors are necessary for food- and insect venom-induced allergic systemic reactions and other medical conditions in which there is a necessity for immediate access to self-administration of epinephrine. The recently published "ICON: food allergy"¹ highlights epinephrine autoinjectors or a 1:1000 solution administered intramuscularly as the first-line outpatient treatment for anaphylaxis. Demand for epinephrine autoinjectors has increased throughout the world as the indications for their use have expanded. Costs have simultaneously increased, resulting in a significant economic burden for some patients and families who require such therapy (Fig 1).

We analyzed data for average wholesale price from all manufacturers currently available and converted values into constant 2011 US dollars to negate the effect of inflation. The average wholesale price of 1 epinephrine autoinjector was found to have increased annually from \$35.59 in 1986 to \$87.92 in 2011 (147%) in constant 2011 US dollars for single-dose equivalent products (ie, the single-unit price for instances in which only dual packs are sold).² Average wholesale price is a commonly used metric in economic analyses to approximate the societal cost of a drug.

Two international surveys support these data on the increasing cost of epinephrine autoinjectors. The first survey, conducted in 2003-2005, yielded a range of estimated international costs of an autoinjector from US\$30 to US\$110 (median not provided).³ A repeat survey in 2007 yielded estimates ranging from US\$54.50 to US\$168.66 (median, US\$97.87).⁴

Greater access to epinephrine has the potential to decrease the number of fatal anaphylactic events. Among patients prescribed autoinjectors, only 40% of teens/adults and 60% of children less than 12 years of age had them refilled over a 6-year period in a study conducted by the Kaiser Health System in California.⁵ This paucity of renewals might be a consequence, in part, of the high cost to families of refilling these prescriptions.

Although the increasing cost of epinephrine autoinjectors might restrict access for some patients, lower-cost alternatives exist. Prefilled epinephrine syringes made in a clinic can be safely provided to patients who cannot afford prescription autoinjectors. They are routinely given to patients in countries in which autoinjectors are not available or unaffordable. Research suggests that prefilled syringes are stable and sterile for 2 months in arid climates and 3 months in humid climates.⁶

Materials needed to prepare a prefilled syringe are simple and include the following:

1. ampules containing 1 mg/mL epinephrine plus a preservative;
2. disposable plastic 1-mL syringe; and
3. a 23-gauge, 2.5-cm needle.

Other alternatives described in the literature include providing an epinephrine ampule with a 1-mL syringe and an appropriate needle without prefilling the syringe. The main drawback to not having the syringe prefilled is the time required to draw up the epinephrine into a syringe. On average, parents take 142 ± 13 seconds to withdraw epinephrine from an ampule into a syringe.⁷ If performed at the first signs or symptoms of a systemic reaction, this time lag should not be clinically significant. Because epinephrine is light sensitive, the ampule and prefilled syringes should be protected from light by wrapping them in aluminum foil or protecting them in a light-free container, such as an eye-glasses case. Syringes should be appropriately labeled to avoid confusion with other medications.

Beyond simply cost, the ability to customize the epinephrine dose for patients might make alternatives to autoinjectors desirable. The epinephrine autoinjector is available in 2 standard doses: 0.15 and 0.3 mg. Neither of these doses is appropriate for children weighing less than 10 kg. Physicians can create prefilled syringes with doses personalized to a patient's weight. Obesity also renders epinephrine autoinjectors less effective. These patients could benefit from personalized dosages.

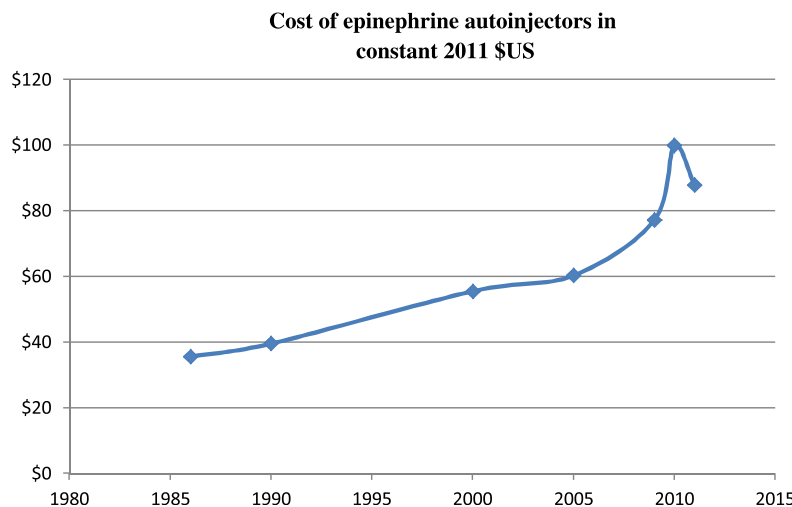


FIG 1. Average wholesale price of epinephrine autoinjectors versus time in constant US dollars. Data on the cost of single-unit equivalent products were obtained from every available manufacturer in the Micromedex Red Book and converted into constant 2011 US dollars.¹

Epinephrine autoinjectors are expensive, and low-cost alternatives exist. In the United States the average wholesale price continues to increase as a percentage of median household income. Patients can seek help from manufacturers' patient access programs to offset the cost of prescription products, but they might have to provide annual financial data. It is simple and cost-effective to make prefilled epinephrine syringes for those who lack the funds to purchase them. This intervention is potentially life-saving for patients at risk for anaphylaxis who lack access to an autoinjector.

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Disclosure of potential conflict of interest: R. F. Lockey consults and participates in clinical research projects with Alcon Laboratories, Almirall Pharmaceuticals, Altana/Byk Gulden, AstraZeneca Pharmaceuticals, Dyax Corporation, Forest Laboratories, Genentech, GlaxoSmithKline, Greer, Jerini, Merck-Schering, MedImmune, Novartis Pharmaceuticals, Pharming, Sanofi-Aventis Pharmaceuticals, Sepracor, Skye Pharma, Shire, Teva, and Viropharma; consults with Merck-Schering, ALK-Abelló, and Dey;

is a coinvestigator for National Institutes of Health and Veterans Administration grants; is in charge of the American Lung Association Clinical Research Unit at the University of South Florida; and does occasional legal work on cases of alleged indoor environmental exposure. The rest of the authors declare that they have no relevant conflicts of interest.

Editor's note: *There is no accompanying reply to this correspondence.*

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