

# Barriers to Treatment of Hereditary Angioedema Attacks Among Patients Using Subcutaneous On-Demand Therapies: Insights from an International Patient Survey

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## Rationale

- Hereditary angioedema (HAE) is characterized by unpredictable swelling attacks affecting mucosal and subcutaneous tissues, which are typically painful, debilitating, and potentially fatal
- WAO/EAACI guidelines recommend the early use of on-demand treatment following recognition of an HAE attack to reduce morbidity and prevent mortality<sup>1-3</sup>
- On-demand treatments that require injection may be painful, difficult to administer, and have previously shown to cause treatment delays<sup>4,5</sup>
- Here we describe the burdens associated with the use of subcutaneous (SC) on-demand treatment

## Methods

- Individuals with Type 1 or 2 HAE due to C1 inhibitor deficiency were recruited by HAEA (US), ITACA (IT), AMSAO (FR), HAEUK (UK), and HZRM and Charité – Universitätsmedizin (DE) between April 2023 and October 2025
- Respondents were ≥12 years old and had to have treated ≥1 HAE attack within 3 months\* prior to the survey with an approved SC on-demand therapy
- The survey was self-reported, and took respondents approximately 20 minutes to complete
- Participants rated their anxiety about using on-demand treatment for their last attack using an 11-point General Anxiety Numeric Rating Scale ranging from 0 “not anxious” to 10 “extremely anxious.”

\*Within 6 months for France.

## Results

Table 1. Respondent Characteristics

	Total (n=211)
Current age; years mean (SD)	45 (15.6)
Age of diagnosis; years mean SD)	20.6 (14.0)
Gender, n (%)	
Male	72 (34.1)
Female	139 (65.9)
Country, n (%)	
United States	63 (29.9)
Italy	55 (26.1)
France	38 (18.0)
Germany	32 (15.2)
United Kingdom	23 (10.9)
HAE Type, n (%)*	
Type I	184 (87.2)
Type II	21 (10.0)
Patients taking long-term prophylaxis, n (%)	114 (54.0)
Days since last attack, mean (SD)	24.6 (22.6)

\*2.8% had either Type 1 or Type 2 but type unknown

Figure 1. On-Demand Therapy Used for Last Treated Attack

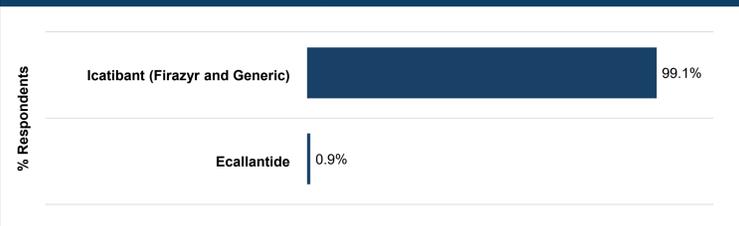
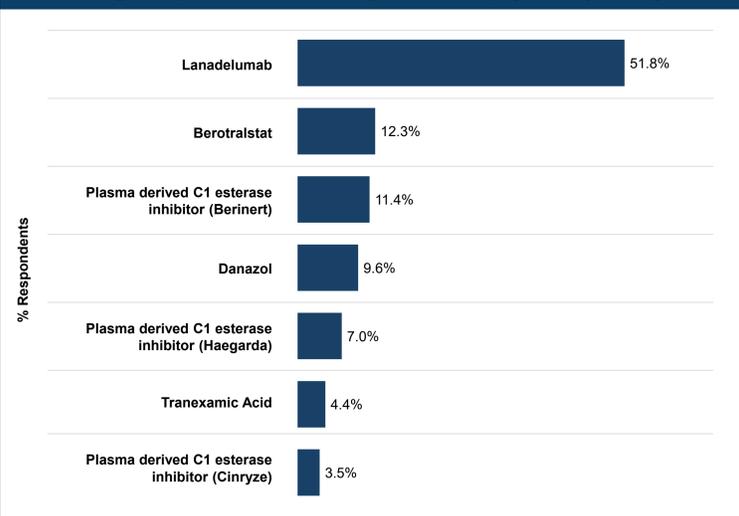


Figure 2. Long-Term Prophylaxis Used at Time of Last Treated Attack by Respondents on Long-Term Prophylaxis (n=114)

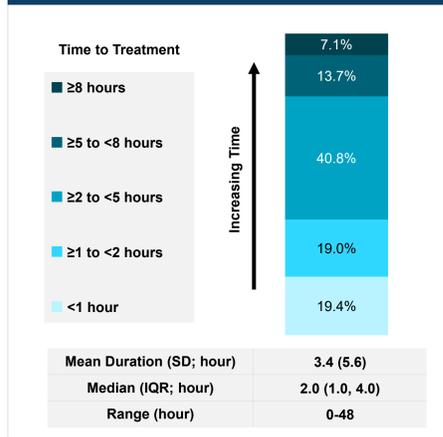


## Disclosures:

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Sinisa Savic has received support for grants or contracts from Novartis, SOBI, and CSL Behring, consulting fees from Novartis, SOBI, CSL Behring, Takeda, KalVista, BioCryst, Pharming, Cellex, and AstraZeneca, payment or honoraria for lectures, presentations, speakers bureaus, manuscript writing or education events from Takeda, SOBI, Novartis, and KalVista Pharmaceuticals, has received support for travel and/or attending meetings from Novartis, and has a leadership or fiduciary role for the British Society of Immunology. Paola Triggianese was speaker/consultant and received honoraria and/or meeting/travel support from Abbvie, Janssen, BioCryst, CSL Behring, KalVista Pharmaceuticals, Novartis, and Takeda. H. James Wedner has received consulting fees, speaker fees, and/or research funding from KalVista Pharmaceuticals, Takeda, Pharnavis, BioMarin, Astra, Ionis Pharmaceuticals, CSL Behring, Intellia Therapeutics, and Allergy Therapeutics. 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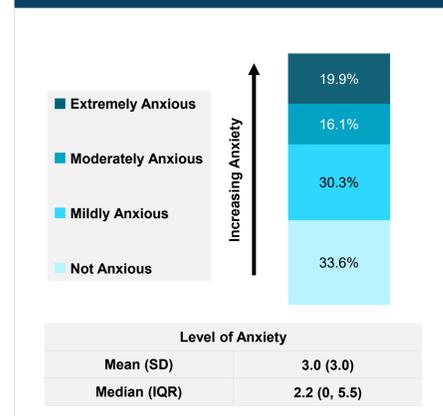
## Results

Figure 3. Time to SC On-Demand Treatment After Attack Onset



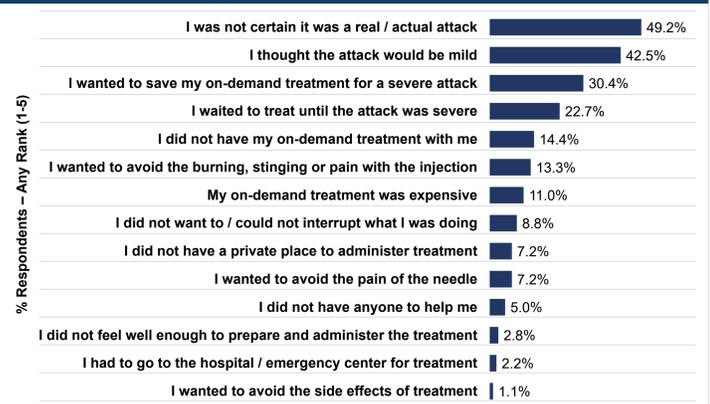
- The mean (SD) time from symptom onset to treatment was 3.4 hours (5.6) with only 19% (n=41) of respondents treating in <1 hour

Figure 5. Anxiety About Treating with SC On-Demand Treatment



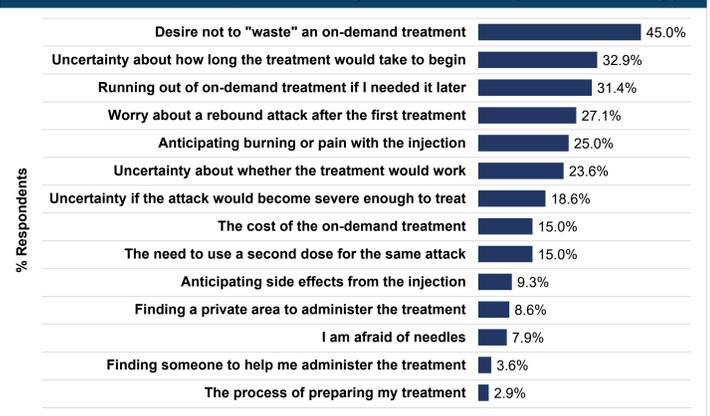
- Most (66.4%) respondents reported experiencing anxiety about treating their attack with subcutaneous treatment

Figure 4. Barriers to Treating Attack Early With SC On-Demand Treatment (n=181; excluding those who treated the attack immediately)



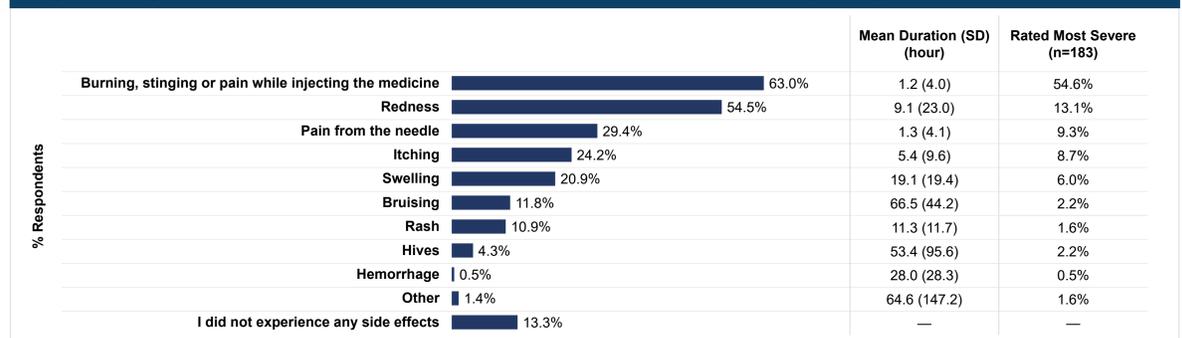
- The most common treatment-related reasons for not treating earlier were not having treatment with them (14.4%), wanting to avoid the burning, stinging, or pain with injection (13.3%), and not wanting to interrupt what they were doing (8.8%)

Figure 6. Reasons for Anxiety Associated With SC On-Demand Treatment (n=140; only those who reported anxiety)



- Primary causes of anxiety related to SC treatment administration were anticipated burning and pain with the injection (25%), anticipated side effects from injection (9%), and fear of needles (8%)

Figure 7. Injection-Site Side Effects From SC Treatment Administration (n=211)



- After administering treatment, 87% of participants reported an injection site side effect, lasting a mean of 4.3 hours (SD, 10.6)
- The most common side effect was burning, stinging, or pain while injecting the medicine (63% of respondents), which lasted a mean of 1.2 hours (SD, 4.0)

## Conclusions

- Many patients who use subcutaneous on-demand treatment do not meet guideline recommendations for early treatment, with only 19% treating in <1 hour
- Delays were commonly due to waiting for the attack to progress in severity and anxiety around administering injectable treatment
- Most (87%) respondents reported experiencing side effects at the injection site after administering SC on-demand treatment for an attack
  - 54.6% reported burning, stinging, or pain while injecting the medicine as the most severe side effect, and reported side effects lasting over 1 hour
  - Side effects such as bruising and hemorrhage lasted over 50 hours
- These results highlight a need to address burdens and barriers contributing to treatment delays

## References

- Betschel S et al. *Allergy, Asthma & Clinical Immunology*. 2019;11(25):15(1):72.
- Busse PJ et al. *J Allergy Clin Immunol Pract*. Jan 2021;9(1):132-150.e3.
- Maurer M et al. *Allergy*. Jul 2022;77(7):1961-1990.
- Radojicic C et al. *J Allergy Clin Immunol*. 151 (2): AB143.
- Yong P et al. *Allergy Asthma Clin Immunol*. 2025 Nov 29;21:52.

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