

# Embracing Digital Health Solutions: The Pivotal Role of the CRUSE App in Chronic Spontaneous Urticaria Management

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The global prevalence of chronic allergic and immunological diseases is on the rise, creating an increasing demand for innovative digital health solutions to enhance patient outcomes, streamline treatment processes, and facilitate medical research (1). Chronic urticaria (CU) patients face many challenges, such as the need for multiple visits to physicians, treatment costs, time-consuming treatment schedules and difficulty in accessing experts easily where digital medicine may be helpful (2,3). With the advancement of metaverse medical platforms and the incorporation of artificial intelligence (AI) technologies, digital solutions appear poised to find widespread applications in the field of medicine. This showed huge and rapid improvement during the COVID-19 pandemic, as was experienced by CU patients, where the rate of remote consultations increased by more than 600% (4). The increased use of remote consultations and telemedicine gave rise to the need for applications to remotely monitor patients with chronic diseases. One such advancement is the CRUSE app (Chronic Urticaria Self Evaluation; <https://cruse-control.com>), developed by UCARE (Urticaria Centers of Reference and Excellence), an international network of urticariologists and specialized urticaria cent-

ers (5). CRUSE is a state-of-the-art digital platform and caters specifically to patients with chronic spontaneous urticaria (CSU). CRUSE enables CSU patients to monitor their condition, optimize disease management, and provide valuable data to healthcare providers and researchers.

The development of the CRUSE app was inspired by the findings of the UCARE CURICT project, which explored the potential use of Information and Communication Technologies (ICT) in patients diagnosed with CSU and chronic inducible urticaria (CIndU). The study's results demonstrated that more than 50% of CU patients have a significant interest in using a mobile app to monitor their condition (6). A subsequent study showed that suitable apps for patients to self-evaluate their disease activity, impact, and control and to improve the self-management of their condition by recognizing important triggers of exacerbation, comorbidities, and consequences of their disease, were lacking (7). This prompted the development of CRUSE, launched initially in Germany in March 2022. The CRUSE app has since expanded its reach, serving over 3000 patients from around the world. The app is now live in 14 countries (Germany, Austria, Switzerland, Italy,

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Spain, Portugal, Turkey, France, UK, Ecuador, Argentina, Brazil, Peru and Ukraine) adapted to the local language and medication, with a worldwide English and Ukrainian version also available.

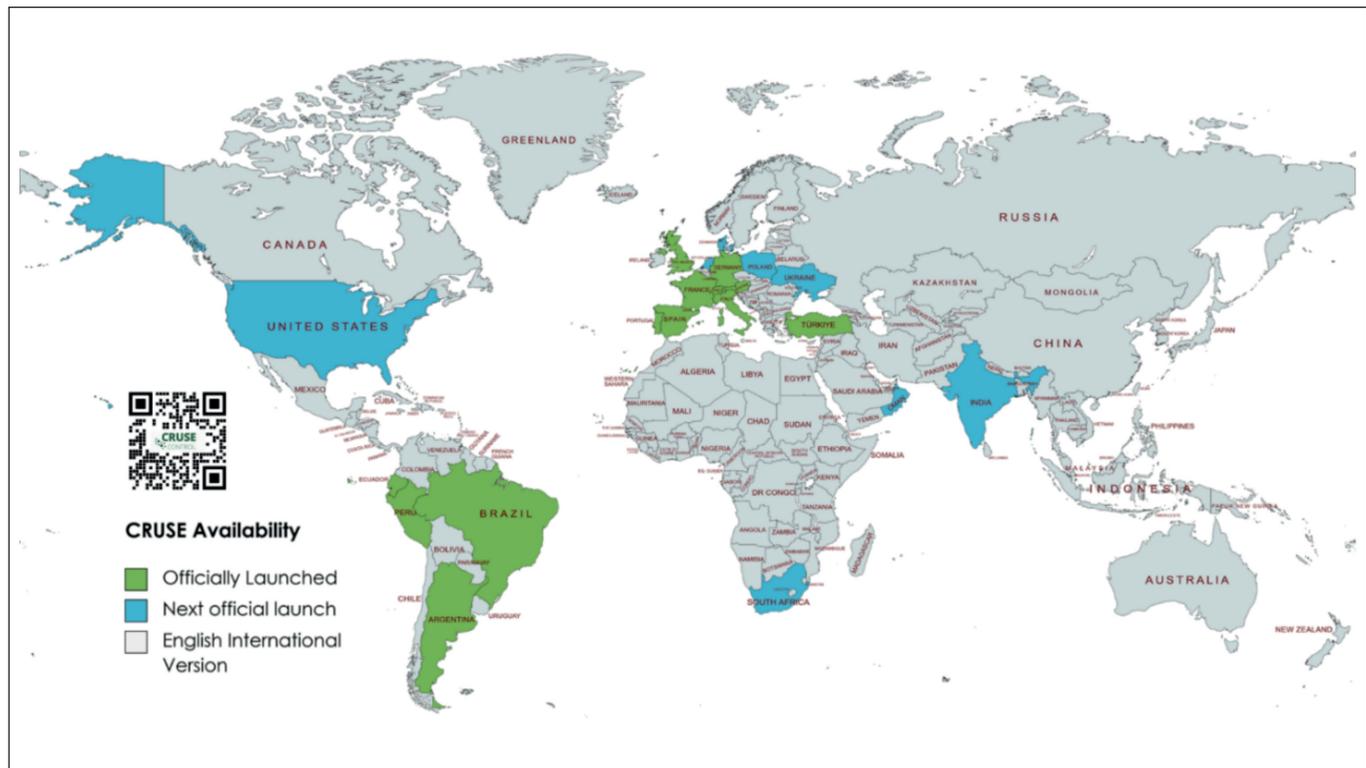
A real-world study that explored the use of patient-reported outcome measures (PROMs), showed that physicians who treat patients with CU are not aware of PROMs and that most (>80%) do not use them. The main barriers to using PROMs were “time constraints”, the perception that patients dislike PROMs, and the lack of integration into clinical systems (8). Real-time digital tools used by patients prior to their visits could counter time restraints and ameliorate the perception that patients dislike PROMs by integrating user-friendly interfaces.

CRUSE aims to meet the demand for a user-friendly platform by allowing CSU patients to complete PROMs on their smartphones. The app is designed to capture crucial data such as the urticaria and angioedema activity score (UAS and AAS), urticaria and angioedema control test (UCT and AECT), and the EQ5D-VAS. It enables patients to securely send their results, current medication information, and photographs to their healthcare providers via

email, providing real-time insight into disease progression and treatment efficacy.

The CRUSE app is seamlessly connected to the global Chronic Urticaria Registry (CURE), further broadening its impact and facilitating data sharing (9). Moreover, the app is part of the UCRAID (Ukrainian Citizen and Refugee Electronic Support in Respiratory, Allergy, Immunology and Dermatology) action plan (Bousquet, J; personal communication), which aims to provide Ukrainian refugees diagnosed with CSU access to the app in their native language. This initiative offers crucial support during a vulnerable period and demonstrates the app’s commitment to global accessibility.

By providing patients and healthcare providers with real-time, data-driven insights, CRUSE facilitates personalized treatment plans, strengthens patient-physician communication, and encourages active patient engagement in their disease management. Furthermore, the app generates valuable data for researchers, potentially fueling novel insights into CSU progression and treatment response, leading to improved patient outcomes and enhanced quality of life.



**Figure 1.** Global availability of CRUSE as of May 2023 and CRUSE QR code.

As part of the ongoing development, CRUSE will include more patient education features in the future to recognize the importance of informed patients in managing CSU. Informed patients are better equipped to take control of their condition, make appropriate treatment decisions, and adhere to treatment plans (10). By providing easily accessible and accurate information on CSU, its causes, symptoms, and available treatments, the app will empower patients to take charge of their health and collaborate more effectively with their physician.

Future iterations of CRUSE and similar platforms could benefit from integrating AI and machine learning algorithms to analyze patient data and offer personalized recommendations based on individual disease patterns and treatment responses.

The rapid availability and acceptance of CRUSE should inspire the development of similar digital health tools for other chronic conditions, paving the way for a more personalized, patient-centered approach to healthcare. By empowering patients to take control of their health, digital health solutions like CRUSE can foster a future where patients and physicians work closer together to achieve optimal results, informed by real-time data and individualized treatment plans. We invite you to make use of CRUSE and to join the journey towards a new era in chronic urticaria management!

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