# A Citizen-Centric Mobile Application for Health Crisis Preparedness and Response: The PREPSHIELD Approach

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## ABSTRACT

Health crises such as pandemics, outbreaks and disasters caused by natural hazards require timely, trusted and accessible information from authorities combined with adequate citizen preparedness. Without reliable communication and engagement, communities may be left vulnerable, and decision-making can be weakened by misinformation. The PREPSHIELD project addresses these challenges by introducing a *citizen-centric mobile application* that fosters inclusiveness, active engagement, resilience against misinformation, and trusted crisis communication. In detail, the objectives of the app are to a) support citizens, especially vulnerable and non-compliant groups, b) ensure inclusiveness and accessibility, c) support active citizen engagement, d) provide legitimate sources of information, e) personalize content, f) strengthen resilience against misinformation, and g) facilitate trusted crisis communication.

The app was created through a co-created and iterative improvement design approach. Internal workshops were conducted in order to address both projects' objectives while comprehending and fulfilling stakeholders' needs. Stakeholders' groups are encompassed by citizens, and organizations that support people during health crisis. During workshops a set of forty-one (41) requirements was extracted translated to nine (9) targeted features. In parallel, a set of stakeholder mobile app mini scenarios described sketching the communication environment between stakeholders. Mobile apps will host static educational content and real time information received from CMTs. Two-way communication is provided via an anonymization layer in between, respecting GDPR.

**Keywords:** crisis management, health preparedness, mobile application,citizen engangement, resilience, emergency response.

## 1. INTRODUCTION

The COVID-19 pandemic highlighted the importance of prevention, prediction, and effective management of crisis resources. In recent years, significant research and development have focused on improving preparedness and response to health emergencies. The PREPSHIELD project advances this work by promoting a holistic and citizen-centric approach to crisis management [1][2][3]. Its aim is to co-create policy recommendations, methods, and an AI-powered platform that enhance both preparedness and response from a social and societal perspective. To achieve this, PREPSHIELD involves a wide range of stakeholders, including public authorities, citizens, especially vulnerable and non-compliant groups, civil society organizations, disaster response organizations, and healthcare institutions. One of its key outputs is a mobile application designed to connect citizens with trusted information and crisis management teams.

## 2. EXPERIMENTAL METHOD

## 2.1. Design Process

PREPSHEILD app followed the 6 major Stages of the Design and Development Process.

Specifically, during the Research stage, all the elements that can build an idea are a set up. Objectives and requirements, actors, stakeholders, mini scenarios. All these elements can be identified and re-identified. Planning stage, where the timeline of next stages is set or re-estimated based on the changes that happened to Research stage elements. At the Design stage, the *Wireframe* and the *Prototype* are set and validated by the end-users. At this stage the design of the app comes to its end, however design and development are distinct but interconnected processes. So, feedback received from design workshops, tabletop exercises and pilots are going to be incorporated each time. Ensuring that the mobile app evolves, respecting the main objectives, needs, the overall initial design and the projects timeframe.

The mobile app was developed under a co-creation approach [4] with stakeholders and its representatives from the consortium, in particular citizens, NGOs, healthcare practitioners, and Crisis Management Teams (CMTs), in four (4) internal design specific-oriented workshops. During workshops their needs and preferences expressed and targeted functionalities designed. Also, with the creation of mini scenarios and requirements, the interconnection and the data exchange between mobile app and CMT identified. CMTs will receive anonymized statistical information, reports and misinformation alerts. This information can influence and accurately improve their decision making while executing their operational processes. Moving to the Development stage, the final Visual Design of the mobile app is functional. At the Testing stage, the functional product is tested by the users, and within the Deployment stage the product is used under the exact same conditions that have been designed for.

## 2.2. End-Users

The main end-users of the PREPSHIELD mobile application are citizens, with particular attention to vulnerable and non-compliant groups. Other stakeholders include organizations that support people during health crises, such as Non-Governmental Organizations (NGOs), volunteers, and healthcare practitioners. Within these organizations, both managers (e.g., heads of NGOs) and field workers are considered. Crisis Management Teams (CMTs) do not use the app directly but remain key stakeholders, as they exchange information with users through it.

## 2.3. Requirements

**Figure 1.** PREPSHIELD user requirements overview

Functional requirements included the provision of alerts, health service information, and preparedness guidelines, gamification user engagement etc. while non-functional requirements emphasized accessibility, security, and compliance with ethical and data protection standards. Some indicative user reqirements are presented in Figure1. The requirements were iteratively validated through personas, user scenarios, and tabletop exercises, ensuring alignment with both user needs and the broader PREPSHIELD platform objectives.

## 2.4. Features

The PREPSHIELD mobile application incorporates a set of nine (9) core features, each designed to address identified user needs and ensure inclusiveness. **Login and Registration** functions enable secure and personalized access, while a **Wizard** guides first-time users through the setup process, indicating their preferences towards the type of informative and educational material they want to receive. **The Skip** option allows non-compliant users to explore the app before registration, ensuring initial access to verified content while encouraging full registration for advanced functions. The user should register for more. The **Newsroom** feature provides timely alerts, health facilities information, and guidelines provided by the CMTs, complemented by a **Map** that visualizes the location of the incidents. Users also have the capability to choose whether they want to showcase their own location to the map by activating GPS. **Newsroom**, in addition, hosts articles from trusted website sources. **Insights** allow users to review either their submitted surveys, or personalized recommended material, such as quizzes, guidelines, and surveys supporting reflective learning. **Notifications** provide timely updates of the system or user's actions in the app, finally **Badges** foster user engagement and motivate active participation in preparedness activities. Together, these features create a comprehensive, user-friendly environment that strengthens communication and enhances resilience during health crises.

## 2.5. Mobile App Material and Data

The app hosts a combination of static educational material with real-time crisis information. Static content encompasses guideline documents and videos from trusted sources. Almost static educational content refers to surveys issued by Crisis Management Teams (CMTs), which remain active for a limited period. The Newsroom section provides articles on specific topics of interest, ensuring continuous awareness and preparedness. Real-time information includes alerts (e.g., area restrictions, mandatory mask wearing), updates on health services (testing, medication, vaccination, distribution centers), and guidelines released directly by government authorities. Two-way communication with CMTs is facilitated through an **anonymization layer**, which ensures GDPR compliance while enabling the transfer of reports, statistics, and misinformation flags as indicated in Figure2.

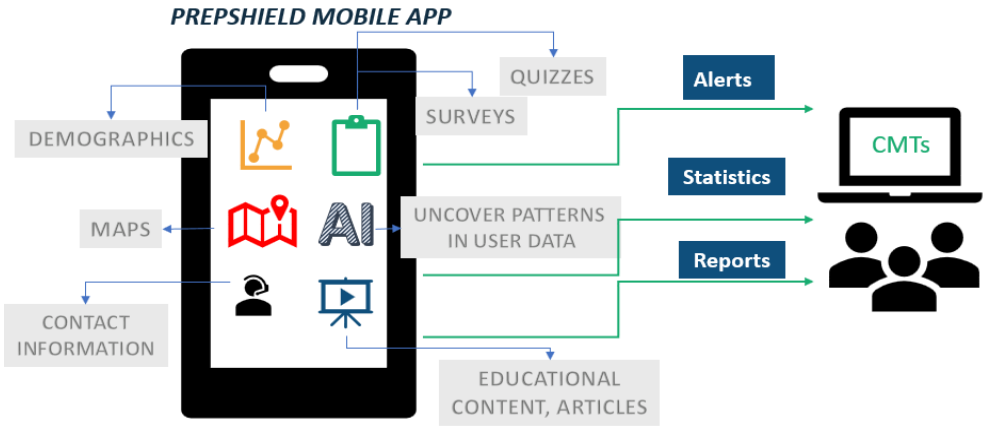

**Figure 2.** PREPSHIELD mobile app indicative hosting material and high-level communication with CMTs.

## 3. RESULTS AND DISCUSSIONS

The mapping of requirements to features confirmed that stakeholders need trusted communication [5], accessibility, and personalized outreach. ***Secure access requirements and personalization*** led to ***Login, Registration, Wizard, and Skip***, while ***timely information delivery*** was addressed through the ***Newsroom and Map***. ***Engagement and feedback*** needs were supported by ***Insights, Notifications, and Badges and by the Newsroom***. This clear mapping ensured that every major requirement was linked to one or more features. The app also transforms citizen inputs into anonymized **statistics and insights**, which are shared with Crisis Management Teams (CMTs). These include survey responses, reports, and flagged misinformation. Such data help authorities adjust communication strategies, detect early issues, and support decision-making. Workshops confirmed that this feedback loop adds value for NGOs and healthcare actors, who see it as a way to bring community needs into the crisis response process.

## CONCLUSION

The PREPSHIELD mobile application shows how digital tools can improve preparedness, trust, and response in health crises. Early and continuous feedback loops indicate that the app improves communication, increases accessibility, and helps limit misinformation. Its dual role, providing educational material and trusted information to users and insights to authorities, makes it a bridge between community needs and institutional actions. Future pilots will further test usability and scalability across Europe. In this way, PREPSHIELD contributes to a stronger culture of preparedness and more resilient societies.


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