



When medication is part of daily survival, reliability matters.

This project presents a **compact, rechargeable medication case** that creates a **protective micro-environment** during everyday mobility. It is designed for people living with **chronic** or **longstanding illnesses** who lead active, self-determined lives in unpredictable conditions, such as commuting, long days, changing temperatures, and direct sunlight, while their medication must remain stable and trustworthy.

The concept is structured as a simple **two-piece system**:

1. A **weekly preparation case** enables structured organization at home.
2. A **compact carry case** that provides protected daily transport outside.

How the system works:

1. **Prepare for the week**
Medication is organized in advance using the weekly preparation case at home.
2. **Cool the compact case**
The case is recharged in the refrigerator until the PCM reaches its solid (active) state. This happens after just 30 min or less.
3. **Assemble for the day**
The medication insert is placed into the compact carry case together with the pre-cooled PCM element.
4. **Carry with passive protection**
During mobility, the PCM absorbs heat and stabilizes the internal temperature. The cooling status can be verified by touch: a firm surface indicates active buffering.
5. **Exchange and recharge**
After use, the insert can be exchanged for the next day, and the compact carry case returned to the refrigerator to recharge.

This system functions **without electronics** or **disposable parts**, reducing complexity and long-term dependency.

The project emerged from **personal experience** managing medication during daily mobility, as well as conversations and observations within a chronic illness context. It

combines **user-centered design** with **material logic** to translate stability risks into a tangible object, providing both protection and certainty in everyday life.

Concept and distinguishing approach

Existing solutions typically offer either **organization without protection** (standard pill boxes) or **protection through active systems** (electronics, batteries, or disposable cooling elements). The approach presented here introduces a **third path: passive temperature stabilization** combined with **built-in status certainty**.

This is achieved through three integrated design decisions:

- **PCM-based buffering:** A phase change material absorbs heat during its phase transition (latent heat), creating a temperature plateau instead of allowing a rapid internal temperature rise.
- **Tactile verification:** Cooling status is readable through touch. As long as the PCM surface remains firm (solid phase), the buffering system is active; gradual softening signals that capacity is being used. An otherwise invisible thermal state becomes intuitively perceptible—without digital indicators.
- **Layered protection:** A reflective and insulating internal architecture reduces heat gain and UV/light exposure, supporting medication stability in realistic carry contexts such as bags, outdoor transit, or overheated rooms.

Why the “25°C” threshold matters

Many medicinal products within European regulatory guidance are labelled with storage statements such as “*Do not store above 25°C.*”

In practice, everyday environments can exceed recommended ambient ranges faster than expected; particularly in enclosed spaces like bags or cars. At the same time, sunlight and bright indoor light may contribute to degradation in sensitive medicines without visible signs.

Target group and relevance

The solution supports people living with **chronic illness** who wish to **remain active**: Students, commuters, working adults, and anyone managing **multi-medication routines** during days that rarely unfold under controlled conditions.

The potential user base is significant: more than one-third of adults in the EU reported living with a longstanding illness or health problem in 2023. As awareness of

temperature excursions and photostability increases, so does the need for practical, everyday protection strategies.

Unique value proposition

The core innovation lies in material-based reliability: **passive PCM stabilization** paired with **tactile status verification**. This combination delivers **protection** and **certainty without electronics** or **disposable elements** and integrates naturally into realistic weekly preparation and daily carry routines.

Market situation and opportunity

The concept is positioned between two established categories:

- **Medication organizers**, which structure routines but offer no environmental protection
- **Medical cooling and transport solutions**, which are often bulky, technical, or battery-dependent

This creates a clear opportunity for a discreet, daily-carry product that combines **portability**, **passive stabilization**, and **immediate user confidence** through tactile feedback, designed for everyday life rather than specialized medical logistics.

Indirect competition includes:

- Standard pill boxes
- Cooling pouches and gel-based systems
- Electronic cooling cases
- Improvised thermal containers

None of these combine **stabilization**, **feedback**, and **routine integration** in a compact, non-electronic system.

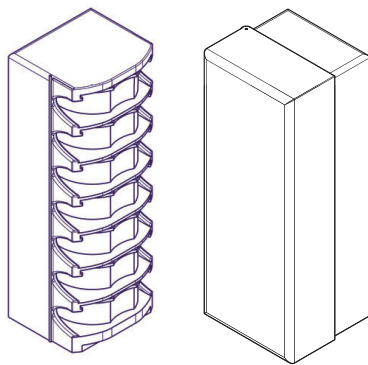
Current state of development

A functional prototype has been developed, and thermal behavior has been calculated to validate the stabilization principle and estimate performance under defined assumptions.

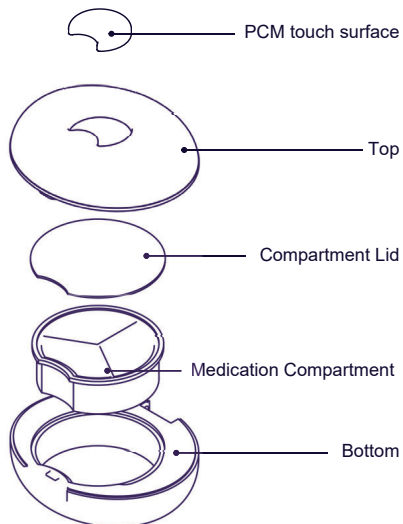
This demonstrates **technical feasibility** beyond a purely conceptual stage.



The system cycle



Preparation Case



Exploded view: Compact Case



3D-Render: Compact Case



3D-Render: Preparation Case



3D-Render: Compact Case and Preparation Case



Prototype picture: Preparing pills



Prototype picture "PCM touch surface"



Prototype picture: Open