Improving medical adherence in atopic eczema treatments
project title

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date   13 - 02 - 2023   30 - 06 - 2023   end date

Eczema is a skin condition which comes in different forms. The most common form is atopic eczema, also known as atopic dermatitis. It is a long-lasting condition caused by an inflammatory reaction in the skin, causing the skin to become dry, itchy, and cracked. This type of eczema is most common in young children.
Worldwide, 3 to 10% of children suffers from eczema, while 1 to 3% of adults do. The condition often develops below the age of five, and for 60% of patients, before the age of one.

Accordingly, the dermatology department of Erasmus MC has provided an assignment relating to atopic eczema. While mainly focusing on the young patients as the target group. In current treatment trajectories, multiple obstacles are encountered, especially concerning the at home treatment adherence. Two important factors herein are, firstly, the ability of the patient and/or their guardian to correctly measure the severity of the eczema. Which also influences the treatment plan and required medication. And secondly, the ability to correctly dose their medication/ointments.

Normally, the patient will have their first appointment with the dermatologist to receive a diagnosis and treatment plan. Followed by a second appointment after 6 weeks. After that, there will be an appointment every three months. When the patient shows improvements, the appointments can take place every six months and at some point, once a year.

The two main stakeholders within this project are the patient, and the dermatologist. However, since a large percentage of the patients are young children, their parents/guardians also form an extremely important stakeholder.

In current treatment trajectories, it is apparent to the dermatologists that patients often do not properly adhere to their treatment plan. This can be caused by multiple factors, but often relates back to health literacy. Which concerns the ability of an individual to properly understand and use medical information to make health related decisions for themselves or others. The lack of knowledge often results in an under treatment of some sort.

Thus, it is important to provide support to eczema patients and their guardians, to help them correctly apply their prescribed treatments. Currently, they are not provided with any tools to support them in this process, which forces them to depend on their limited knowledge. During check-up appointments, dermatologists often encounter the patients to have less improvements than can be expected from their treatment plan. Which in most cases, shows the plan has not been followed as it was supposed to.

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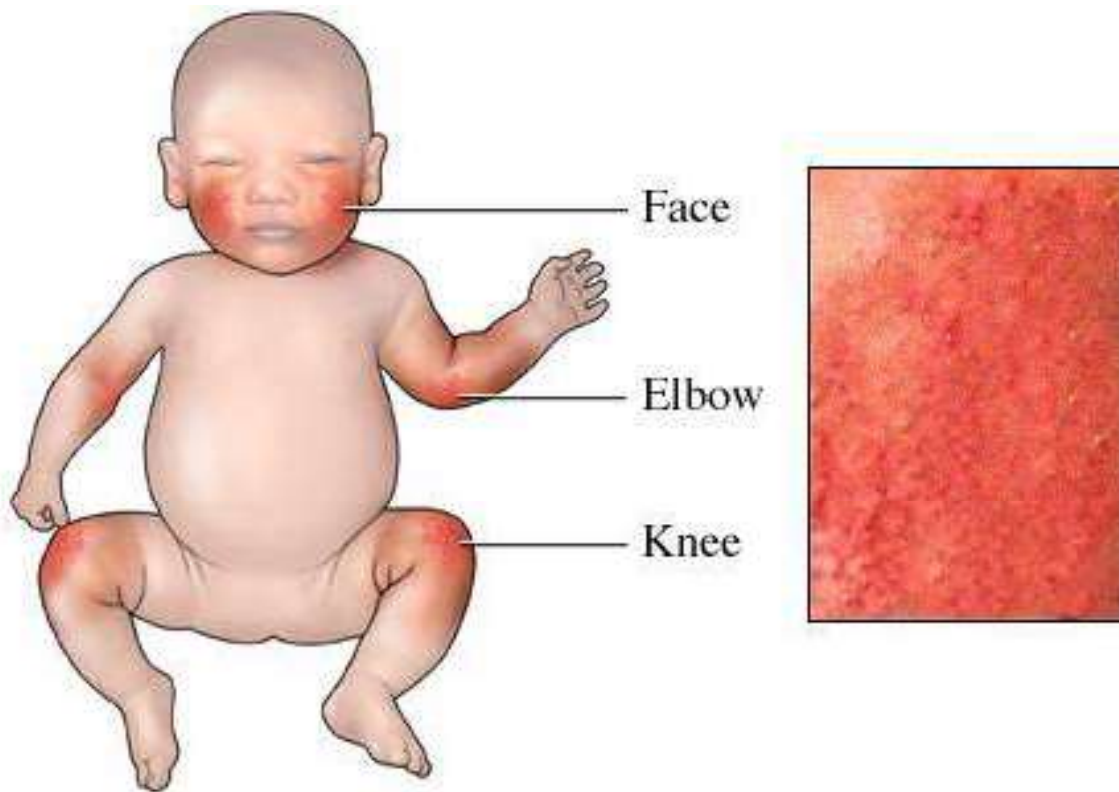introduction (continued): space for images

image / figure 1:   Atopic Eczema In Children

image / figure 2:   Atopic Eczema Severities

PROBLEM DEFINITION **
Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

The project scope focuses on the time in between doctor check-ups, in which patients have to individually treat their eczema according to their treatment plan.

The current problem with eczema treatment lies within the lack of adherence, which is often caused by low health literacy. This relates to two sub challenges which can lead to undertreatment. Firstly, being able to correctly estimate how severe the eczema is. And then secondly, being able to make the correct treatment decisions which correspond to that degree/severity of eczema.

For the patient (and their guardian), it is often unclear which medication/ointment they should apply, as well as where to apply it and how much. Thus, different supporting interventions and tools can be explored to help the patient establish their eczema severity and consequently be able to correctly dose their medications.

Whereas for the dermatologist, it is important to be able to confirm how the patient has used their prescribed medications and ointments. Currently, doctors rely on patient's self-report, however, more dependable systems can be explored in combination with the patient dosing system.

ASSIGNMENT **
State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, ... In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

Designing two supportive tools for at home treatment of atopic eczema to help improve health literacy and allow for more proper usage of medication. This should also aid in improving the communication of treatment back to the dermatologist. Current ways of treatment and at home execution of it will be researched to determine patient obstacles and struggles and provide fitting interventions.

The assignment description mentions the design of two tools, these refer to the two solutions of the sub-challenges; 1: Measuring eczema severity and 2: Medication dosing system. It might be possible that these elements will eventually be integrated into one overarching tool, however that is not the current expectation.

To elaborate, the expected solution is to first and foremost provide physical products that supports patients in dosing their ointments and correctly measuring their eczema severity.
For the first objective, possible inspiration points can be existing products such as the dosing tools used to ensure correct amount of toothpaste application.
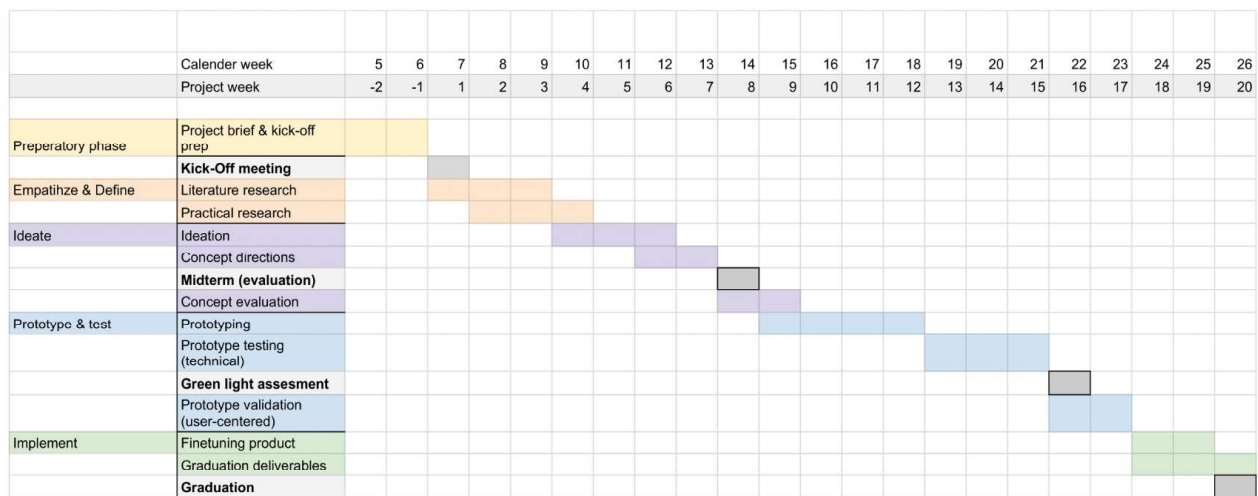The latter objective will build on existing technologies and require the design of a smart product. Such as the at-home hair removal laser device which allows you to 'scan' your skin to confirm skin color setting. The required techonology will obviously be a lot more complicated for eczema, however, it can help shape a vision to build on.

To make using the aforementioned products easier, a coherent system can be designed that bring these treatment steps together and make it insightful for the dermatologists treating the patients. This could happen by the addition of a mobile application that brings the system together. However, the project's primary focus will be on designing the supportive products.

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PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date   13 - 2   - 2023   - 6 - 2023   end date

		Calender week	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
		Project week	-2	-1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Preperatory phase	Project brief & kick-off prep																							
	Kick-Off meeting																							
Empatihze & Define	Literature research																							
	Practical research																							
Ideate	Ideation																							
	Concept directions																							
	Midterm (evaluation)																							
	Concept evaluation																							
Prototype & test	Prototyping																							
	Prototype testing (technical)																							
	Green light assesment																							
	Prototype validation (user-centered)																							
Implement	Finetuning product																							
	Graduation deliverables																							
	Graduation																							

For my planning I used the design thinking model as a basis. This led to the design phases of Understand (empthize & define), Explore (Ideate & prototype) & materialze (test & implement).

The project will have a duration of 100 days. I am planning to work on this project full-time for the entire semester. Thus I have not included any off-days. If instances apply where a week day is taken off, it will be replaced by a weekend day.

The planning includes the most important/required meetings. Additionally, I intend to have bi-weekly meetings with my chair & mentor. I am initially suggesting to do these in alternating weeks so that I can have a coaching moment each week. However, this can be changed as deemed necessary. Overall, it is a flexible planning, for structural purposes.

Meetings with the external mentor will be planned as deemed necessary during the process. The expectation is that this won't be more than once per two weeks.

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Ever since I started my education in industrial design I have been developing my passion for designing in a medical context. This is essentially also why I chose to do my masters in Delft, to be able to follow the medisign specialization. My motivation and drive behind designing is the ability to help people.

This project caught my interest due to multiple elements: Firstly, the collaboration with a hospital. In previous experience, I enjoyed working within a hospital context and being able to collaborate with, and closely observe professionals and patients. Secondly, the problem scope relating to eczema is presented to be complex and I am interested to explore it, and believe it will bring many design opportunities. Lastly, I enjoy designing for children. It is a target group that can challenge you as a designer and requires extra creativity.

There are various competencies I want to showcase and develop throughout this project. Firstly, relating to the research phases, I am experienced with literature research and want to show a structured approach herein. As for user research, I am comfortable with user explorations. However, I need to develop my interaction skills and be able to better approach both healthcare workers and patients in context. I am familiar with different general methods relating to user interviews and observations. For this project, I am interested in exploring more methods such as context mapping and focus groups.

Then relating to the ideation phases, I am confident in my ability to translate research insights into concepts. However, I aim to be more structured when converging into a concept direction or choosing the final concept. There are numerous methods that I can apply to help me asses concepts from different perspectives.

As for prototyping, this is one of the phases in which I most want to develop my skills. I have experience with low-fi prototyping with communicative or validating aims. This also often comes along with simple technical explorations. But I lack experience in creating higher-end prototypes, which are visually aesthetic and better represent the concept in mind.

Lastly, I want to mention some general aspects that I want to reflect on in this project. Firstly, throughout my internship, I have received compliments about my structured way of working and I am excited to be able to apply this within the scope of a larger project. As for a point of improvement, I want to be able to ask for help more easily. And with that also involve experts where needed within the different design phases.

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