Creamitosmooth

SMART WATCH FOR KIDS WITH ECZEMA

MODULE: LCHS7009 Population Health and Digital Health Promotion
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A Smartwatch for Children with Eczema: Promoting Timely Emollient Use through Digital Health Innovation

About Eczema

Eczema, also known as atopic dermatitis, is a common, non-contagious skin condition that causes the skin to become dry, itchy, and irritated. Often referred to as “the itch that rashes” (Nemeth et al., 2022), this long-term condition tends to flare up unpredictably, making it challenging to manage and to assess treatment effectiveness (Langan et al., 2024).



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ECZEMA in numbers

2.6%

Of the global population is affected by eczema.

86%

Children with eczema report loss of sleep.

1 in 10

Adults in the UK have eczema

26%

Children missed 1-2 days of school per month due to eczema.

1 in 5

Children in the UK have eczema

£257 million

Spent by the NHS treating eczema in 2020.



References: National Eczema Society (2025); British Journal of Dermatology (2023) & Dawson, 2023.

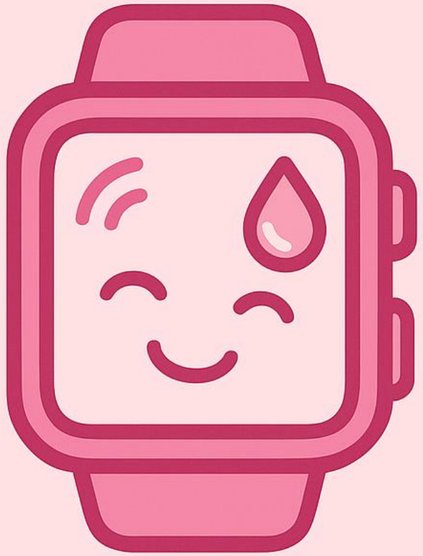
Why?

- Managing eczema is demanding, often requiring multiple daily treatments which take up to 2+ hours daily affecting routines and social life (Murray, 2020).
- Patients struggle to maintain consistent use of emollients due to inconvenience, fear of side effects, forgetfulness, or limited understanding of their condition (Tier et al., 2021).
- Research shows that adherence to topical treatments can drop by around 70% within just a few days of starting a regimen (Krejci-Manwaring et al, 2007).

Effective management therefore relies not only on medical treatment but also on behavioural support – eczema is a disease that requires change in daily habits (Muzzolon et al., 2025).



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SMART WATCH FOR KIDS WITH ECZEMA

About the smartwatch

- Hydration and dryness sensors detect early signs of eczema flare-ups.
- AI reminders schedule emollient application at optimal times.
- Interactive interface designed for children
- Reward Systems and Streaks system - **gamification**
- Data sharing with parents or healthcare professionals

Purpose:

Encourages routine adherence, improves eczema management, and empowers children to take part in their own care.

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What makes Creamitosmooth unique?



INTEGRATES GAMIFICATION:

Recognised as an effective strategy for enhancing user engagement and facilitating behavioural change. Existing evidence demonstrates that gamification holds significant potential to (Al-Rayes et a., 2022):

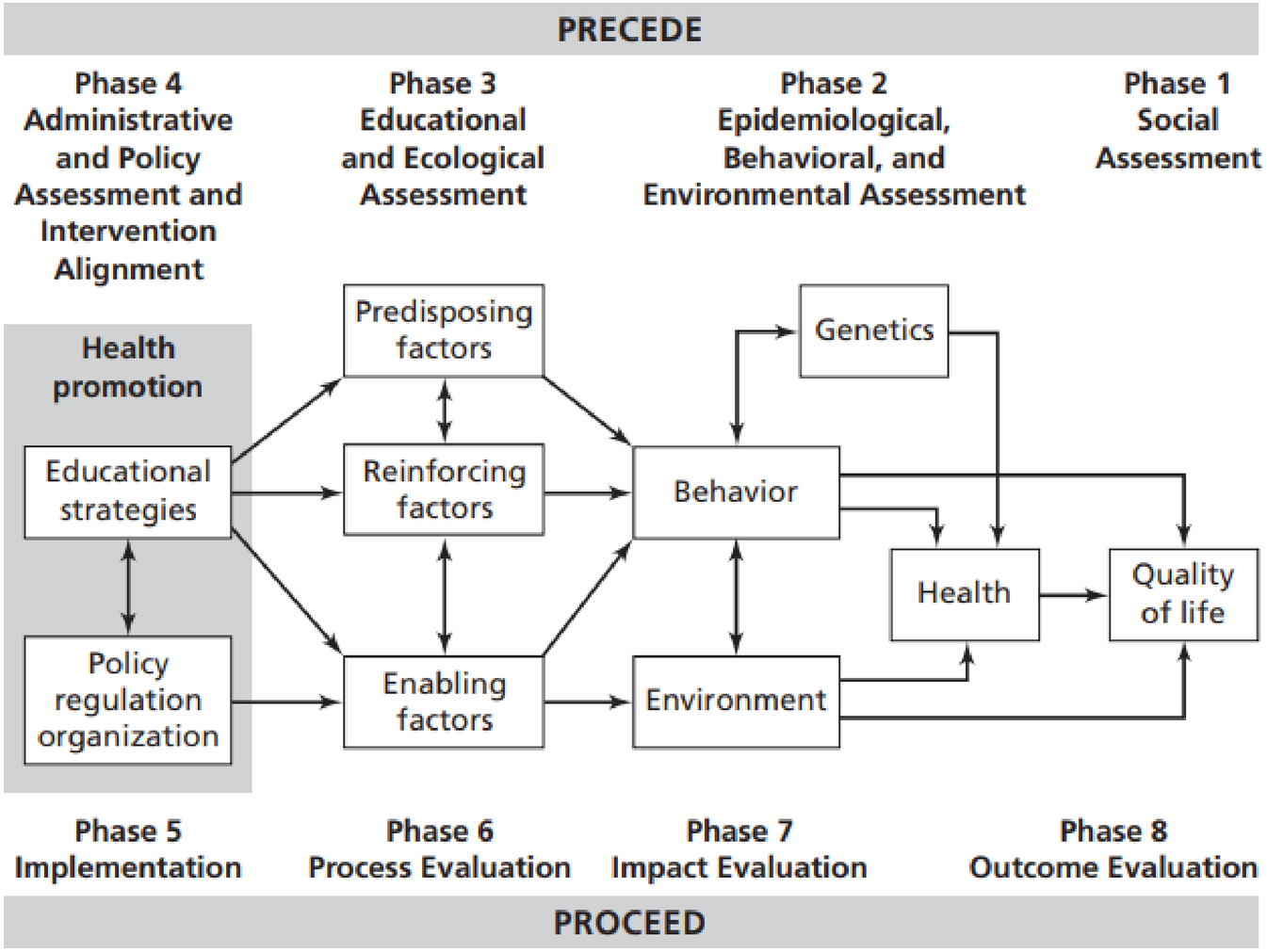
- **support patient behavioural modification**
- **promote self-management of chronic conditions,**
- **improve adherence to treatment**
- **enhance ongoing patient monitoring.**

PREPARES CHILDREN FOR THE FUTURE AND PROMOTES GOOD PRACTICES:

Managing long-term conditions requires ongoing lifestyle changes and self-care skills. This can be particularly difficult for younger patients (Wilson et al., 2024). Creamitosmooth Exposes children to self-care at a young age preparing them to eventually manage their long term-condition in adulthood.

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Application



REFERENCE: (Gielen et al., 2008).

Introduction to the PRECEDE-PROCEED Model:

- Applying health behaviour theory is vital when designing health interventions, as most current health issues are influenced by behavioural risks and protective factors (Gielen et al., 2008).
- A planning model works like a blueprint. It provides a step-by-step structure for designing, implementing and evaluating an intervention (Crosby et al., 2011).
- The PRECEDE-PROCEED Model is one of the most widely used planning models in public health (Porter, 2016).

PRECEDE (Steps 1–4): PLANNING

- Stands for: Predisposing, Reinforcing and Enabling Constructs in Educational/Environmental Diagnosis and Evaluation
- Focuses on assessment and understanding factors influencing the health problem

PROCEED (Step 5 onwards): EVALUATION

- Stands for: Policy, Regulatory and Organisational Constructs in Educational and Environmental Development
- Focuses on implementing and evaluating the intervention

PRECEDE vs Creamitosmooth



SOCIAL	EPIDEMIOLOGICAL
• Eczema in children also leads to absence from school because of infections and chronic sleep deprivation (Eczema Support, 2025). • Loss of sleep influences concentration, emotions and the general quality of life. • Families feel pressured with the daily routine and treatment duties in the house.	• In the UK, symptoms of eczema affect 1 in 5children (Allergy UK, 2025). • Weak compliance with the use of emollients results in frequent exacerbations and pain. • The NHS is treating eczema-related complications to improve people's health (Smith, 2025).

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PRECEDE vs Creamitosmooth



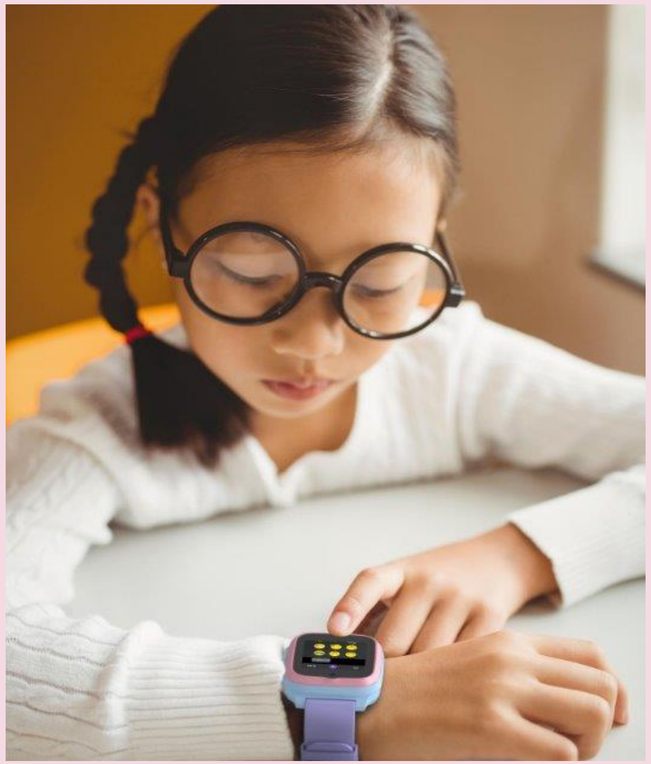
BEHAVIOURAL/ENVIRONMENTAL	EDUCATIONAL/ECOLOGICAL	ADMINISTRATIVE & POLICY
• Children tend to forget using emollients because they are not reminded about using them routinely. • Treatment consistency and effectiveness are minimised by busy family schedules and lack of motivation. • Symptoms are aggravated by environmental factors such as heat or low humidity (Ma et al., 2021).	• Parents and patients' education are highly significant in the eczema management (Almutairi et al., 2025). • Children are dependent on parents and do not know how to cope with their skin condition. • Families are not provided with tools or reminders to facilitate frequent application of emollients.	• The National Institute for Health and Care Excellence guidelines suggest regular emollient application in eczema treatment of children (NICE, 2025). • Digital health tools that deal with under-13s need parental consent (ICO, 2025).

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PROCEED vs Creamitosmooth

1. Implementation

- The smartwatch gives hydration notifications and emollient reminders.
- Gamified rewards support children to follow their treatment and improve well-being (Gkintoni et al.,2024).
- Children are assisted by their parents and teachers to use the device on a regular basis and in a safe manner.



PROCEED vs Creamitosmooth

2. Process Evaluation

- Process evaluation is a check on the usage of the smartwatch and app.
- It follows up on the completion of reminders, the use of the apps, and the rate at which people use their devices daily.
- User feedback plays a critical role in improving application usability by providing developers with valuable insights (GTCSYS, 2025).



PROCEED vs Creamitosmooth

3. Impact Evaluation

- Digital technologies and health innovation can speed up the achievement of health and well-being across the globe (WHO, 2025).
- Changes in the frequency of Eczema and controlling symptoms are evaluated through impact evaluation.
- It examines the frequency of adherence to the treatment routine by the children using the app.



PROCEED vs Creamitosmooth

4. Outcome Evaluation

- Self-care interventions, such as devices, help in enhancing self-care (WHO, 2024).
- Outcome evaluation is associated with such long-term benefits as improved sleep and well-being.
- Outcomes demonstrate the quality of life that is supported by the intervention in the family.



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STAKEHOLDERS

- The main stakeholders are child and parents, physicians, teachers, NHS teams, developers and Health workers and charities.

- These populations are significant since they enable children to utilise the smartwatch.



Child and Parents

- Parents help children to use the intervention (Jeong et al., 2021).
- They check on the app frequently to update on the health status and act on the alerts or recommendations.
- Children use the smartwatch functions, and this promotes their frequent use.



Teachers and Schools

- Teacher assists students with the intervention (Osman et al., 2024).
- Schools provide the opportunity to test and monitor the effectiveness of a safe.
- The teachers report any concerns or progress to parents and health teams.



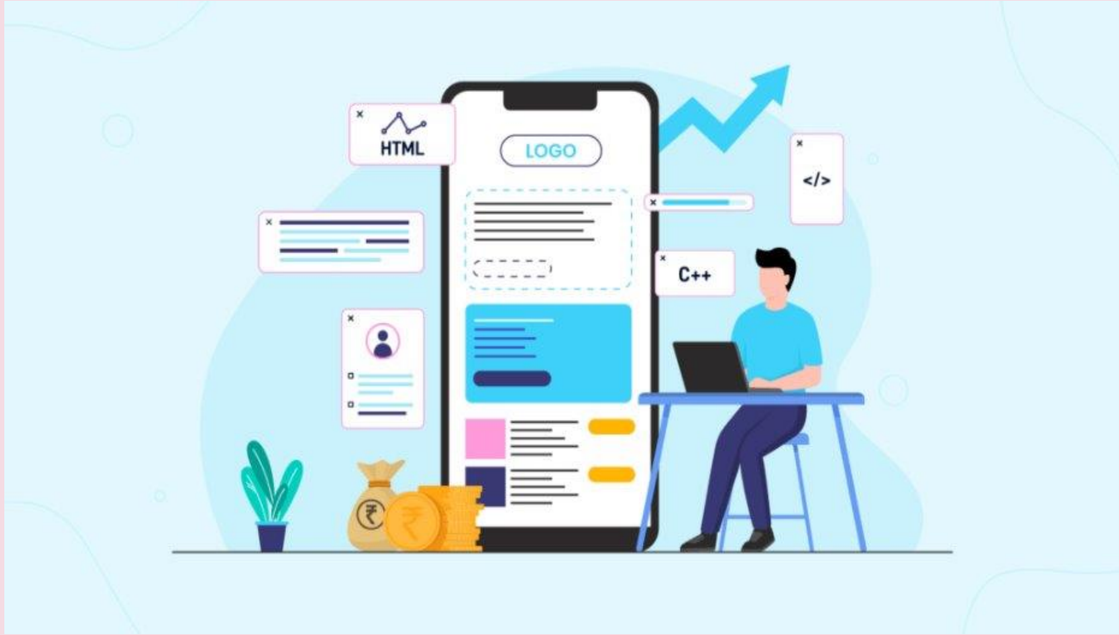
Physicians and NHS teams

- Physicians monitor skin information and adjust the treatment method.
- They guarantee that the device is appropriate to the clinical standards and does not disrupt the current medical care.
- NHS teams help in funding and policy assistance (McKee et al., 2025).



Developers, Health workers and charities

- Developers develop convenient apps (Alrabaiah et al., 2021).
- They guarantee the compatibility of the app with other devices and standards of privacy and security.
- Health workers and charities create awareness and make the families aware of the correct usage of the device



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BARRIERS

Barriers	WHY	How to overcome them
Technological	• The battery cannot last long, and sensors can provide incorrect readings (Ometov et al., 2021). • The app may be difficult to use or fail to support other languages. • Lack of robust digital infrastructure in rural areas can also prevent families from using the technology (RSN Online,2024).	• Smartwatches should have longer battery life, and sensor performance should be clinically tested to enhance reliability. • It is important to ensure that they have easy-to-use a applications and that they support a variety of languages. • It is also vital to offer offline data syncs to offer families the services where the internet is unavailable (Offline Internet, 2024).
Behavioural	• Certain families will not prefer to use the device because of a lack of a trusted brand (Basarir-Ozel et al., 2022). • The low motivation level or busy schedules can also influence adherence to the intervention at home.	• Collaborations with various organisations and professionals can enhance brand trust and awareness among the people (Senyapar, 2024). • Encourage children to use applications to make them use them regularly. • Provide opportunities to use flexibly and reminders to ensure that the busy families remain committed to the intervention.
Cultural and Social	• Certain families might lack the online skills to use online applications (Skopeliti, 2024). • The app may be difficult to communicate with because of language barriers. • Social shame of skin conditions is also a factor that leads to reduced usage (National Eczema, 2025).	• Conduct online training for families whose digital skills are limited to boost confidence (Wilson-Menzfeld et al., 2023). • Add images and support more than one language to simplify the application use. • Campaigns in schools and communities can lower the shame of skin conditions.

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Legal and Ethical Issues Associated with the Successful Implementation

- Collecting health information of children without the appropriate consent of GDPR Article 8 may result in legal issues (GDPR, 2025).
- Inappropriate storage of sensitive information presents the possibility of data breaches.
- The families might be confused by the complex or unclear privacy policies and be less willing to participate.
- The use of technology that is not sensitive to cultural values or individual values can lead to ethical issues and social withdrawal.



Ethical Considerations in Practice

- Obtain clear consent from parents before gathering or utilising any health information on children.
- Use a strong password and a safe system to keep all personal information (Microsoft, 2025).
- Keep privacy regulations simple, and every family should be able to comprehend them.
- Create the app with the assistance of various communities to ensure that the app fits the requirements of all people.



Recommendations

- Affordable devices can help families to access this intervention.
- The smartwatch must be user-friendly and enjoyable for children.
- The application should be easy and should support numerous languages (McLean, 2020).
- Training of parents and teachers is required.
- The intervention needs to be more effective, trusted, and inclusive, with clear privacy rules.



BENEFITS

- Improved adherence leading to fewer flares (Torrelo et al, 2013)
- Better sleep & quality of life for children and carers (Bass et al, 2015)
- Empowers children learn to self-care via gamification (Mettarikanon et al., 2025)
- Parents gain confidence in managing eczema as the device provides reminders and progress updates (National Eczema Society, 2025).
- By maintaining hydration levels, the smartwatch helps in preventing severe flare-ups, thereby improving daily functioning (Langan et al., 2014).
- Supports a sense of autonomy and responsibility among children in self-managing their condition(Mettarikanon et al.,2025).



BENEFITS

- Enhanced treatment adherence through timely AI reminders and hydration alerts (Tier et al., 2021).
- Fewer clinical visits as early detection prevents severe eczema escalation (NHS Digital, 2024).
- Reduction in emotional and psychological stress for both children and caregivers due to improved symptom control (Bass et al., 2015).
- Improved academic performance and attendance due to better sleep and comfort (Greener, 2016).
- Consistent monitoring creates a dataset that allows parents and clinicians to track progress over time (Crosby & Noar,2011).
- Overall improvement in quality of life and treatment satisfaction (Torrelo et al., 2013).







IMPLICATIONS FOR POLICY

- Demonstrating cost-effectiveness and improved outcomes could justify NHS support or reimbursement for digital eczema devices (NICE,2023).
- Supports integration of digital health interventions under NHS Digital’s real-world monitoring initiatives (NHS Digital, 2024).
- Encourages future NHS and NICE guidelines to incorporate wearable digital tools for eczema management (UK Government, 2024).
- Provides policymakers with evidence for equitable access to child-friendly health technologies (Porter,2016).
- Supports the UK's digital health innovation strategy and promotes technology-enabled self-care (NHSDigital, 2024).



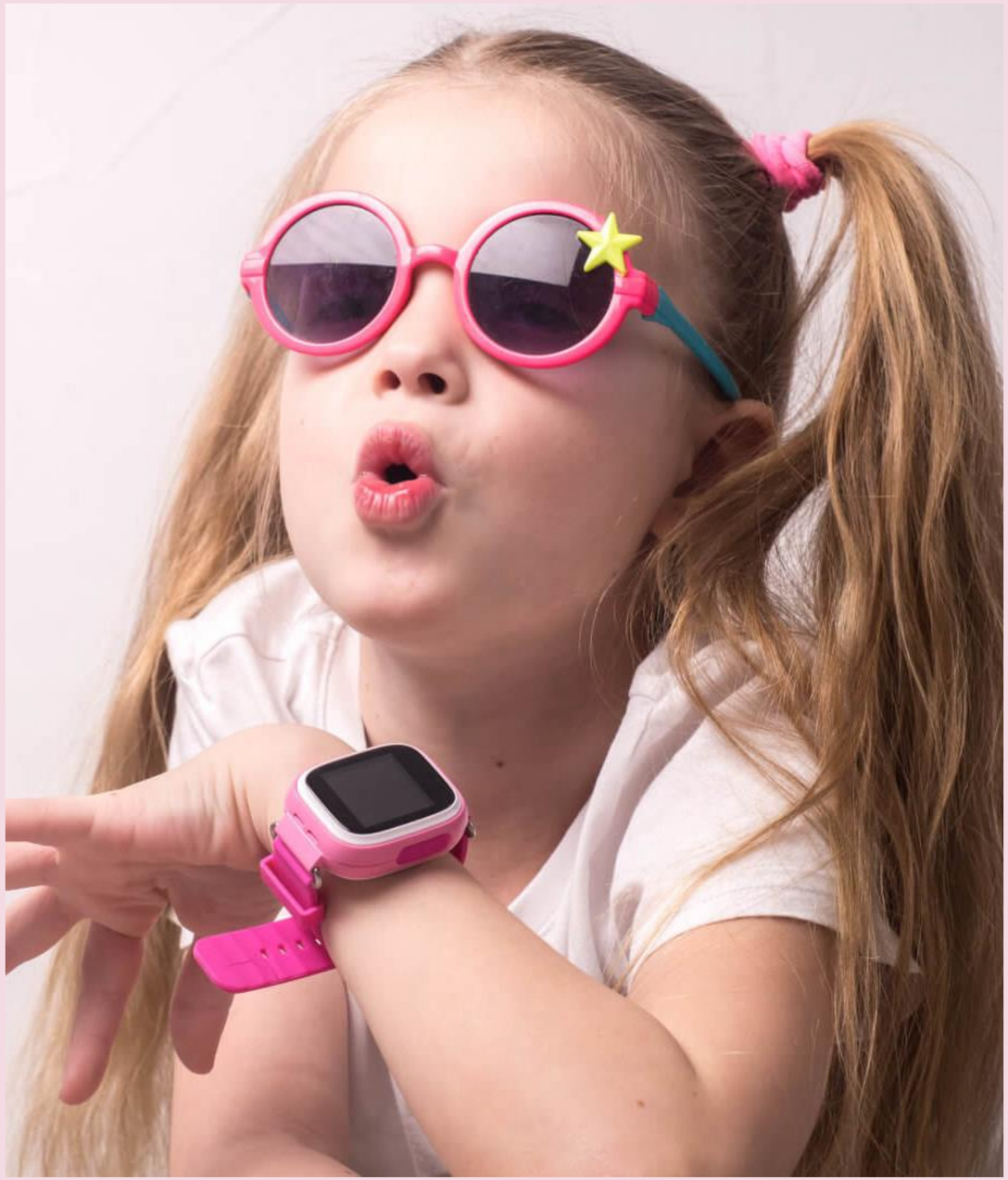
IMPLICATIONS FOR EDUCATION AND RESEARCH

- Healthcare professionals can use smartwatch data to personalised eczema treatment and identify non-adherence(Greener, 2016).
- Digital health training modules could be introduced for healthcare staff to improve understanding of data-driven care(NHS Digital, 2024).
- Incorporating eczema awareness and digital self-care programs into schools enhances children’s knowledge and early management (National Eczema Society, 2025).
- Anonymised adherence data could advance dermatology research and clinical practice insights (Langan et al., 2014).
- Supports future research on gamification and digital engagement among pediatric patients (Mettarikanon et al.,2025).
- Encourages academic partnerships for ongoing evaluation and improvement of digital eczema tools (Crosby & Noar,2011).

CONCLUSION

- Eczema management is demanding and time-consuming, often requiring multiple treatments each day.
- As a result, adherence can drop by up to 70% within only a few days of starting treatment.
- Effective eczema care therefore relies not only on medication, but also on behavioural support and sustained self-care habits.

The Creamitosmooth smartwatch empowers children through reminders, gamification, and real-time monitoring—helping to build healthy routines that improve long-term outcomes.



References

Alrabaiah, H.A. and Medina-Medina, N. (2021) ‘Agile Beeswax: Mobile app development process and empirical study in real environment’, Sustainability, 13(4), p.1909. Available at: https://doi.org/10.3390/su13041909 (Accessed: 04 November 2025).

Al-Rayes, S., Al Yaqoub, F.A., Alfayez, A., Alsalman, D., Alanezi, F., Alyousef, S. et al. (2022) ‘Gaming elements, applications, and challenges of gamification in healthcare’, Informatics in Medicine Unlocked, 31, 100974. (Accessed: 04 November 2025).

Allergy UK (2025) Eczema (Atopic Dermatitis). Available at: https://www.allergyuk.org/about-allergy/types-of-allergies/eczema/ (Accessed: 06 November 2025).

Almutairi, M.M., Al-Ojail, H.Y., Almaghrabi, M.A., Aldreweesh, Y.A., Alduhailan, T.S., Obaid, A.A.B. et al. (2025) ‘Parenting knowledge and attitude toward eczema in children: a study in the Eastern Province of Saudi Arabia’, International Journal of Medicine in Developing Countries, 9(2), pp.373–373. Available at: https://doi.org/10.24911/IJMDC.51-1736276775 (Accessed: 04 November 2025).

Bass, A.M., Anderson, K.L. and Feldman, S.R. (2015) ‘Interventions to increase treatment adherence in pediatric atopic dermatitis: a systematic review’, Journal of Clinical Medicine, 4(2), pp.231–242. (Accessed: 04 November 2025).

Basarir-Ozel, B., Turker, H.B. and Nasir, V.A. (2022) ‘Identifying the key drivers and barriers of smart home adoption: A thematic analysis from the business perspective’, Sustainability, 14(15), p.9053. Available at: https://doi.org/10.3390/su14159053 (Accessed: 04 November 2025).

British Journal of Dermatology (2023) ‘A study about how many people around the world have atopic dermatitis’, British Journal of Dermatology, 190(1), p.e6. Available at: https://doi.org/10.1093/bjd/ljad462 (Accessed: 04 November 2025).

Crosby, R. and Noar, S.M. (2011) ‘What is a planning model? An introduction to PRECEDE-PROCEED’, Journal of Public Health Dentistry, 71, pp.S7–S15.
Dawson, A. (2023) The Costs of Atopic Dermatitis. Sanofi UK. Available at: https://www.sanofi.co.uk/assets/dot-uk/pages/images/skin-in-the-game/cost-of-ad-pdf.pdf (Accessed: 2 November 2025).

Eczema Support (2025) Eczema and Missing School. Available at: https://www.eczemasupport.org.au/eczema-and-missing-school/ (Accessed: 06 November 2025).
GDPR (2025) Conditions applicable to child's consent in relation to information society services. Available at: https://gdpr-info.eu/art-8-gdpr/ (Accessed: 04 November 2025).

Gielen, A.C., McDonald, E.M., Gary, T.L. and Bone, L.R. (2008) ‘Using the PRECEDE–PROCEED model to apply health behavior theories’, in Health Behavior and Health Education: Theory, Research, and Practice. 4th edn. pp.407–29. (Accessed: 04 November 2025).

References

Gkintoni, E., Vantaraki, F., Skoulidi, C., Anastassopoulos, P. and Vantarakis, A. (2024) ‘Promoting physical and mental health among children and adolescents via gamification—A conceptual systematic review’, Behavioral Sciences, 14(2), p.102. Available at: https://doi.org/10.3390/bs14020102

Greener, M. (2016) ‘Eczema at school: more than skin deep’, British Journal of School Nursing, 11(5), pp.221–224.

GTCSYS (2025) What is the role of user feedback in improving web application usability? Available at: https://gtcsys.com/faq/what-is-the-role-of-user-feedback-in-improving-web-application-usability/ (Accessed: 07 November 2025).

ICO (2025) UK GDPR guidance and resources. Available at: https://ico.org.uk/for-organisations/uk-gdpr-guidance-and-resources/ (Accessed: 07 November 2025).

Information Commissioner’s Office (2025) Age-Appropriate Design: Code of Practice for Online Services (Children’s Code) – Guidance for organisations. Available at: https://ico.org.uk/... (Accessed: 2 November 2025).

Jeong, J., Franchett, E.E., Ramos de Oliveira, C.V., Rehmani, K. and Yousafzai, A.K. (2021) ‘Parenting interventions to promote early child development in the first three years of life: A global systematic review and meta-analysis’, PLoS Medicine, 18(5), p.e1003602. Available at: https://doi.org/10.1371/journal.pmed.1003602

Krejci-Manwaring, J., Tusa, M.G., Carroll, C., Camacho, F., Kaur, M., Carr, D. et al. (2007) ‘Stealth monitoring of adherence to topical medication: adherence is very poor in children with atopic dermatitis’, Journal of the American Academy of Dermatology, 56(2), pp.211–216.

Langan, S.M. et al. (2014) ‘How are eczema "flares" defined? A systematic review and recommendation for future studies’, British Journal of Dermatology, 170(3), pp.548–556.

Ma, Y.L., Li, S., Liu, J.T., He, X.T., Li, L.Y., Niu, J.P., Luo, B. and Zhang, K. (2021) ‘Impact of absolute humidity and temperature on eczema’, Biomedical and Environmental Sciences, 34(1), pp.61–65. Available at: https://doi.org/10.3967/bes2021.008

McKee, M., Vaughan, L.K. and Russo, G. (2025) ‘A contentious intervention to support the medical workforce: a case study of the policy of introducing physician associates in the United Kingdom’, Human Resources for Health, 23(1), p.4. Available at: https://doi.org/10.1186/s12960-024-00966-1

McLean, M.V. (2020) Developing an App for Multiple Languages. Available at: https://calvium.com/developing-an-app-for-multiple-languages/ (Accessed: 04 November 2025).

Mettarikanon, D., Eden, C. and Tawanwongsri, W. (2025) ‘The role of game-based learning in dermatology: A scoping review on patient education’, Frontiers in Communication, 10, 1636364.
Microsoft (2025) What is password protection? Available at: https://www.microsoft.com/en-us/security/business/security-101/what-is-password-protection (Accessed: 07 November 2025).

Murray, G. (2020) ‘Psychosocial burden and costs in patients with atopic dermatitis’, Irish Skin Foundation. Available at: https://irishskin.ie/... (Accessed: 2 November 2025).

National Eczema (2025) Managing Stress from Eczema. Available at: https://nationaleczema.org/... (Accessed: 04 November 2025).

References

National Eczema Society (2025) Information and advice. Available at: https://eczema.org/information-and-advice/ (Accessed: 2 November 2025).

National Eczema Society (2025) What we do. Available at: https://eczema.org/what-we-do/ (Accessed: 2 November 2025).

NHS Digital (2024) Monitoring the safety and effectiveness of digital technologies (real-world monitoring). Available at: https://www.digitalregulations.innovation.nhs.uk/... (Accessed: 2 November 2025).

NICE (2023) Atopic eczema in under 12s: diagnosis and management (NICE guideline CG57). London: National Institute for Health and Care Excellence. Available at: https://www.nice.org.uk/guidance/cg57/ (Accessed: 2 November 2025).

NICE (2025) Atopic eczema in under 12s: diagnosis and management – Recommendations. Available at: https://www.nice.org.uk/... (Accessed: 07 November 2025).

Nemeth, V., Syed, H.A. and Evans, J. (2022) 'Eczema', in StatPearls. Treasure Island (FL): StatPearls Publishing. Available at: https://www.ncbi.nlm.nih.gov/books/NBK538209/
Offline Internet (2024) The Power of Offline Internet Beyond the Binary of Connectivity. Available at: https://www.offlineinternet.org/... (Accessed: 07 November 2025).

Ometov, A., Shubina, V., Klus, L., Skibińska, J., Saafi, S., Pascacio, P. et al. (2021) 'A survey on wearable technology: History, state-of-the-art and current challenges', Computer Networks, 193, 108074. Available at: https://doi.org/10.1016/j.comnet.2021.108074

Osman, S., Hirsch, C., Jalal, Z. and Paudyal, V. (2024) 'Collaborative approaches to health education: perspectives of parents and teachers on self-care and managing common health issues in UK primary schools', BMC Health Services Research, 24(1), p.1315. Available at: https://doi.org/10.1186/s12913-024-11724-3

Pireddu, M. (2021) How to create a multi-language app? Available at: https://www.goodbarber.com/blog/how-to-create-a-multi-language-app-a714/ (Accessed: 04 November 2025).

Porter, C.M. (2016) 'Revisiting PRECEDE–PROCEED: A leading model for ecological and ethical health promotion', Health Education Journal, 75(6), pp.753–764.

RSN Online (2024) Digital Disparity: A Closer Look at Rural Connectivity in England. Available at: https://www.rsnonline.org.uk/... (Accessed: 04 November 2025).

Senyapar, H.N. (2024) 'Healthcare branding and reputation management strategies for organizational success', Technium Social Sciences Journal, 55, p.26.

Skopeliti, C. (2024) 'Nearly half of UK families excluded from modern digital society, study finds', The Guardian. Available at: https://www.theguardian.com/... (Accessed: 04 November 2025).

Smith, S. (2025) 'New eczema treatment approved for NHS use "will help 62,000"', The Mirror. Available at: https://www.mirror.co.uk/... (Accessed: 06 November 2025).

References

Tier, H.L., Balogh, E.A., Bashyam, A.M., Fleischer, A.B., Spergel, J.M., Masicampo, E.J. et al. (2021) ‘Tolerability of and adherence to topical treatments in atopic dermatitis: a narrative review’, Dermatology and Therapy, 11(2), pp.415–431.

Torrelo, A., Ortiz, J., Alomar, A., Ros, S., Pedrosa, E. and Cuervo, J. (2013) ‘Health-related quality of life, patient satisfaction, and adherence to treatment in patients with moderate or severe atopic dermatitis on maintenance therapy: the CONDA-SAT study’, Actas Dermo-Sifiliográficas (English Edition), 104(5), pp.409–417.

UK Government (2024) Regulating medical devices in the UK. Available at: https://www.gov.uk/guidance/regulating-medical-devices-in-the-uk (Accessed: 2 November 2025).

WHO (2024) Self-care for health and well-being. Available at: https://www.who.int/news-room/fact-sheets/detail/self-care-health-interventions (Accessed: 07 November 2025).

WHO (2025) Digital health. Available at: https://www.who.int/health-topics/digital-health#tab=tab_1 (Accessed: 07 November 2025).

Wilson, A. and McDonagh, J.E. (2014) ‘A gamification model to encourage positive healthcare behaviours in young people with long term conditions’, EAI Endorsed Transactions on Game-Based Learning, 14(2), e3.

Wilson-Menzfeld, G., Gates, J.R., Moreland, M., Raw, H. and Johnson, A. (2023) ‘Learning digital skills online: empowering older adults through one-to-one, online digital training provision’, Frontiers in Psychology, 14, p.1122277. Available at: https://doi.org/10.3389/fpsyg.2023.1122277