Why common fever thermometers are not enough
A systematic perspective in the crossing between medicine and engineering
Rodrigues Santos, Ana; Diehl, Jan-Carel; Reis, R.

Publication date
2016

Citation (APA)

Important note
To cite this publication, please use the final published version (if applicable).
Please check the document version above.

Copyright
Other than for strictly personal use, it is not permitted to download, forward or distribute the text or part of it, without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license such as Creative Commons.

Takedown policy
Please contact us and provide details if you believe this document breaches copyrights.
We will remove access to the work immediately and investigate your claim.
WHY COMMON FEVER THERMOMETERS ARE NOT ENOUGH
A SYSTEMIC PERSPECTIVE IN THE CROSSING BETWEEN MEDICINE AND ENGINEERING

**Project purpose**

This abstract describes a cross-disciplinary design project aiming at developing a fever thermometer for East Africa, with clear cut-off points for community health workers and caregivers, based on medical evidence, and adapted to local realities and cultural norms. The Frugal Thermometer project is an initiative supported by the Centre for Frugal Innovation in Africa and it is carried out by the Delft University Medical Centre and the Faculty of Industrial Design Engineering at Delft University of Technology since 2010.

The fever thermometer is an essential health technology and the entry point to a diversity of health technologies, like the fever thermometer itself. Nonetheless, the fever thermometer is an essential part of the delivery of primary healthcare services for global health. Despite the increasing engagement of the private sector and academia, there is a poor understanding of the barriers to their implementation across the different healthcare systems and their structures.

**Design**

In this abstract, the authors suggest that the crossing of medicine and design engineering has the potential to offer new perspectives to health technologies, by focusing on developing value-sensitive innovations that include consideration for human factors involved in the development, procurement, use, and disposal of technologies (e.g., individual, relational and organizational aspects), to the technical ecosystem and underlying financing model needed to sustain such technologies.

**Outcome and evaluation**

This abstract exposes a systemic perspective on the assessment of fever in rural Africa by describing how the engagement of these two disciplines in a series of design projects lead to relevant insights about the current barriers to access and proper use of existing fever thermometers and provides scenarios and concepts towards new solution directions.

---

**DISTRIBUTION OF HEALTHCARE RECEIVED BY PEOPLE WITH FEBRILE SYMPTOMS**

- Visited a healthcare provider (except a traditional healer)
- Self treated
- Visited a traditional healer
- No action

---

**DISTRIBUTION OF HEALTHCARE PROVIDERS VISITED BY PEOPLE WITH FEBRILE SYMPTOMS**

- Professional non-profit
- Public
- Private non-profit
- Informal

---

A.L.R. Santos1,3, J.C. Diehl1, R. Reis2, Rikako Iwamoto1

1 Delft University of Technology, Faculty of Industrial Design Engineering, The Netherlands
2 Leiden University Medical Centre, The Netherlands
3 Médecins Sans Frontières Sweden Innovation Unit, Sweden

---

**Leiden • Delft • Erasmus**

Centre for Frugal Innovation in Africa
WHY COMMON FEVER THERMOMETERS ARE NOT ENOUGH
A SYSTEMIC PERSPECTIVE IN THE CROSSING BETWEEN MEDICINE AND ENGINEERING

**Project purpose**
This abstract describes a cross-disciplinary design project aiming at developing a fever thermometer for East Africa, with clear cut-off points for community health workers and caregivers, based on medical evidence, and adapted to local realities and cultural norms. The Frugal Thermometer project is an initiative supported by the Centre for Frugal Innovation in Africa and it is carried out by Delft University Medical Centre and the Faculty of Industrial Design Engineering at Delft University of Technology since 2012.

Health technologies, like the fever thermometer, are an essential part of the delivery of primary healthcare services for global health. Despite the increasing engagement of the private sector and academia, there is a poor understanding of the barriers to their implementation across the different healthcare systems and their structures.

**Design**
In this abstract, the authors suggest that the crossing of medicine and design engineering has the potential to offer new perspectives to health technologies, by focusing on developing value-sensitive innovations that include consideration for human factors involved in the development, procurement, use and disposal of technologies (e.g. individual, relational and organizational aspects), to the technical eco-system and underlying financing model needed to sustain such technologies.

**Outcome and evaluation**
This abstract exposes a systemic perspective on the assessment of fever in rural Africa by describing how the engagement of these two disciplines in a series of design projects lead to relevant insights about the current barriers to their implementation across the different healthcare systems and their structures.

**Access to an accurate and reliable diagnostic tool is an essential part of the delivery of primary healthcare services for global health.**

**DISTRIBUTION OF HEALTHCARE RECEIVED BY PEOPLE WITH FEBRILE SYMPTOMS**
- Visited a healthcare provider (except a traditional healer)
- Visited a traditional healer
- Self treated
- No action

**DISTRIBUTION OF HEALTHCARE PROVIDERS VISITED BY PEOPLE WITH FEBRILE SYMPTOMS**
- Private for profit
- Public
- Private non-profit
- Informal

Going forward, the Centre for Frugal Innovation in Africa and the partnering universities actively pursuit this applied research agenda by generating and disseminating knowledge about the contribution of frugal innovation to global health.

A.L.R. Santos1,3, J.C. Diehl1, R. Reis2
1 Delft University of Technology, Faculty of Industrial Design Engineering, The Netherlands
2 Leiden University Medical Centre, The Netherlands
3 Faculty of Industrial Design Engineering, The Netherlands

Rikako Iwamoto1
1 Medecins Sans Frontieres Sweden Innovation Unit, Sweden

Graphic support

Leiden • Delft • Erasmus
Centre for Frugal Innovation in Africa