



# THE 2022 TECHMED EVENT



# Personalisation of care: the case of Diabetes

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**THE 2022  
TECH-MED  
EVENT**

## The Picture

### Netherlands:

- approx. 1.2 million citizens suffer from diabetes, of which 90% have type 2 diabetes (T2D)
- number of those with diabetes is growing every week by 1200 partly due to increases in obesity among young people [1]
- approx. 6.8 billion euros spent on diabetes management: 25% in healthcare [2]
- costs will treble in coming years.

1. Diabetes in cijfers. 06-10-2022]; Available from: <https://www.diabetesfonds.nl/over-diabetes/diabetes-in-het-algemeen/diabetes-in-cijfers>.

2. Peters, M., et al., The current total economic burden of diabetes mellitus in the Netherlands. *Neth J Med*, 2017. 75(7): p.

## Type 2 Diabetes: Some Facts

- increased blood glucose values (hyperglycemia),

- relative or absolute insulin deficiency.

- regular visits to HCPs;

- 24/7 task to keep blood glucose values within a healthy range.

- frequent “out of range”- episodes, impacting well-being and increasing risks of acute and long-term complications [3].

- Daily management of T2D :

- fine balance of diet and physical activity
- self-monitoring of blood glucose levels.
- different people encounter distinct barriers and enablers to their daily management of this condition.

## Diabetes type 2 beter voorkomen dan genezen



## Diabetes & Behaviour

- Health behaviours in diabetes management
- Difficult to adjust behaviours

## System constraints: reactivity of care

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-A person living with T2D gets professional help when there are problems

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- Labour intensive (e.g. organised face to face)

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- Little degrees of freedom leading to the use of a 'one size fits all' approach [1] whilst origin, maintaining factors and course of T2D are different for each patient.

# The TechMed Approach: Blended Care



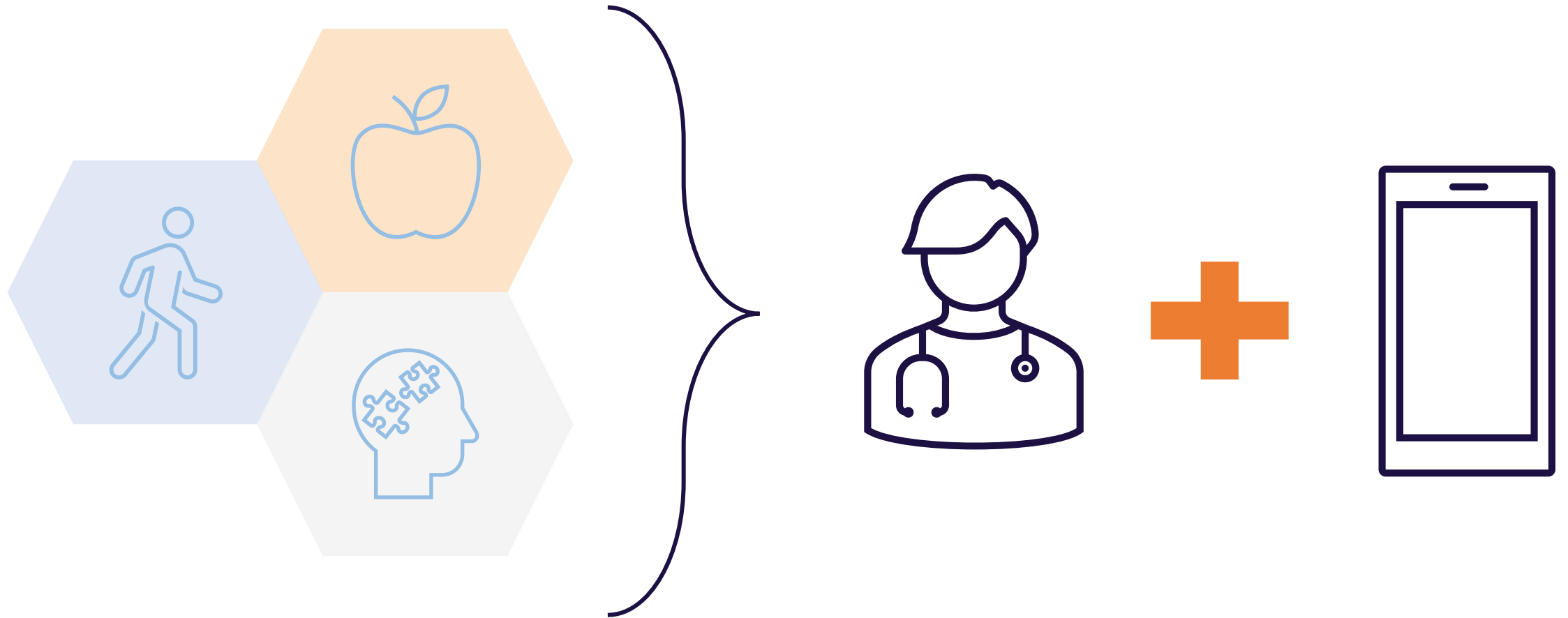
Good technological solutions can support the delivery of blended care.



Blended care combines

- “traditional” face-to-face care
- telecare using digital technology,
- use of real time sensors of health outcomes (blood glucose) & self-monitoring of data (e.g. PA & Diet) to increase insight on health and behaviours
- proactive & personalized care
- lower costs and lower time

# The TechMed Approach: Examples of Developments in the Region



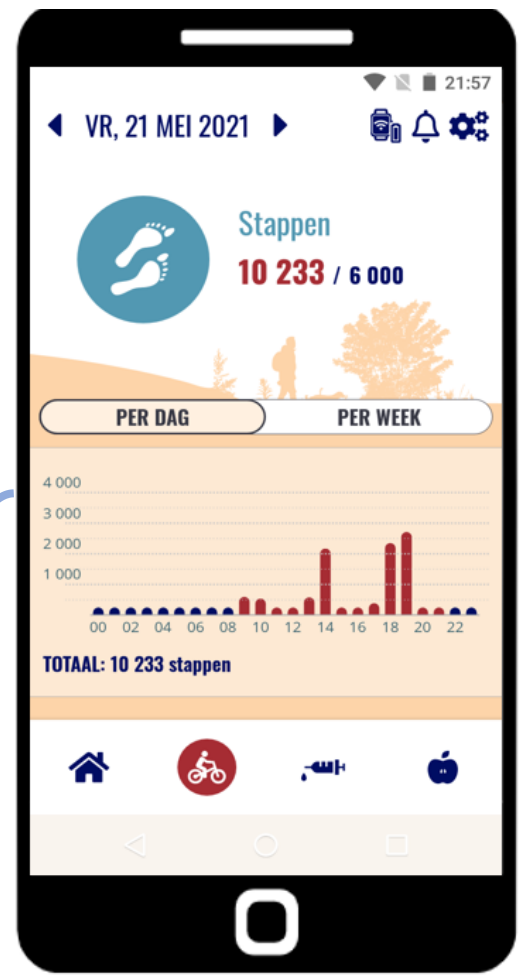


# THE DIAMETER

An app to promote a healthy lifestyle and glucose management for people with type 2 diabetes



Goal setting

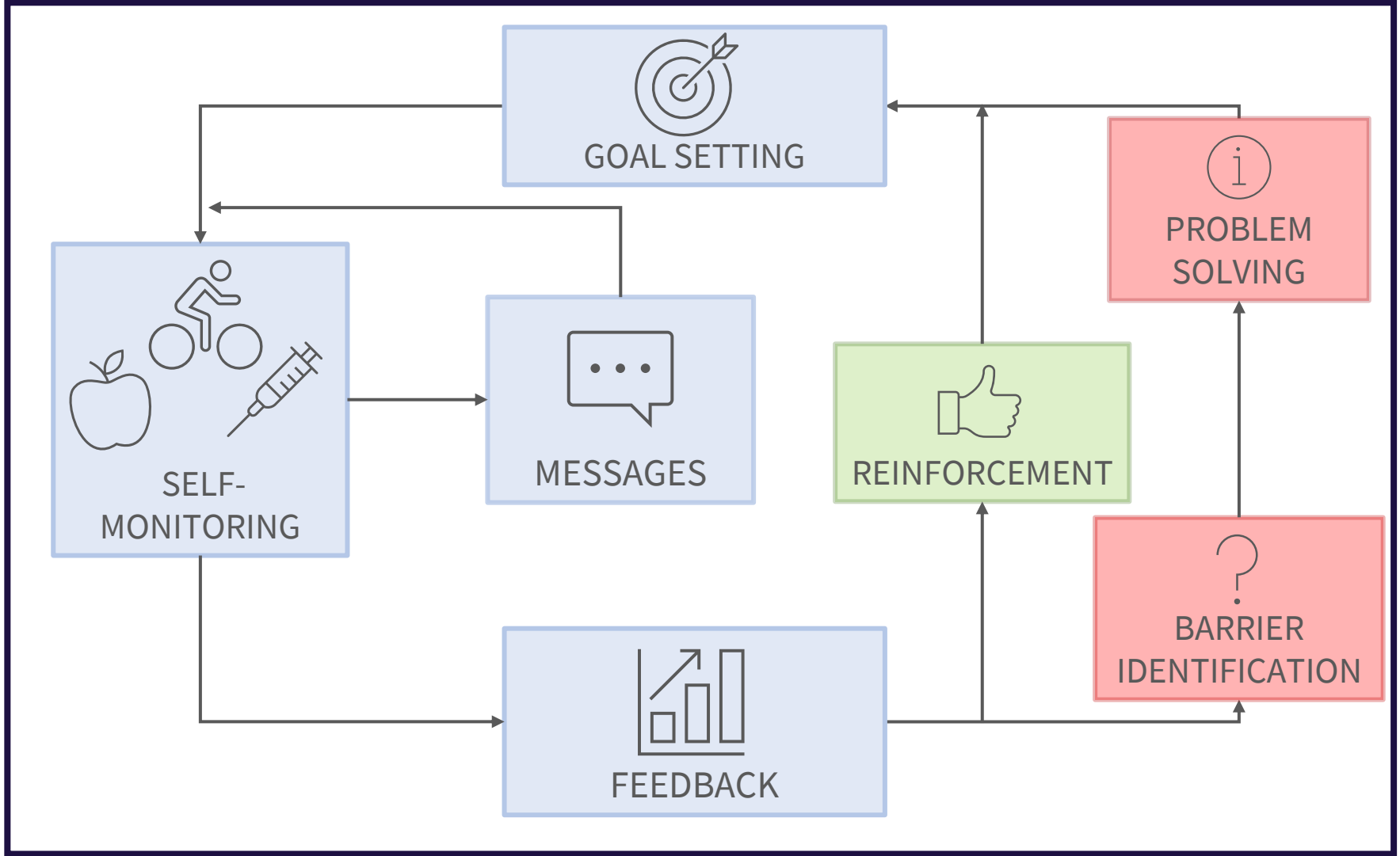


Self-monitoring



Feedback & Coaching

# THE DIAMETER



# THE E-SUPPORTER

The coaching content in the Diameter

## Behavior Change Theory

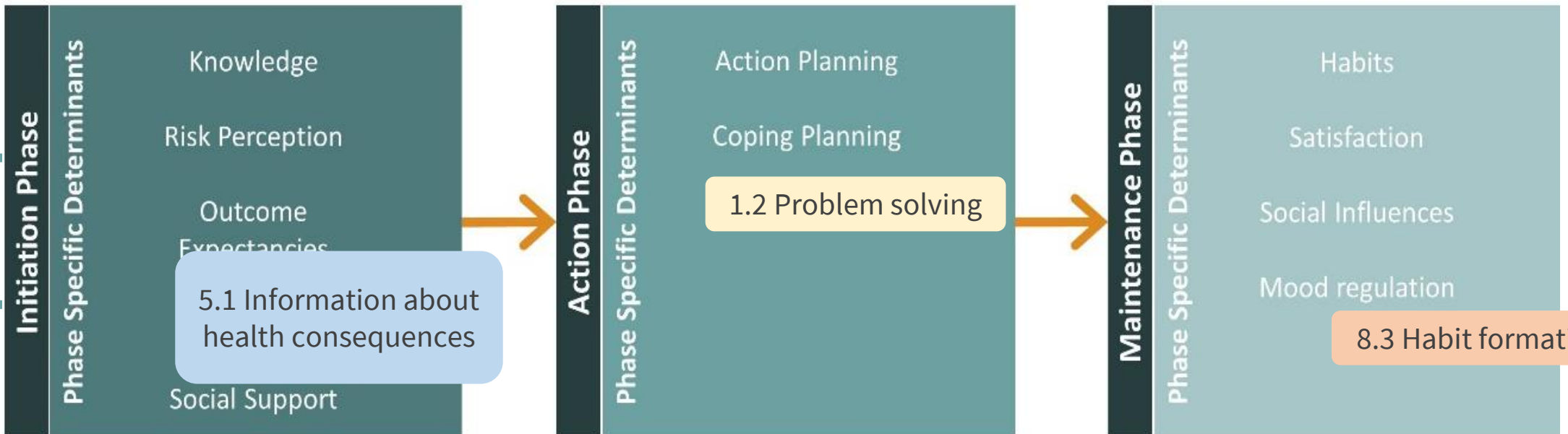
Health Action Process Approach (HAPA)  
Theories for maintenance of behavior

## Behavior Change Techniques

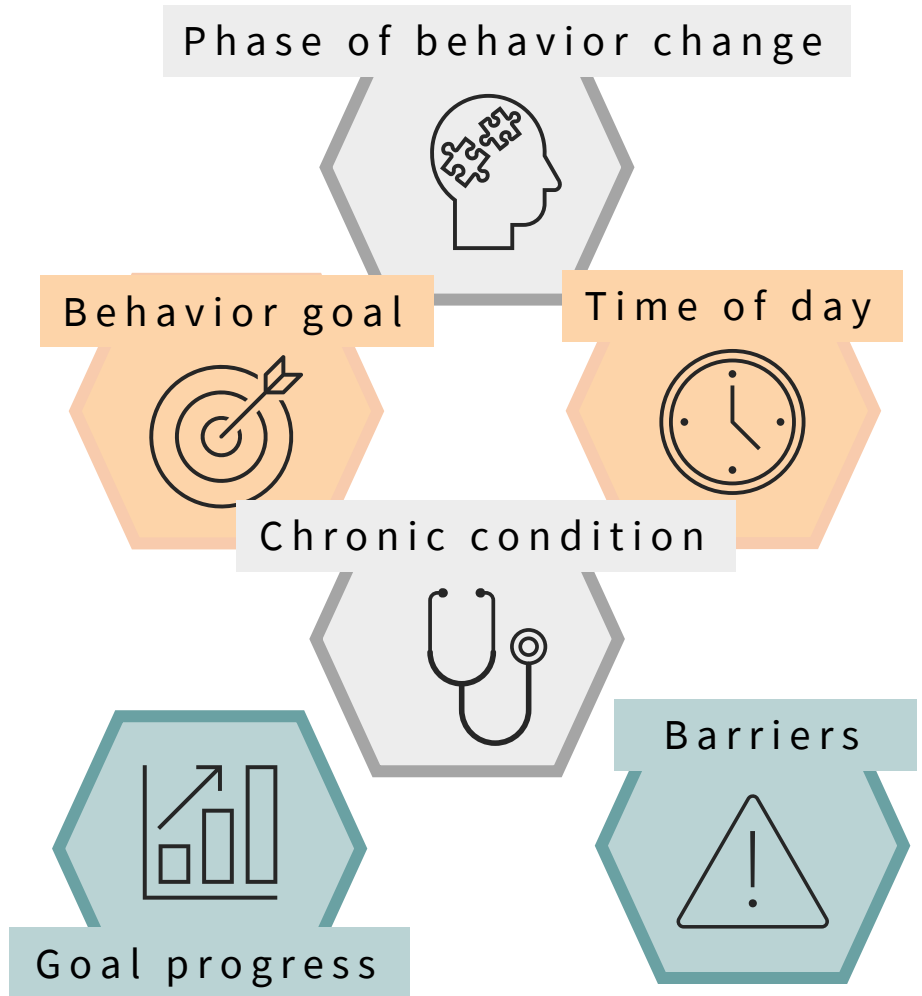
### All Phases

Key Determinants  
Action Control  
Self-Efficacy

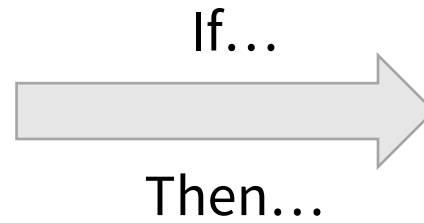
1.1 Goal setting



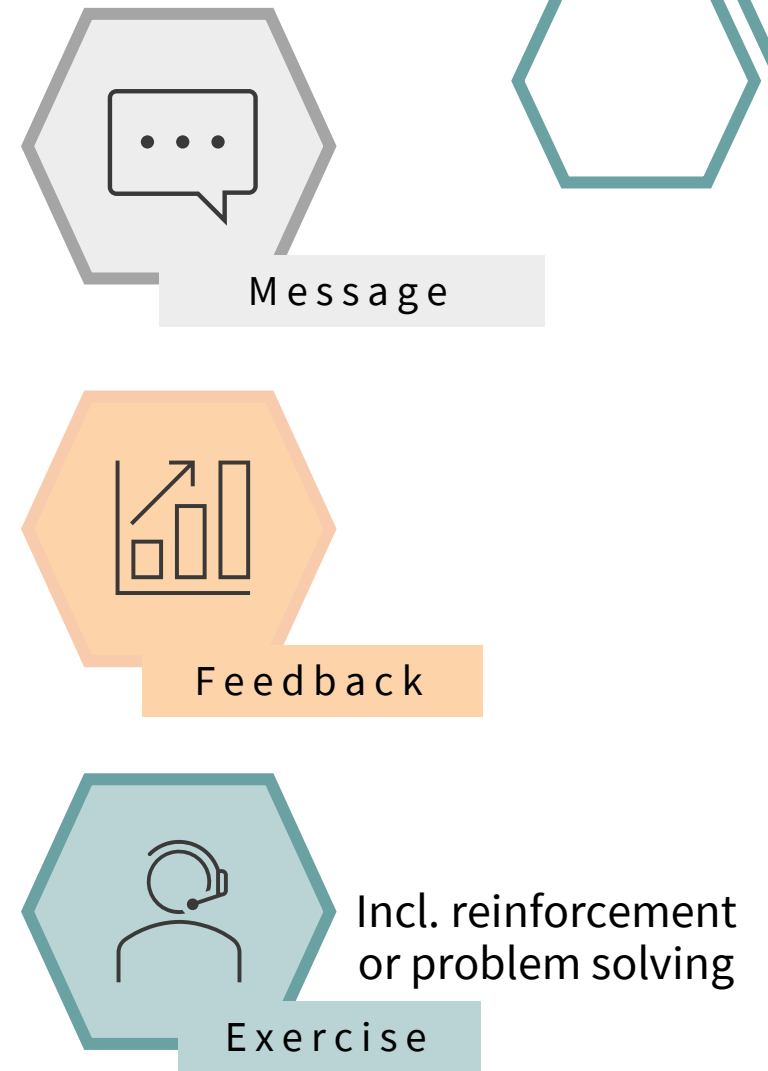
# THE E-SUPPORTER



Tailoring Variables



If-then rules



Intervention options

# Current Proposal

1

Develop an interoperable platform for blended care using:

- State of the art intervention development with co-design [4] engaging those living with diabetes as well as HCPs. Participants recruited from ZGT Diabetes Patient Panel (DPP) and from the Dialect Cohort, led by Prof. Laverman.

2

Use previous developed (Diameter and E-supporter) to integrate in a single platform that will act based on:

- Individual monitoring and self-monitoring;
- Individual needs assessment

3

Develop a Dashboard for HCPs and those living with Diabetes

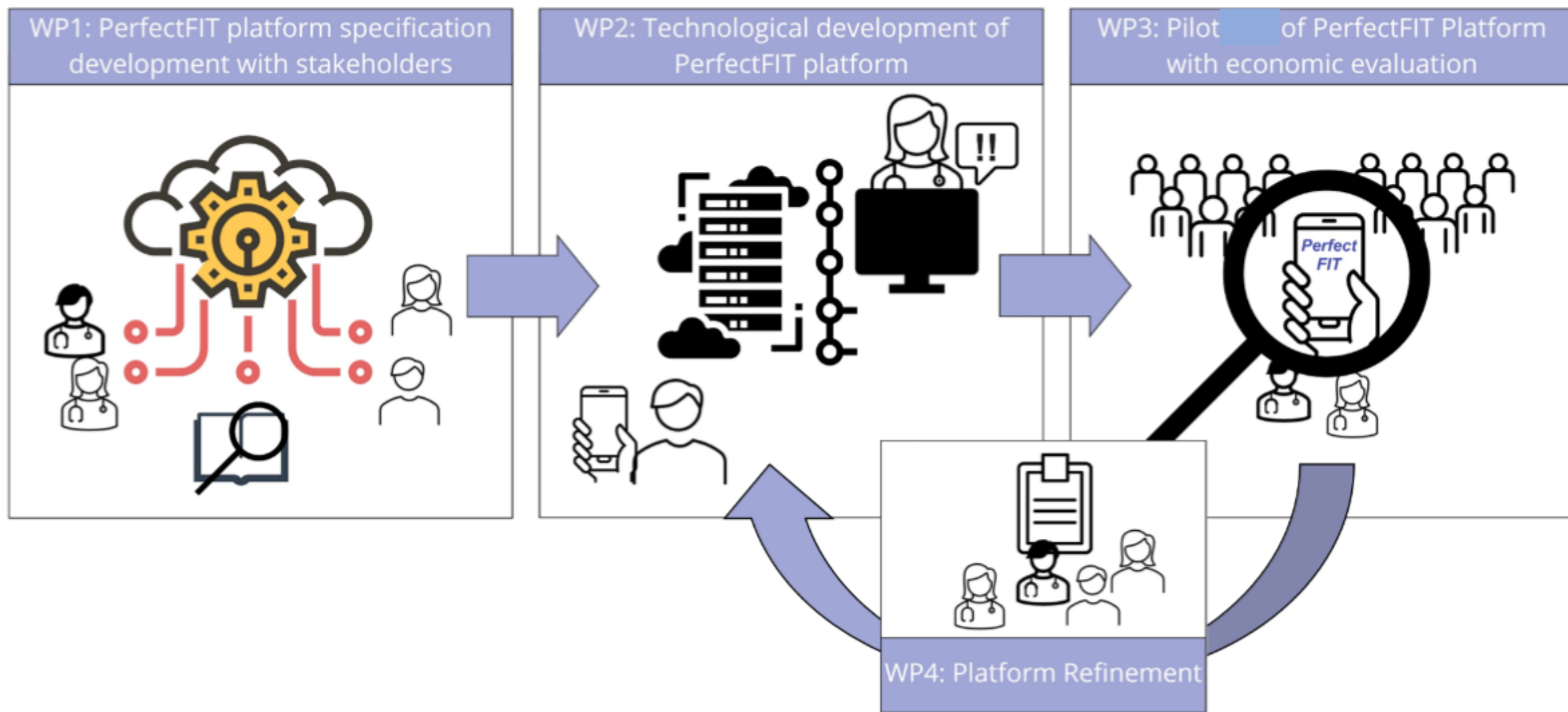


Figure 1: Basic workplan of PerfectFIT

WP1: Platform specification and development, 1-9 M

WP 2: Dev Digital Platform for Blended Personalised Care 3-12 M

Intervention Development  
Guidance Alignment

Evidence base  
Appropriate Theory

Modelling process and outcome, describing the intervention fully, pre-trial economic evaluation

**Evidence base:**  
• Proof that lifestyle changes support management of T2D. Evidence on best BCTs to support change.

**DiaMeter App Studies**  
• Allows to monitor physical activity, nutrition and Blood Glucose Levels

**E-supporter:** Digital coaching tool  
• Motivational messages  
• Goal setting  
• Weekly exercises;  
• Barrier identification and problem solving with interaction with virtual coach

**Outcome:** Empirical evidence statements available

**Co-Design Workshops I:** Test evidence statements and brainstorm integration ideas (with those with T2D and HCPs)

**Outcome:** Principles underpinning the blended intervention/dashboard

**Co-Design Workshops II:** Test the principles and brainstorm intervention ideas (with those with T2D and HCPs)

**Outcome:** Core concepts and paper prototypes

**Translating Outputs:** Develop a design brief and intervention specification

**Outcome:** Design brief and specification

**Intervention Build:** Produce a functional version of the intervention in interaction with AncoraHealth (WP2)

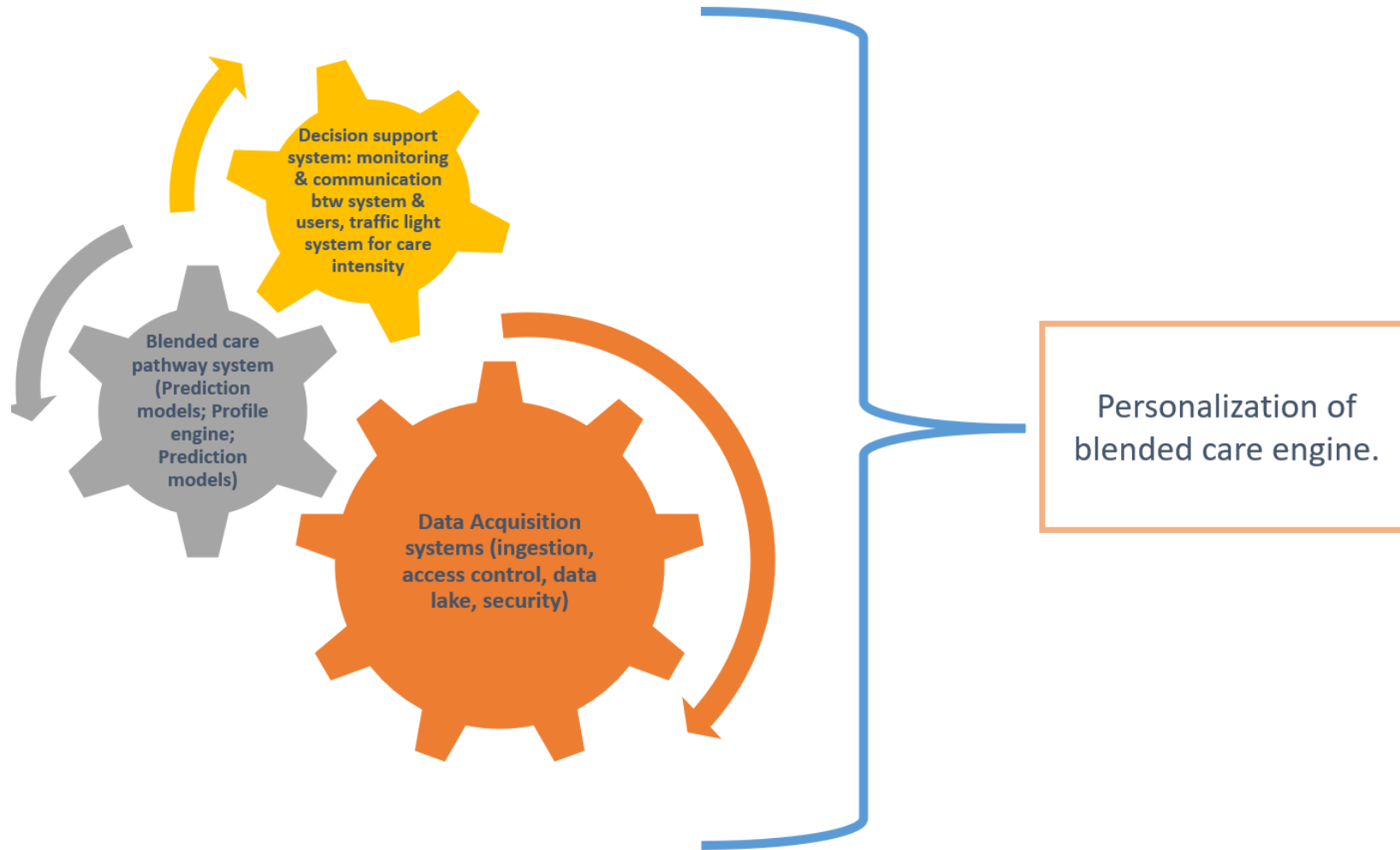
**Outcome:** Intervention Prototype(s)

**Co-design Workshops III:** “De-risk” the prototype (test functionality and identify required changes, (with those with T2D and HCPs)

**Outcome:** List of required revisions of prototype

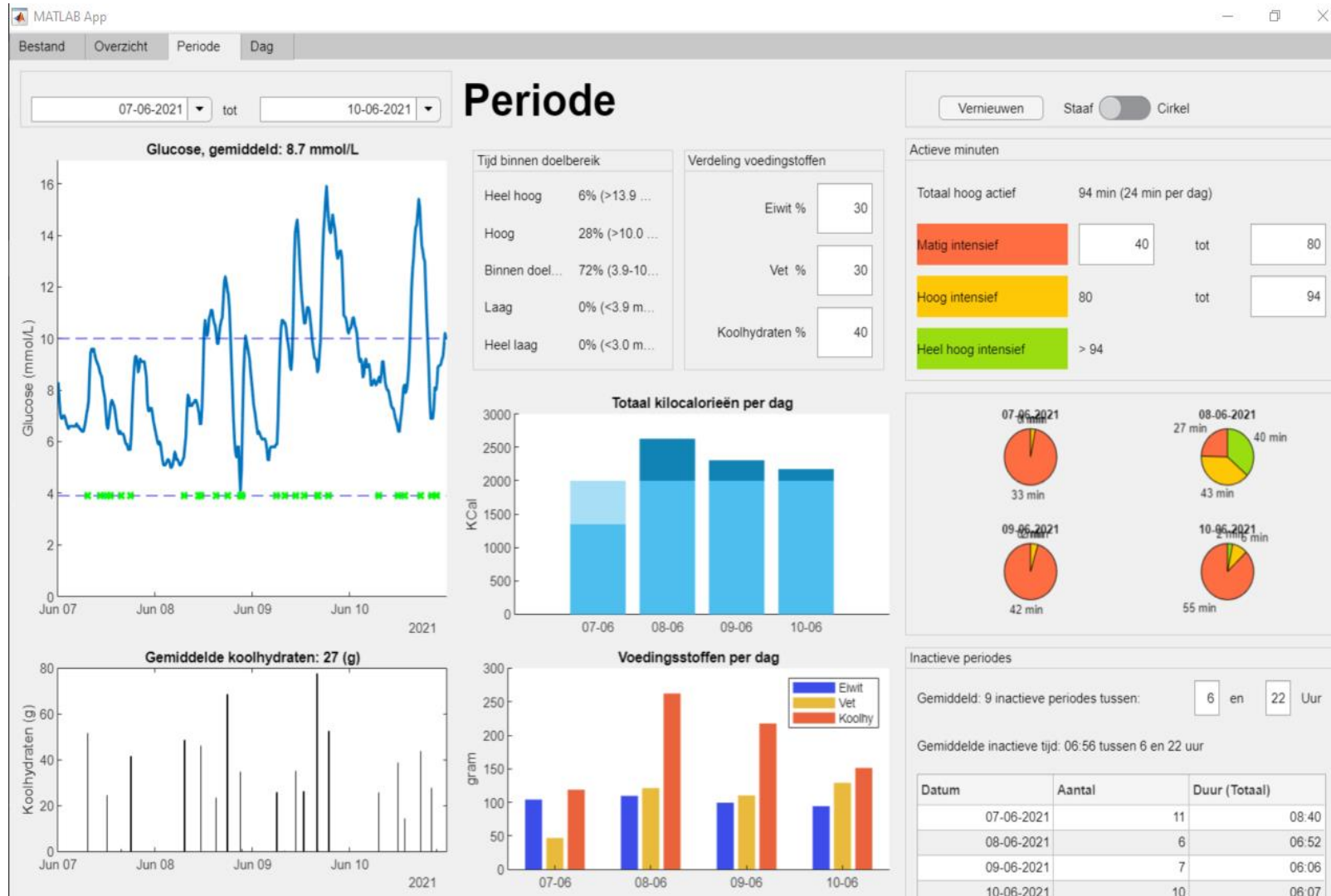
**Iterative Intervention Optimisation with small tests:** 2 rounds of two weeks of using the platform to gather user feedback to test and optimise revised versions of the platform (T2D & HCPs)

**Outcome:** The Beta version of the PerfectFit Blended Intervention





# Example of a Potential Dashboard





# Conclusion

- It is possible to develop a blended care platform with the support of previous research
  - Key stakeholders will be involved e.g. engaging the local ZGT Diabetes Patient Panel (DPP) as well as HCPs
  - Engaging end users will increase the likelihood of acceptability and feasibility
  - Digital tools and sensors will allow for the personalisation of care
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# The Team

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*Miriam Vollenbroek-Hutten (MST, UT)*

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*Goos Laverman (ZGT)*

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*Mattijs Out (MST)*

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*Mark van Haaren (MST)*

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*Jaydev Varma (Ancora Health)*

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*Xavier Pouwels (HTSR)*

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*Nienke Beerlage – de Jong (HTSR)*

Thank you to:

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All involved in research in this area: you know who you are!



# Other references

- Araújo-Soares, V., et al., *Developing behavior change interventions for self-management in chronic illness*. *European Psychologist*, 2019. 24(1).
  - Hietbrink, E.A.G., et al. *A Pilot Study on the Diameter app: Lifestyle Support for Type 2 Diabetes Mellitus Patients*. in *10th Supporting Health by Technology 2021*.
  - Hietbrink, E.A.G., et al. *Development and Qualitative Evaluation of the E-Supporter ... People with T2DM*. in *ISBNPA XChange Initiative 2021*.
  - den Braber, N., et al., *Requirements of an application to monitor diet, PA and glucose values in patients with type 2 diabetes: The diameter*. *Nutrients*, 2019. 11(2): p. 409.
  - Currie, C.C., et al., *Intervention Development...: Integrating Evidence and the Perspectives of Users and Stakeholders*. In *Handbook of Clinical Psychology*. Elsevier, 2022.
  - Dombrowski, S.U., et al., *Optimizing acceptability and feasibility ...: an open-pilot*. *Patient education and counseling*, 2012. 87(1): p. 108-119.
  - Bults, M., et al., *Barriers and Drivers Regarding the Use of Mobile Health Apps Among Patients With Type 2 Diabetes Mellitus in the Netherlands: Explanatory Sequential Design Study*. *JMIR diabetes*, 2022. 7(1): p. e31451.
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Thank you!





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