Cloudcare, a population health management application for people with diabetes: Interim results from a multicenter observational study

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Background

- Increasing use of technology in type 1 diabetes (T1D) contributes to improved outcomes, treatment experience and decision support.[1,2]

- Glucose-sensing technologies generate large volumes of data across different care settings, increasing the need for scalable tools that enable healthcare professionals (HCPs) to efficiently collect, interpret and act on these data.(i.e. population health management or PHM systems).

- We developed CloudCare,[3] a CE-marked eHealth application and population health management (PHM) system for remote glucose monitoring and triaging. It:

  - provides continuous insights between visits,
  - supports proactive and targeted interventions within hybrid care pathways,
  - improves outcomes, treatment satisfaction and cost-effectiveness, and
  - enables data-driven, personalized care that can be applied consistently across heterogeneous populations, independent of diabetes technologies used.

Research questions

- This study aimed to evaluate the effects of the CloudCare application on daily practice by assessing:

  - treatment satisfaction, using the DTSQs (status) and DTSQc (change) questionnaires[4,5]
  - perceived diabetes-related distress, using the PAID-5 questionnaire[6]
  - glycemic control
  - number and type of contacts between HCPs and PWDs

- In addition, consistency of effects across centers with differing patient populations and care pathways was explored.

Study design

- Multicenter observational prospective cohort study (Clinicaltrials.gov: NCT05431140)
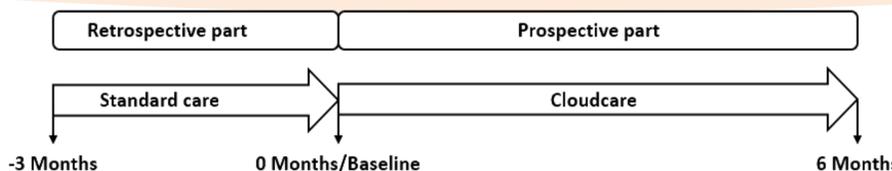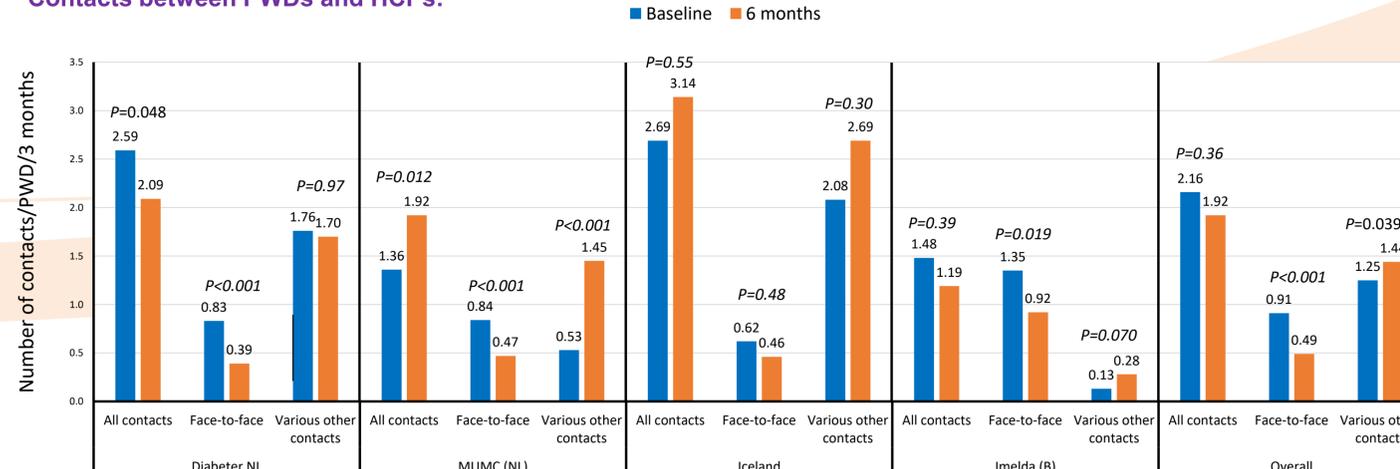
Baseline characteristics:

	Diabeter NL N=167	MUMC (NL) N=55	Iceland N=42	IMELDA (BE) N=69	All N=333
Age, Year, median (IQR)	29.5 (24.8–43.5)	38.9 (29.1–54.0)	37.2 (32.2–46.0)	52.8 (41.0–58.3)	36.3 (28.0–52.2)
Sex, Female, n (%)	102 (61.1)	31 (56.4)	25 (59.5)	31 (44.9)	189 (46.8)
GMI, mean (SD)	50.0 (3.2)	51.9 (4.73)	53.6 (6.0)	55.5 (9.3)	52.0 (6.0)
Glucometrics					
TIR, mean (SD)	78.9 (8.5)	73.4 (11.9)	70.9 (14.4)	62.7 (16.0)	73.4 (13.4)
TBR, mean (SD)	2.6 (7.4)	2.2 (3.0)	1.3 (1.5)	2.4 (2.9)	2.4 (5.5)
TAR, mean (SD)	19.0 (8.3)	24.3 (12.9)	27.9 (14.7)	34.9 (16.5)	24.5 (13.6)
Current Insulin Therapy					
MDI, n (%)	11 (6.6)	16 (29.1)	15 (35.7)	37 (53.6)	79 (23.7)
Pump, n (%)	156 (93.4)	39 (70.9)	27 (64.3)	32 (46.6)	254 (76.3)

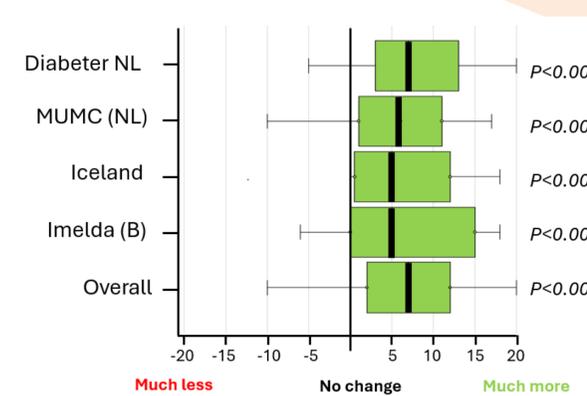m (sd): mean (standard deviation); md (IQR): median (Quartile 1-Quartile 3)

DTSQc 6 months:

Glucometrics:
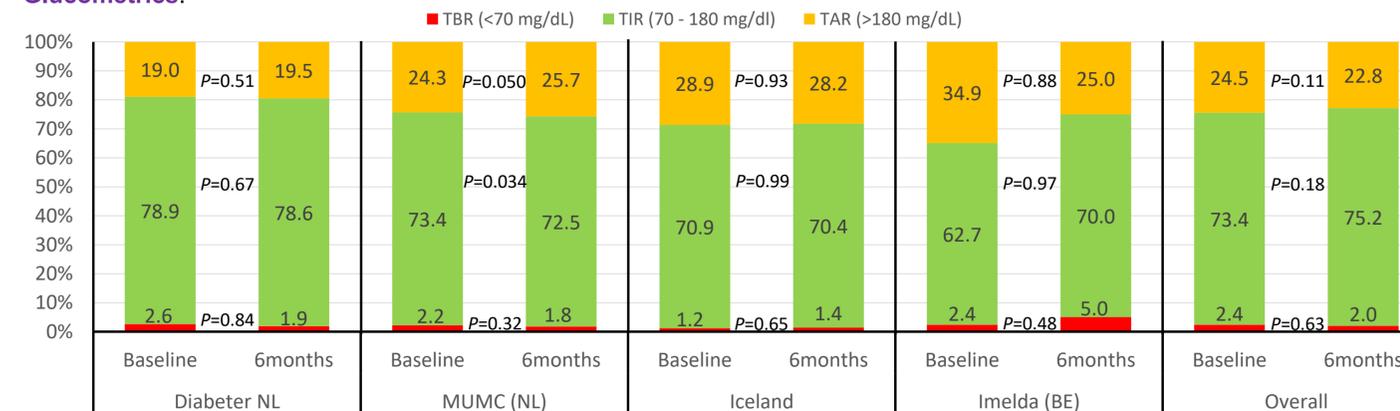
Contacts between PWDs and HCPs:

Interim results (N=333)

- Overall, DTSQc showed a median increase of + 7 points (0 is no change in treatment satisfaction) at 6 months (p<0.001). There were no significant differences between centers (p=0.42).

- Perceived diabetes-related distress: median PAID-5 remained stable at 5.0 with no significant difference between centers (p=0.24).

- Mean Glucose Management Indicator (GMI or estimated Hb1Ac) did not significantly change between baseline and at 6 months (p=0.44) and there were no significant differences between centers (p=0.064).

- Overall there were no differences in glucometrics between baseline en 6 months (TIR: p=0.71, TBR: p=0.70, TAR: p=0.61). Also there were no differences between centers (TIR: p=0.17, TBR: p=0.18, TAR: p=0.99)

- Face-to-face contacts significantly decreased between baseline and 6 months (p<0.001), while Non-Face-to-face contacts significantly increased (p<0.001); total contacts did not differ between baseline en 6 months (p=0.27). Significant differences between centers were observed across for all contact types (p<0.001).

- Details are shown in the tables and graphs.

Conclusions & Discussion

- In this multicenter cohort, CloudCare consistently improved treatment satisfaction and reduced diabetes-related distress, while decreasing the number of face-to-face contacts without compromising glycemic control.

- Despite substantial heterogeneity in patient characteristics and care organization across centers, effects were comparable, supporting the generalizability of the CloudCare pathway.

- These findings suggest that CloudCare can support scalable and need-driven population health management across diverse diabetes care settings.

- Longer-term follow-up will further clarify sustainability of effects and impact on care efficiency at scale.

References

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Disclosures

DTSQc, Change version of Diabetes Treatment Satisfaction Questionnaire; FGM, flash glucose monitoring; GMI, glucose management indicator; HbA1c, glycated hemoglobin A1c; HCP, healthcare professional; IQR, interquartile range; MDI, multiple daily insulin injections; NS, non-significant; PAID-5, Problem Areas In Diabetes-5; PHM, population health management; PWD, person with diabetes; SD, standard deviation; TAR, time above target glucose range; TBR, time below target glucose range; TIR, time in target glucose range.