Virtual Diabetes Prevention Program: effects on Medicare Advantage healthcare costs and utilization

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Background

Diabetes affects approximately 13% of the population in the US[1] and is the fourth leading cause of death.[2] Studies have shown that the need for healthcare services and consequently costs become greater when people with prediabetes progress to diabetes.[3,4] The in-person Diabetes Prevention Program (DPP) has been shown to be effective in older adults.[5] A study of older adults participating in a digital version of the DPP reported meaningful weight loss and improvement in glucose and lipid control.[6] The analysis reported here is based on the same study of digital DPP and focuses on health care utilization and costs.

Objective

To determine whether a digital DPP conducted in a Medicare Advantage population significantly influenced healthcare utilization and costs.

Methods

Study Design: Retrospective Cohort study

Data Source

- Claims and enrollment data, Humana Inc.
- Consumer data from an external vendor (AmeriLINK®)

Intervention (501 program enrollees): 12-month digital DPP (the Omada Health program) that included a wireless scale, pedometer, nutrition tracker, educational lessons, health coaching, and peer group support through an online platform.

Program Eligibility

Inclusion Criteria

- Enrollment in Medicare Advantage and Drug Plan (MAPD) during 2015
- Evidence of metabolic syndrome or prediabetes in claims data

Exclusion Criteria: Age <65 or ≥75 years, hospice, end-stage renal disease, or diagnosis of diabetes

Program Participation Pool: Invitations were sent in two waves to a random sample of individuals, for a total of 9,497 invitees.

Control Group Pool: Randomly chosen from among individuals eligible for the program who did not receive an invitation.

Matching

- Controls matched 1:1 to program participants by propensity score (PS) (propensity to participate in program) and engagement score (ES) (propensity to engage once enrolled).
- PS and ES models included age, sex, race/ethnicity, geographic region, plan type, Charlson Comorbidity Index (CCI), utilization during the previous 6 months and consumer data; 123 variables total.
- Participants and matched controls excluded from analysis in cases where the control was not enrolled at the time the participant started the program.

Outcomes (measured up to 24 months following program start)

- Per member per month (PMPM) cost, including payer and patient costs. Separate computation of total, medical and pharmacy costs.
- Number of visits: physician, emergency department, and inpatient

Statistical Analyses

Utilization: Descriptive statistics

Costs: Difference-in-differences regression, using generalized linear models (gamma distribution for the cost outcomes and Poisson distribution for the utilization outcomes). Control variables included the PS and ES.

Results

Table 1. Study Group Flow Diagram

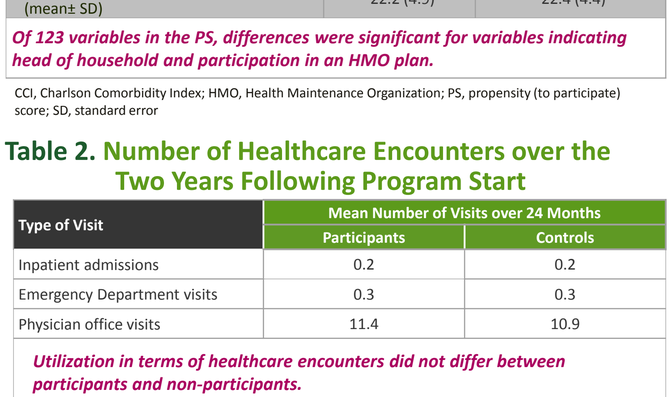


Table 1. Key Characteristics of Study Group

	Program Participants	Matched Controls
N	464	464
Age, years (mean ± SD)	68.9 (2.6)	69.1(2.6)
Female Gender, n (%)	300 (65%)	269 (58%)
Race, n (%)		
White	395 (85.1%)	407 (87.7%)
Other	69 (14.9%)	57 (12.3%)
CCI score (mean ± SD)		
Mean (±SD)	2.8 (0.998)	2.9 (0.993)
Median	3.0	3.0
Follow-up, months since program start (mean± SD)	22.2 (4.9)	22.4 (4.4)

Of 123 variables in the PS, differences were significant for variables indicating head of household and participation in an HMO plan.

CCI, Charlson Comorbidity Index; HMO, Health Maintenance Organization; PS, propensity (to participate) score; SD, standard error

Table 2. Number of Healthcare Encounters over the Two Years Following Program Start

Type of Visit	Mean Number of Visits over 24 Months	
	Participants	Controls
Inpatient admissions	0.2	0.2
Emergency Department visits	0.3	0.3
Physician office visits	11.4	10.9

Utilization in terms of healthcare encounters did not differ between participants and non-participants.

Figure 2. Cumulative Difference in Change over Time, PMPM Total Costs

Adjusted analysis suggested savings beginning 8 months after program start and a cumulative savings of $1,298 per member at 24 months (average $54 PMPM). However, these results were not statistically significant, as indicated by the upper confidence interval limit remaining above the null value most months.

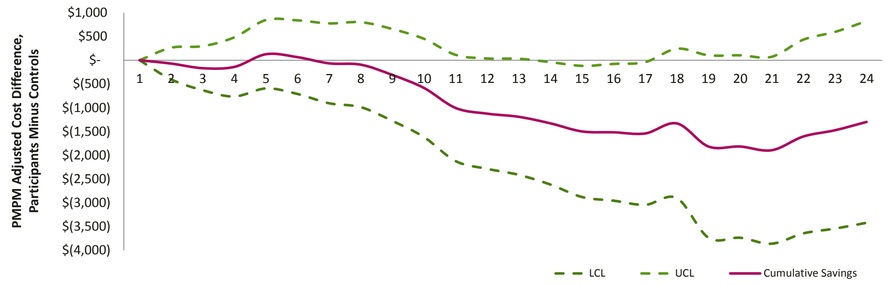


Figure 3. Cumulative Difference in Change over Time, PMPM Medical Costs

The cumulative adjusted 24-month savings per member was $813 (average $34 PMPM), not statistically significant.

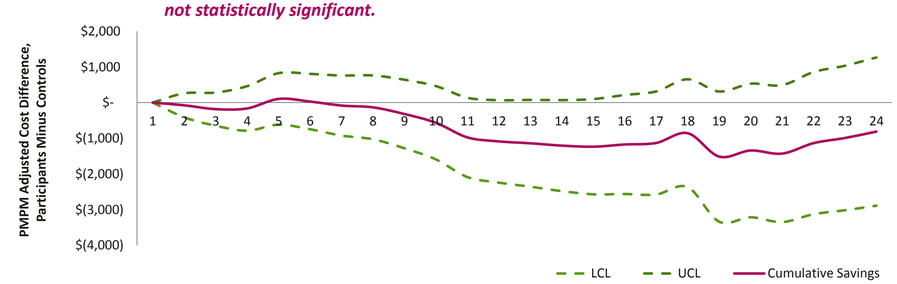
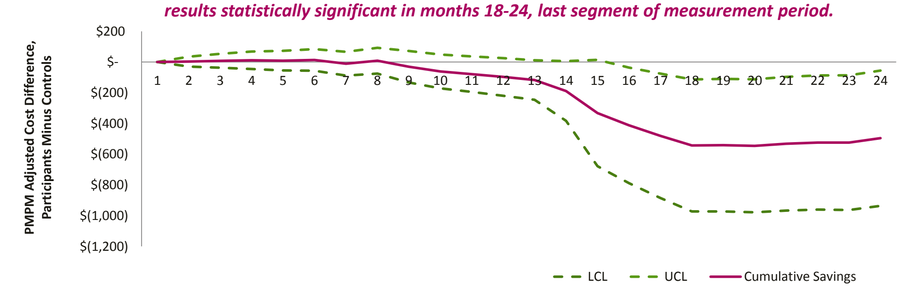


Figure 4. Cumulative Difference in Change over Time, PMPM Pharmacy Costs

The cumulative adjusted 24-month savings per member was $496 (average $21 PMPM); results statistically significant in months 18-24, last segment of measurement period.



Conclusions

- A virtual DPP may change utilization patterns and reduce costs in a Medicare Advantage population. The increase in physician visits might reflect greater seeking of preventive care as a result of the prevention program. Reduction in pharmacy costs ahead of reduction in medical costs would be consistent with past experience with this particular Medicare Advantage population.
- The virtual platform may be especially helpful to older adults with mobility and transportation limitations.

Limitations

- Lack of randomized treatment assignment, but this limitation is mitigated by the selection of controls who did not receive the invitation.
- Small sample of early responders to a one-time invitation with relatively low mean CCI score and baseline utilization. Effects might be larger in a more representative population.
- Possible lack of power to detect statistically significant effects due to small sample size.
- Short follow-up from end of program. Greater effects might be observed with longer follow-up.
- Limitations inherent in claims-based study, including missing data and coding errors.

References

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