Vantaggi e svantaggi della Telemedicina

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DUALITY OF INTEREST DISCLOSURE

Dr Dicembrini has received speaking and/or consulting fees from:

AstraZeneca, BMS, Eli Lilly, Janssen, Novartis, Novo Nordisk, Sanofi, Takeda, Abbott.

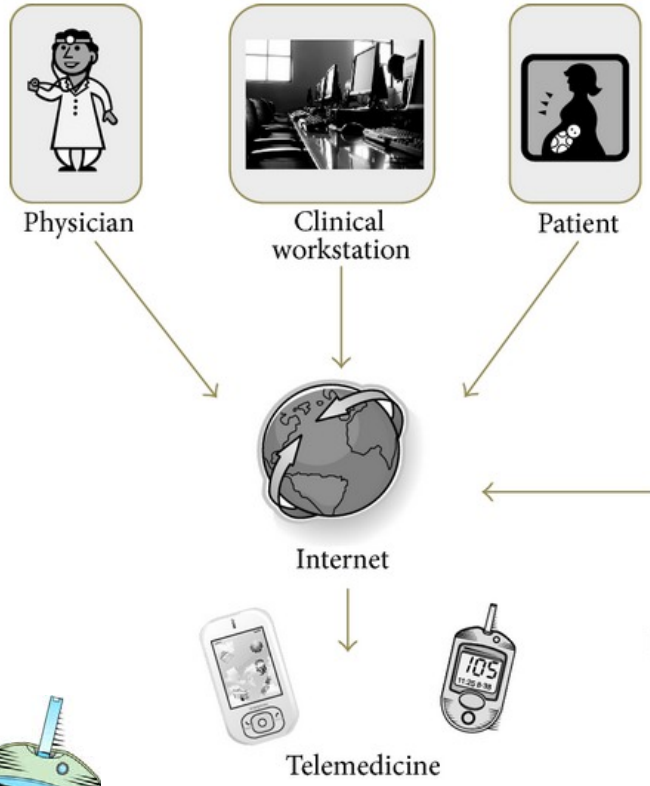
Telemedicine

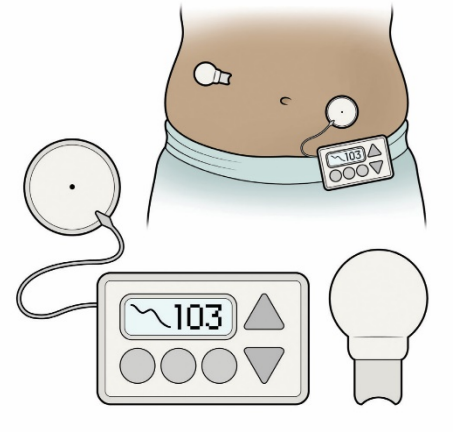
As the use of medical information exchanged from 1 site to another via electronic communications to improve patient's clinical health status

…2-way video, email, texting, smartphones, tablets, wireless monitor, decision support tools, and ecc……

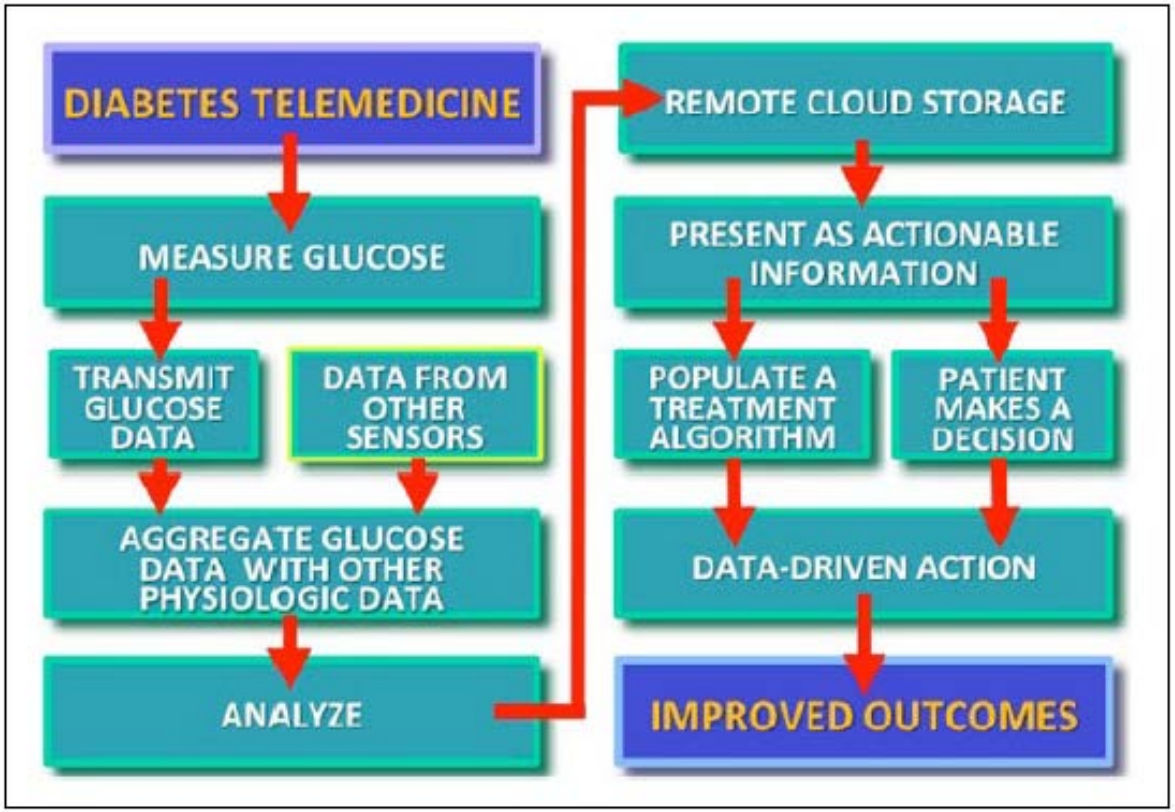
AMERICAN TELEMEDICINE ASSOCIATION

How TM results in improved outcomes





How Diabetes TM results in improved outcomes?



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TM and HbA1c: results

n=21 RCT

Patient or population: adults, adolescents and children with Type 1 or Type 2 diabetes
Settings: primary-, secondary-, tertiary- and community-care settings
Intervention: remote monitoring systems for chronic condition, and/or education for self-management using video-conferencing
Comparison: usual diabetes care

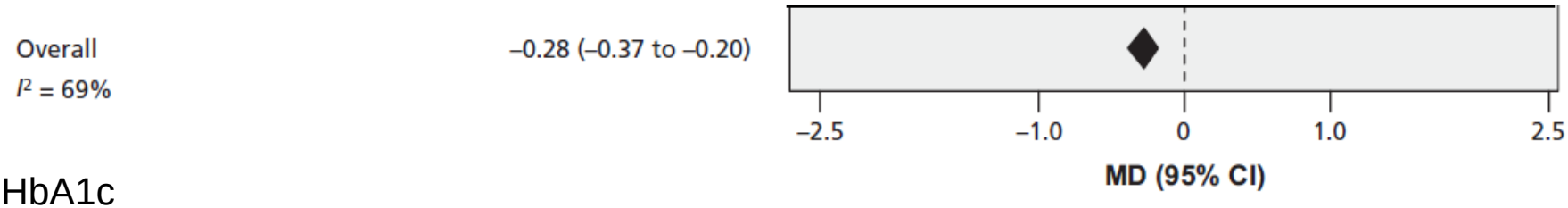
Outcomes	Intervention effect	No and type of sites	No of studies (participants)	Certainty of the evidence (GRADE)	Comments
HbA1c (%)	MD (95% CI): -0.31 (-0.37 to -0.24) at median 9 months follow-up (range: 3 to 12 months) see Analysis 2.1	In 15 studies participants were recruited from an out-patient clinic, and in 1 study from a community health centre	16 RCTs (n = 2768)	⊕⊕⊕⊕ High	There was moderate hetero-geneity (I^2= 42%; P = 0.04)
LDL cholesterol	MD (95% CI): -12.45 (-14. 23 to -10.68) mg/dL, P < 0. 00001, at median 9-month follow-up (range: 6 to 12 months). see Analysis 2.2	In 3 studies participants were recruited from an out-patient clinic, and in 1 from a community health centre	4 RCTs (n = 1 692)	⊕⊕⊕◯[1] Moderate	Four out of 21 studies re-ported LDL data that could be pooled in a meta-analy-sis
Blood pressure	MD (95% CI): SBP: -4.33 (-5.30 to -3.35) mmHg, P < 0. 00001) DBP:-2.75 (-3.28 to -2.22) mmHg, P < 0.00001) at median 9-month follow-up (range: 6 to 12 months)	In 3 studies participants were recruited from an out-patient clinic, and in 1 study from a community health centre	4 RCTs (n = 1770)	⊕⊕⊕◯[1] Moderate	Four out of 21 included studies reported blood pres-sure data that could be pooled in a meta-analysis

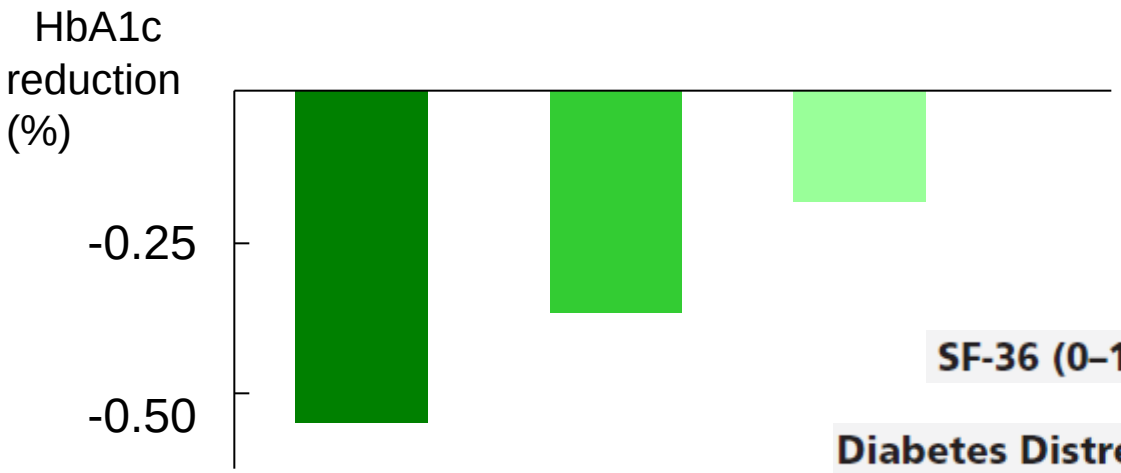
Median FU: 9 months

Flodgren G, Rachas A, Farmer AJ, Inzitari M, Shepperd S.
Interactive telemedicine: effects on professional practice and health care outcomes.
Cochrane Database of Systematic Reviews 2015, Issue 9. Art. No.: CD002098.

TM and HbA1c: results

n=111 RCT (23648 patients)





No effects on:

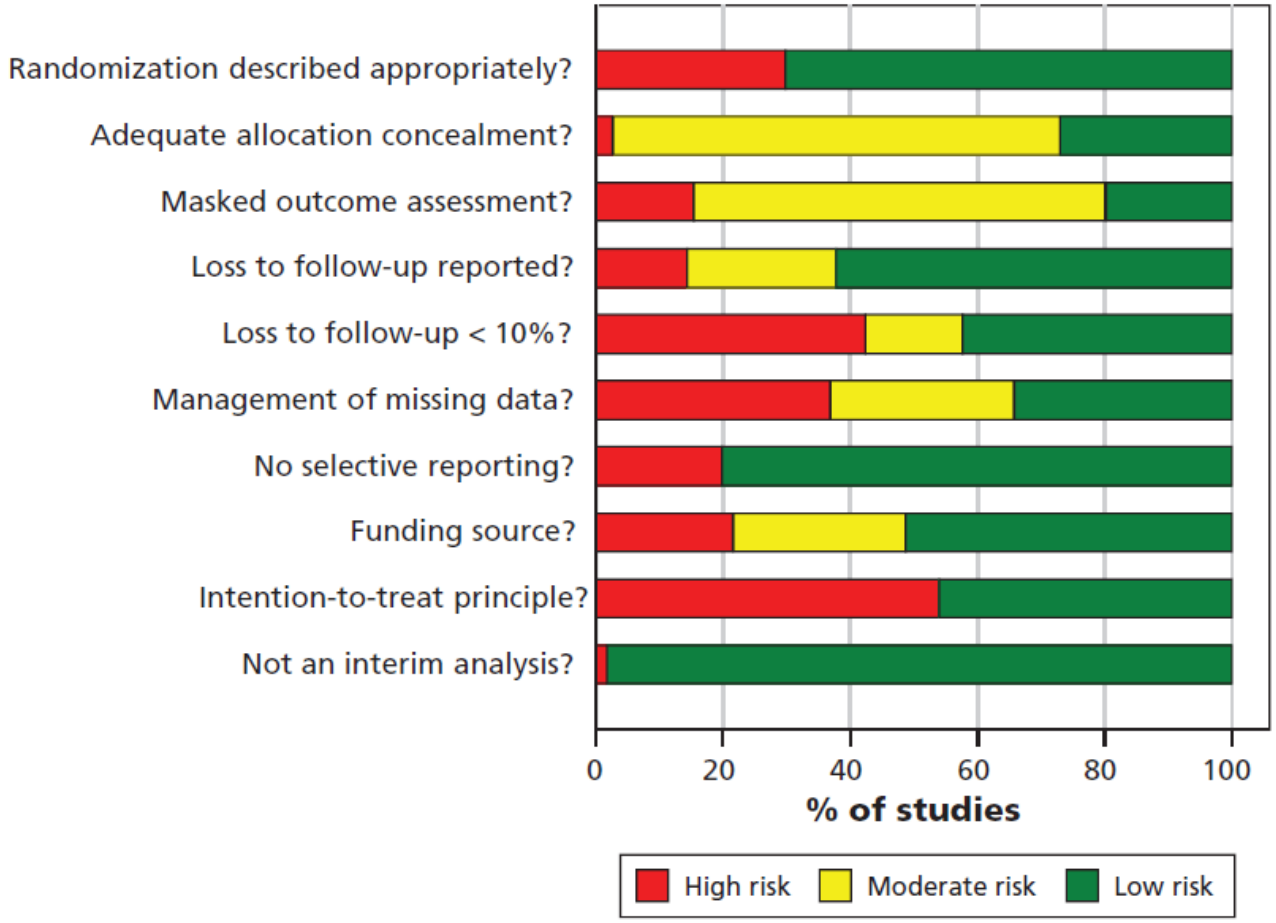
- **Hypoglycemia**
- **SF-12 (0–100)**
- **SF-36 (0–100)**
- **Diabetes Quality of Life (1–5)**
- **Diabetes Distress Scale (1–6)**
- **EQ-5D (0–1)**
- **PAID (0–100)**

Follow-up periods

≤3 months **4-12 mo** **> 12 months**

CMAJ 2016. DOI:10.1503/

Telemedicine and HbA1c: limitations



Telemedicine and HbA1c: results

n=55 RCT (9528 patients)

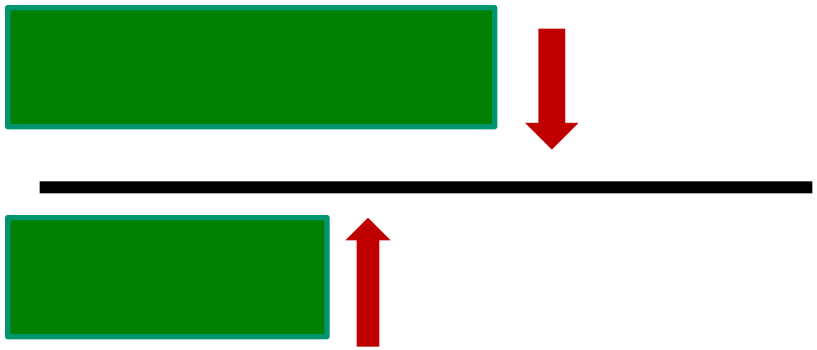
Test of differences across subgroups		
	Q statistics	*p*-Value
Age of study participants		
<40 vs. ⩾40	1.42	0.23
Type of diabetes		
Type 1 vs. Type 2	4.25	0.04
Type 1 vs. Type 1 & 2	0.17	0.68
Type 2 vs. Type 1 & 2	2.88	0.09

Telemedicine and Cost-effectiveness

This study presents a systematic review of economic evaluations of self-management support interventions for people with diabetes, which found evidence that education-centred self-management support interventions are likely to be cost-effective.

Telemedicine interventions are potentially not cost-effective.

$ 50.000 per QALY



$ 28.000 per QALY

$ **65.000** per QALY
Quality-adjusted
Life-year

Teljeur C et al: Diabete Med 2016.

Telemedicine: how to classify

1. The product.
2. The technology.
3. User or customer.
4. Data.
5. Delivery.
6. Validation.
7. Economic model for payment.

Which patient?

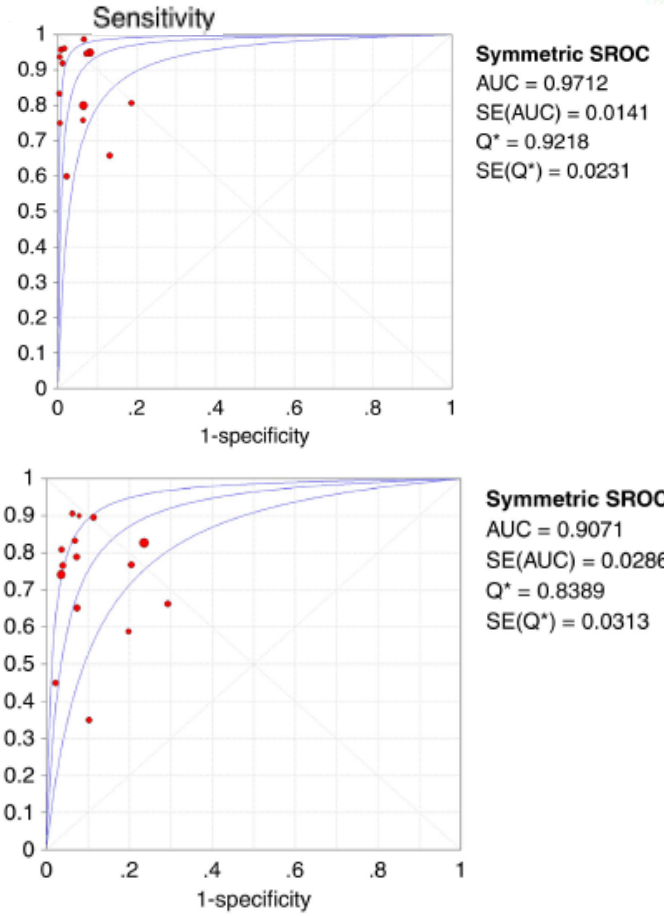
Type 2 Diabetes

Diabetic Retinopathy

Telemedicine in DR screening

n=20 RCT (1960 patients)

DR	Pooled Sensitivity	Pooled Specificity
Absence Low and high risk RDP	>80%	>90%
Mild/moderate NPDR DME CSME	>70%	>90%
Severe NPDR	53%	>90%



Digital imaging tecnique combining mydriasis and a wide angle field (100- 200°) is the best choice in detecting absence of RD and presence mild NPDR.

Shi L, *et al*. *Br J Ophthalmol* 2015;**99**:823–831.

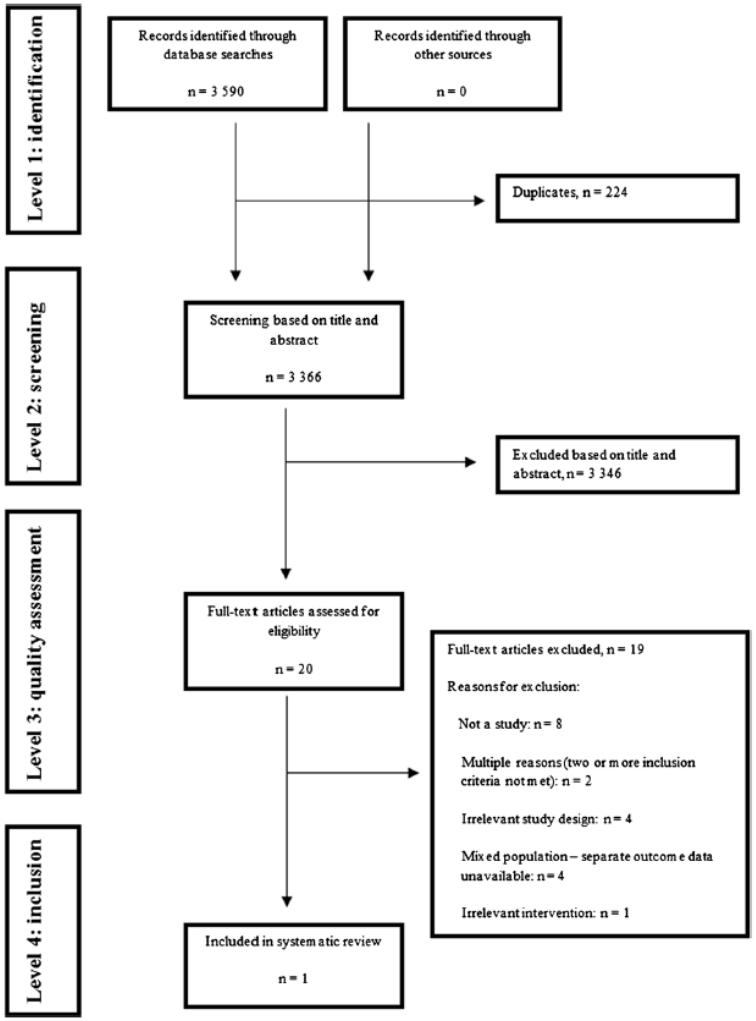
Which patient?

Type 2 Diabetes

Diabetic Retinopathy

Foot ulcer

Telemedicine and Foot Ulcer



	Tele medicine	Control
HEALING TIME	43.2±29.3 d	45.5±33.4 d
HEALING RATIO (age, ulcer duration, location, size, severity)	1.40	1.00

Nordheim *et al. BMC Health Services Research* 2014, **14**:565
http://www.biomedcentral.com/1472-6963/14/565

Which patient?

Type 2 Diabetes

Diabetic Retinopathy

Foot ulcer

Gestational Diabetes

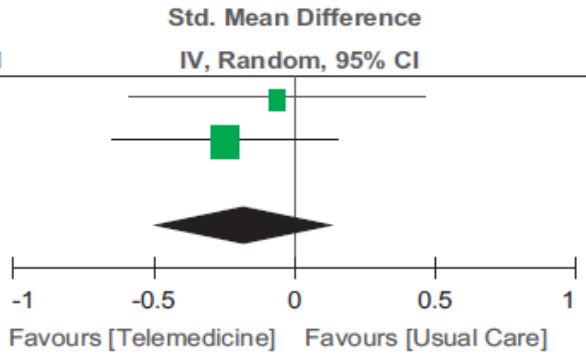
Telemedicine & Gestational Diabetes

Glycemic control (HbA1c) =

Study or Subgroup	Telemedicine Mean	SD	Total	Usual Care Mean	SD	Total	Weight	Std. Mean Difference IV, Random, 95% CI
Homko 2007	6.1	0.8	32	6.2	2.2	25	36.8%	-0.06 [-0.59, 0.46]
Pérez-Ferre 2010a	5.3	0.4	49	5.4	0.4	48	63.2%	-0.25 [-0.65, 0.15]
Total (95% CI)			81			73	100.0%	-0.18 [-0.50, 0.14]

Heterogeneity: Tau² = 0.00; Chi² = 0.30, df = 1 (P = 0.58); I² = 0%

Test for overall effect: Z = 1.11 (P = 0.27)



Postprandial Glycemic control (BGL) =

Maternal Outcomes, Birth-Weight, Macrosomia, Caeserean Deliveries, Special care nursery admissions =

Telemedicine & Gestational Diabetes

Health Service Utilization (insulin-treated patients) ≠

Study	*n*	Face-to-face visits, mean(sd)	Unscheduled visits, mean(sd)
Homko et al. 2007		N/A	N/A
Pérez-Ferre et al. 2010	$T = 49$, $C = 48$	$T = 3.98(0.99)$, $C = 4.34(1.73)$, $p = 0.733$	$T = 0.38(0.68)$, $C = 1(1.35)$, $p = 0.033$
	[$T = 17$, $C = 9$]*	[$T = 4.25(0.93)$, $C = 6.22(1.48)$, $p = 0.002$]*	[$T = 0.50(0.73)$, $C = 2.89(1.05)$, $p = 0.0001$]*
Homko et al. 2012		N/A	N/A

* Insulin treated subgroup; T = Telemedicine group, C = Control.

Which patient?

Type 2 Diabetes

Diabetic Retinopathy

Foot ulcer

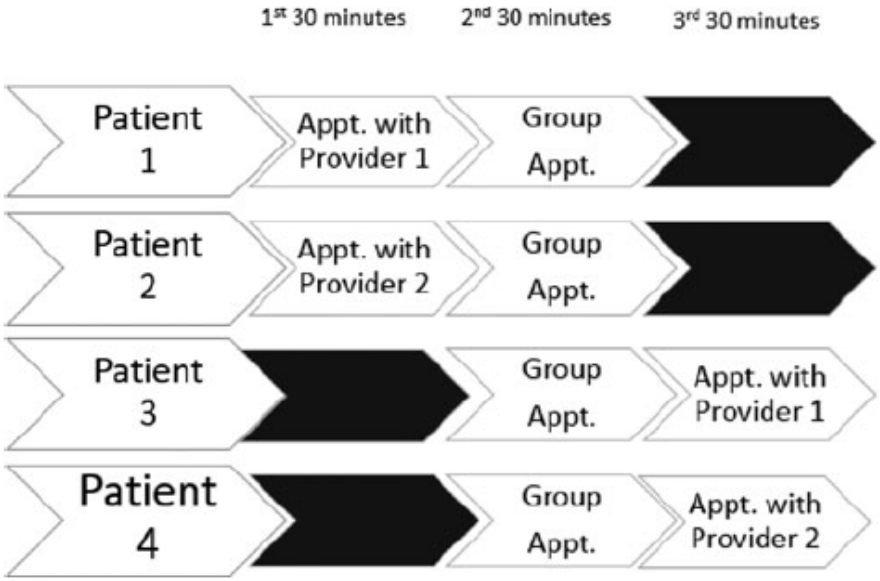
Gestational Diabetes

Type 1 Diabetes

Telemedicine & T1DM

RCT n=45 T1DM patients

Characteristic	*Value*
Hemoglobin A1c	8.7% ± 1.6% (71.6 mmol/mol)
Gender (female)	55.8%
Age (years)	19.8 ± 1.6
Completed diabetes clinic visits in the last year (*n*)	2.5 ± 1.2
Diabetes duration (years)	8.6 ± 4.6
Blood glucose readings per day (*n*)	2.93 ± 2.1
Use insulin pumps	76%
Use multiple daily injections	34%
Use continuous glucose monitors	5%



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Telemedicine & T1DM

RCT n=45 T1DM patients

TABLE 2. PARTICIPANTS' REPORT OF TIME SAVINGS WITH THE COLORADO YOUNG ADULTS WITH TYPE 1 DIABETES CLINIC

Average time	*Value*
Travel for in-person diabetes clinic visit ($n=32$)	131 min
Lost from work/school day for CoYoT1 Clinic appointment ($n=31$)	0.08 h
Lost from work/school day for traditional, in-person clinic visit ($n=31$)	6.05 h
Savings for online appointment	5.97 h[a]

[a]$P<0.0001$ for difference.

Statement	*Agree or strongly agree*	*Neutral*	*Disagree or strongly disagree*
I felt comfortable using technology for my online visit.	95%	5%	0%
I felt as though the online visit respected my privacy.	92%	5%	3%
I got everything I needed during the online appointment.	90%	8%	2%
The online appointment was much easier than my normal appointments.	76%	24%	0%
Compared to a normal appointment, the online appointment took a lot more time.	11%	11%	78%
I would recommend this technology to others.	92%	8%	0%
I would like to have an online appointment again.	95%	5%	0%
I liked talking to other young adults during the online visit.	70%	27%	3%
I felt supported during the group visit.	90%	10%	0%
I felt comfortable asking my doctor questions through the online visit.	97%	0%	3%
I was able to speak freely and express myself.	92%	8%	0%
I liked the group style of the appointment.	70%	19%	11%

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Conclusion


COST


MASSA CARRARA
LUCCA
PISTOIA
PRATO
FIRENZE
AREZZO
PISA
LIVORNO
SIENA
GROSSETO