LA GRAVIDANZA È SEMPRE PIÙ TECNOLOGIA

Digital Health

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La dott.ssa Angela Girelli dichiara di aver ricevuto negli ultimi due anni compensi o finanziamenti dalle seguenti Aziende Farmaceutiche e/o Diagnostiche:

- Eli Lilly
- Abbott
- Sanofi
- Roche

Dichiara altresì il proprio impegno ad astenersi, nell'ambito dell'evento, dal nominare, in qualsivoglia modo o forma, aziende farmaceutiche e/o denominazione commerciale e di non fare pubblicità di qualsiasi tipo relativamente a specifici prodotti di interesse sanitario (farmaci, strumenti, dispositivi medico-chirurgici, ecc.).

L’**eHealth** (anche chiamata **digital health**, o **salute digitale** in italiano) consiste nell’**uso di tecnologie informatiche e di telecomunicazione** (**ICT**, in breve) **a vantaggio della salute umana**, secondo la definizione della **World Health Organization** (**WHO**), ossia l’**Organizzazione Mondiale della Sanità** (**OMS**).

Secondo l’**International Telecommunication Union** (**ITU**) il termine **“e-health”** **comprende tutte le tecnologie dell’informazione e della comunicazione (ICT) necessarie per far funzionare il sistema sanitario**.

- Sia il termine **e-health** che il termine **digital health** sono termini generici “ombrello”, ossia molto ampi e flessibili. Si possono tradurre entrambi in italiano come “salute digitale”.

- Tuttavia, la World Health Organization (WHO) ha proposto un uso ancora più ampio del termine digital health, a cui ha fatto eco l’ITU: “un termine molto generico che include l’e-health oltre che aree in fase di sviluppo come l’uso delle scienze informatiche avanzate (ad esempio nel campo dei “big data”, della genomica e dell’intelligenza artificiale)”.

- Quindi per l’Organizzazione mondiale della sanità quando si parla di **digital health** ci si riferisce all’eHealth ma anche ad ulteriori “scienze informatiche avanzate” che potrebbero esulare dall’e-health. Ciò sembra inteso a lasciare aperta una scappatoia normativa per casi “avanzati” non pienamente coperti da norme e descrizioni formali.

Digital Health

Digital health includes technologies, platforms, and systems that engage consumers for lifestyle, wellness, and health-related purposes; capture, store or transmit health data; and/or support life science & clinical operations.

Data & information capture, storage, and display

- User-facing technologies
- Health Information Technology (HIT)
- Consumer health information

Data & information transmission

- Telehealth
- Decision support software
- Enterprise support
- Clinical care administration & management tools

Digital Medicine

Digital medicine includes evidence-based software and/or hardware products that measure and/or intervene in the service of human health.

Measurement products

- Digital diagnostics
- Digital biomarkers
- Electronic clinical outcome assessments
- Remote patient monitoring
- Decision support software

Measurement & intervention products

- Digital companions
- Digital products that measure and intervene, and do not require human intervention to serve primary purpose

Digital Therapeutics

Digital therapeutic (DTx) products deliver evidence-based therapeutic interventions to prevent, manage, or treat a medical disorder or disease.

Monotherapy

- Designed to treat a disease by delivering therapeutic intervention digitally
- Mostly used in mental health as Cognitive Behavioural Therapies (CBT) that can be digitally delivered to patients to treat several conditions

Adjunctive

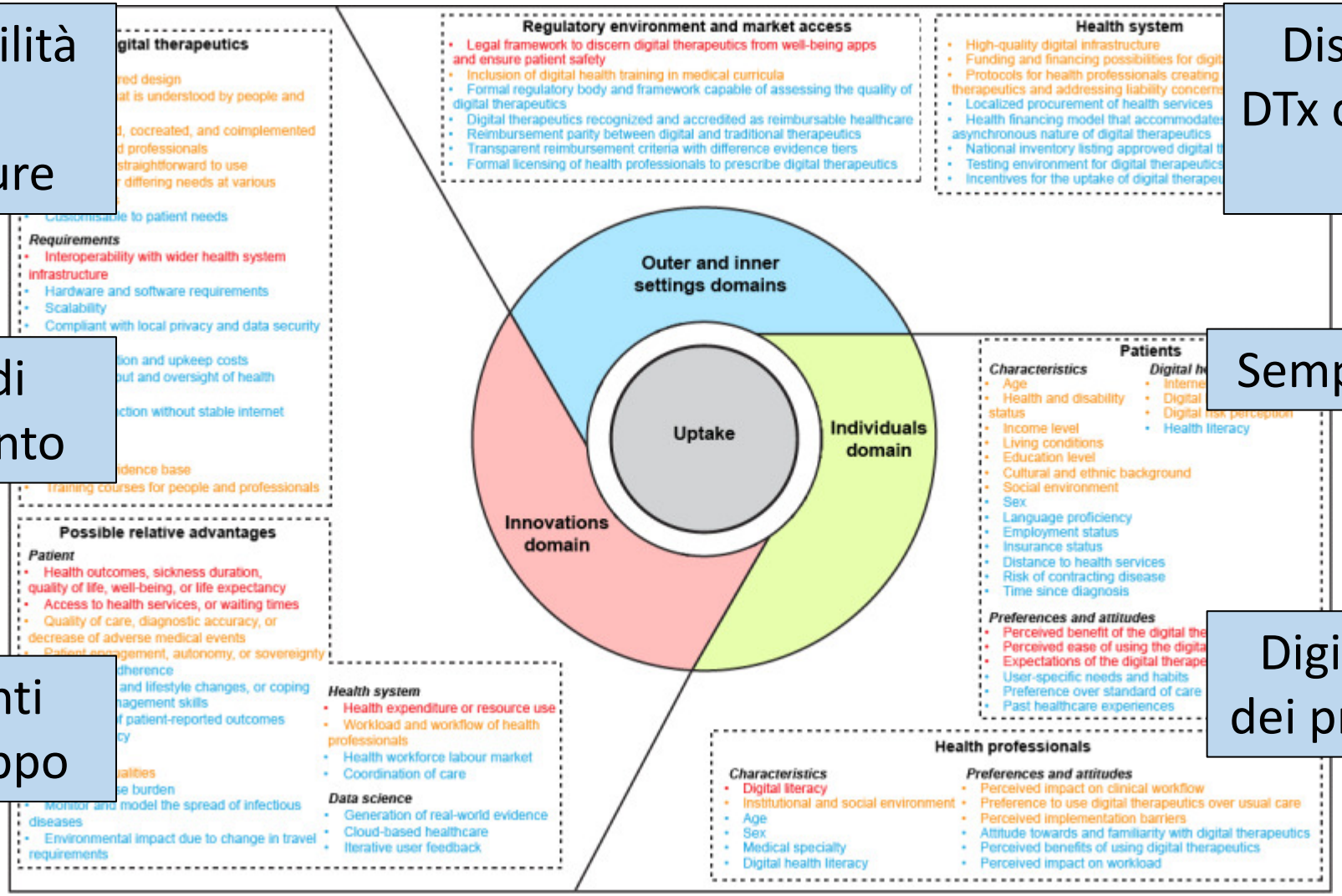
- Designed to improve the effectiveness, management or treatment of a prescribed pharmacological intervention
- Usually prevalent in complex indications such as diabetes, obesity and hypertension

- **Telemedicina** (telediagnostica, teleassistenza, teleconsulto, televisita, telemonitoraggio)
- **Informazione sanitaria online** (su web, social media, ecc.)
- **Cartella clinica elettronica (electronic health record)**, **e-Prescription**, ecc.
- **Telesoccorso** e supporto alle situazioni di **emergenza**
- **Digital wellbeing** (ossia le tecnologie digitali per il benessere personale e per la prevenzione)
- **Dispositivi mobili, portatili e indossabili** (**m-health**)
- **Robotica** medica e **protesica** avanzata
- **Diagnostica avanzata** assistita da algoritmi di ***intelligenza artificiale*** **e di** ***Big Data***
- **Medicine digitali o pillole digitali** (che combinano farmaci con micro-sensori incorporati)
- **Terapie digitali** (**Digital Therapeutics**, o DTx, in inglese)
- **Altre a venire…**

Interoperabilità con le infrastrutture

Modello di finanziamento

Investimenti per lo sviluppo



Distinguere le DTx dalle App per la salute

Semplicità d'uso

Digital literacy dei professionisti

Van Kessel, J Med Internet Res, 2023

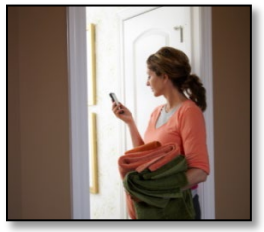
Il futuro: «the diabetes connected care»

I dati sono automaticamente caricati su una App

Dato (pens, BG; CGM, CSII; AID...)

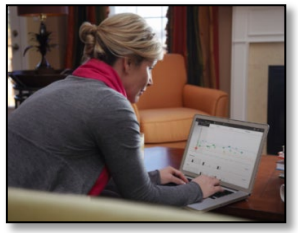
Cloud

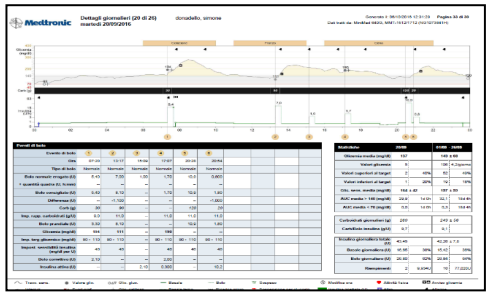
I caregivers sono connessi

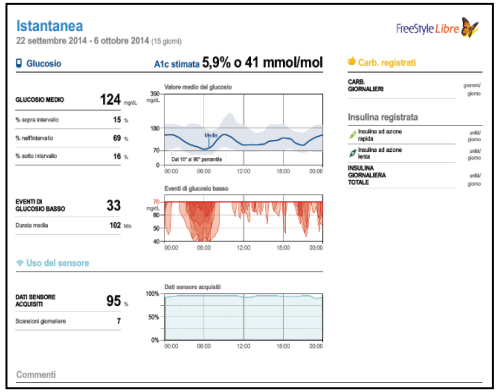


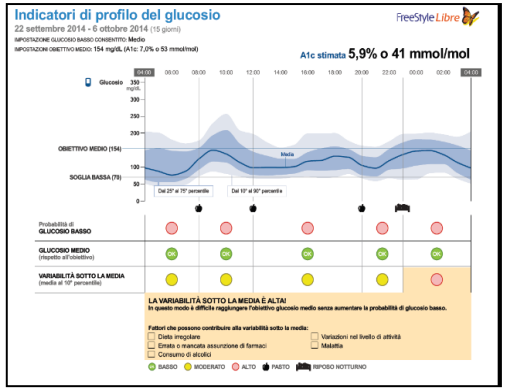
I dati sono immediatamente disponibili per medici autorizzati anche per consulti remoti.

I dati sono immediatamente disponibili per l'elaborazione e l'integrazione









Non solo Televisita e non solo medico!!

GU dicembre 2022:

- Televisita
- Teleconsulto
- Telemonitoraggio
- Teleassistenza

Nella gravidanza con diabete

Diabete tipo 1

- App
- Smart MDI
- CGM
- AID

- Telemedicina

Diabete Gestazionale

- App
- Smart MDI
- CGM

- Telemedicina

Review Article

Effectiveness of Telemedicine in Managing Diabetes in Pregnancy: A Systematic Review and Meta-Analysis

Journal of Diabetes Science and Technology
2023, Vol. 17(5) 1364–1375

DOI: 10.1177/19322968221094626
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Sisse H. Laursen, PhD, Msc[1,2,3], Lise Boel, Msc[1], Flemming W. Udsen, PhD, Msc[1], Pernille H. Secher, PhD, Msc[1], Jonas D. Andersen, Msc[1], Peter Vestergaard, PhD, MD[3,4,5], Ole K. Hejlesen, PhD, Msc[1], and Stine Hangaard, PhD, Msc[1,3]

Table 2. Telemedicine Characteristics.

				Included technology									Purpose of intervention (components)					
Study	Year	Setting	Frequency of contact	SMS	Weight	Glucometer	Telephone	Web site	App	Blood pressure monitor	Pedometer	E-mail	Glycemic improvement	Dietary support	Exercise support	Weight control	Prevention of glycemic events	Educational
Downs et al[50]	2017	University	Biweekly	—	—	—	Yes	—	—	—	Yes	—	—	Yes	Yes	Yes	—	Yes
Durnwald et al[51]	2016	Hospital	Weekly	—	—	Yes	Yes	—	—	—	Yes	—	Yes	Yes	Yes	Yes	—	Yes
Fallucca et al[52]	1996	Specialized	Weekly	—	—	Yes	—	—	—	—	—	—	Yes	Yes	Yes	—	Yes	—
Given et al[53]	2015	Specialized	Weekly	—	Yes	Yes	Yes	Yes	—	Yes	—	Yes	Yes	—	—	Yes	Yes	—
Homko et al[54]	2007	University	N/A	—	—	Yes	—	Yes	—	—	—	—	Yes	Yes	Yes	—	Yes	Yes
Homko et al[55]	2012	University	Weekly	—	—	Yes	Yes	Yes	—	—	—	—	Yes	Yes	Yes	—	Yes	—
Mackillop et al[56]	2018	Hospital	N/A	Yes	—	Yes	—	Yes	Yes	—	—	—	Yes	Yes	—	—	Yes	—
Miremberg et al[57]	2018	Specialized	Daily	—	—	Yes	—	—	Yes	—	—	Yes	Yes	Yes	—	—	—	—
Perez-Ferre et al[58]	2010	Hospital	N/A	Yes	—	Yes	Yes	Yes	—	—	—	—	Yes	Yes	—	—	Yes	—
Rasekaba et al[59]	2018	Specialized	As needed	—	—	Yes	—	Yes	—	—	—	—	Yes	Yes	—	—	Yes	—
Ładyzyński et al[60]	2007	Specialized	As needed	—	—	Yes	Yes	—	—	—	—	—	Yes	Yes	Yes	—	Yes	—
Al-Olfi et al[61]	2018	Specialized	Weekly	Yes	—	Yes	—	—	Yes	—	—	—	Yes	Yes	Yes	Yes	Yes	—
Borgen et al[62]	2019	Specialized	N/A	—	—	Yes	—	—	Yes	—	—	—	Yes	Yes	Yes	—	—	Yes
Carolan-Olah and Sayakhot[63]	2019	Hospital	N/A	—	—	—	—	Yes	—	—	—	—	—	—	—	—	—	—
Cheung et al[64]	2019	Hospital	As needed	Yes	—	—	—	—	Yes	—	—	—	—	Yes	Yes	—	—	Yes
Guo et al[65]	2019	Hospital	Daily	—	—	Yes	—	—	Yes	—	—	—	Yes	Yes	Yes	Yes	Yes	Yes
Jelsma et al[66]	2018	Hospital	Biweekly	Yes	—	—	Yes	—	—	—	Yes	Yes	—	Yes	Yes	—	—	Yes
Sung et al[67]	2019	Hospital	Biweekly	Yes	—	Yes	—	—	Yes	—	Yes	—	Yes	Yes	Yes	—	—	Yes

Abbreviation: SMS, Short Message System; N/A, not available.

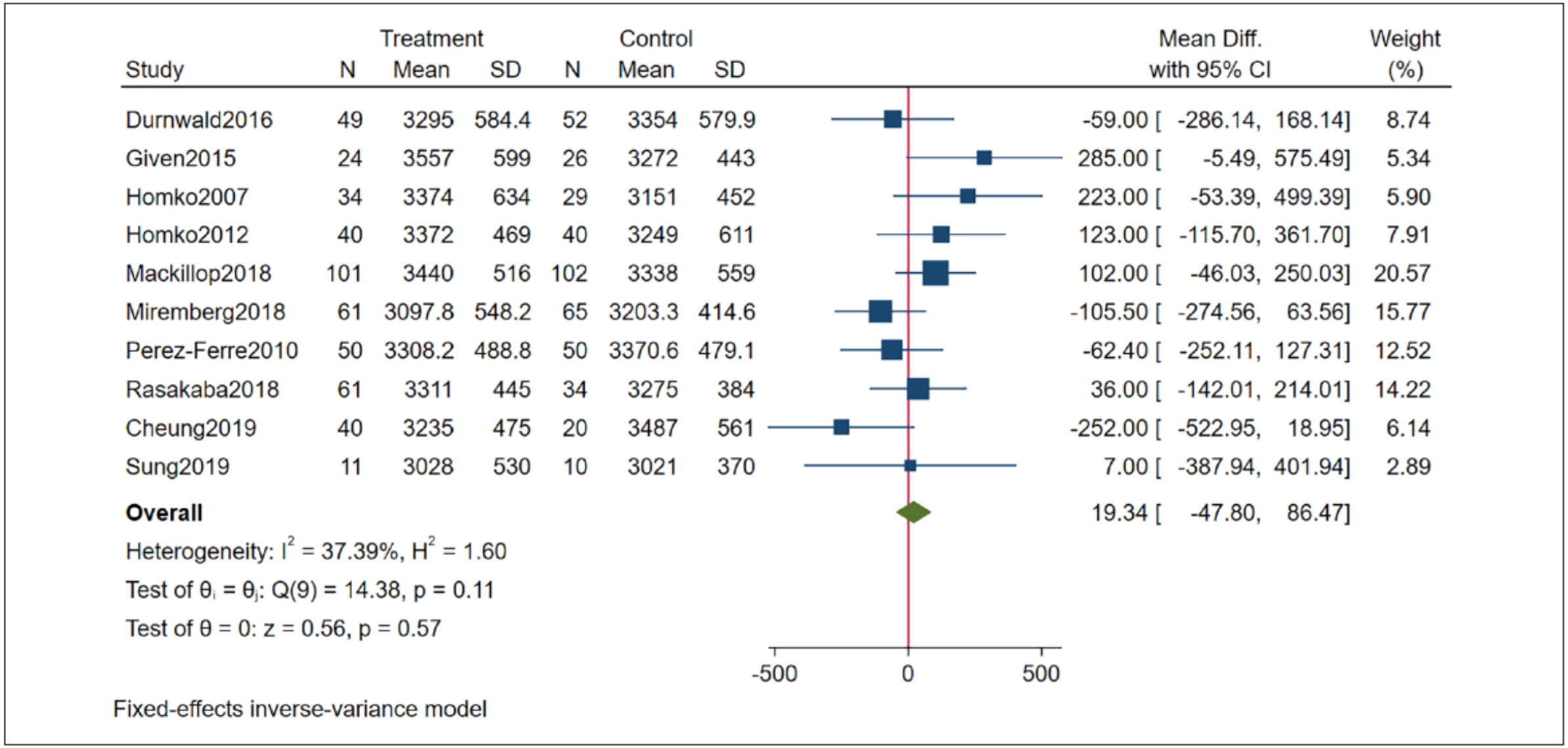


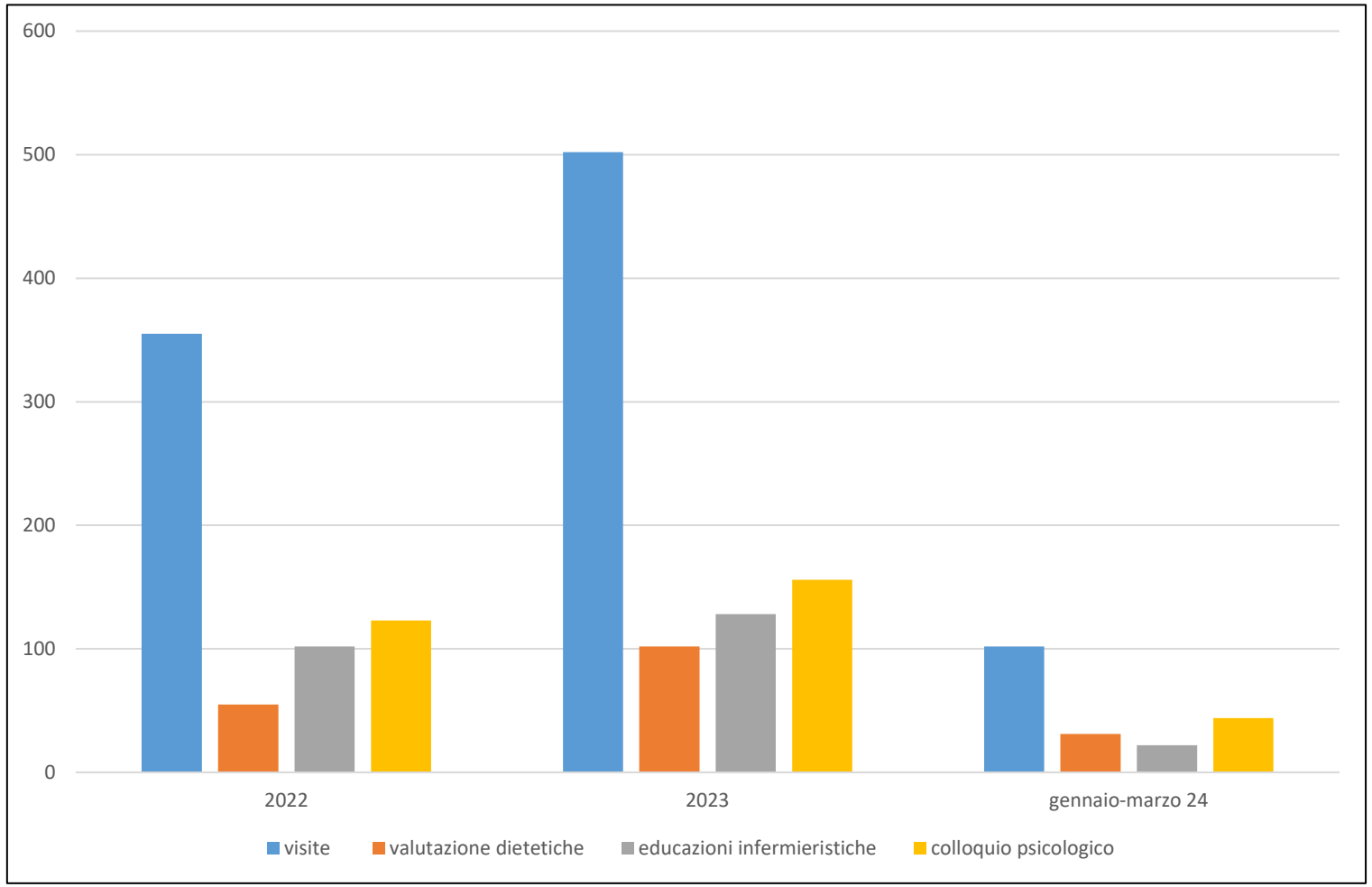
Figure 3. Results from meta-analysis on infant birth weight.

Telemedicine studies often differ in terms of technology, intervention, organizational setup, and so on and are thus difficult to compare. However, for the present review, the heterogeneity was moderate (I_2 = 37%), which is fairly low when
compared with other reviews within the field of telemedicine.
[23,69] The included studies varied greatly in terms of duration, follow-up time, intervention components, and technologies used (Tables 1 and 2), which may explain the variations in the results of the meta-analysis. Another explanation for the variations could be the heterogeneity following diabetes subtypes.
Thus, the differences in disease management, pathophysiology, and progress between preexisting diabetes and GDM may also be a possible explanation for the high variance reported in the study results.[11,70,71]

In conclusion, the present systematic review and meta-analysis did not find sufficient evidence to support telemedicine as an alternative to usual care when considering maternal and fetal outcomes for patients with pregestational or gestational diabetes.

However, studies on telemedicine solutions for pregnant women with diabetes as well as economic evaluations in the field are still limited and should be prioritized in future research

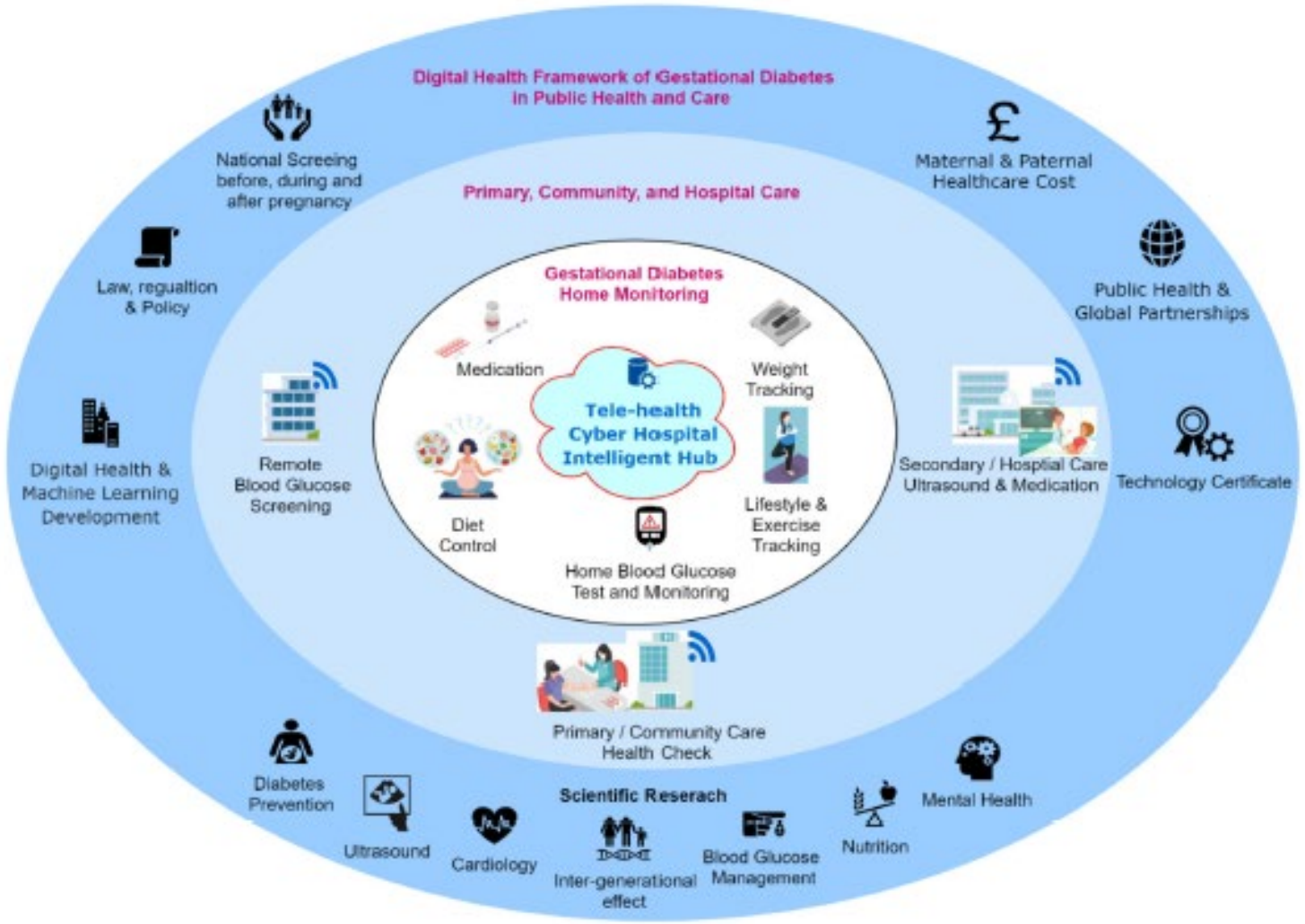
Prestazioni in TELEVISITA



Agenda TLV per tipo 1
Agenda TLV per tipo 2

Prestazioni non erogate:
24.8% per tipo 1
12.8% per tipo 2

Diabete Gestazionale



IEEE Rev Biomed Eng. 2023 February 07; 17: 98–117

Diabete Gestazionale

RESEARCH ARTICLE

Digital health interventions for gestational diabetes mellitus: A systematic review and meta-analysis of randomised controlled trials

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Digital health outreach to promote postpartum screening after gestational diabetes: A randomized factorial pilot study

Susan D. Brown[a,b,*], Brittany L. Garcia[a], Jenna L. Ritchie[b], Ai-Lin Tsai[b], Andrea Millman[b], Mara Greenberg[c], Charles P. Quesenberry[b], Assiamira Ferrara[b]

frontiers in Bioengineering and Biotechnology

SYSTEMATIC REVIEW
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Impact of Remote Monitoring Technologies for Assisting Patients With Gestational Diabetes Mellitus: A Systematic Review

Ayleen Bertini[1,2], Bárbara Gárate[3], Fabián Pardo[1,4], Julie Pelicand[1,4], Luis Sobrevia[5,6,7,8,9,10,11], Romina Torres[12], Steren Chabert[3,13,14] and Rodrigo Salas[3,13,14]*

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SYSTEMATIC REVIEW

BIRTH Issues in Perinatal Care WILEY

Effectiveness of remote monitoring for glycemic control on maternal–fetal outcomes in women with gestational diabetes mellitus: A meta-analysis

Shu-Wen Yue RN, MSN[1] | Jie Zhou BN, MSN Candidate[1] | Lu Li RN, MSN[1] | Jin-Yi Guo BN, MSN Candidate[1] | Jing Xu RN, MSN[1] | Jia Qiao RN, MSN[1] | Sharon R. Redding RN, EdD, CNE[2] | Yan-Qiong Ouyang MD[1]

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Digital Health and Machine Learning Technologies for Blood Glucose Monitoring and Management of Gestational Diabetes

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