# Les nouvelles formes de communication (réseaux / télémédecine / application santé) répondent-elles aux attentes ?

ÉVOLUTIONS SOCIO-CULTURELLES ET NOUVELLES ATTENTES DES DEUX POPULATIONS EN 2022





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Institut Gustave Roussy

### **Conflicts of interest**

### Ines Vaz-Luis reports:

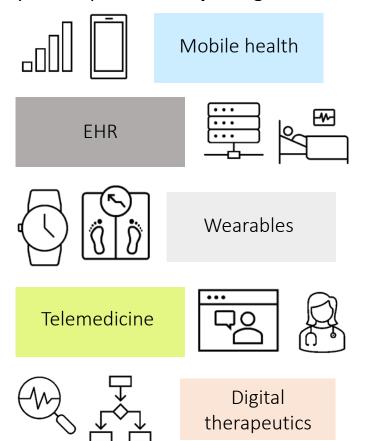
- Speaker honoraria from Amgen, AstraZeneca, Pfizer/Edimark, Novartis, Sandoz
- Writing engagement from Pfizer/Edimark,
- Research funding from Resilience Care

- 1. Digital health
- 2. How digital health is incorporated in clinical care
  - 1. Symptom monitoring: active data collection
  - 2. Digital self-management support/ supportive care
  - 3. Future
- 3. Digital health for everyone? Differences between the young and the elderly

### 1. Digital health

### Digital health / eHealth

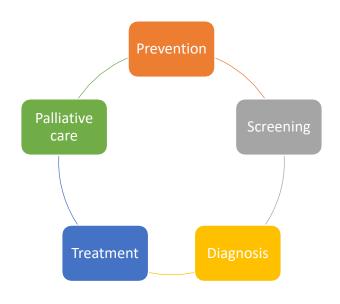
- "The use of technology for health"
- 1) May encompass a variety of digital technologies



### 2) Multiple stakeholder

Patients
Healthcare workers
Health care system managers
Pharmaceutical Industry

### 3) Across the whole cancer care continuum

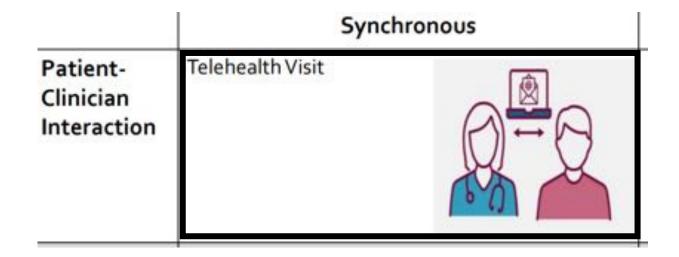


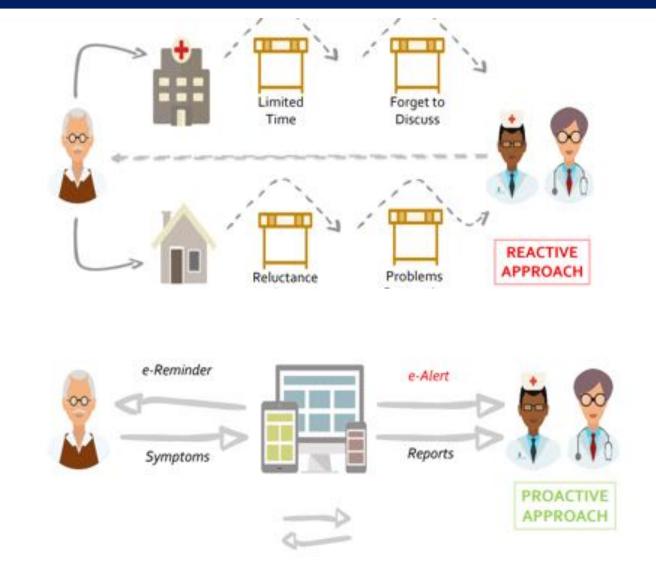
**Covid-19 Pandemic = acceleration of Digital health** 

# Pandemic accelerated uptake of digital health Telemedicine became a standard



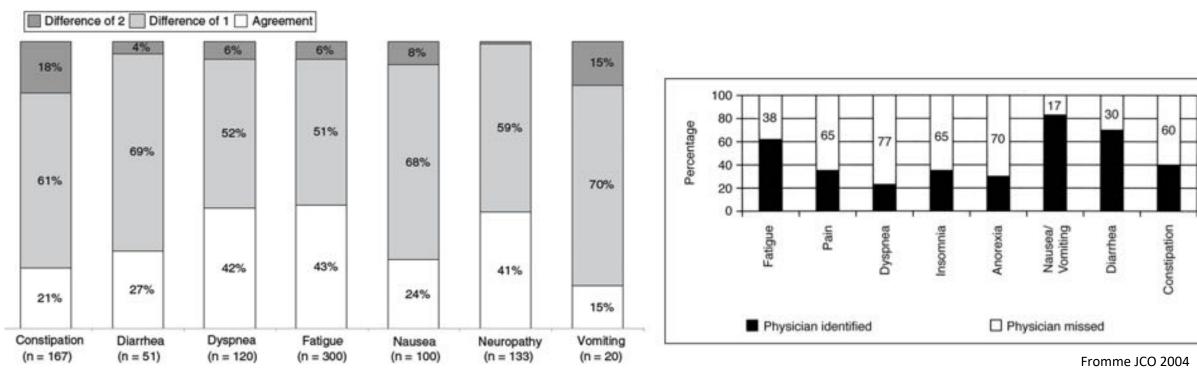
# 2. How digital health is incorporated in clinical care Telehealth visit





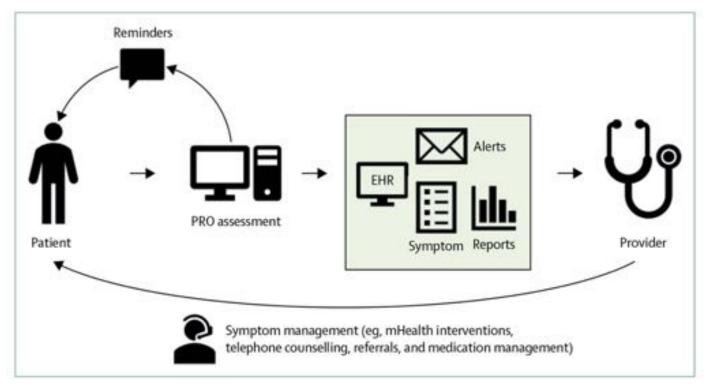
Patient reported outcomes (PROs): measurement of the patient's condition, reported directly by the patient

**Clinician rated adverse-events + PROs =** more reliable information on the patient's experience



**Electronic Patient reported outcomes - ePROs:** measurement of the patient's condition, reported directly by the patient through electronic devices

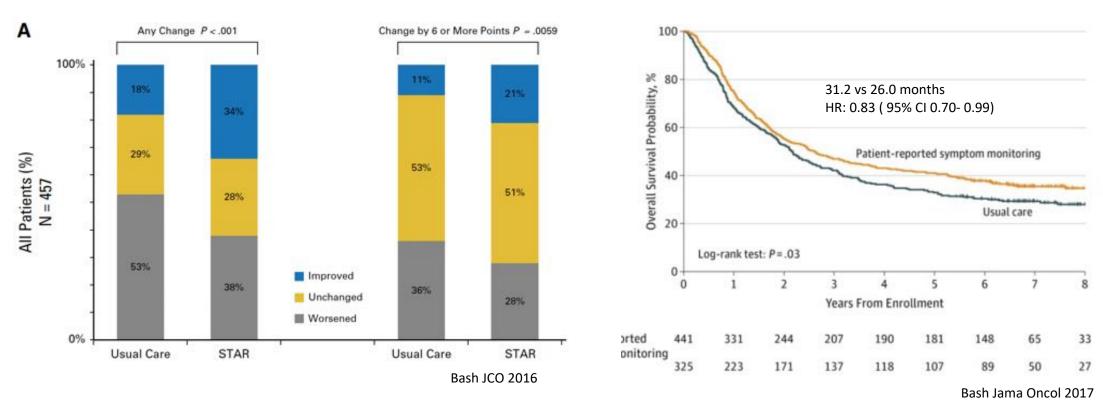
**Remote monitoring :** Real-time PRO reporting and management



Penedo Lancet Oncol 2020

Electronic patient reported outcomes improve QoL in patients with <u>metastatic disease</u> receiving chemotherapy

STAR trial: improvement in QoL and OS (n= 766)

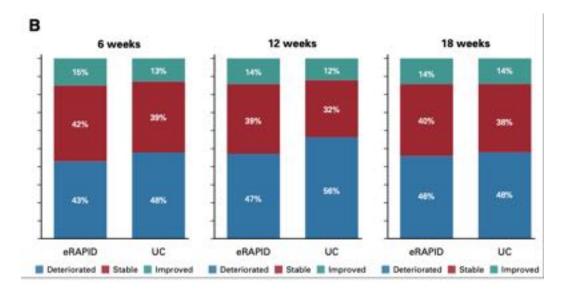


CAPRI trial: Relative dose-intensity 93.4% vs 89.4% p=0.04, reduced grade ≥3 AEs 27.6% vs 36.9% (n= 559) – Mihr Nat Medicine 2022

**PROTECT trial:** n= 1191, 52 centers in the US -> improvement in physical function, symptom control and QoL— Bash JAMA 2022 (30% never used email or computer, 36% high school educational level)

### Electronic patient reported outcomes improve QoL in patients receiving chemotherapy

eRAPID trial: N= 508 (337 adjuvant setting)
Increased physical well being and self-efficacy



Absolom JCO 2021

eSMART trial: N= 829 (adjuvant setting)
Significant reduction in symptom burden, increased QoL

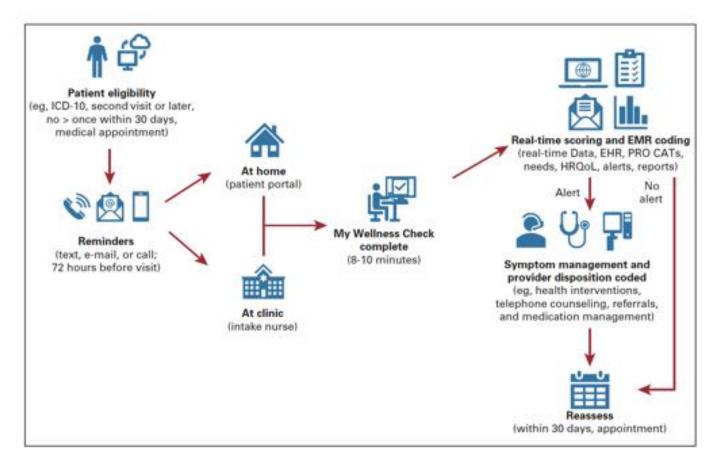
	Adjusted* least squa	ares mean (95% CI)	Adjusted* mean difference (95	% CI)
Variable	Intervention	Standard care	Intervention v standard care	P value
Total MSAS†	0.36 (0.34 to 0.39)	0.52 (0.49 to 0.54)	-0.15 (-0.19 to -0.12)	<0.001
MSAS global distress index	0.46 (0.42 to 0.50)	0.67 (0.63 to 0.71)	-0.21 (-0.27 to -0.16)	< 0.001
MSAS psychological	0.51 (0.46 to 0.55)	0.67 (0.63 to 0.72)	-0.16 (-0.23 to -0.10)	<0.001
MSAS physical	0.33 (0.30 to 0.36)	0.54 (0.51 to 0.58)	-0.21 (-0.26 to -0.17)	< 0.001
FACT-G total	86.3 (85.3 to 87.3)	82.3 (81.3 to 83.3)	4.06 (2.65 to 5.46)	< 0.001
FACT-G physical	23.4 (21.3 to 23.7)	21.6 (21.3 to 22.0)	1.75 (1.25 to 2.25)	< 0.001
FACT-G emotional	20.4 (20.2 to 20.7)	19.9 (19.6 to 20.1)	-0.54 (-1.23 to 0.16)	0.13
FACT-G social	23.6 (23.2 to 23.9)	23.2 (22.8 to 23.5)	0.44 (-0.06 to 0.93)	0.08
FACT-G functional	19.1 (18.7 to 19.5)	17.5 (17.1 to 17.9)	1.61 (1.00 to 2.22)	<0.001
STAI-R trait	32.7 (32.2 to 33.3)	33.9 (33.4 to 34.4)	-1.15 (-1.90 to -0.41)	0.003
STAI-R state	31.9 (31.2 to 32.6)	33.0 (32.4 to 33.7)	-1.13 (-2.06 to -0.20)	0.02
CASE-Cancer	43.7 (43.3 to 44.2)	42.9 (42.3 to 43.4)	0.81 (0.19 to 1.43)	0.01
SCNS-SF34 psychological	23.2 (21.9 to 24.6)	24.4 (23.0 to 25.8)	-1.14 (-3.04 to 0.75)	0.24
SCNS-SF34 health system and information	22.3 (21.1 to 23.4)	23.7 (22.5 to 24.9)	-1.46 (-3.13 to 0.21)	0.09
SCNS-SF34 sexuality needs	12.0 (10.9 to 13.1)	13.5 (12.4 to 14.7)	-1.56 (-3.11 to -0.01)	< 0.05
SCNS-SF34 patient care and support	17.5 (16.5 to 18.6)	19.3 (18.1 to 20.4)	-1.74 (-3.31 to -0.16)	0.03
SCNS-SF34 physical and daily living	27.3 (25.7 to 28.8)	30.0 (28.5 to 31.6)	-2.8 (-5.0 to -0.6)	0.01

CASE-Cancer~Communication and Attitudinal Self-Efficacy scale for cancer; FACT-G=Functional Assessment of Cancer Therapy—General; MSAS=Memorial Symptom Assessment Scale; SCNS-SF34~Supportive Care Needs Survey Short-Form; STAI=State-Trait Anxiety Inventory.

Maguirre Oncol 2021

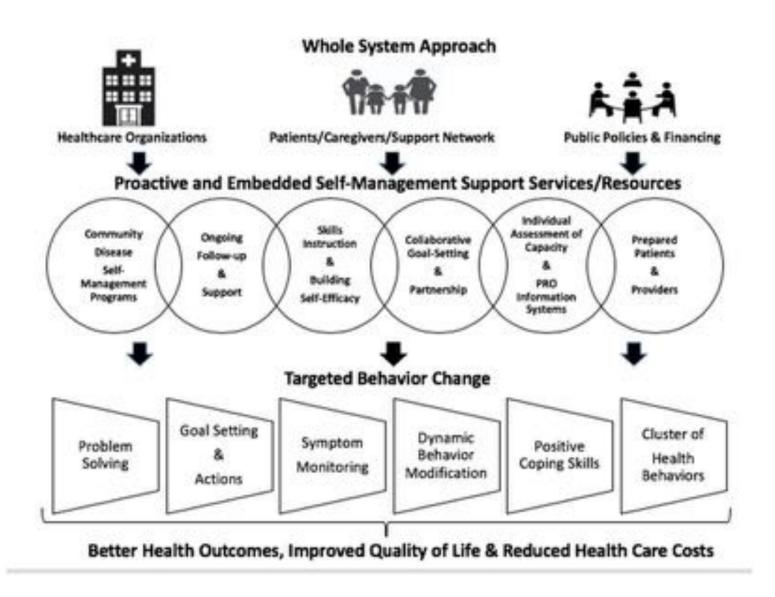
<sup>\*</sup>Adjusted for baseline patient reported outcome measure, cycle, age, sex, cancer type, comorbidity, and country. †Primary outcome.

Real-time and dynamic symptom management and needs assesment "From the hospital to home and back to the hospital"



### Types of PROs:

Health related QoL Symptoms Health system utilization Satisfaction/Experience



Published: 26 January 2013

Survivorship Clinic Group Educational Sessions: Adoption, Acceptance, and Attendance

Journal of Cancer Education 28, 79-83 (2013) Cite this article

### The Efficacy of Internet-Based Cognitive Behavioral Therapy for Severely Fatigued Survivors of Breast Cancer Compared With Care as Usual: A Randomized Controlled Trial

Harriët J.G. Abrahams, MSc 312; Marieke F.M. Gielissen, PhD3; Rogier R.T. Donders, PhD4; Martine M. Goedendorp, PhD5;
Agnes J. van der Wouw, PhD6; Constans A.H.H.V.M. Verhagen, PhD7; and Hans Knoop, PhD13

### Web-Based Tailored Education Program for Disease-Free Cancer Survivors With Cancer-Related Fatigue: A Randomized Controlled Trial

Young Ho Yun, Keun Seok Lee, Young-Woo Kim, Sang Yoon Park, Eun Sook Lee, Dong-Young Noh, Sung Kim, Jae Hwan Oh, So Youn Jung, Ki-Wook Chung, You Jin Lee, Seung-Yong Jeong, Kyu Joo Park, Young Mog Shim, Jae Ill Zo, Ji Won Park, Young Ae Kim, En Jung Shon, and Sohee Park

# Internet-Delivered Cognitive-Behavioral Therapy for Insomnia in Breast Cancer Survivors: A Randomized Controlled Trial

Robert Zachariae, Ali Amidi, Malene F. Damholdt, Cecilie D. R. Clausen, Jesper Dahlgaard, Holly Lord, Frances P. Thorndike, Lee M. Ritterband

### Efficacy of Internet-Based Cognitive Behavioral Therapy in Improving Sexual Functioning of Breast Cancer Survivors: Results of a Randomized Controlled Trial

Susanna B. Hummel, Jacques J.D.M. van Lankveld, Hester S.A. Oldenburg, Daniela E.E. Hahn, Jacobien M. Kieffer, Miranda A. Gerritsma, Marianne A. Kuenen, Nina Bijker, Paul J. Borgstein, Gijsbert Heuff, Alexander M.F. Lopes Cardozo, Peter W. Plaisier, Herman Rijna, Suzan van der Meij, Eric J. van Dulken, Bart C. Vrouenraets, Eva Broomans, and Neil K. Aaronson

Efficacy of Internet-Based Cognitive Behaviora
Therapy for Treatment-Induced Menopausal
Symptoms in Breast Cancer Survivors: Results of
a Randomized Controlled Trial

Vera Atema, MSc<sup>1</sup>; Marieke van Leeuwen, PhD<sup>1</sup>; Jacobien M. Kieffer, PhD<sup>1</sup>; Hester S.A. Oldenburg, MD, PhD<sup>1</sup>; Marc van Beurden, MD, PhD<sup>2</sup>; Miranda A. Gerritsma, MSc<sup>1</sup>; Marianne A. Kuenen, BSc<sup>1</sup>; Peter W. Plaisier, MD, PhD<sup>2</sup>; Alexander M.F. Lopes Cardozo, MD<sup>2</sup>; Yvonne E.A. van Riet, MD<sup>2</sup>; Gijsbert Heuff, MD, PhD<sup>2</sup>; Herman Rijna, MD, PhD<sup>2</sup>; Suzan van der Meij, MD<sup>2</sup>; Eva M. Noorda, MD, PhD<sup>3</sup>; Gert-Jan Timmers, MD, PhD<sup>3</sup>; Bart C. Vrouenraets, MD, PhD<sup>13</sup>; Mira S. Hunter, PhD<sup>14</sup>; and Neil K. Aaronson, PhD<sup>1</sup>

Face-to-Face and Internet-Based Mindfulness-Based Cognitive Therapy Compared With Treatment as Usual in Reducing Psychological Distress in Patients With Cancer: A Multicenter Randomized Controlled Trial

Félix Compen, Else Bisseling, Melanie Schellekens, Rogier Donders, Linda Carlson, Marije van der Lee, and Anne Speckens

Computerized Cognitive Training for Amelioration of Cognitive Late Effects Among Childhood Cancer Survivors: A Randomized Controlled Trial

Heather M. Conklin, Robert J. Ogg, Jason M. Ashford, Matthew A. Scoggins, Ping Zou, Kellie N. Clark, Karen Martin-Elbahesh, Kristina K. Hardy, Thomas E. Merchant, Sima Jeha, Lu Huang, and Hui Zhang

### Evaluation of a Web-Based Cognitive Rehabilitation Program in Cancer Survivors Reporting Cognitive Symptoms After Chemotherapy

Victoria J. Bray, Haryana M. Dhillon, Melanie L. Bell, Michael Kabourakis, Mallorie H. Fiero, Desmond Yip, Frances Boyle, Melanie A. Price, and Janette L. Vardy

Outcome	Finding	N SRs	N primary Studies	Overlap	Intervention designs	SR Refs
Domain 2: Surveillance and managen	nent of phys	ical effects	No.	12000	2.000 Product	A CONTRACTOR OF THE PARTY OF TH
Physical symptom burden	+	6	6	14%	Web, phone	24,25,37,40,40,48
Physical functioning	+	5	6	16%	Web, wearables	34,29,34,40,43
Fatigue	+	18	31	35%	Web, phone, mobile app	11,34-26,75,50,31,36-40,42,44,47-0
Sleep quality	+	6	5	40%	Web, mobile app	25,25,38-40,46
Sexual function	+	3	6	16%	Web, phone	31,40,43
Cognitive functioning	+	6	11	9%	Web, mobile app	24,25,37,40,45,48
Pain	Warner I	5	5	40%	Web, phone	25,29,29,40,44
Domain 3: Surveillance and managen	nent of psyc	hosocial ef	fects	14.100		
Motivation	+	2	2	0%	Wearables	24,48
Stress	+	4	4	25%	Web, mobile app	37,40,48,49
Fear of recurrence	+	4	3	66%	Web, app	27,40,48,49
Social and emotional functioning	+	4	5	20%	Web, app	26,44,47,68
Self-efficacy	+	4	9	1196	Web, app, phone	11,27,40,48
Quality of life	+	15	47	45%	Web, app, phone	11,23-25,27,36-30,42,44,43,47-49
Body image	+	2	2	50%	Web	40,45
Mood	NC	4	5	20%	Web, phone	29,29,36,36
Distress	NC	9	15	13%	Web, app, phone	24,27,29,30,31,34,42,48,49
Depression	NC	18	21	52%	Web, app, phone	23-30,34,37-41,47-50
Anxiety	NC	9	15	46%	Web, app, phone	25,29,30,31,37,38,40,41,46
Domain 5: Health promotion and dis	ease prevent	tion	1900			
Physical activity	+	15	34	47%	Web, app, phone, wearables	53,34,35,53,55,40,42,47.49
Body weight	4	7			Web, app, phone, wearables	29,36-36,45,42,49
Diet quality	+	4	10	20%	Web, app, phone, wearables	35,35,36,43
Smoking	NC	4	3	66%	Web	33,36,37,67
Alcohol	NC	3	2	50%	Web, phone	38,96,37

N, number; NC, Non-convincing findings; Refs, references; SR, systematic review.

<sup>+</sup>Statistically significant improvement in outcome with telemedicine intervention (more than two-thirds of systematic reviews concluding an overall significant effect).

<sup>-</sup>Telemedicine intervention had no significant effect on outcome (more than two-thirds of systematic reviews concluding non-significant finding).





# Electronic Health Interventions for Patients With Breast Cancer: Systematic Review and Meta-Analyses

Anna C. Singleton, PhD<sup>1</sup>; Rebecca Raeside, MPH<sup>1</sup>; Karice K. Hyun, PhD<sup>1,2</sup>; Stephanie R. Partridge, PhD<sup>1,3</sup>; Gian Luca Di Tanna, PhD<sup>4</sup>; Nashid Hafiz, MIPH<sup>1</sup>; Qiang Tu, PhD<sup>1</sup>; Justin Tat-Ko, BMSc<sup>1</sup>; Stephanie Che Mun Sum, BMSc<sup>1</sup>; Kerry A. Sherman, PhD<sup>5</sup>; Elisabeth Elder, MBBS, PhD<sup>6,7</sup>; and Julie Redfern, PhD<sup>1,4</sup>

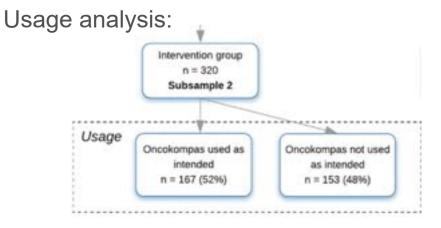
### Role of eHealth application Oncokompas in supporting self-management of symptoms and health-related quality of life in cancer survivors: a randomised, controlled trial

Anja van der Hout, Cornelia F van Uden-Kraan, Karen Holtmaat, Femke Jansen, Birgit I Lissenberg-Witte, Grard A P Nieuwenhuijzen,
José A Hardillo, Robert J Baatenburg de Jong, Nicolette L Tiren-Verbeet, Dirkje W Sommeijer, Koen de Heer, Cees G Schaar, Robert-Jan E Sedee,
Koop Bosscha, Michiel W M van den Brekel, Japke F Petersen, Matthijs Westerman, Jimmie Honings, Robert P Takes, Ilse Houtenbos,
Wim T van den Broek, Remco de Bree, Patricia Jansen, Simone E J Eerenstein, C René Leemans, Josée M Zijlstra, Pim Cuijpers,
Lonneke V van de Poll-Franse, Irma M Verdonck-de Leeuw

Primary endpoint: Patient Activation was not significantly different between intervention and control group over time

Small benefits in secondary outcomes: overall QoL and tumour specific symptoms

Need for **personalised and tailored** interventions Right information at the **right time** 

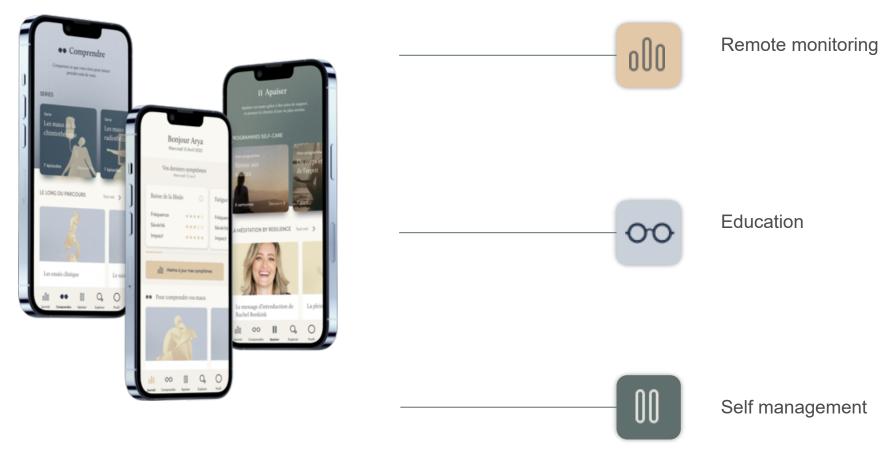


Reasons for not using Oncokompas:

- No symptom burden 32%
- Lack of time 26%
- Not interested 10%
- Not fitting to personal problems 10%
- Personal reasons 10%
- Technical problems 22%
- Aim of Oncokompas was not clear 6%
- Too comprehensive: 3%

Time since diagnosis, months	25.0 (16.0-41.0)	29-0 (16-5-41-0)	
3-<12	39 (12%)	38 (13%)	
12-<24	104 (33%)	85 (28%)	
24-60	177 (55%)	182 (60%)	

# 2. How digital health is incorporated in clinical care Experience GR



Courtesy of Resilience Care

# 2. How digital health is incorporated in clinical care **Experience GR**

#### #1327 A multimodal and personalized digital companion to help survivors of breast cancer manage side effects of adjuvant endocrine therapy: a qualitative exploration

The Marks 1, Armond Di Magdo 1, Perto Liquidos 11, Donate Paul Disease \* Calles Localities \* Localities Section 12 Anna Process \* Mattheway Commission (Commission Commission Commission

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#### MATERIALS & METHODS

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Figure 1: Economicture of the receipt could office.

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#### CONCLUSION

findings from the qualitative sholl even promoting regarding the acceptability and parresplan of unabliness of a personalised mobble application for the militarium of endocrare transporcials effects in the adjovent setting.

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#### CANCELLAND DEVELOPMENT

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This mobile application has been included as a compared of the new indictional bread concersummarship case pathway which includes it his recount of in announting case year document its mediator to participate to group services, It invitation to use the mobile (application). At decision stell the physicians on force to remoge pre-deri symptoms of species of beauti

A pilot Biole is organize to evaluate profession. inflation of particle and potent health therapy before and other the intervention,

Secule will management programs the burnsy treatment and all he integrated in the spall-often.

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this makes application, with the prospection of to safe reprogresser property will be feeled in a rendomped controlled that starting in Q1,0002, which self-evolution in affectiveness is survivore at timesal operior.

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#### REMEMBACKS

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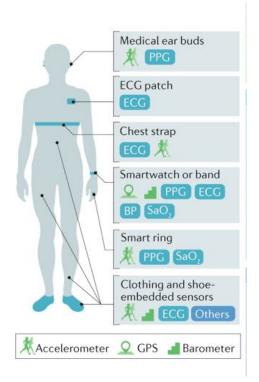
Trace is followed, placement make appropriate model and appropri-

make one or reserved. Marines to combine and stoney calcolly climine backs, their



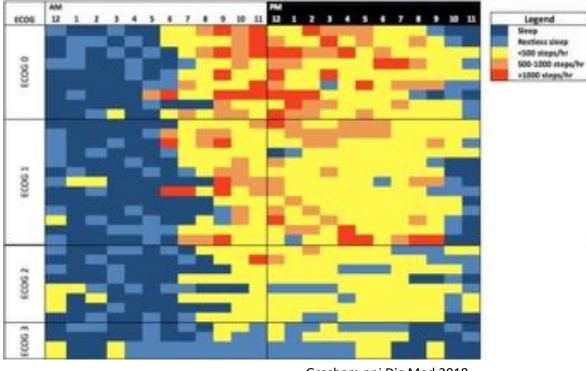


### **Biometric sensors:**



Bayumi Nat Review Card 2021

# Physical activity/ Functional status / Fatigue Accelerometers



Gresham npj Dig Med 2018

Steps counts during concomitant chemoradiotherapy – predictor of unplanned hospitalization (Ohri 2017, Ohri 2019)

#### Location

**GPS** 

### Diet

Webb/app diaries
Wireless scales (body composition)
Image recognition

### Sleep

### **Neuropathy**

Pletoplethysmography sensors

### **Emotional distress**

Galvanic skin reaction
Cortisol levels on sweat

### **Alcohol and Tabacco**

Movement detection

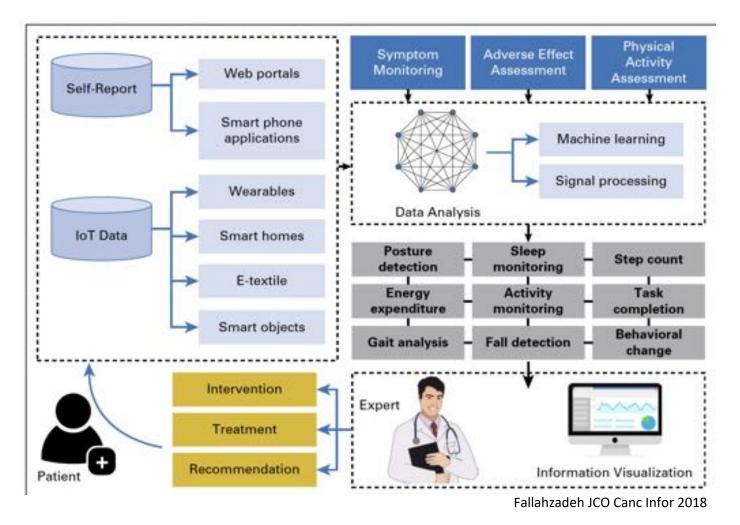
### **Smart Pill dispenser**

Adherence

•••

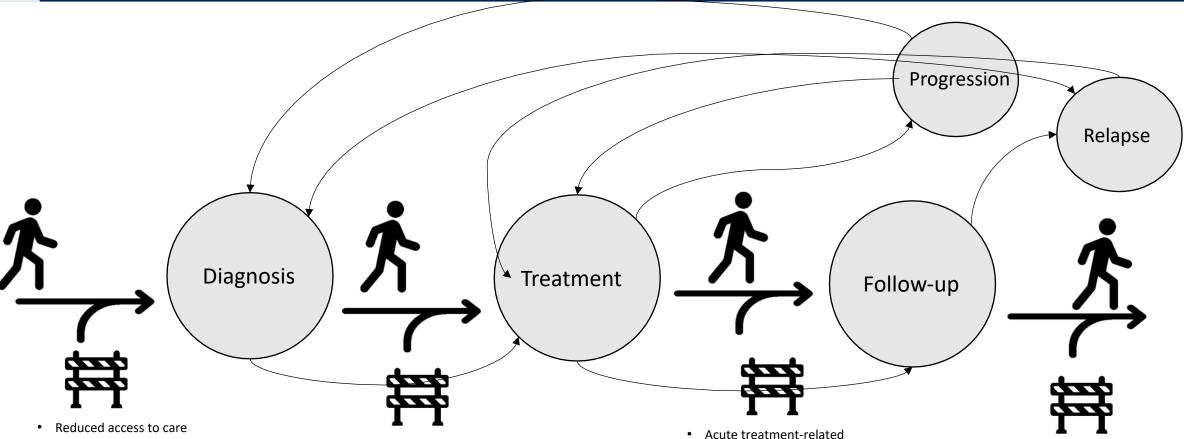
Internet of Things (IoT) have facilitated new ways to colled patient-generated health data during clinic visits and daily

life



Patient education, empowerment and community engagement Promote and enable self-management Enable remote monitoring and communication with care team Care coordination, digital navigation & multidisciplinary referrals Healthcare professional awareness and facilitated care

The PRO-ACTive approach:



- · Non adhrence to screening
- Misinsformation
- Lack of education

- Psychological distress
- Poor understandment of treatment plan and options
- Financial distress & social distress
- Poor comunication with care team
- Non-adherence to treatment plan
- Unhealthy behaviours

- Acute treatment-related toxicities
- Poor communication with care team
- Unplanned hospitalizations
- Non-adherence to treatment plan
- Unhealthy behaviours
- Financial and social distress

- Chronic and long lasting physical and emotional toxicities
- Poor communication with care team
- Non adherence to treatment plan
- Unhealthy behaviours
- Second primary malignancies
- Concomitant diseases

24

### Side car initiatives struggle





Multiple functionalities – dynamic structure

### **Connectors**

Between tools and with medical records

Centralized secured database host system SNDS-compatible

**Data-management tools** 



Facilitate SHS research in cancer

Ensure quality and security

Accessibility and mutualisation

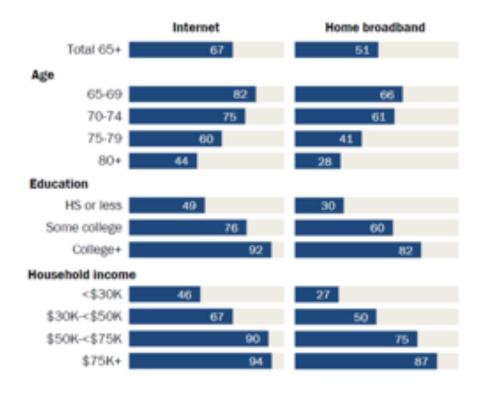
**Standardisation** 





# Internet use and broadband adoption among seniors varies greatly by age, income and education

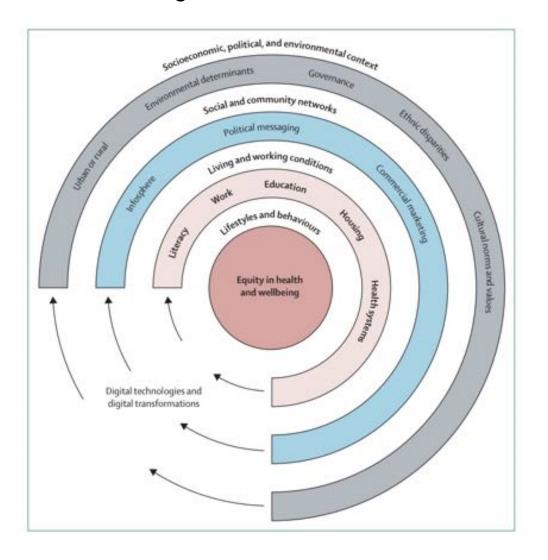
% of U.S. adults ages 65 and older who say they use/have the following ...



Source: Survey conducted Sept.29-Nov.6, 2016. "Tech Adoption Climbs Among Older Adults"

#### PEW RESEARCH CENTER

### Interface between digital health and determinants of health

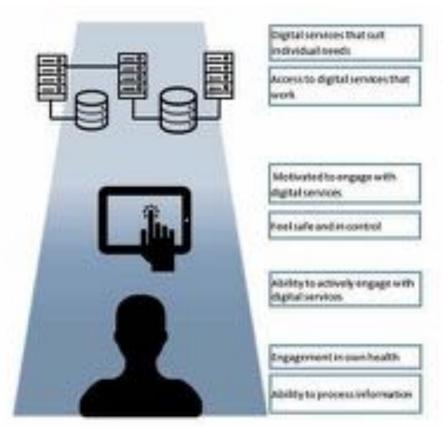


### 3. Digital health for everyone? eHealth Literacy

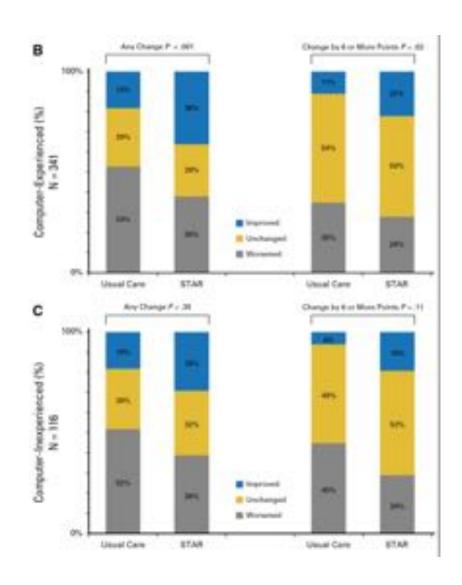
**Health literacy:** the cognitive and social skills which determine the motivation and ability of individuals to gain access to, understand and use information in ways which promote and maintain good health

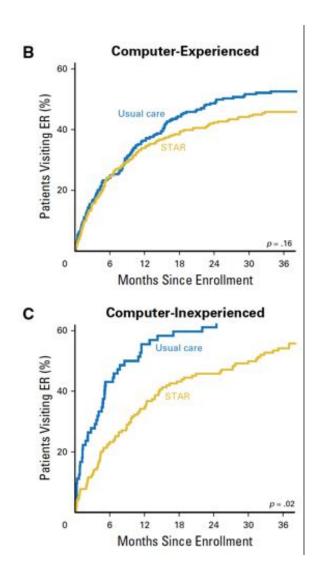
**eHealth literacy:** the ability to seek, find, understand and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem (Norman & Skinner 2006)

### The eHealth literacy framework - eHLQ



# 3. Digital health for everyone? eHealth literacy

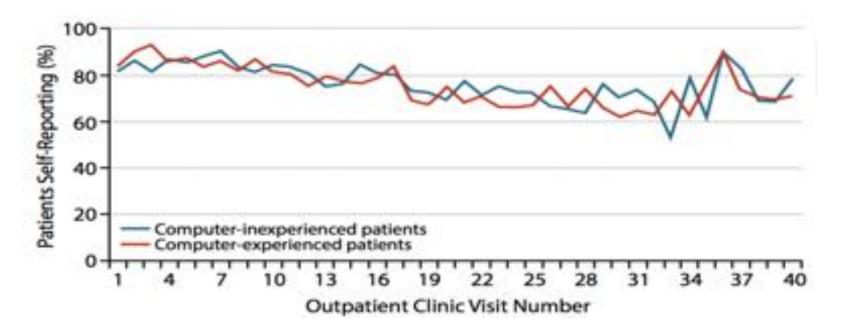




# 3. Digital health for everyone? eHealth literacy

75-80% of patients self reported at any given clinic visist, even those who were inexperienced computer users

Patients continued reporting over time



Bash JCO 2017

Digital health can be used to support the cancer patient journey and we demonstrated high utilization in an array of sociodemographic variables in our population.

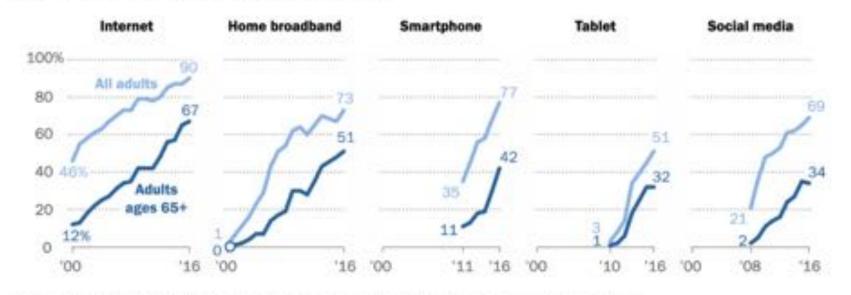
Patel, ASCO clinical care, 2022

# 3. Digital health for everyone? eHealth literacy



### Smartphone adoption among seniors has nearly quadrupled in the last five years

% of U.S. adults who say they have or use the following



Source: Survey conducted Sept.29-Nov.6, 2016. Trend data are from previous Pew Research Center surveys. "Tech Adoption Climbs Among Older Adults"

#### PEW RESEARCH CENTER

Awareness/interest; access/cost; adoption; patient centric, representation, trust

# Young, Empowered & Strong Web-Based Portal



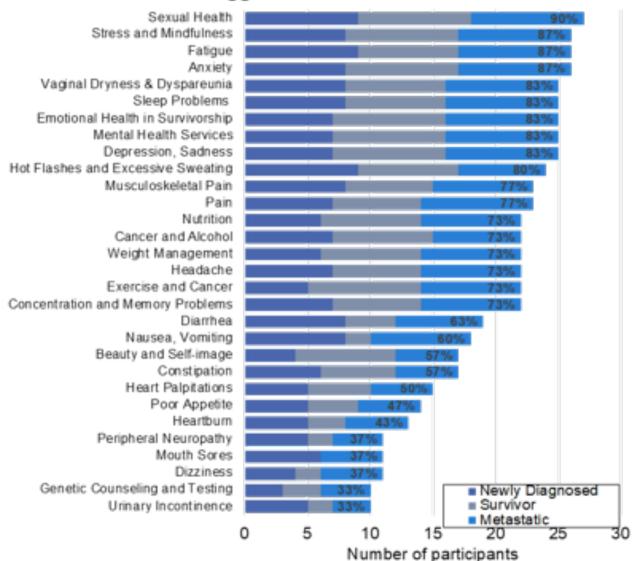
A multicomponent intervention to engage and activate young women with breast cancer to self-monitor and self-manage concerns and symptoms by providing tailored information, resources and support (chat rooms and expressive writing opportunity)

YES builds on and extends prior web and clinic-based Young and Strong intervention

Serial symptom monitoring into the survivorship period, when chronic symptoms and informational and supportive care needs are prevalent

Model emphasizes self-monitoring and self-management, without heavy clinician involvement, and self and peer support

### Triggered informational resources

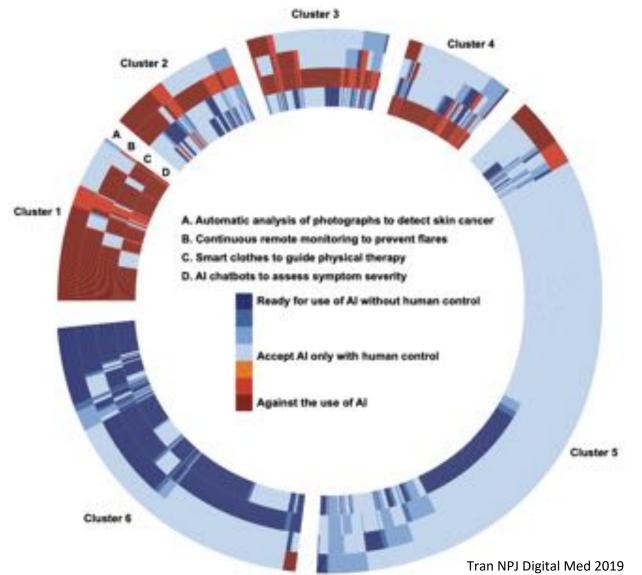


### 3. Digital health for everyone? Patient's perspective

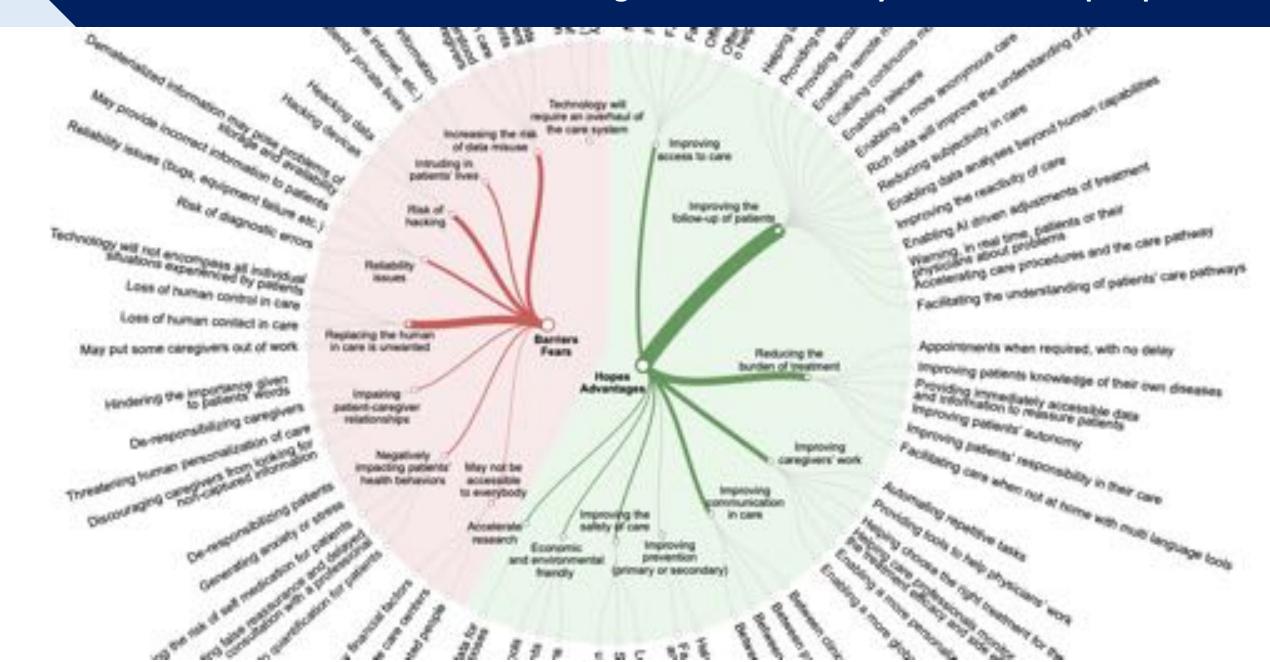
### Patients' perceived benefits and risks for the use of digital technologies and AI in healthcare

N= 1183 pts with chronic conditions (9% cancer)

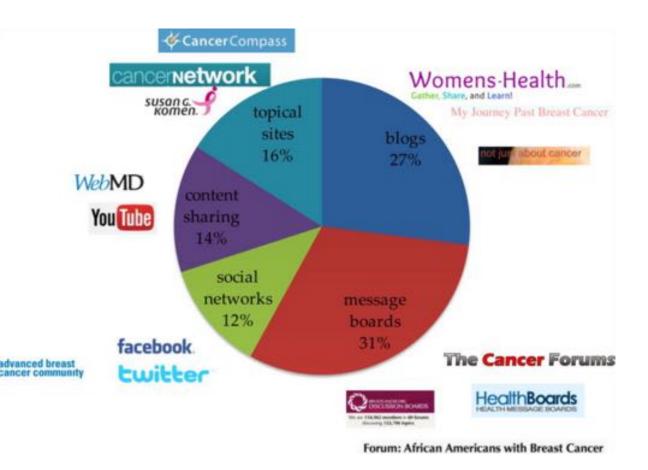
- 47% of participants considered as a great opportunity
- 11% participants considered as a great danger
- 20% participants considered that the potential benefits of technology greatly outweighed its potential dangers

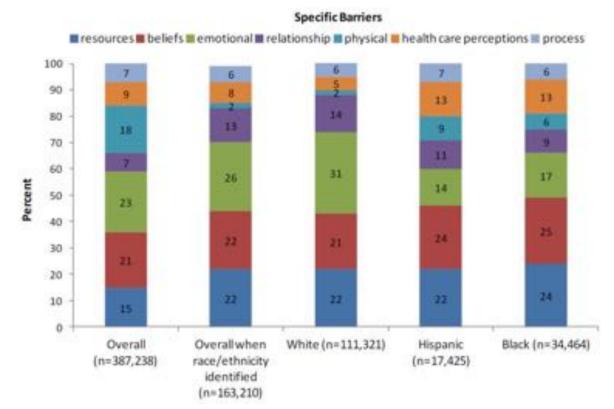


### 3. Digital health for everyone? Patient's perspective



### 3. Digital health and social media



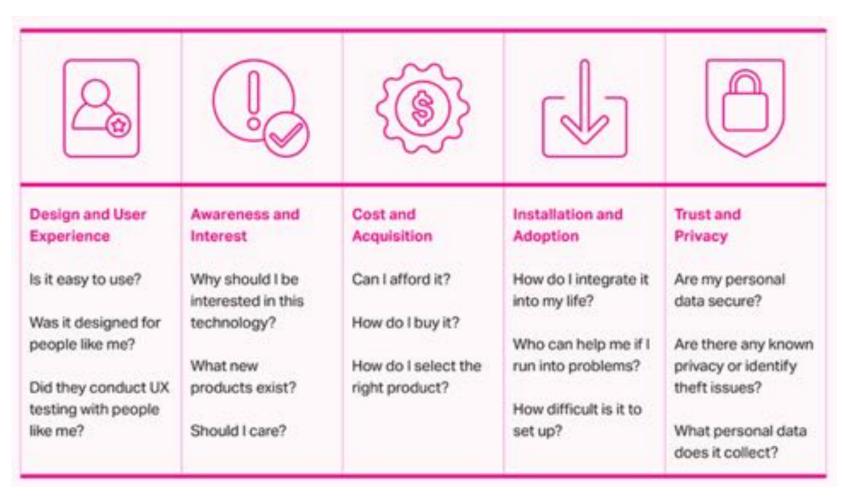


# **IDEAS ARE EASY IMPLEMENTATION IS HARD**

Guy Kawasaki



# 6. Digital health for everyone? Tailored digital health for everyone!



### Take-home messages

- 1) Digital health encompasses many digital technologies/devices such as mHealth, remote monitoring, wearables, EMR, telemedicine and digital therapeutics.
- 2) ePROs and remote monitoring improves QoL in the early and metastatic setting.

- 3) Digital technologies may facilitate self-management support and the delivery of supportive care interventions along the cancer care continuum.
- 4) One size does not fil all: prioritize personalization, timely and targeted interventions, consider eHealth literacy, adaptive interfaces and hybrid care models.

### Merci

Maria Alice Franzoi Camila Chiodi Ann Partridge