AI and telemedicine to improve access to care

LUCA TAGLIAFERRI - MD, PhD

Fondazione Policlinico Univeristario «Agostino Gemelli» IRCCS

Gemelli ART (Advanced Radiation Therapy) - Interventional Oncology Center (IOC)

28th October 2025

Gemelli
Fondazione Policlinico Universitario Agostino Gemelli IRCCS
Università Cattolica del Sacro Cuore

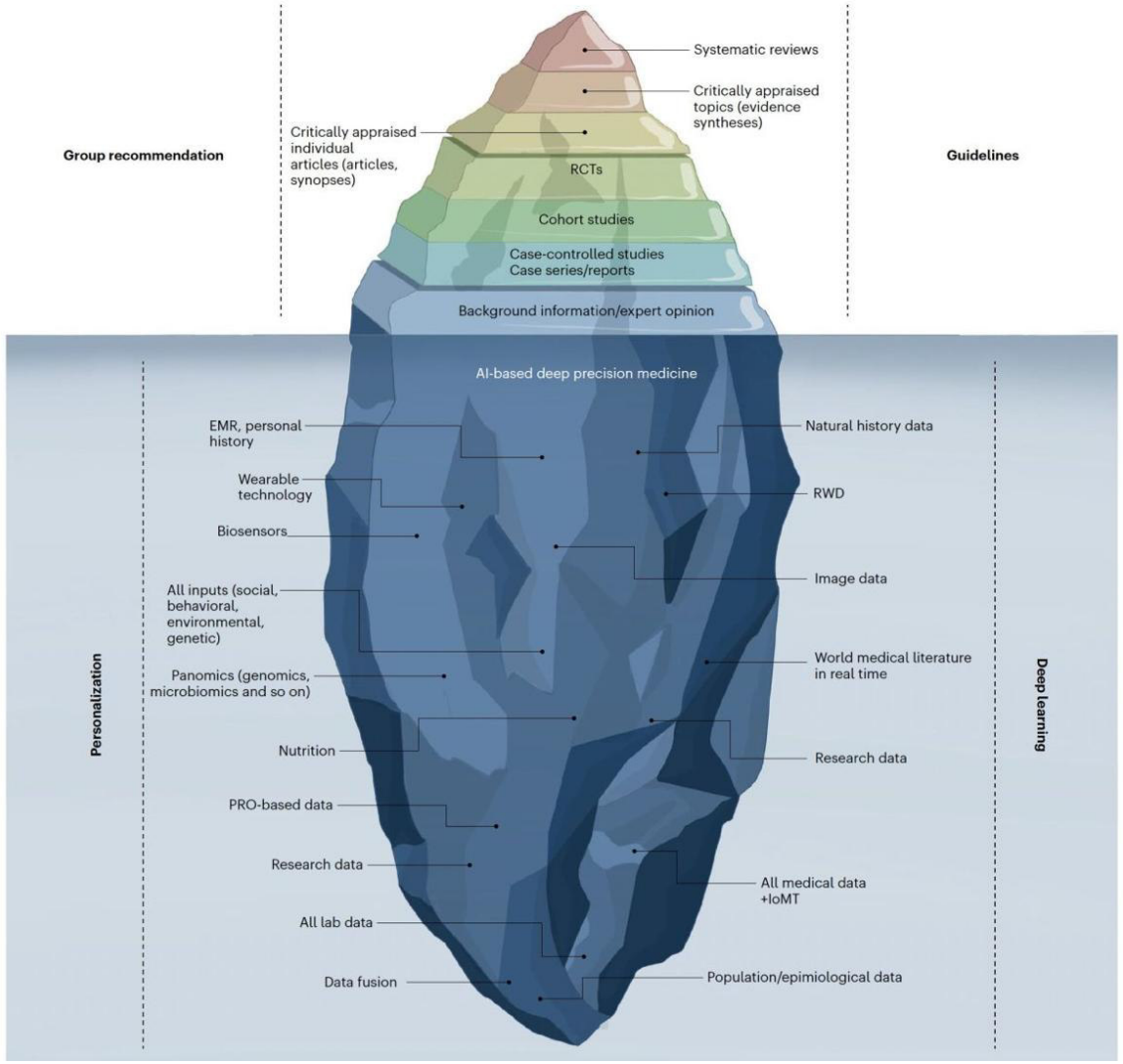
GART Advanced Radiation Therapy

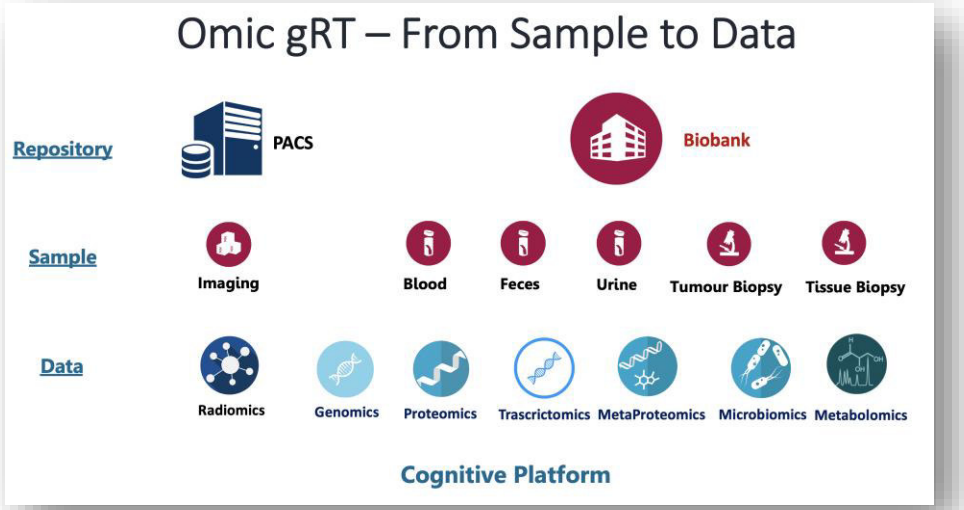
IOC Interventional Oncology Center
Centro di Oncologia Interventistica

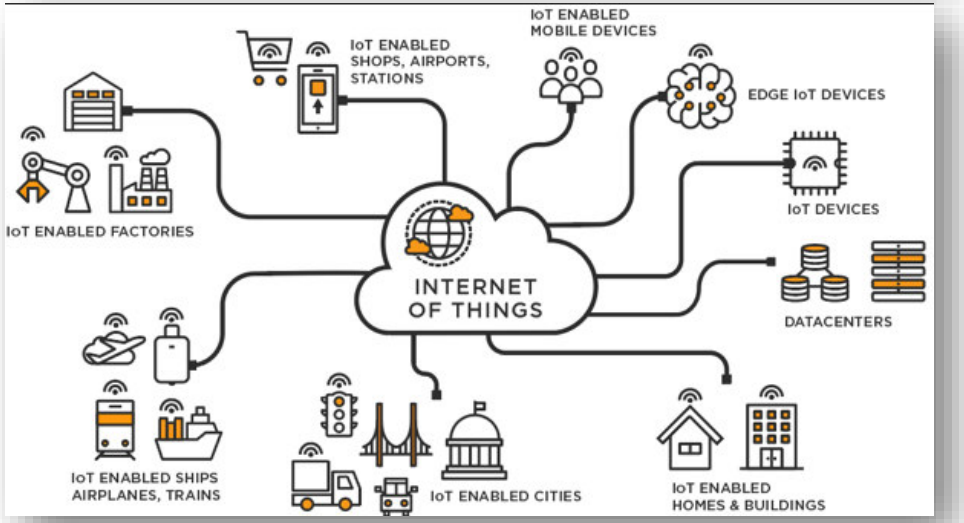
TOC Theragnostic Oncology Center

BEST HOSPITALS 2025 Newsweek
2st Italian Hospital
Top 50 World Hospital
POLICLINICO UNIVERSITARIO A. GEMELLI

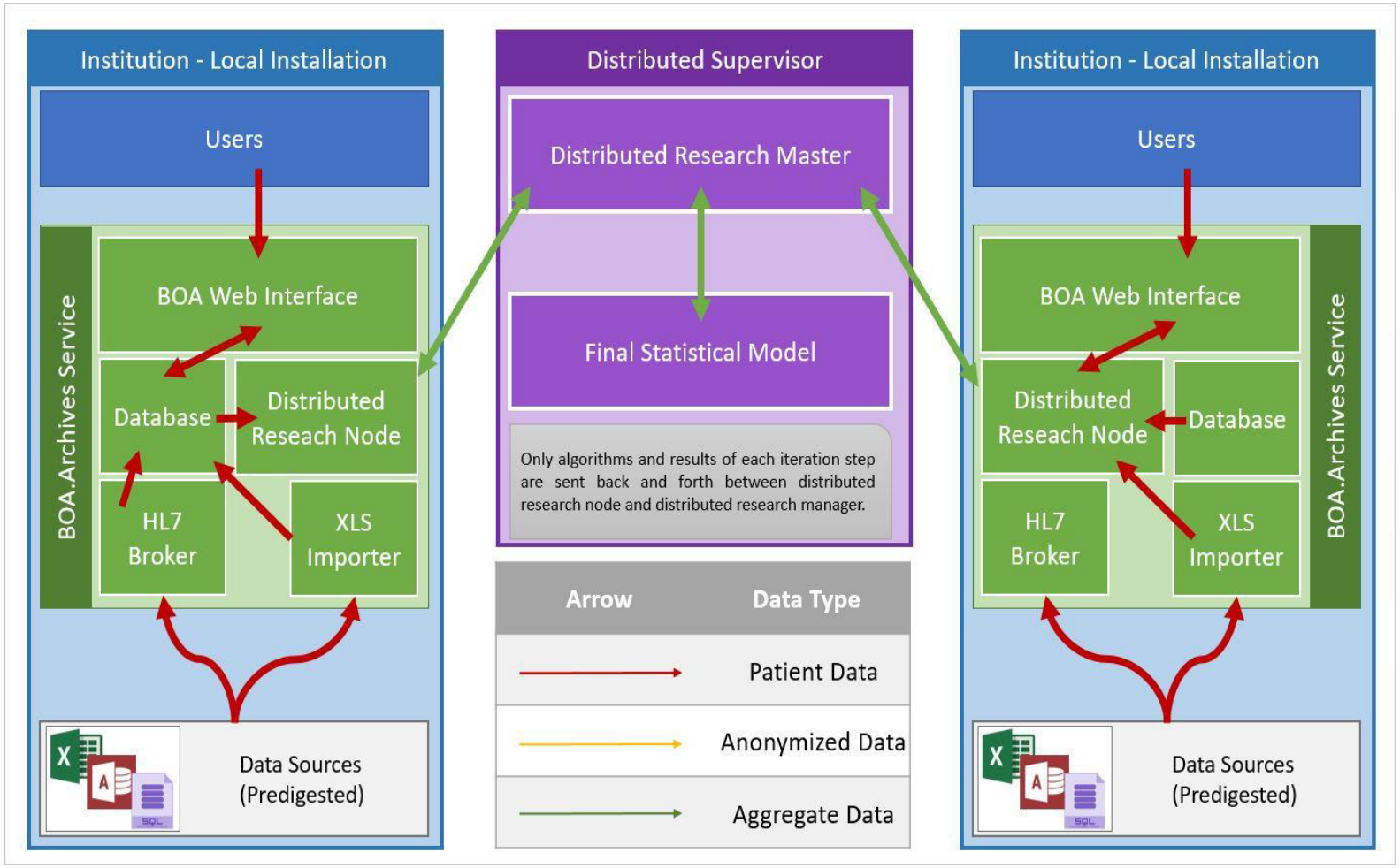
Interventional and External beam
INTERACTS
Radiotherapy Active Teaching School

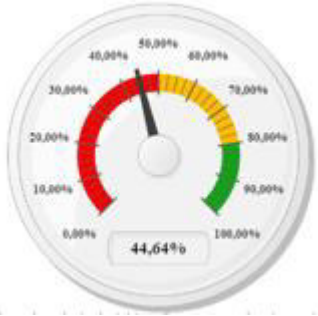






- Subbiah V. Nat Med 2023





- Tagliaferri L, Kovács G, Autorino R, Budrukkar A, Guinot JL, Hildebrand G, Johansson B, Monge RM, Meyer JE, Niehoff P, Rovirosa A, Takàcsi-Nagy Z, Dinapoli N, Lanzotti V, Damiani A, Soror T, Valentini V. ENT COBRA (Consortium for Brachytherapy Data Analysis): interdisciplinary standardized data collection system for head and neck patients treated with interventional radiotherapy (brachytherapy). J Contemp Brachytherapy. 2016 Aug;8(4):336-43. doi: 10.5114/jcb.2016.61958. Epub 2016

- Marazzi F, Tagliaferri L, Masiello V, Moschella F, Colloca GF, Corvari B, Sanchez AM, Capocchiano ND, Pastorino R, Iacomini C, Lenkowicz J, Masciocchi C, Patarnello S, Franceschini G, Gambacorta MA, Masetti R, Valentini V. GENERATOR Breast DataMart-The Novel Breast Cancer Data Discovery System for Research and Monitoring: Preliminary Results and Future Perspectives. J Pers Med. 2021

TUTORING

- Emotional and difficult moment
- Many uncertainties and questions about the course of treatment
- Little knowledge of the disease

- Not enough time to educate the patient
- Repetitive education al needs of the patients

ALERTING

- Inability to recognize clinically significant signs and/or symptoms

- Lack of tools to monitor patients at home
- Lack of triage to support physicians in optimizing resources

REPORTING

- Difficulty communicating and monitoring one's health status
- Numerous data to be collected and delivered

- Difficulty in finding data
- Lack of tools for a holistic view

TUTORING

ALERTING

REPORTING

REACTIVE

- Educational content for patients
- Frequently Asked Questions

- In critical situations, the patient receives an invitation to contact their physician.

- Report with clinical and behavioral data entered by the patient

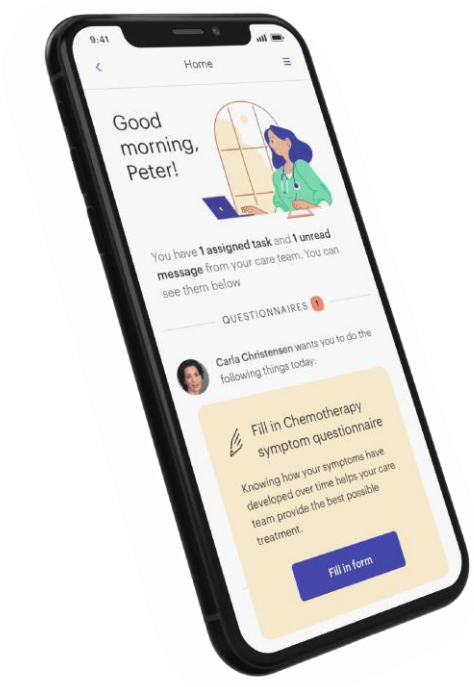
PROACTIVE

- The clinical team intervenes by contacting the patient.

- The clinical team monitors and contacts the patient when necessary.

- The doctor accesses the clinical platform to analyze the data entered by the patient.

KIT.ART
(Keep In Touch)



APP
Monitoring AI driven

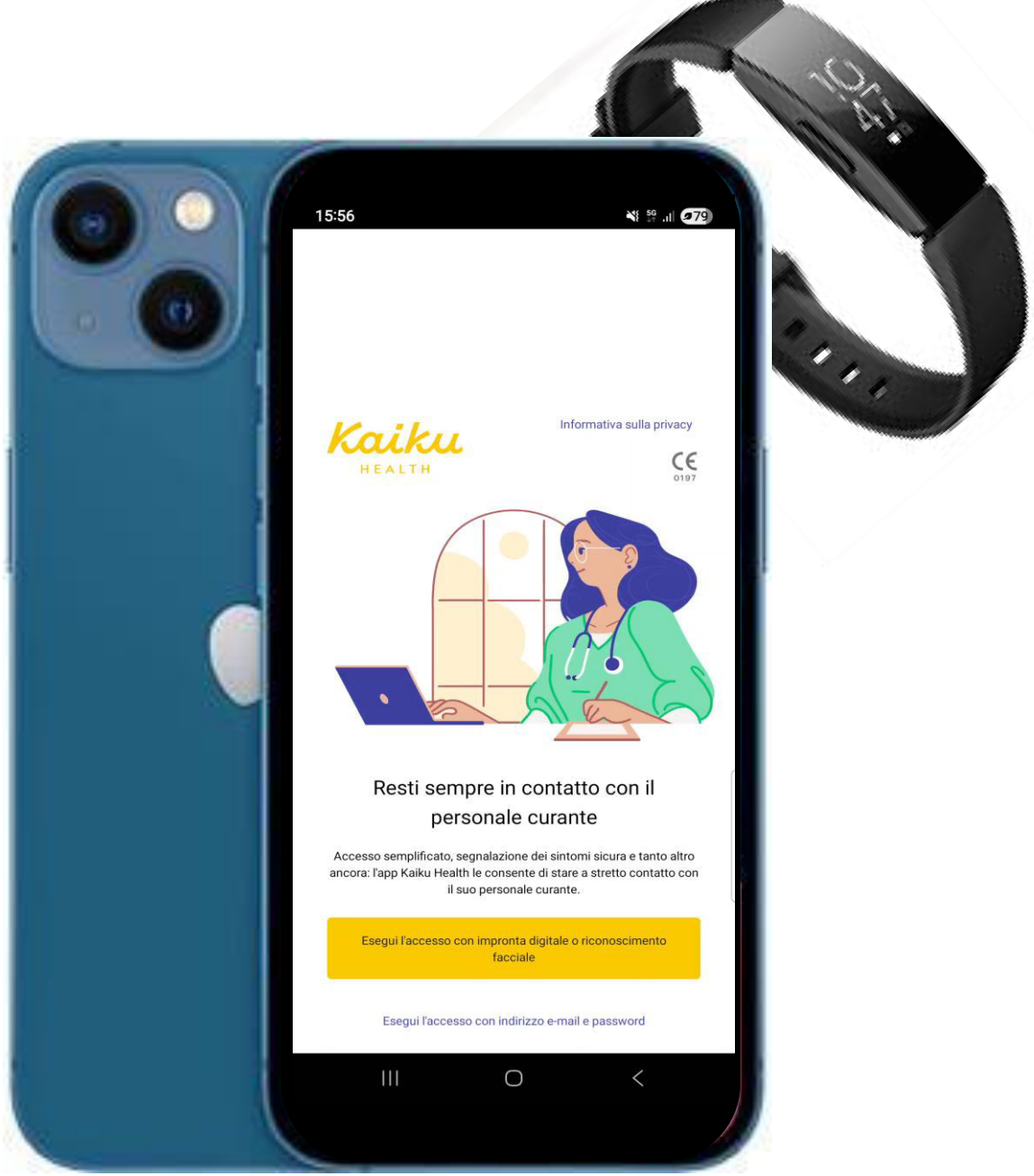
CHATBOT
Tutoring AI base

AUGMENTED REALITY VIEWERS
Tutoring and art4ART platform connection

- Marazzi F, Tagliaferri L, Masiello V, Moschella F, Colloca GF, Corvari B, Sanchez AM, Capocchiano ND, Pastorino R, Iacomini C, Lenkowicz J, Masciocchi C, Patarnello S, Franceschini G, Gambacorta MA, Masetti R, Valentini V. GENERATOR Breast DataMart-The Novel Breast Cancer Data Discovery System for Research and Monitoring: Preliminary Results and Future Perspectives. J Pers Med. 2021
- Casà C, Corvari B, Cellini F, Cornacchione P, D'Aviero A, Reina S, Di Franco S, Salvati A, Colloca GF, Cesario A, Patarnello S, Balducci M, Morganti AG, Valentini V, Gambacorta MA, Tagliaferri L. KIT 1 (Keep in Touch) Project-Televisits for Cancer Patients during Italian Lockdown for COVID-19 Pandemic: The Real-World Experience of Establishing a Telemedicine System. Healthcare (Basel). 2023

APP

- Administer editable questionnaires
- Symptoms recording and storage
- IOT connection
- Frailty test
- Photo and document acquisition
- Tutor e Surveillance
- GDPR conformity

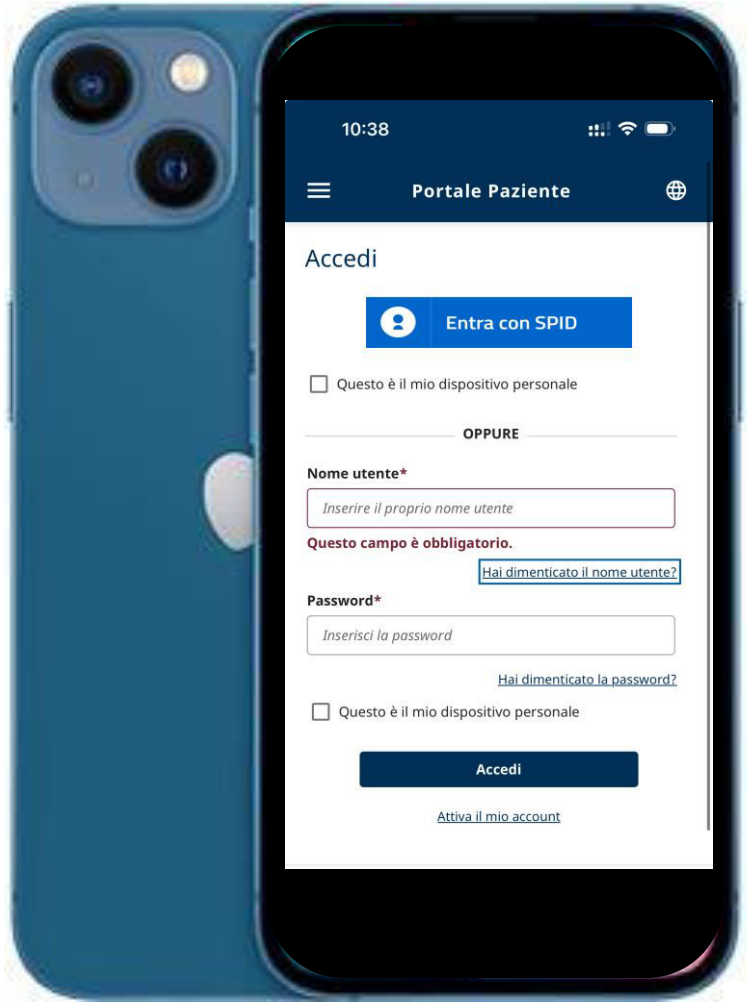


CHAT-BOT: Entry service

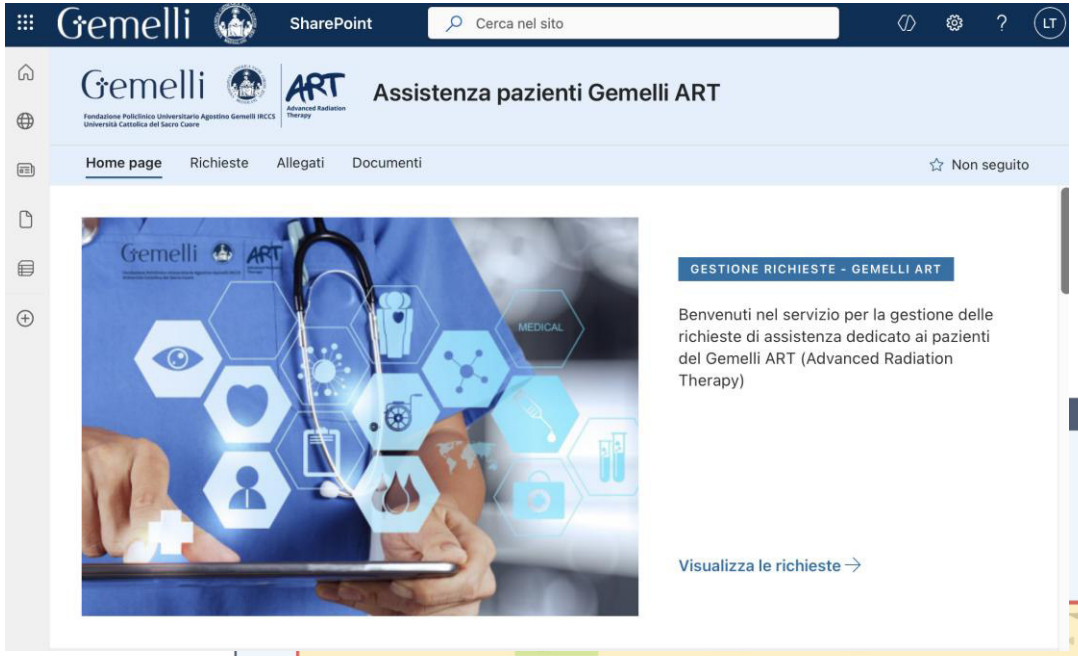
WhatsApp

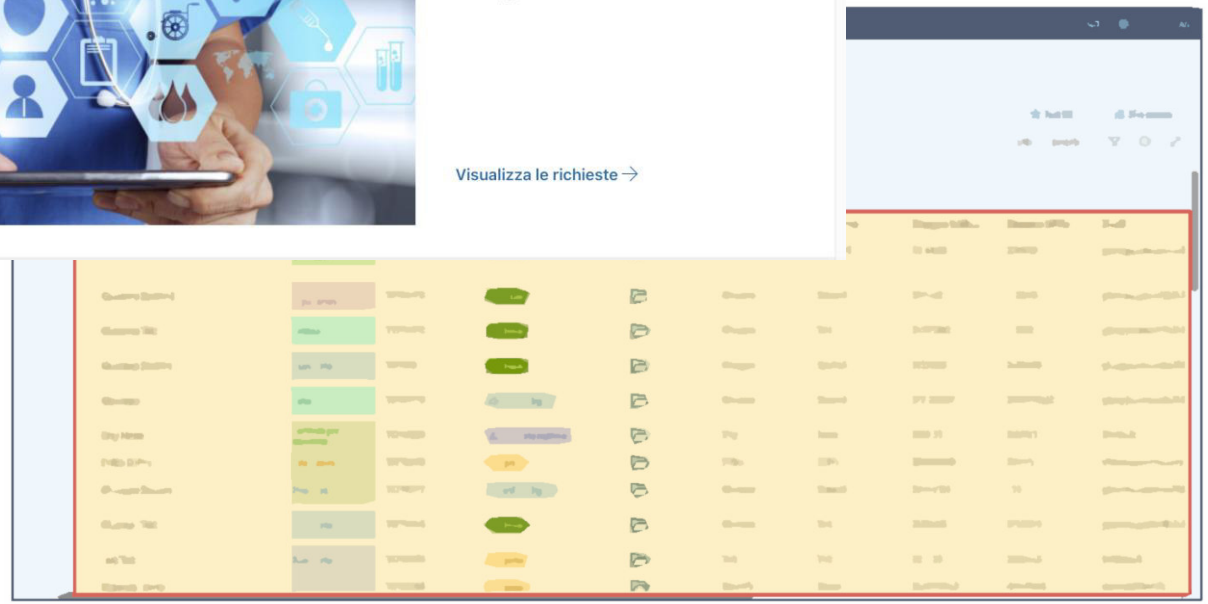
CHAT-BOT: Landing service

Patient Portal

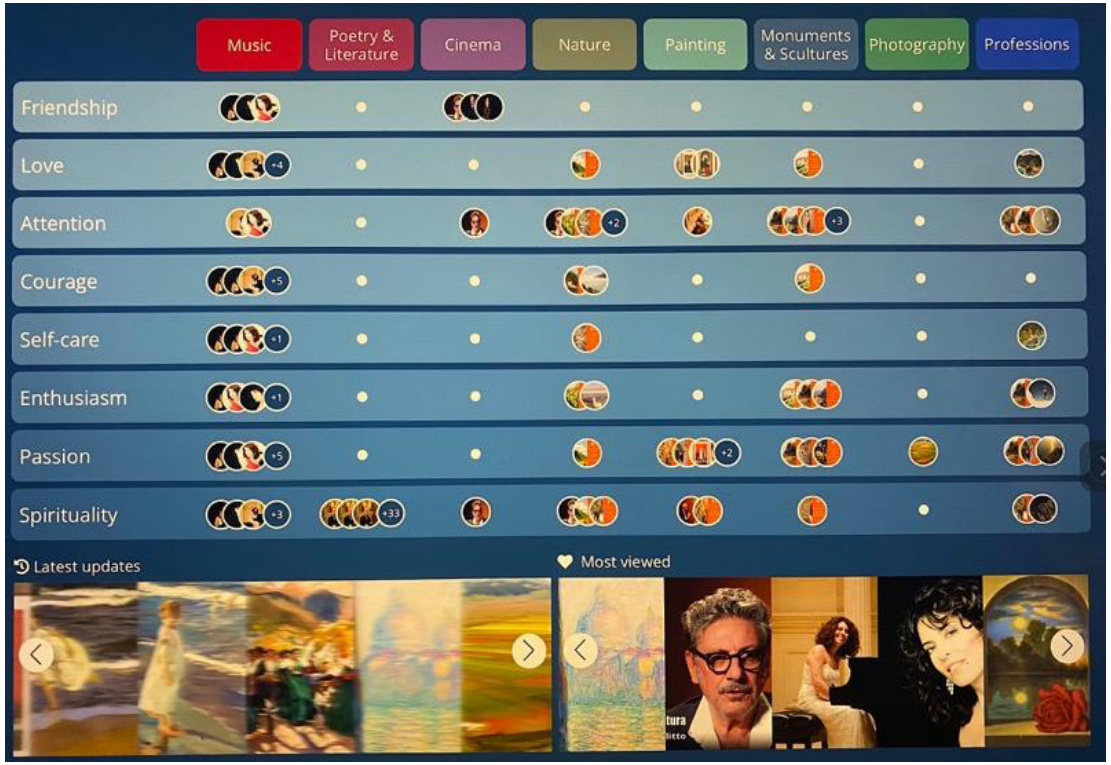


Patient Care Service





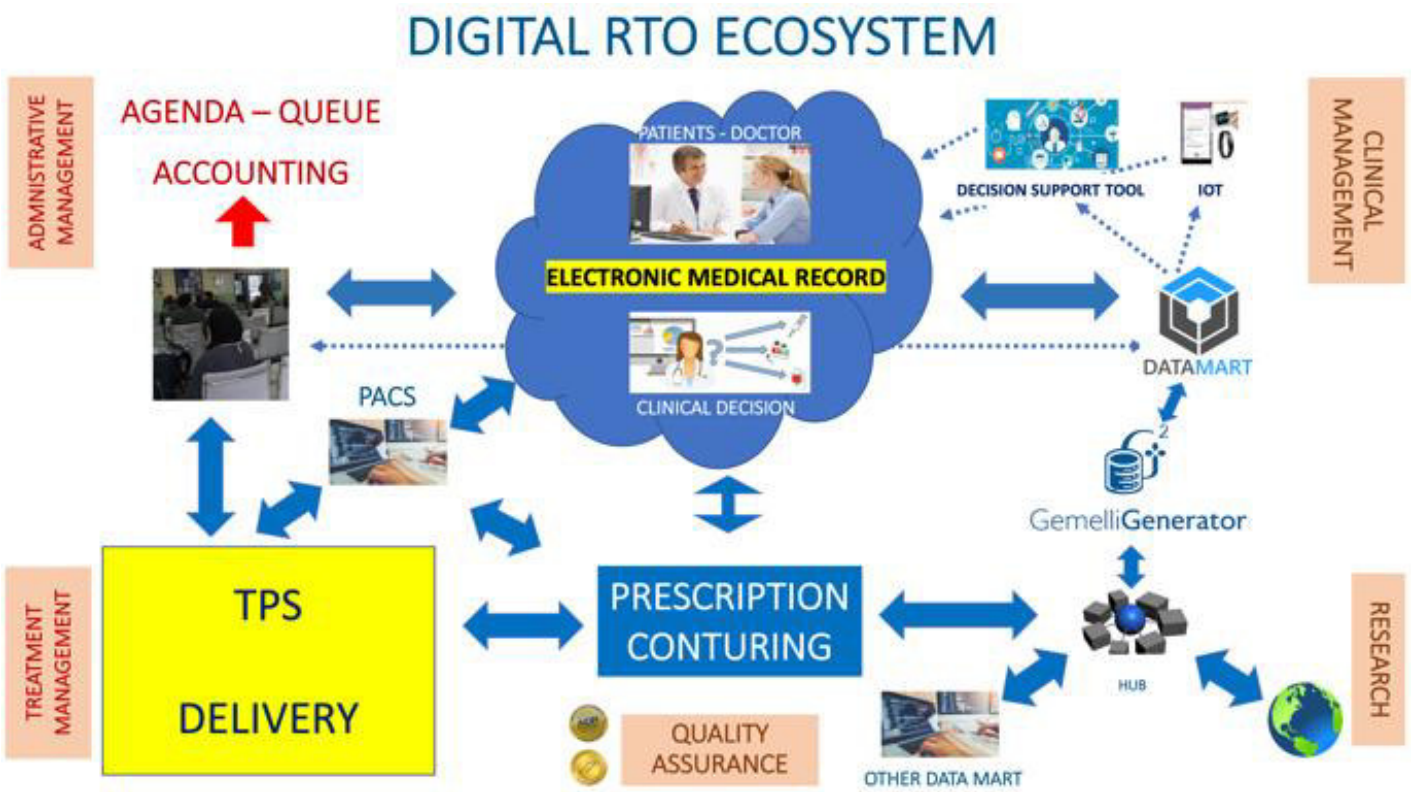
AUGMENTED REALITY VIEWERS

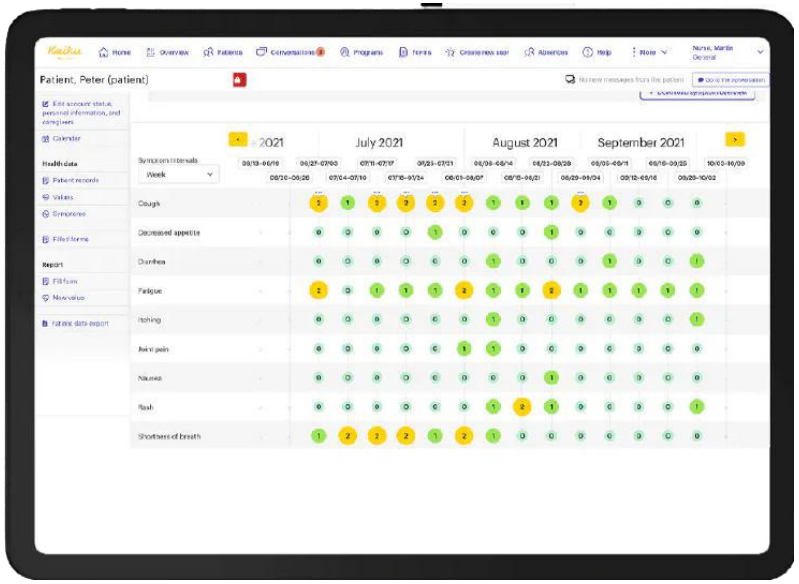


Tutoring and art4ART platform connection

- Tagliaferri L, Fionda B, Casà C, Cornacchione P, Scalise S, Chiesa S, Marconi E, Dinapoli L, Di Capua B, Chieffo DPR, Marazzi F, Frascino V, Colloca GF, Valentini V, Miccichè F, Gambacorta MA. Allies not enemies-creating a more empathetic and uplifting patient experience through technology and art. Strahlenther Onkol. 2024

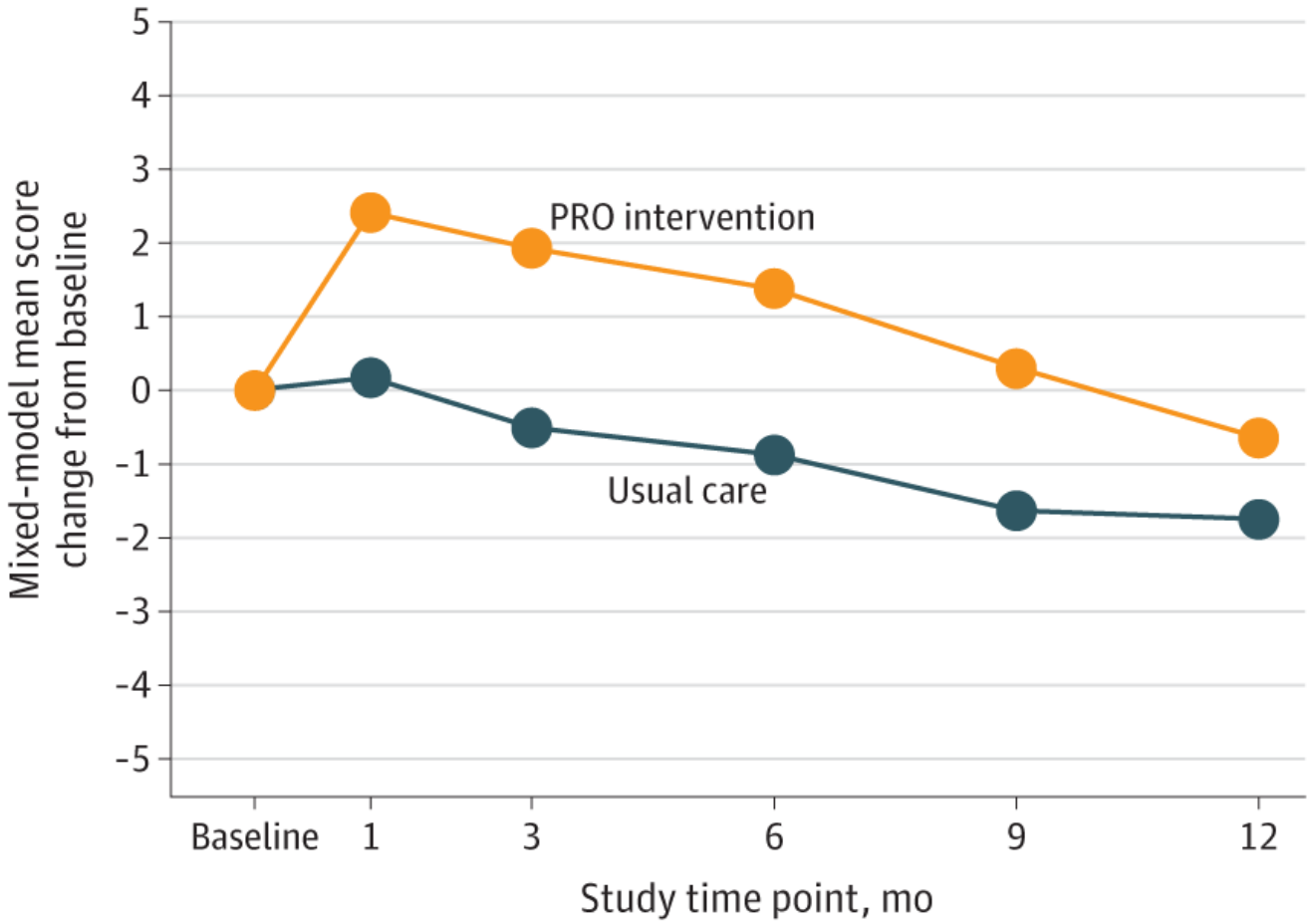
DINAMIC FOLLOW-UP





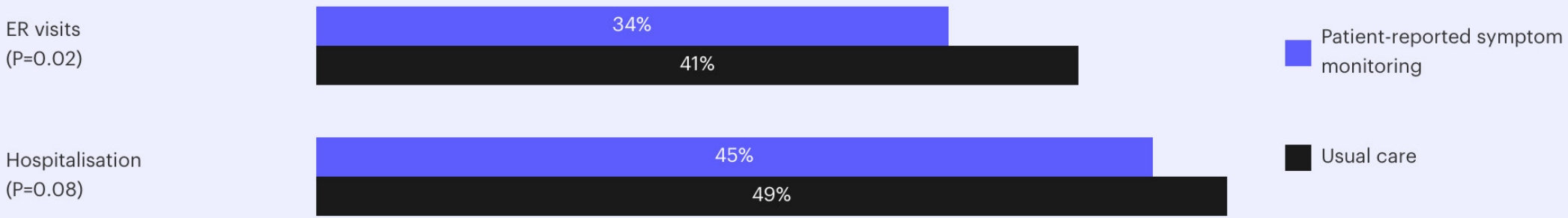
1. Basch, JCO 2017; 2. Basch et al., JAMA 2022; 3. Mir et al. 2020; 4. Patt, JCO Clinical Informatics 2023

C Mean change in health-related quality-of-life score



- Basch E, Deal AM, Dueck AC. Patient-Reported Symptom Monitoring During Chemotherapy-Reply. JAMA. 2017

ER visits and hospitalization at one year mark



-17 to 28%

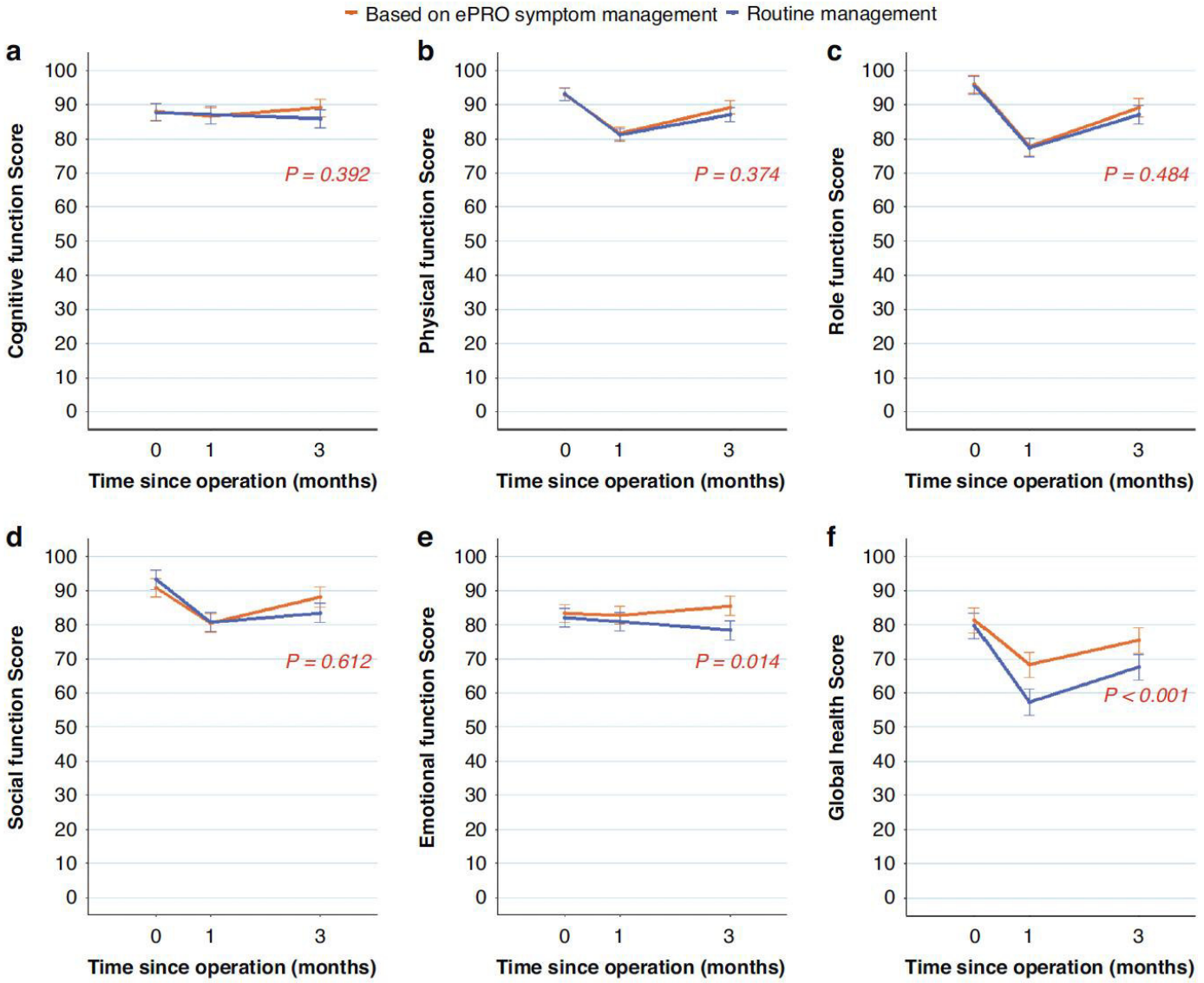
of emergency visits and unplanned hospitalizations[1-4]

-1,6 days

of unplanned hospitalizations[3]

- Basch E, Schrag D, Henson S, Jansen J, Ginos B, Stover AM, Carr P, Spears PA, Jonsson M, Deal AM, Bennett AV, Thanarajasingam G, Rogak LJ, Reeve BB, Snyder C, Bruner D, Cella D, Kottschade LA, Perlmutter J, Geoghegan C, Samuel-Ryals CA, Given B, Mazza GL, Miller R, Strasser JF, Zylla DM, Weiss A, Blinder VS, Dueck AC. Effect of Electronic Symptom Monitoring on Patient-Reported Outcomes Among Patients With Metastatic Cancer: A Randomized Clinical Trial. JAMA. 2022
- Basch E, Allison MD, Mark GK, Howard IS, Clifford AH, Paul S. Symptom Monitoring With Patient- Reported Outcomes During Routine Cancer Treatment: A Randomized Controlled Trial, J Clin Oncol 2016: 34(6), 557–565.

EMOTIONAL DISTRESS



British Journal of Cancer www.nature.com/bjc

ARTICLE OPEN

Clinical Study

Physiological and psychological symptom management based on electronic patient-reported outcomes: the TD-WELLBEING randomized clinical trial

Pengyu Jing[1], Ying Liang[2], Zhijun Tan[2], Xiaolong Yan[1], Jie Lei[1], Yunfeng Ni[1], Ximing Zhu[1], Chun Qiu[3], Jian Wang[1], Peng Ge[4], Yong Zhang[5], Lv Wang[6,7], Nan Zhao[8], Yong Zhang[9], Juan Wang[1], Yan Wang[1], Chunlong Zheng[1], Qiongjie Shao[1], Haiyue Zhang[2], Zhe Yang[2], Haichao Li[1], Jiangjiang Fan[1], Siming Liu[10], Kyriacos Kyriacou[10], Lei Shang[2] and Zhongping Gu[1]

© The Author(s) 2025

Jing P, Liang Y, Tan Z, Yan X, Lei J, Ni Y, Zhu X, Qiu C, Wang J, Ge P, Zhang Y, Wang L, Zhao N, Zhang Y, Wang J, Wang Y, Zheng C, Shao Q, Zhang H, Yang Z, Li H, Fan J, Liu S, Kyriacou K, Shang L, Gu Z. Physiological and psychological symptom management based on electronic patient-reported outcomes: the TD-WELLBEING randomized clinical trial. Br J Cancer. 2025 Oct;

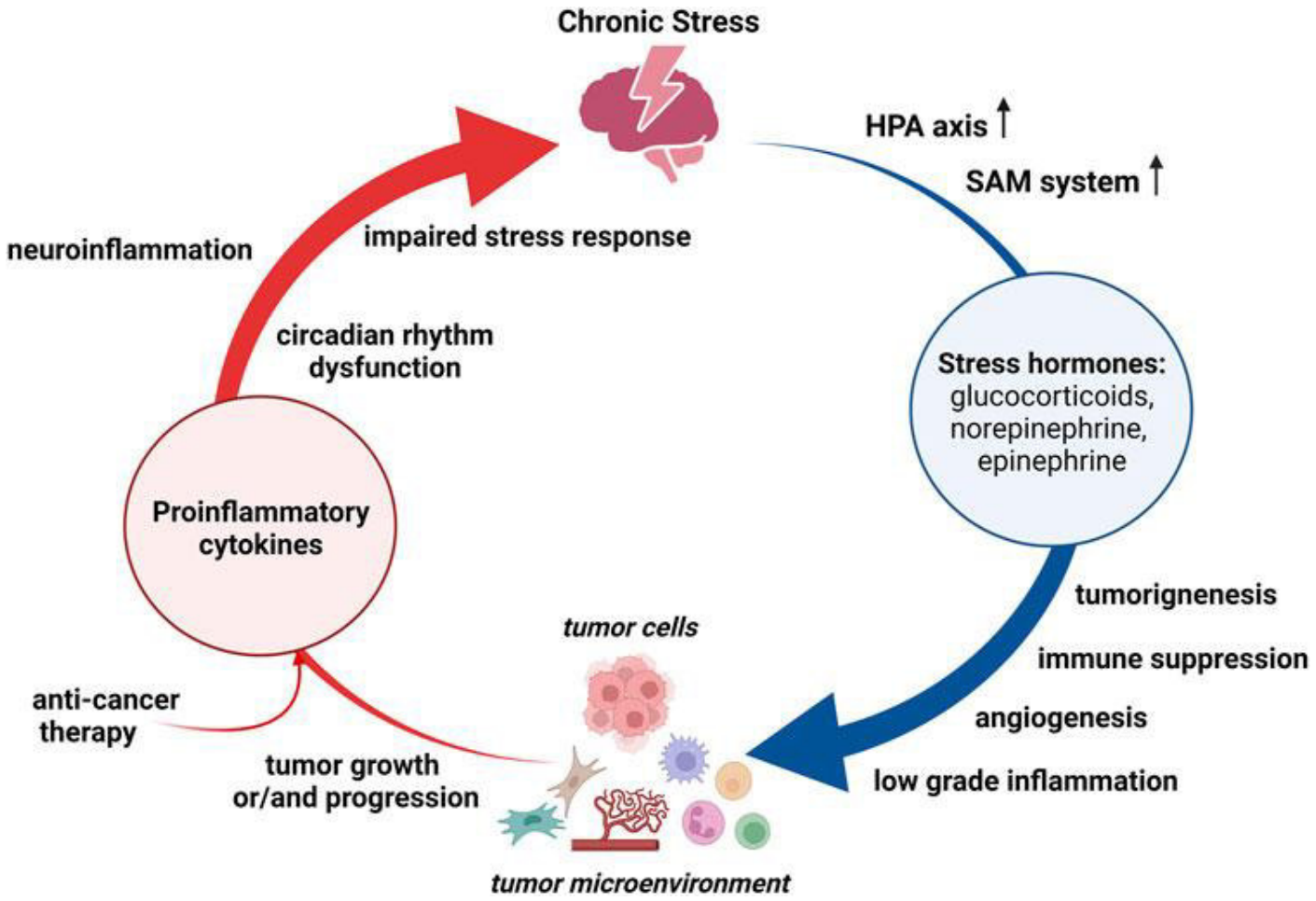
EMOTIONAL DISTRESS

nature medicine

Article https://doi.org/10.1038/s41591-024-02929-4

Association between pretreatment emotional distress and immune checkpoint inhibitor response in non-small-cell lung cancer

ED group showed elevated blood cortisol



Zeng Y, Hu CH, Li YZ, Zhou JS, Wang SX, Liu MD, Qiu ZH, Deng C, Ma F, Xia CF, Liang F, Peng YR, Liang AX, Shi SH, Yao SJ, Liu JQ, Xiao WJ, Lin XQ, Tian XY, Zhang YZ, Tian ZY, Zou JA, Li YS, Xiao CY, Xu T, Zhang XJ, Wang XP, Liu XL, Wu F. Association between pretreatment emotional distress and immune checkpoint inhibitor response in non-small-cell lung cancer. Nat Med. 2024

Vignjević Petrinović S, Milošević MS, Marković D, Momčilović S. Interplay between stress and cancer-A focus on inflammation. Front Physiol 2023

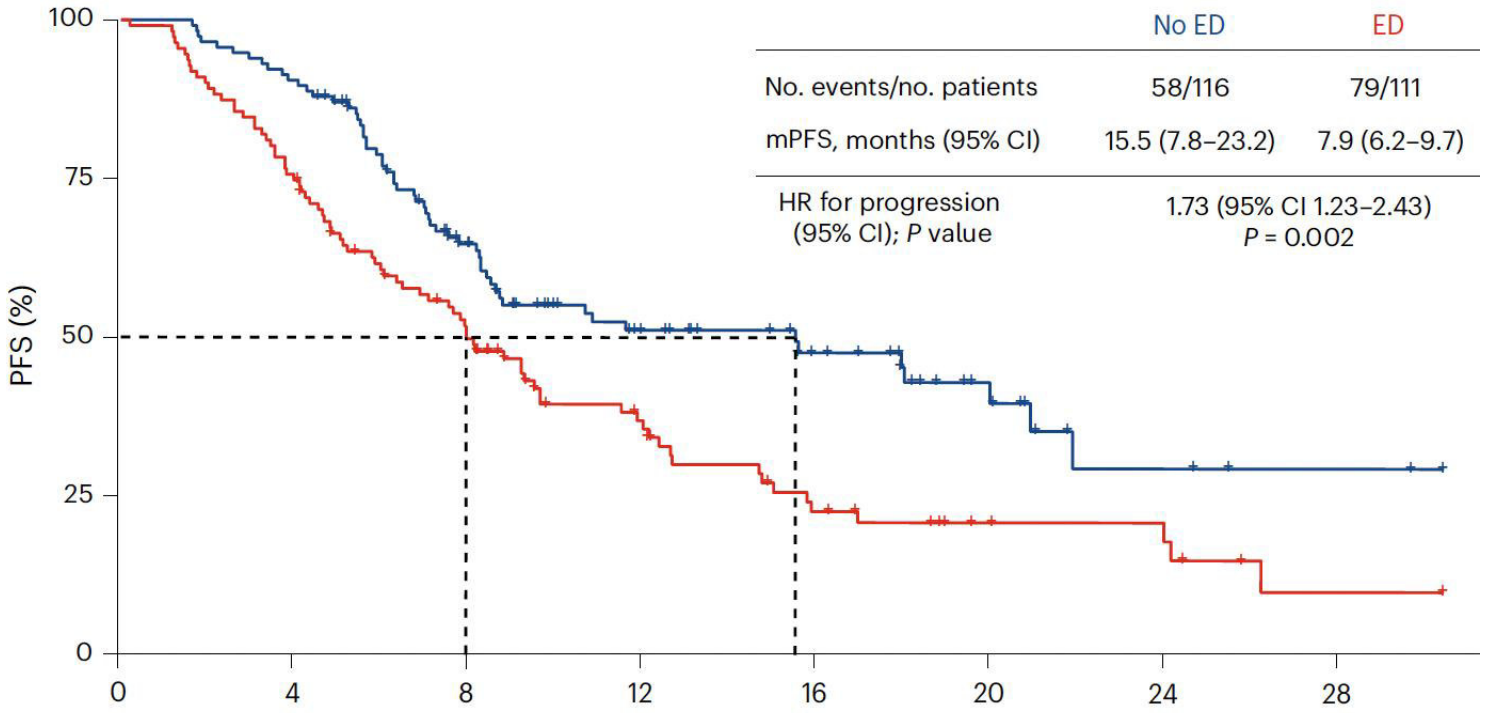
EMOTIONAL DISTRESS

nature medicine

Article https://doi.org/10.1038/s41591-024-02929-4

Association between pretreatment emotional distress and immune checkpoint inhibitor response in non-small-cell lung cancer

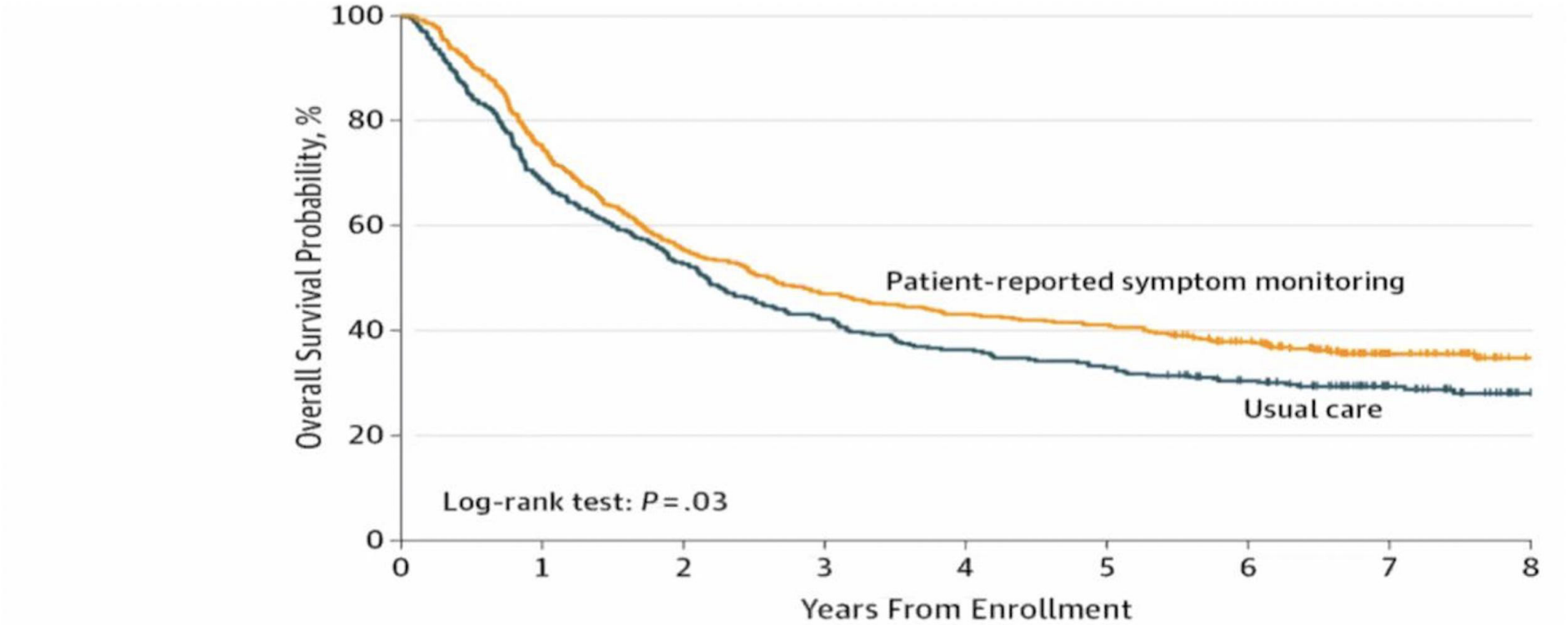
ED group showed elevated blood cortisol levels, which **was associated with adverse survival outcomes**. This study suggests that there is an **association between ED and worse clinical outcomes** in patients with advanced non-small-cell lung cancer treated with ICIs, highlighting the potential significance of addressing ED in cancer management



CART Advanced Radiation Therapy

Zeng Y, Hu CH, Li YZ, Zhou JS, Wang SX, Liu MD, Qiu ZH, Deng C, Ma F, Xia CF, Liang F, Peng YR, Liang AX, Shi SH, Yao SJ, Liu JQ, Xiao WJ, Lin XQ, Tian XY, Zhang YZ, Tian ZY, Zou JA, Li YS, Xiao CY, Xu T, Zhang XJ, Wang XP, Liu XL, Wu F. Association between pretreatment emotional distress and immune checkpoint inhibitor response in non-small-cell lung cancer. Nat Med. 2024

EMOTIONAL DISTRESS



No. at risk									
Patient-reported symptom monitoring	441	331	244	207	190	181	148	65	33
Usual care	325	223	171	137	118	107	89	50	27

- Basch E, Schrag D, Henson S, Jansen J, Ginos B, Stover AM, Carr P, Spears PA, Jonsson M, Deal AM, Bennett AV, Thanarajasingam G, Rogak LJ, Reeve BB, Snyder C, Bruner D, Cella D, Kottschade LA, Perlmutter J, Geoghegan C, Samuel-Ryals CA, Given B, Mazza GL, Miller R, Strasser JF, Zylla DM, Weiss A, Blinder VS, Dueck AC. Effect of Electronic Symptom Monitoring on Patient-Reported Outcomes Among Patients With Metastatic Cancer: A Randomized Clinical Trial. JAMA. 2022