European Commission | Horizon 2020 European Union funding for Research & Innovation

Artificial Intelligence Supporting Cancer Patients across Europe

ASCAPE

Clinical Coordinator: Paris A. Kosmidis (Care Across)
paris.kosmidis@careacross.com

Medical Oncologist
Former President, European Society for Medical Oncology

The broader context

The incidence of Cancer is growing.

However, patients live longer

The number of survivors is continuously increasing.

Quality of Life

- In spite of long survival, Quality of Life of these patients is impaired due to both cancer and its treatments.
- Many patients are suffering from side-effects and need support.

An unmet need

Supporting cancer patients during or after treatment is of paramount importance which, however, is an unmet need

- Lack of healthcare
- Limited available time of Physicians
- Financial reasons
- Social reasons
- Not yet a priority

"Digital Oncology"

- "Digital Oncology" is a reality.
- COVID-19 Pandemic increased the speed of applicability.
- Big data analytics and Artificial Intelligence are progressing and have emerging role in several clinical aspects of Oncology.

Artificial Intelligence

- By contrast, Artificial Intelligence, so far, has had very limited role in supporting cancer patients with impaired Quality of life.
- Limited evidence with prospective studies.

Target audience

Commonest cancers with long survival and longstanding side effects.

- Breast cancer for female
- Prostate cancer for male

European Commission
Horizon 2020
European Union funding
for Research & Innovation

The ASCAPE goal

ASCAPE was born with a goal to provide targeted, personalised support to breast and prostate cancer patients.

This will be achieved with AI-based predictions for QoL and suggest evidence-based interventions to their physicians.

Methodology

Four pilot sites:

1. Hospital clinic de Barcelona (and iSYS Foundation)
   Breast cancer
2. Sismanogleio Hospital, NKUA
   Prostate cancer
3. Orebro and Uppsala University
   Breast and Prostate cancer
4. CareAcross online platform
   Breast and Prostate cancer

Methodology

- The study will last for 12months.
- Every 3 months, all patients will receive the same QoL questionnaires electronically.
- All data will be incorporated to ASCAPE platform.
- The incorporation will take place either transferring the data or integrating ASCAPE platform into the follow-up strategy.
- Wearable devices will be used by some of the patients.

European Commission
Horizon 2020
European Union funding
for Research & Innovation

QoL Issues

The identification of the QoL issues to be predicted by the ASCAPE platform was based on current evidence (PubMed) and clinical practice for breast and prostate cancer.

QoL Issues

From the initial list of several QoL issues, the clinical partners prioritized the final list, based on:

- Frequency.
- Magnitude of impact on patients' daily life.
- Potential positive impact, if the QoL issue can be predicted.

QoL Issues

Further assessment by clinical partners based on:
Ability of ASCAPE platform to propose specific interventions

Aspects under consideration:

- Frequency of QoL issue.
- Self reporting.
- Need for clinical examination.
- Emergencies.
- Risk of AI intervention

7 QoL Issues per cancer type

Breast Cancer

- Anxiety
- Depression
- Fatigue
- Weight gain
- Hot Flushes
- Joint Pain
- Neurotoxicity

Prostate Cancer:

- Anxiety
- Depression
- Fatigue
- Weight Changes
- Hot Flushes
- Incontinence
- Sexual Dysfunction

Proposed Interventions

Breast Cancer

Proposed Interventions *(Work in Progress)*

Proposed interventions for breast cancer patients

Anxiety

- Anti-stress techniques: Mindfulness, Yoga
- Movement-based relaxation techniques
- Physical activity (e.g nordic walk)
- Promotion of positive familiar and social relationship
- Psychological support
- Psychiatric support
- Anxiolytics
- Anti-depressants

Proposed interventions for breast cancer patients

Depression

- Anti-stress techniques (e.g mindfulness)
- Movement-based relaxation techniques
- Physical activity (e.g nordic walk)
- Promotion of positive familiar and social relationship
- Psychological support
- Psychiatric support
- Anti-depressants

Proposed interventions for breast cancer patients

Fatigue

- Anti-stress techniques (e.g mindfulness)
- Movement-based relaxation techniques
- Physical activity (e.g nordic walk)
- Promotion of positive familiar and social relationship
- Psychological support
- Nutrition consultation
- Interventions for sleep disturbancies

Proposed interventions for breast cancer patients

Weight gain

- **Diet**
- **Nutrition consultation**
- **Physical activity (e.g nordic walk)**

Proposed interventions for breast cancer patients

Hot flushes

- **Physical activity**
- **Movement-based relaxation techniques**
- **Psychological support**
- **Antidepressants**
- **Anticonvulsant agents**

Proposed interventions for breast cancer patients

Joint pain

- **Movement-based relaxation techniques**
- **Physical activity**
- **Acupuncture**
- **Switch to another aromatase inhibitor**
- **Switch from aromatase inhibitor to tamoxifen**
- **Analgesic (NSAID or others)**
- **Duloxetine**

Proposed interventions for breast cancer patients

Neurotoxicity

- **Physical activity**
- **Movement-based relaxation techniques**
- **Acupuncture**
- **Antidepressants: duloxetine**

Proposed Interventions

Prostate Cancer

Proposed Interventions *(Work in Progress)*

Proposed interventions for prostate cancer patients

Anxiety

- Anti-stress techniques: Mindfulness, Yoga
- Movement-based relaxation techniques
- Physical activity (e.g nordic walk)
- Promotion of positive familiar and social relationship
- Psychological support
- Psychiatric support
- Anxiolytics
- Anti-depressants

Proposed interventions for prostate cancer patients

Depression

- Anti-stress techniques (e.g mindfulness)
- Movement-based relaxation techniques
- Physical activity (e.g nordic walk)
- Promotion of positive familiar and social relationship
- Psychological support
- Psychiatric support
- Anti-depressants

Proposed interventions for prostate cancer patients

Fatigue

- Anti-stress techniques (e.g mindfulness)
- Movement-based relaxation techniques
- Physical activity (e.g nordic walk)
- Promotion of positive familiar and social relationship
- Psychological support
- Nutrition consultation
- Interventions for sleep disturbancies

Proposed interventions for prostate cancer patients

Weight changes

- **Diet**
- **Nutrition consultation**
- **Physical activity (e.g nordic walk)**

Proposed interventions for prostate cancer patients

Hot flushes

- Physical activity
- Movement-based relaxation techniques
- Psychological support
- Progesterone / progestin
- Cyproterone
- Antidepressants
- Anticonvulsant agents
- Androgen deprivation treatment manipulation

Proposed interventions for prostate cancer patients

Incontinence

- Pelvic muscle training with or without biofeedback
- Electrical stimulation
- Extracorporeal magnetic innervation
- Compression devices
- Lifestyle changes
- Slings and artificial urinary sphincters

Proposed interventions for prostate cancer patients

Sexual dysfunction

- Couple counseling
- 5DE inhibitors
- Intracavernosal injections
- Androgen deprivation treatment manipulation
- Penile prosthesis or pumps

Outcome of Interventions

Outcome of Interventions:

- resolved
- improved
- unchanged
- deteriorated

Evaluation

Evaluation of AI-based follow-up strategy with ASCAPE platform

Patients:

- Satisfaction
- Wearables barriers & facilitators
- Motivation for intervention
- Engagement
- Adherence to intervention
- QoL over time

Physicians:

- Relationship to patients
- QoL issue early diagnosis
- Changes in management
- Assessment of time needed to use AI-based follow-up
- Acceptability of using AI
- Usefulness of provided information
- Interaction between AI-based follow-up system and physicians
- Experience of using the AI-based follow-up platform

Ethical considerations & GDPR (General Data Protection Regulation)

ASCAPE will follow the high standards of information security, privacy and transparency and place a high priority on protecting and managing data according to Ethical Standards and data protection legislation at national and European level.

Conclusion (1 of 2)

ASCAPE is a project that will prospectively investigate an AI-based follow-up of patients with breast and prostate cancer, on a personalised basis.

The main goal is to offer substantial improvement of the QoL of these patients.

Conclusion (2 of 2)

ASCAPE is a typical example on how to use AI and Big Data in cancer care. This is a paradigm shift regarding the follow-up of cancer patients with focus on improving their QoL, which is an important unmet need.

- Contact information: paris.kosmidis@careacross.com