

#PHC23

BREAKOUT SESSION

LIVING WITH DISEASE

Holistic approaches to cancer care: From exercise and nutrition to ambulatory data collection and behavioral interventions

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BREAKOUT SESSION – LIVING WITH DISEASE

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Designing effective behavior change interventions

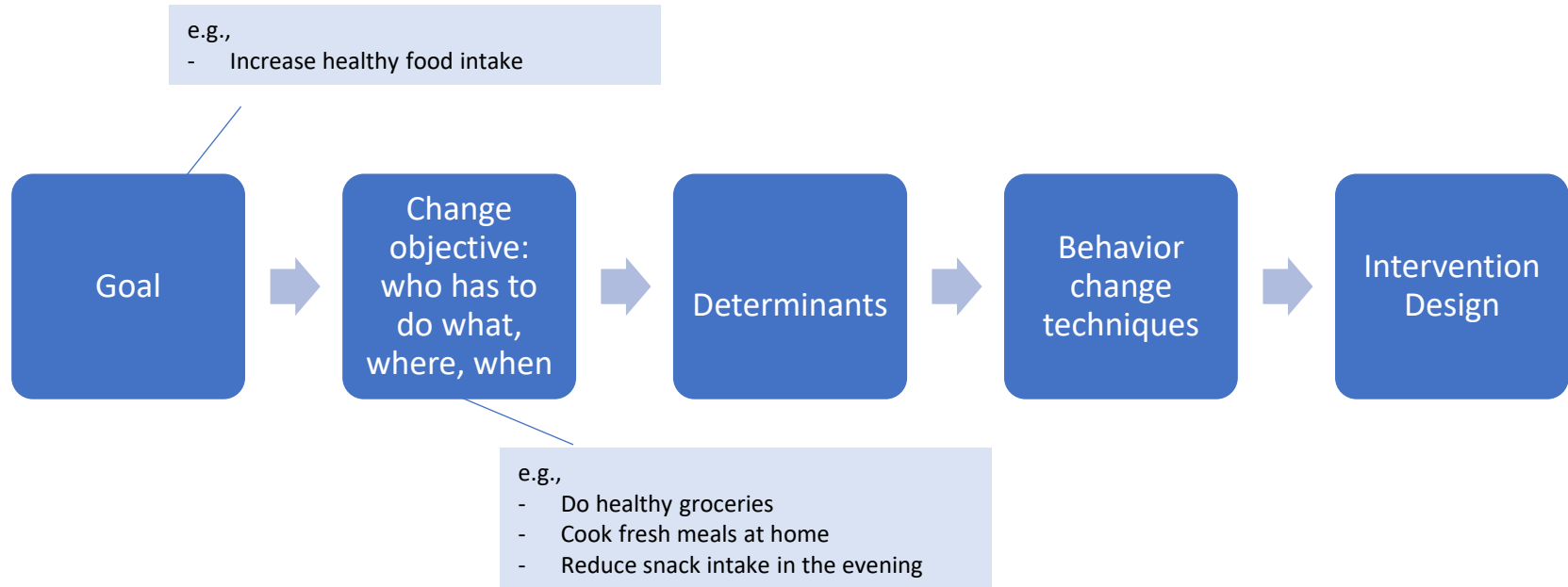
Dr. Floor Kroese, behavioral scientist

UU Department of Social, Health, & Organizational Psychology; RIVM Behavior & Health Unit

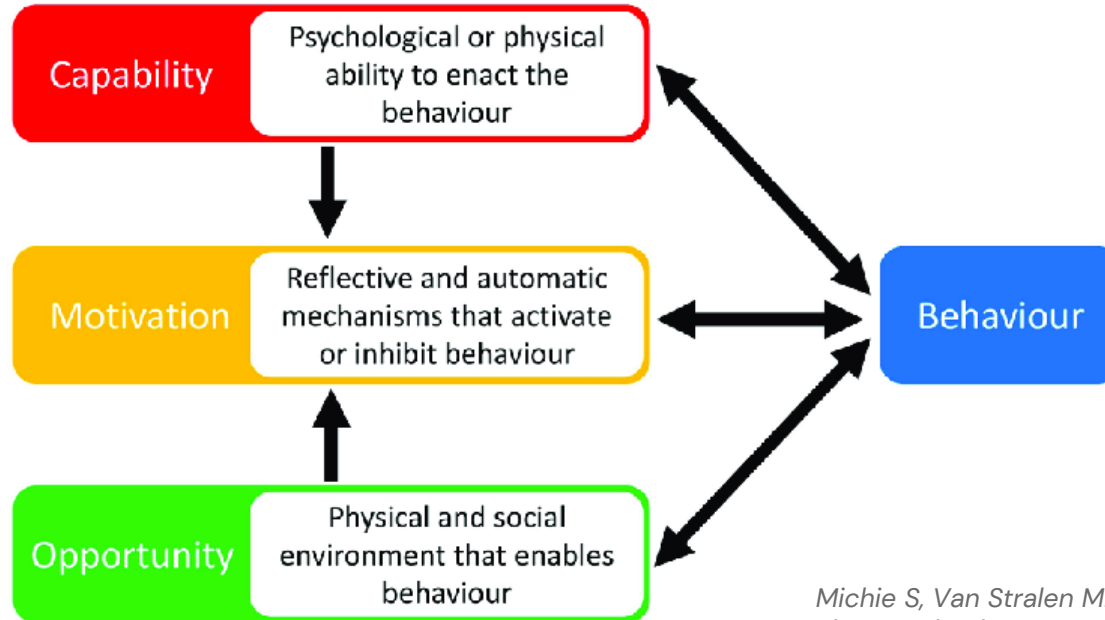
Lifestyle change = behavior change

- Healthy lifestyle reduces risk of cancer and improves prognosis (e.g., Zhang et al., 2020; Clinton et al., 2020; Van Blarigan et al., 2018; Davies et al., 2011)
- Lifestyle change can be difficult to achieve (and maintain!) (e.g., Courcoulas et al., 2015; Stacey et al., 2015)

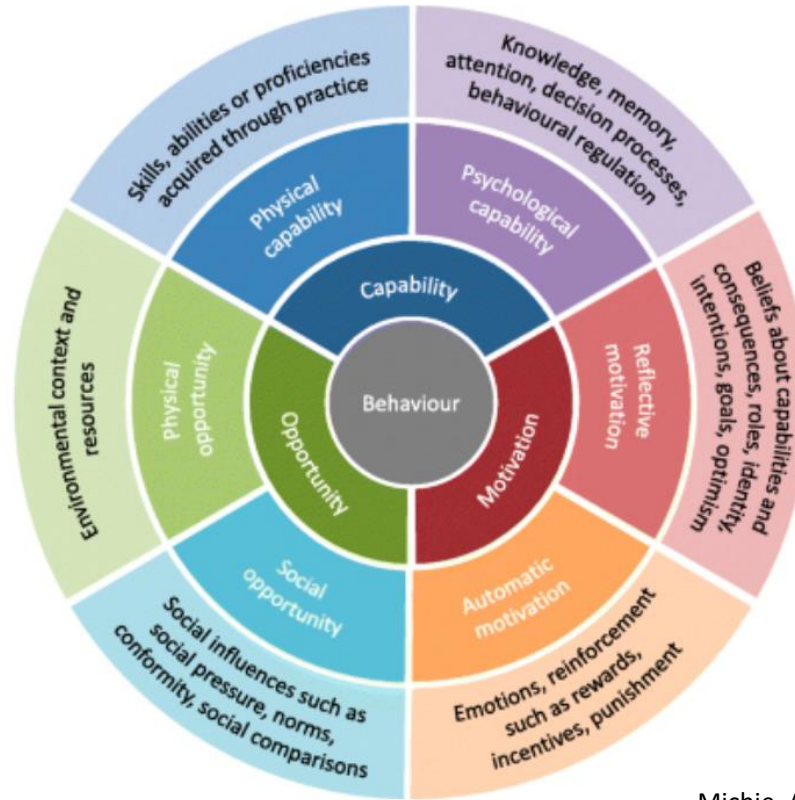
Structured approach to behavior change



The COM-B model



Michie S, Van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. Implement Sci. 2011;6(1):1-12



Michie, Atkins, & West, 2014

Picture from: <https://www.habitweekly.com/models-frameworks/the-com-b-model>

- **Physical capability**
- *Do people need to overcome physical limitations to do the behaviour?*
- *Do people have the physical skills needed (dexterity, strength, eyesight...)*
- **Psychological capability**
- *Do people need to know more about the behaviour?*
- *Do the people need to understand why the behaviour is important?*
- *Do people need to overcome mental obstacles?*
- *Do people need to pay attention to do the behaviour?*
- *Do people find the behaviour easy to do?*

- **Physical opportunity**

- *Do people have the time to do the behaviour?*
- *Do people have the financial resources to do the behaviour?*
- *Do people need special tools to do the behaviour?*
- *Are there triggers in the environment to prompt the behaviour?*

- **Social opportunity**

- *Do people have the social support required to do the behaviour?*
- *Do other people encourage or discourage the behaviour?*
- *Do other people behave in a similar way?*

- **Reflective motivation**

- *Do people feel like they want or need to do the behaviour?*
- *Do people care about the consequences?*
- *Do people believe that they can do the behaviour successfully?*

- **Automatic motivation**

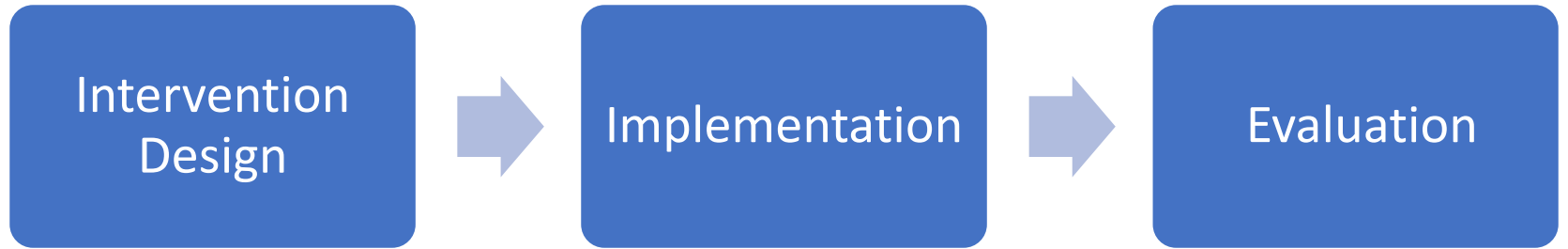
- *Do people have the habit of doing it?*
- *Are people rewarded for doing/not doing the behaviour?*

Determinant -> behavior change technique

Identified barrier	Corresponding behavior change technique
Self-regulation skills (psych capability)	E.g., Planning tools
Social support (opportunity)	E.g., Restructuring physical environment
Beliefs about capabilities (motivation)	E.g., Providing instruction or demonstration of the behavior
Etc.	

- Some factors are more easily addressed than others
- I-frame vs S-frame (Chater & Loewenstein, 2022)

And then what



Implementation

- More attention to implementation in practice
 - role of physician: “who has to do what, when, and where”?
 - lack of behavior specialists in hospitals?





Evaluating interventions

- Assess not only the intended outcome, but also the intended mechanism of change
 - If effects are smaller than expected:
 - No changes in determinant? -> behavior change technique did not work as intended
 - Change in determinant but not on outcome? -> other/additional determinants may need to be addressed
- Many interventions, very little evidence for robust, long-term effects
 - Collaboration, building on existing projects, long-term financing



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Exercise, physical activity and cancer

Dr. Evelyn Monninkhof

Julius Centrum



UMC Utrecht

Prevention

Exercise For Cancer Prevention and Treatment



American College of Sports Medicine
Roundtable Report on Physical Activity,
Sedentary Behavior, and Cancer
Prevention and Control

Citation: <http://bit.ly/moving-through-cancer>

ALPA V. PATEL¹, CHRISTINE M. FRIEDENBERG², STEVEN C. MOORE³, SANDRA C. HAYES⁴, JULIE K. SILVER⁵,
KRISTEN L. CAMPBELL⁶, KERRI WINTERS-STONE⁷, LYNN H. GERBER⁸, STEPHANIE M. GEORGE⁹,
JANET E. FELTON¹⁰, CRYSTAL DENLINGER¹¹, G. STEPHEN MORRIS¹², TRISHA HUE¹³, KATHRYN H. SCHMITZ¹⁴,
and CHARLES E. MATTHEWS¹⁵

MEDICINE & SCIENCE IN SPORTS & EXERCISE. DOI:
10.1249/MSS.0000000000002117

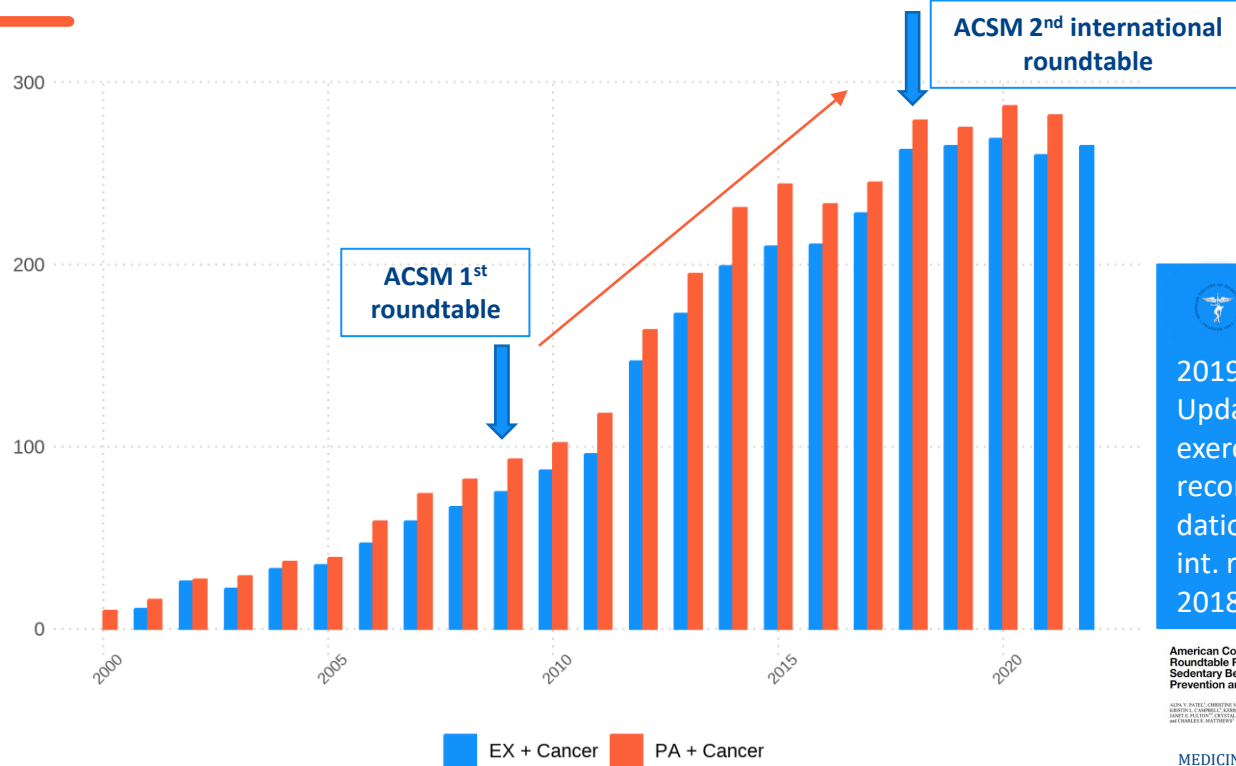
After cancer diagnosis
Physical activity is associated
with a better prognosis of
breast, colon and prostate
cancer.

Exercise and cancer

Effects of exercise on cancer- and treatment-related side effects



Exercise-oncology research field is moving!



2019 Update Cancer exercise recommendations (ACSM int. roundtable 2018)

ASCO Guidelines

2022 Exercise, Diet, and Weight Management During Cancer Treatment

American College of Sports Medicine Roundtable Report on Physical Activity, Sedentary Behavior, and Cancer Prevention and Control

Exercise, Diet, and Weight Management During Cancer Treatment: ASCO Guideline

AMERICAN COLLEGE OF SPORTS MEDICINE ROUNDTABLE REPORT ON PHYSICAL ACTIVITY, SEDENTARY BEHAVIOR, AND CANCER PREVENTION AND CONTROL. 2019. DOI: 10.1249/SSM.0000000000000000. URL: https://www.acsm.org/roundtable-report-on-physical-activity-sedentary-behavior-and-cancer-prevention-and-control/

EXERCISE, DIET, AND WEIGHT MANAGEMENT DURING CANCER TREATMENT: ASCO GUIDELINE. 2022. DOI: 10.1200/JCO.2021.41.15.1. URL: https://www.jco.org/journal/41/15/1/15151

MEDICINE & SCIENCE IN SPORTS & EXERCISE 2019

JOURNAL CLINICAL ONCOLOGY 2022



Pubmed search September 2023 (Filter RCT)

Evidence

Outcomes

Strong evidence

- Anxiety
- Depressive symptoms
- Fatigue
- Quality of life
- Physical functioning
- Lymphedema

Moderate evidence

- Sleep
- Bone health

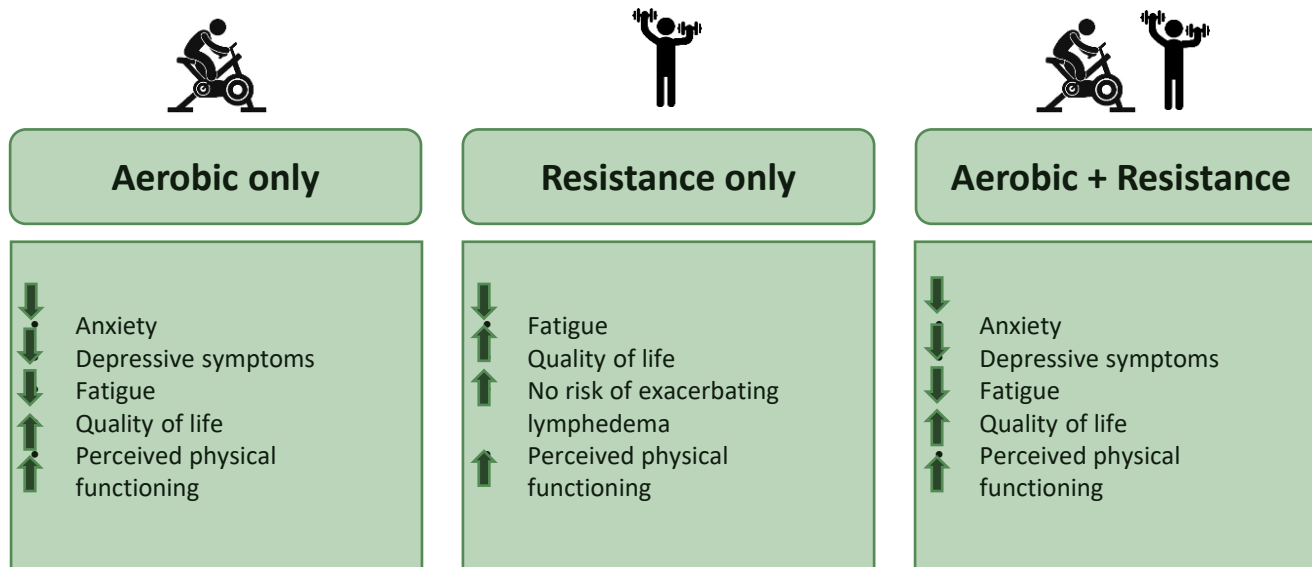
Unclear

- Sexual functioning
- Treatment adherence

- Other cancer types
- Advanced cancers

2022 ASCO guideline Diet, Physical Activity and Weight Management During Cancer Treatment: STRONG evidence for beneficial effects of exercise during cancer treatment (Ligibel, Bohlke, May et al. JCO 2022)

Exercise guidelines for cancer survivors



Exercise guidelines for cancer survivors



Aerobic only

- ↓ Anxiety
- ↓ Depressive symptoms
- ↓ Fatigue
- ↑ Quality of life
- ↑ Perceived physical functioning



Resistance only

- ↓ Fatigue
- ↑ Quality of life
- ↑ No risk of exacerbating lymphedema
- ↑ Perceived physical functioning



Aerobic + Resistance

- ↓ Anxiety
- ↓ Depressive symptoms
- ↓ Fatigue
- ↑ Quality of life
- ↑ Perceived physical functioning

Aerobic exercise
3x per week
30 min per session
Moderate intensity



Resistance exercise
2x per week
30 min per session
2-3 sets, large muscle groups



Fatigue

- Exercise at > moderate intensity
- Low intensity is probably not effective
- Dose-reponse relationship is plausible
→ up to 150 min/week
- Larger effects: longer sessions (>30')
- Larger effects: longer duration of program (>12 weeks)
- Setting and level of supervision are not important for this outcome
- However, a recent IPD-MA shows effects of supervised exercise programs

(Van Vulpen et al. Med Sci Sports Exerc. 2019)

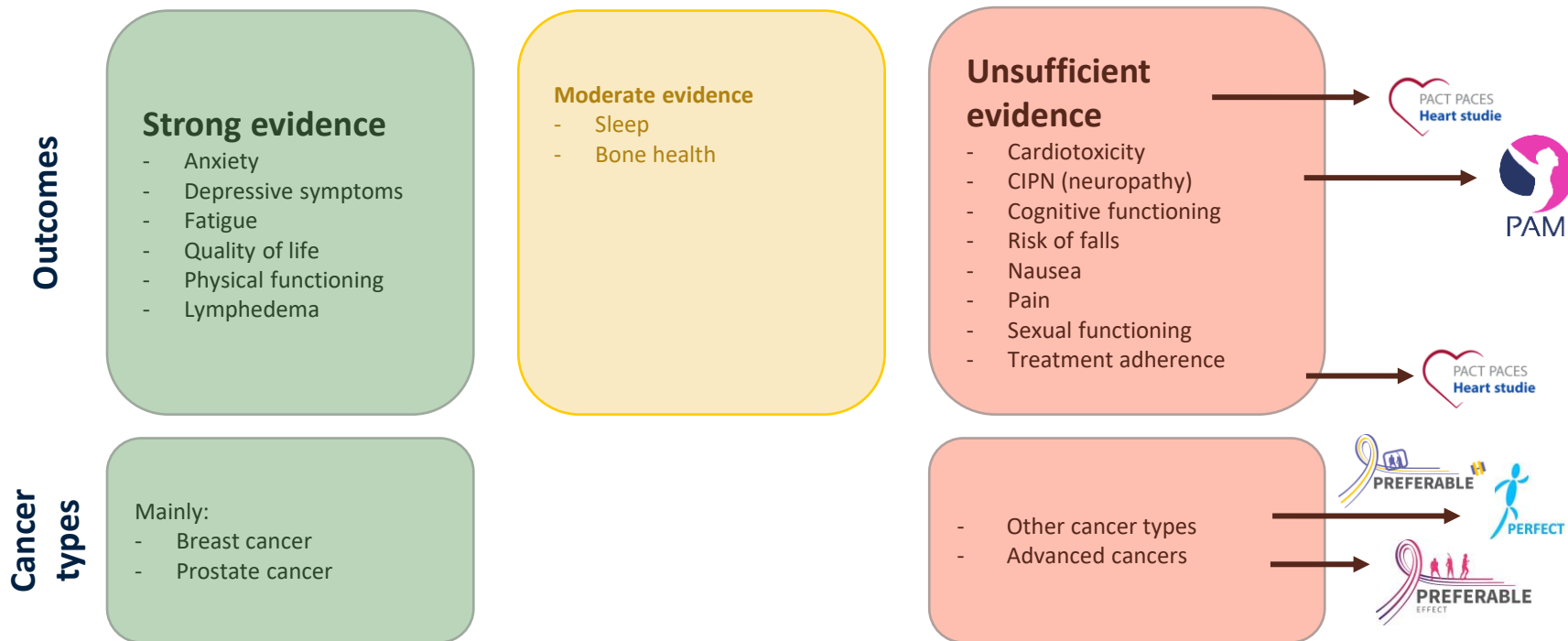
Conclusion

Exercise programs during and after cancer treatment are safe and effective

→ Are these findings also applicable to patients with advanced cancer?

→ Results are mainly based on studies among patients with breast cancer

Evidence



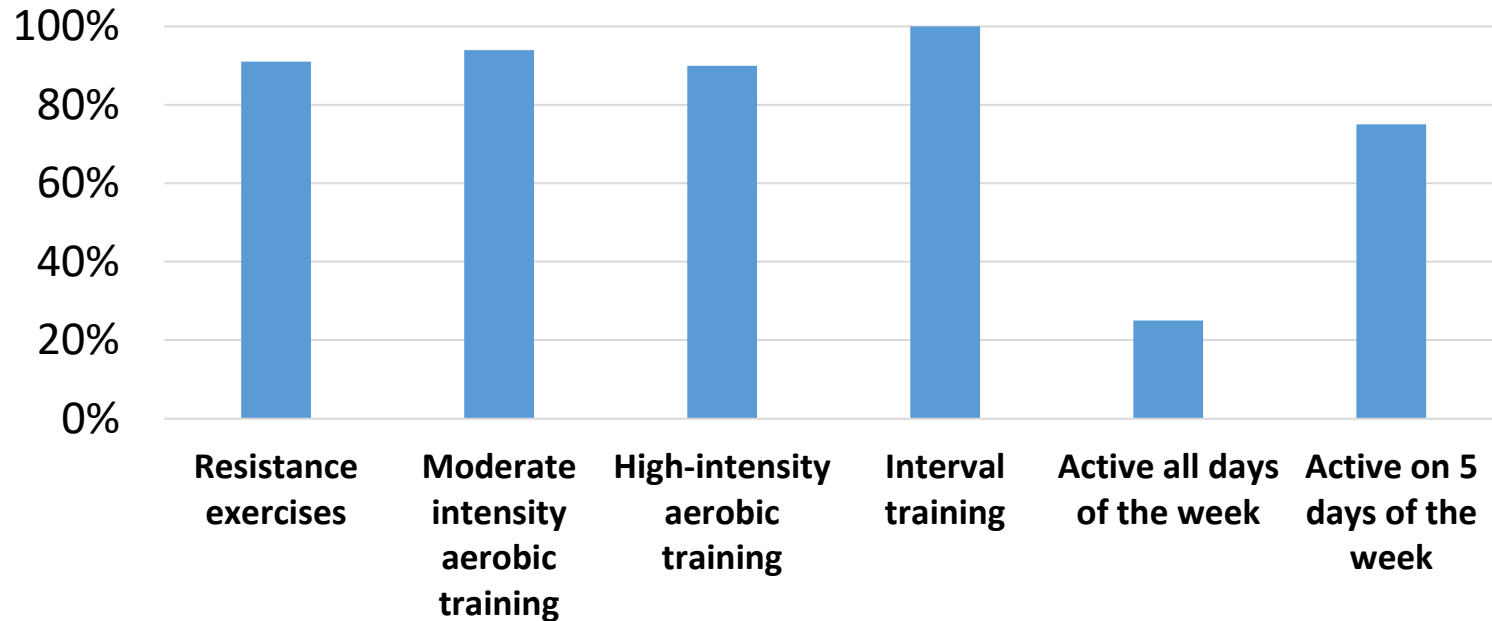
Experiences of a patient

Tamara participates in an exercise study: Benefit study

- Exercise during neo-adjuvant chemotherapy for breast cancer
- What were her experiences of doing aerobic exercise during chemotherapy treatment?

Questions

Adherence to the exercise program PERFECT study



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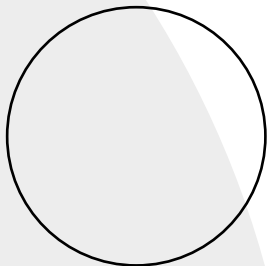
Evelyn Monninkhof
UMCU

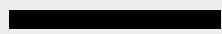


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Pieter van Gorp
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Wearable Experience Sampling with Expericer: Combining Sensor Data with Responses to Personalized Prompts

ALIREZA KHANSHAN, PIETER VAN GORP, PANOS MARKOPOULOS
I4PH 2023 CONFERENCE

Pieter Van Gorp, Associate Professor
Eindhoven University of Technology

Collecting health-related data longitudinally

- Health-related data
 - Emotions
 - Subjective wellbeing
 - Objective sensor data
 - ...
- In the wild:
 - at home
 - in the public space

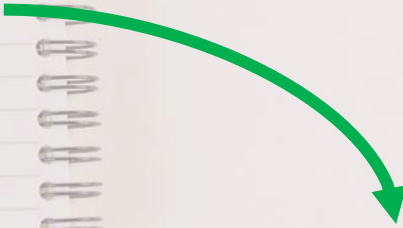


Evolution of Methods

Diary
Observation
Survey



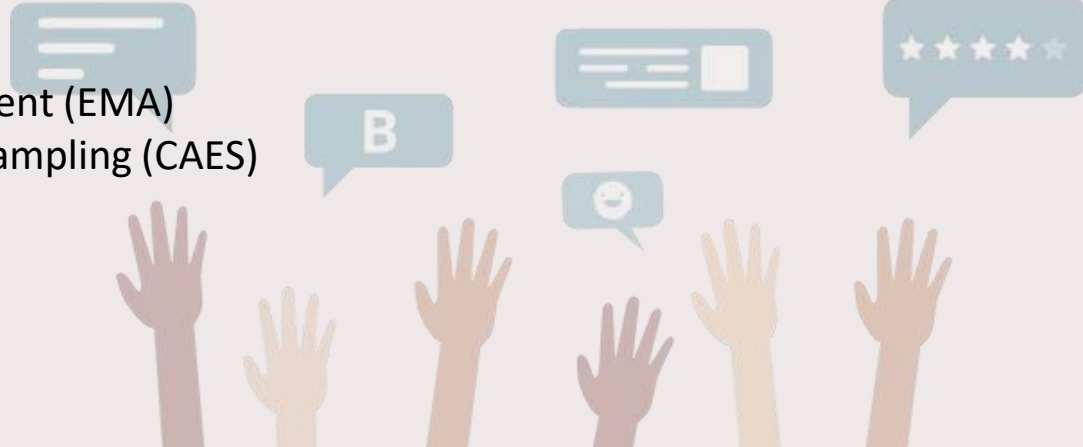
Retrospection
Reactivity



Experience sampling method

The Experience Sampling Method (ESM)

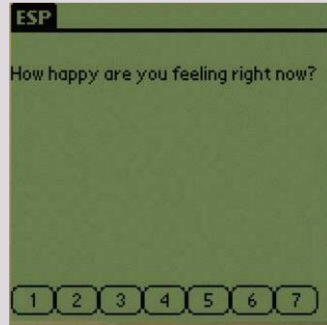
- Notification (beeps/prompts) are systematically spread
- During day-to-day activities
- Higher ecological validity
- Variants
 - Ecological Momentary Assessment (EMA)
 - Contextual Aware Experience Sampling (CAES)



History of ESM Digital Devices



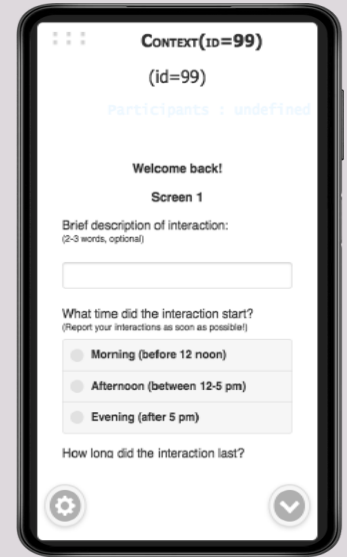
Electronic Mood Device
Hoeksma et al. (2000)



Experience Sampling Program
Barrett and Barrett (2005)



Psymate
Myin-Germeys et al. (2011)



TEMPEST
Batalas et al. (2018)

ESM is *not* a Panacea

- Drop out (especially for studies that should last longer)
- Response rate declines

Why?

Intrusive

At inopportune times

With technical difficulties

...

Recent Efforts

- Personalization (timing, content, ...)
- Context-sensitivity (location, calendar events, PA level, ...)
- Mainly on smartphones
- Prevalence of commodity-level smartwatches
 - More sensors
 - Accurate sensors
 - Higher reachability (wrist-worn)

Wearable Experience Sampling Method (wESM)



WellBeat
Park et al. (2020)



μEMA
Intille et al. (2016)



ROAMM
Kheirkhan et al. (2019)



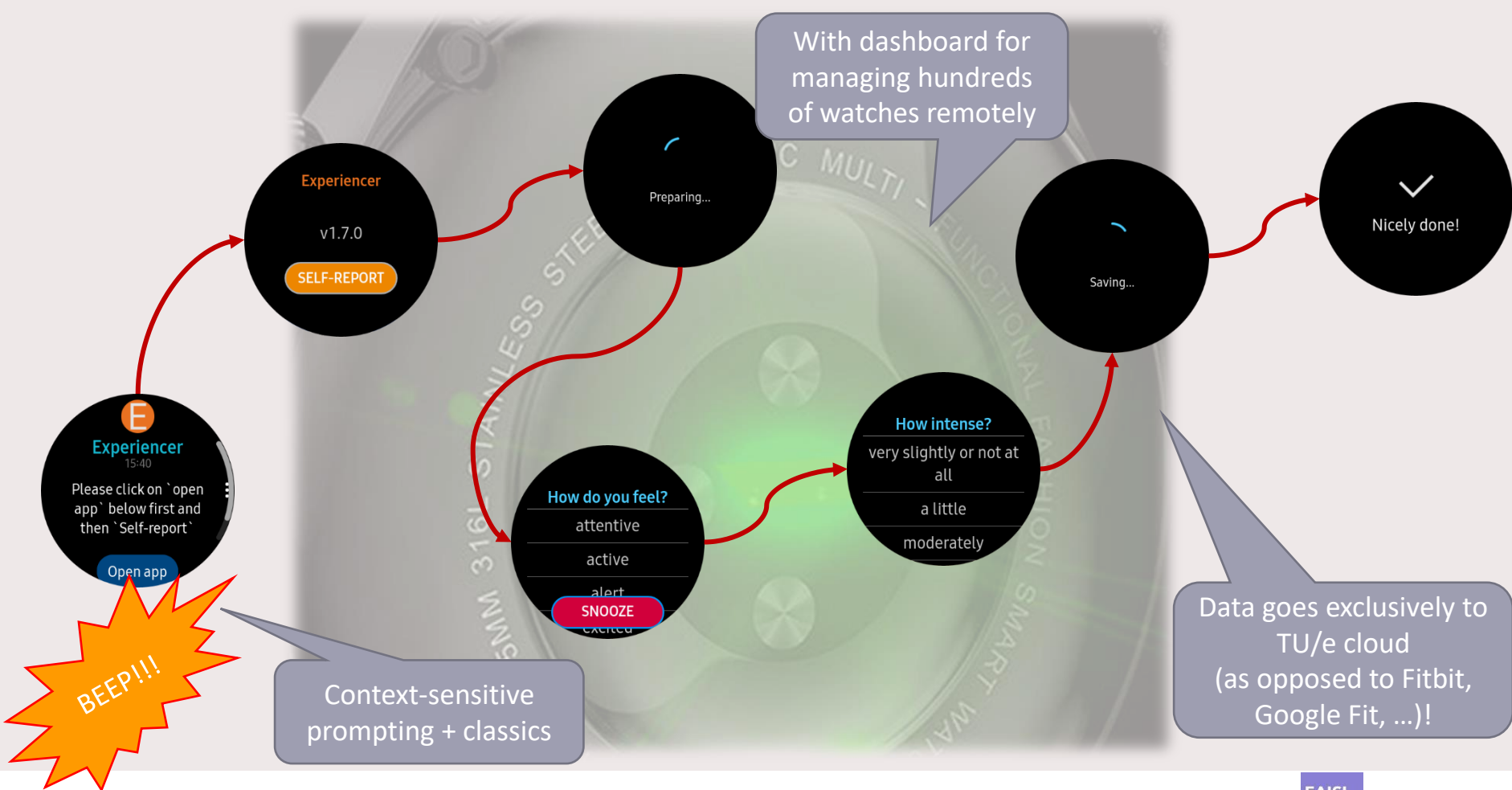
**Open
Available**

Privacy Oriented

Context-sensitive

Category	Feature	Software				
		WellBeat	ROAMM	μEMA	Physiqal	Experiencer
Data collection and analysis	Recording sensor data	✓	✓	✓	✓	✓
	Data analytics dashboard	✓	✓	✗	✓	✗
	Configurable sensors	✗	✓	✗	✗	✓
Scheduling	Context-sensitive	✗	✗	✗	✗	✓
	Temporal	✗	✓	✗	✗	✓
Data entry	Input widgets on the device	✓	✓	✓	✗	✓
	Configurable widgets	✗	✓	✗	✓	✓
Web interface	Data visualization	✗	✓	✓	✗	✗
	Administration dashboard	✗	✓	✗	✓	✗
Scalability	Remote device management	✗	✓	✗	✗	✓
Optimization	Event-based data collection	✗	✗	✗	✗	✓
	Custom data synchronization	✓	✓	✓	✗	✓
Openness, availability, and security	Reusability and availability	✗	✗	✗	✗	✓
	GDPR compliance	✗	✗	✗	?	✓





Case Studies

- Health intervention campaigns in 2020 and 2021
 - Test and compare context sensitive policies (active/resting)
 - Create predictive models for emotion
- Mental healthcare facility
 - Measure and predict stress
- Persuasion profiling
 - Adaptive notifications
- Affective state
 - Study lifestyle behaviors
 - Test and compare context sensitive policies (known/unknown)

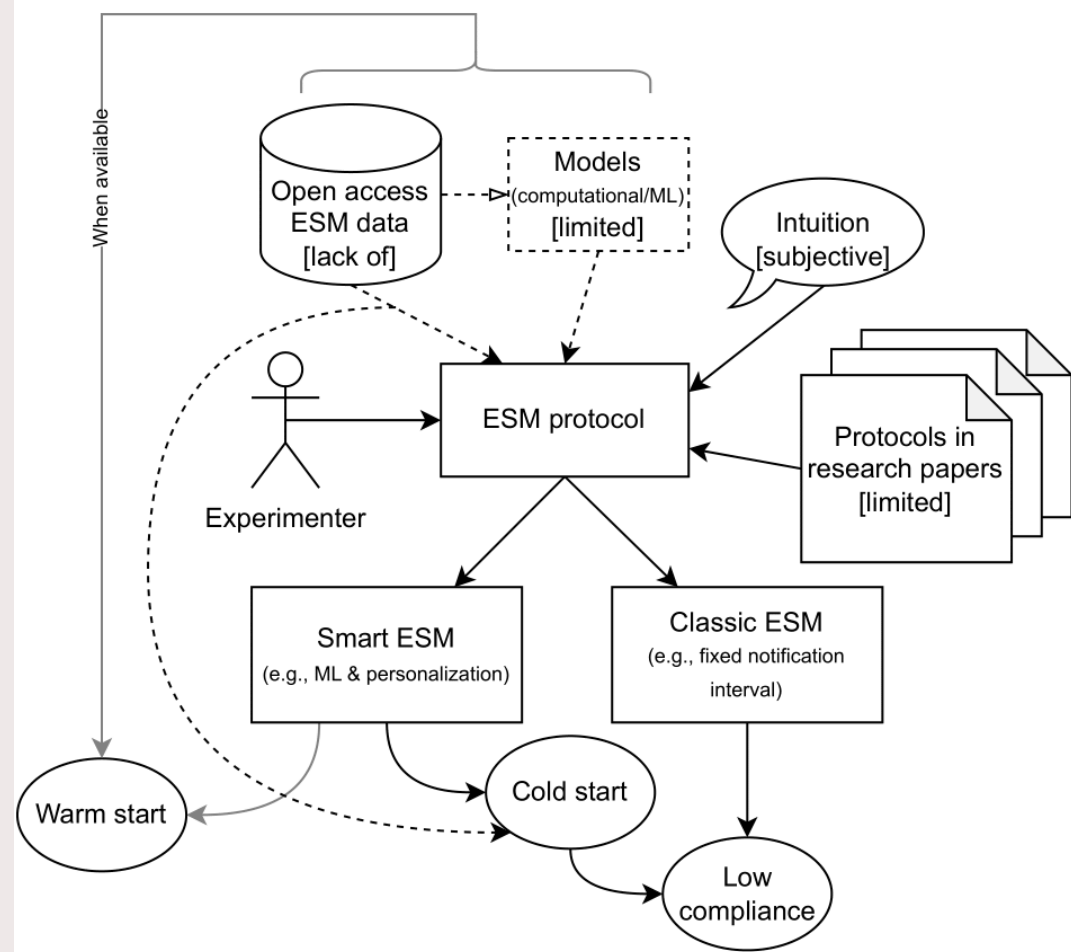


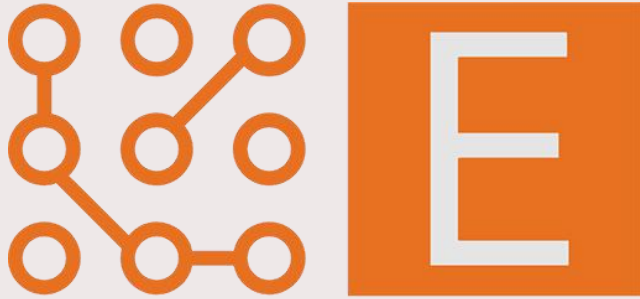
Utrecht
University



Fiber2Heal

- Smart ESM, using reinforcement learning
- Avoiding cold start, based on simulations





EXPERIENCER

experencer.eu

github.com/khnshn/Experencer



Thank You



Dr. Pieter Van Gorp

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Alireza Khanshan

PhD Candidate
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COFFEE BREAK



Coffee Break

14:10 Lifestyle as part of cancer care. Collaborative workshop with KWF

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Barbara Wollersheim
KWF



Lifestyle as part of cancer care – a collaborative workshop with KWF

Barbara Wollersheim, Tracklead Lifestyle as part of cancer care within cluster Prevention

Dorine Collard, Lead cluster Prevention

Tamara de Haas, Secretary Patients' Advisory Committee

BACKGROUND KWF AMBITION

KWF Ambition 2030: To aim for a better quality of life for (recovered) patients and their loved ones

Ambition Prevention: Prevent (second) cancer and improve the course of the disease by influencing lifestyle factors proven to play a role in cancer care

To be achieved by:

- Stimulating and facilitating scientific research
- Stakeholder management
- Information provision
- Lobbying

WHAT IS LIFESTYLE AS PART OF CANCER CARE

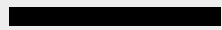
- Healthcare related prevention = individual with disease
- Focus on lifestyle improvements before, during and after treatment
- Focus on physical activity, diet, smoking cessation, alcohol reduction, and relaxation (e.g. stress, sleep)

WORKSHOP: LIFESTYLE AS PART OF CANCER CARE

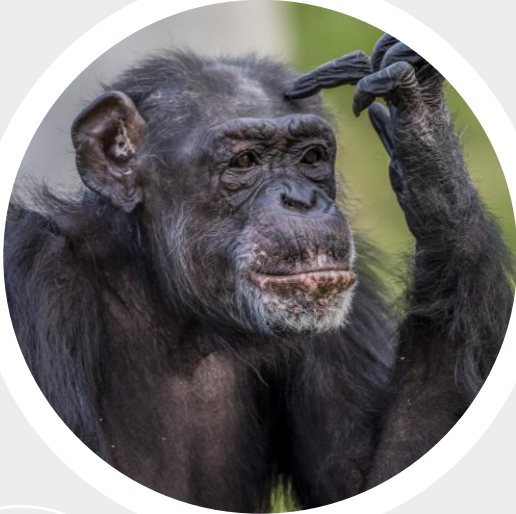
Workshop: your input on what should be prioritized and what is needed in research

- 2 assignments
 - Assignment A: outcome measures used in studying effectiveness of lifestyle interventions for cancer patients
 - Assignment B: personalizing lifestyle improvements for cancer patients
- Divide room in 6 groups
- Prioritize topics on flipchart with stickers: 3 stickers per person
- For the most important topic, write down 3 important research questions
- 1-minute feedback of 1 person per group

QUESTIONS



KEYNOTE SESSION



14:55 – 15:45 Keynote Session **Monkey See, Monkey Do: coexistence versus cooperation in an organizational perspective**

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