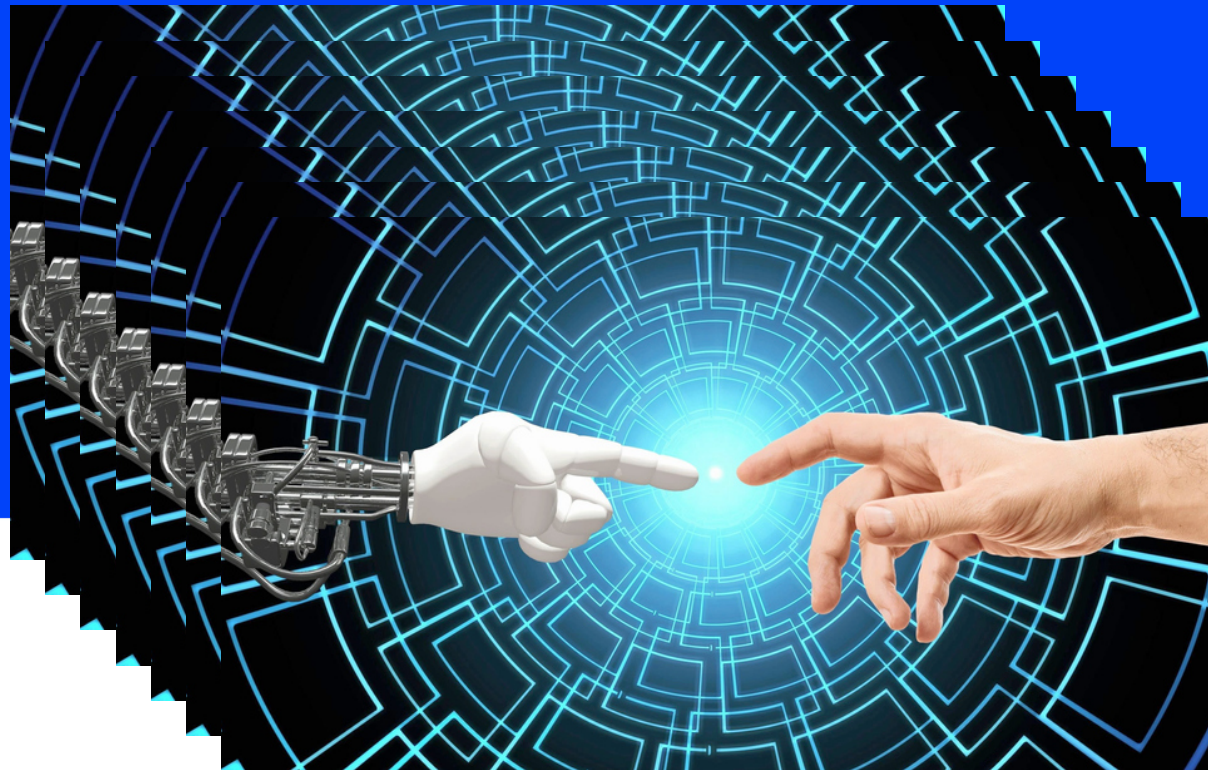


Back to Future: Radiotherapy

Aiming at the patient in a technology driven environment



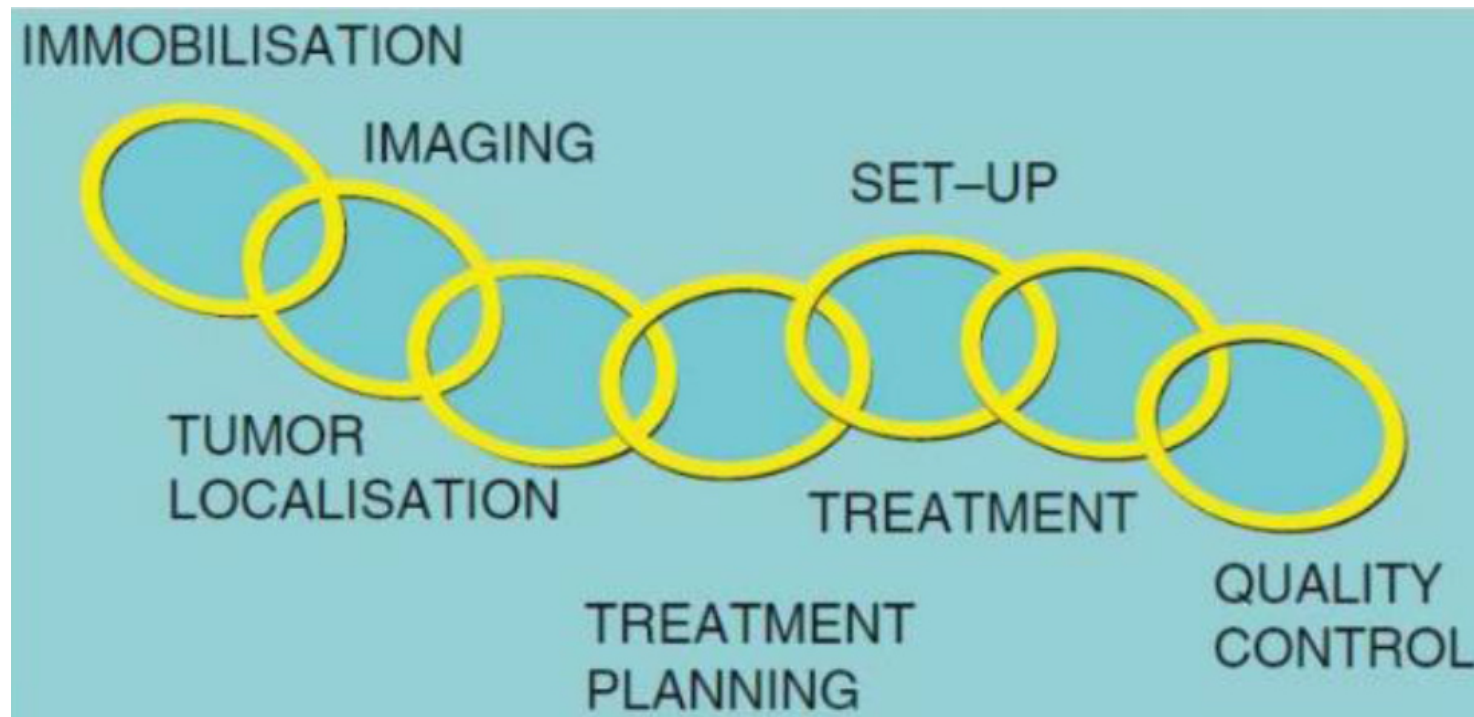
H+
MC

**Mirjam Mast (PhD), staff member Research&Development,
Haaglanden Medical Center, The Netherlands**

Introduction

Radiotherapy

Workflow:



Courtesy S. Rivera, Gustave Roussy, Villejuif, France

Introduction



Radiotherapy

Technology driven and aiming at precision



Introduction



Radiotherapy

Aiming at the patient: A holistic approach

- To provide support
 - that looks at the whole person
 - that should consider physical, emotional, mental and spiritual well-being

Introduction



Radiotherapy

Aiming at the patient: A holistic approach

Adams et al. 2014 / Stewart et al. 2022

- Holistic support not kept pace with improved survival outcomes
- Consider what life after treatment may look/feel like
- Beyond conventional medicalised outcomes -> provide appropriate support

Adams et al. 2014 Clin Oncol (R Coll Radiol) 26:10-7

Stewart et al. 2022 Health Jul 28 (Epub ahead of print)

Radiotherapy

Aiming at the patient: A holistic approach

Adams et al. 2014: Questionnaires cancer survivors 1-11 years after pelvic radiotherapy

- Symptoms as frequent in 6-11 as in 1-5 years after RT
- Symptom severity significantly associated:
 - poorer overall quality of life
 - higher levels of depression

Radiotherapy

Aiming at the patient: A holistic approach

Stewart et al. 2022: prototype digital intervention to support post-treatment well-being for patients

- Patients felt well-supported attending hospital for treatment
- Support dropped off dramatically once radiotherapy completed

Introduction



Well-being --> Central holistic pillars

- **Physical:** Exercise, sleep, healthy diet
- **Emotional:** Ability to navigate our emotions in a healthy way
- **Mental:** Healthy state of mind to cope with stresses of life. Being in a healthy psychological state permits you to perform productively
- **Spiritual:** Spiritual wellness is not about a specific religion or belief system. It is about personalizing the journey.

Introduction



Well-being --> Central holistic pillars

- **Physical**
- **Emotional / Mental**
- **Spiritual**

Radiotherapy

Aiming at the patient:
A holistic approach

Introduction



Well-being --> Central holistic pillars

- **Physical**
- **Emotional / Mental**
- **Spiritual**

Radiotherapy

Aiming at the patient:
A holistic approach

Holistic pillar: Physical



Lipsett et al. 2017: systematic review/meta-analysis

- Breast cancer patients only
- 32 articles: 9 RCTs included (n=802)
- Aerobic exercise, resistance training, yoga, qigong, tai chi and pilates during RT
- Fatigue levels: determined at baseline and post-intervention

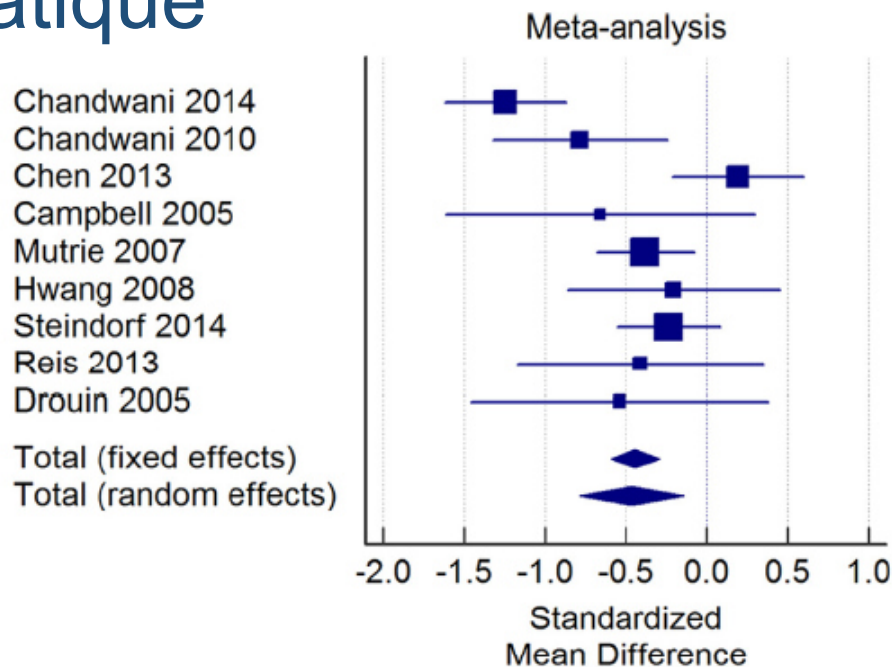
Holistic pillar: Physical



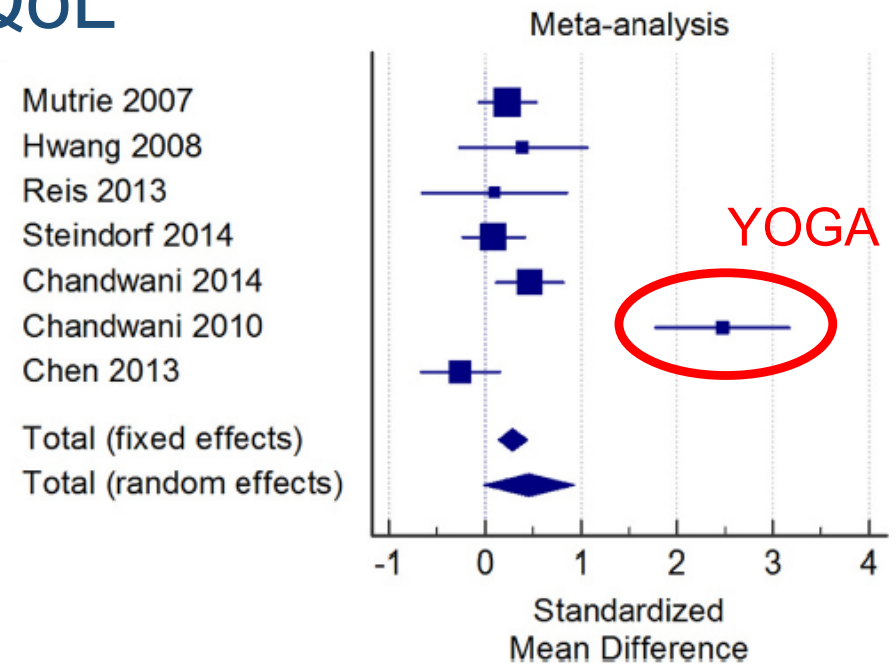
Lipsett et al. 2017: systematic review / meta analysis

- 738 participants

Fatigue



QoL



Holistic pillar: Physical

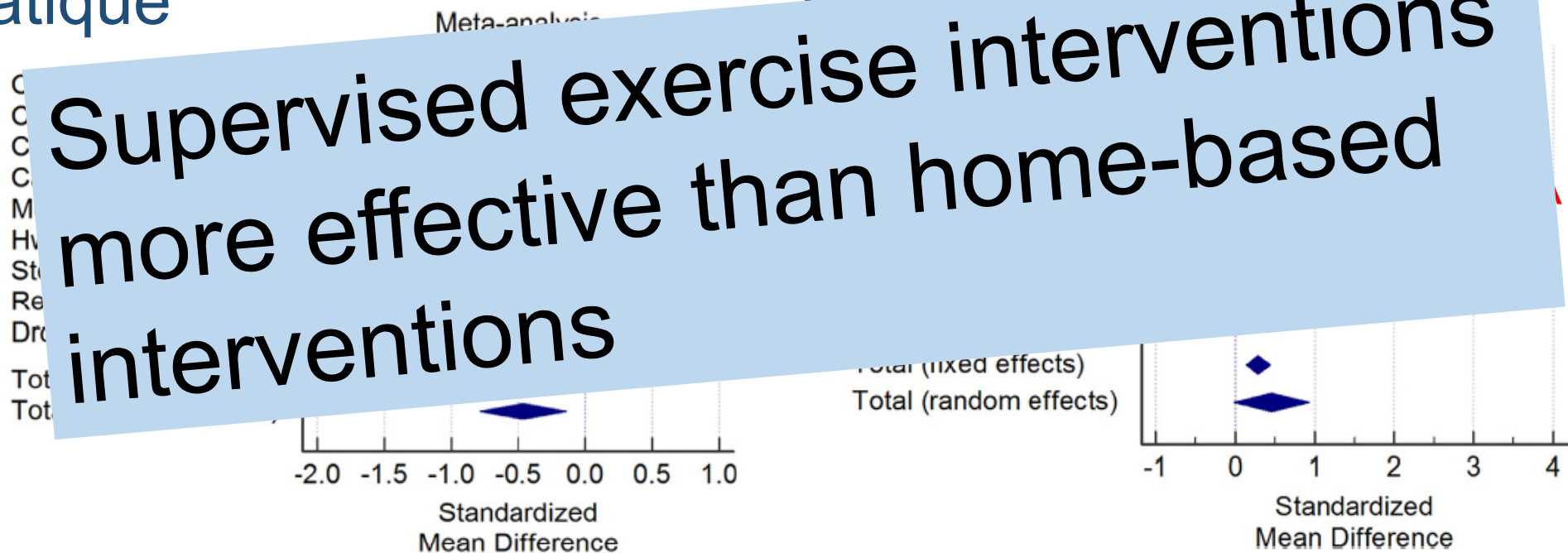


Lipsett et al. 2017: systematic review / meta analysis

- 738 participants

Fatigue

Supervised exercise interventions more effective than home-based interventions



Holistic pillar: Physical

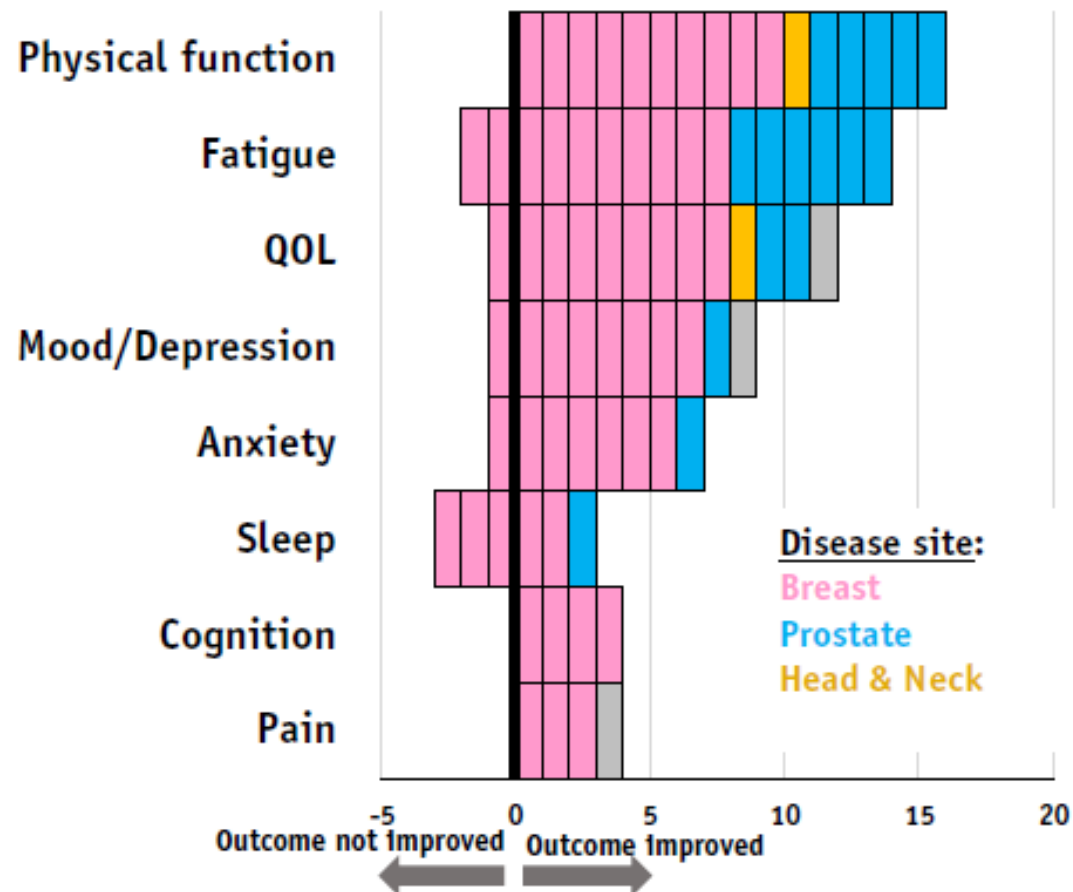


Zaorsky et al. 2021: systematic review

- 693 articles: 26 included
- Heterogeneity in outcomes: no meta-analysis
- 4 categories: resistance training only, aerobic exercise only, yoga and mixed/other exercise
- Tumour sites: breast, prostate, H&N, spinal metastasis

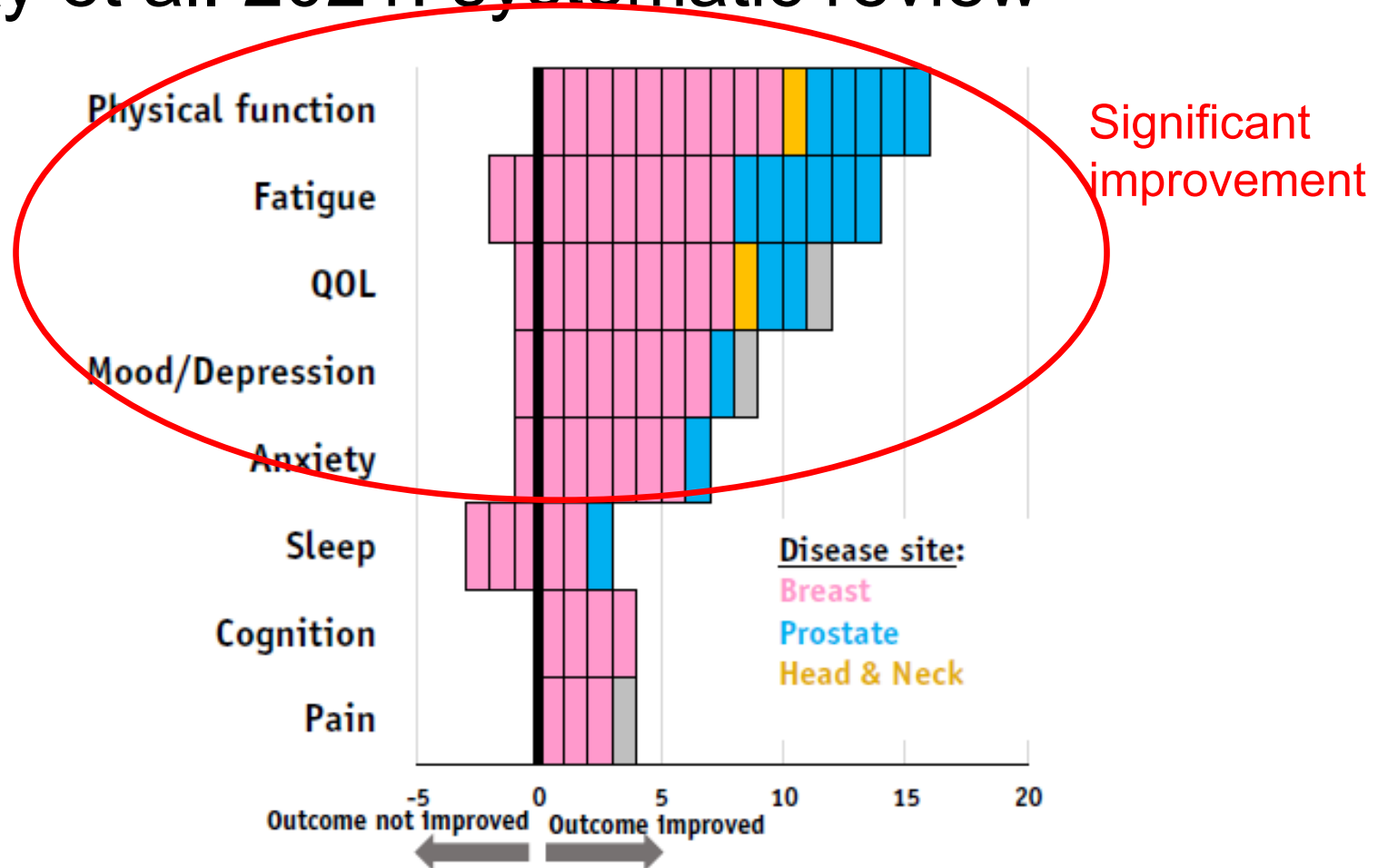
Holistic pillar: Physical

Zaorsky et al. 2021: systematic review



Holistic pillar: Physical

Zaorsky et al. 2021: systematic review



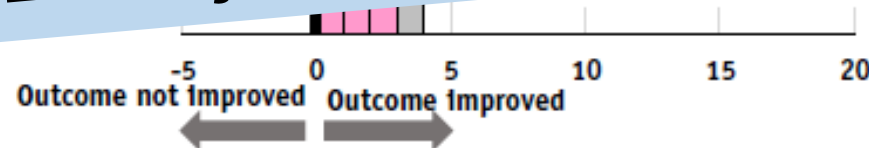
Holistic pillar: Physical

Zaorsky et al. 2021: systematic review

Physical function

Integration of ET into treatment guidelines for select* patients receiving RT seems warranted

*low risk of ET injury



Holistic pillar: Physical



RT for gynecological cancer

Humphrey et al. 2021: systematic review

- Applicator removal most problematic part of brachytherapy. Studies reported:
 - instrument removal “the most physically uncomfortable aspect”
 - “maximal levels of pain” during insertion and removal of the applicator

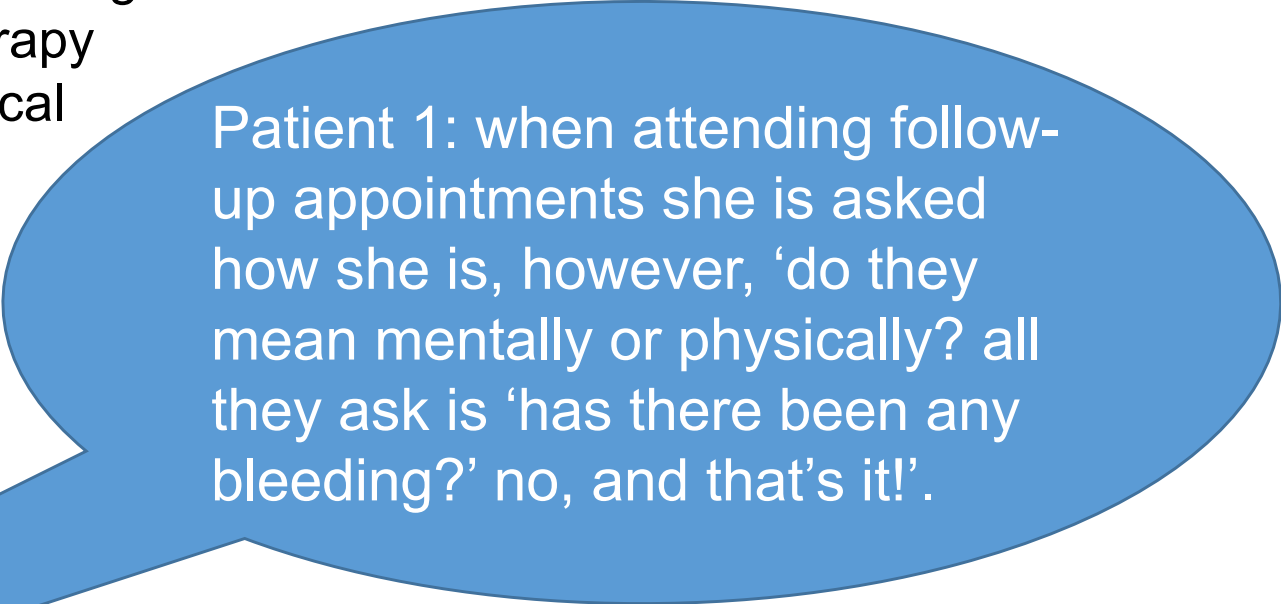
Holistic pillar: Physical



RT for gynecological cancer

Stewart et al, 2022:

Ghosts in the machinery: Living with and beyond radiotherapy treatment for gynaecological cancer



Patient 1: when attending follow-up appointments she is asked how she is, however, 'do they mean mentally or physically? all they ask is 'has there been any bleeding?' no, and that's it!'

Well-being --> Central holistic pillars

- **Physical**
- **Emotional / Mental**
- **Spiritual**

Radiotherapy

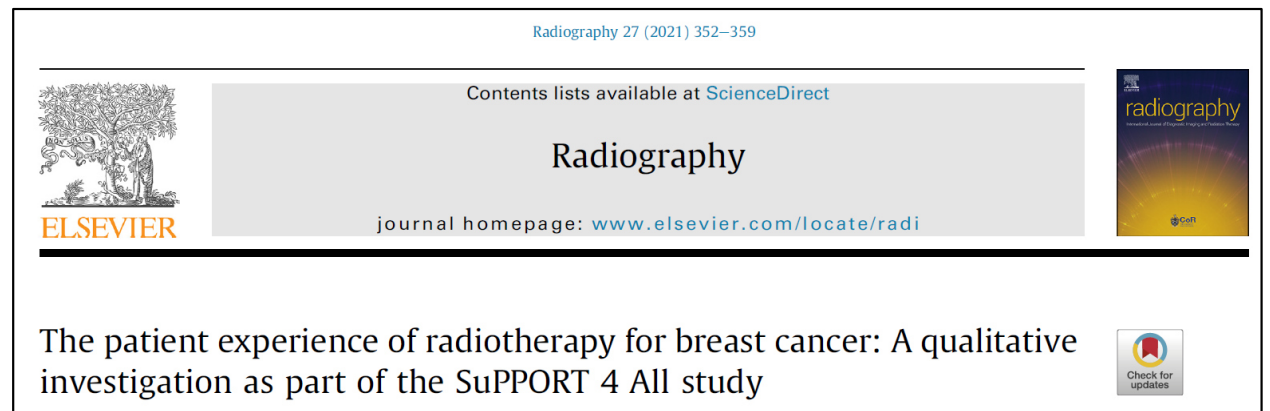
Aiming at the patient:
A holistic approach

Holistic pillar: Emotional/Mental



Probst et al. 2021: qualitative investigation (n=9)

- Experiences of RT pathway?
- Women's views of being naked during RT sessions?
- Permanent tattoos affect overall patient experience?



Probst et al. 2021 Radiography 27:352-359

Holistic pillar: Emotional/Mental



Probst et al. 2021: qualitative investigation (n=9)

- Consider patient dignity, support regarding undressing
- Understanding impact permanent tattoos
- Encourage patient empowerment during RT

Holistic pillar: Emotional/Mental



Luigjes et al. 2022: systematic review/meta-analysis

- Recurrence distress (Fear Cancer Recurrence FCR)
- 280 articles: 87 included (n= 9311 meta-analysis)
- The mean FCR severity score:14.8 (13.7–16.0)
(<13 low fear of cancer recurrence)
 - Moderate level of FCR (≥ 13): 59%
 - High level of FCR (≥ 22): 19% (need for specialized intervention)

Holistic pillar: Emotional/Mental



Luigjes et al, 2022, systematic review/meta-analysis

- No major differences: survivors and patients
- More prevalent among women
- FCR scores:
 - Highest: lung cancer and melanoma
 - Lowest: prostate cancer
- All time points since cancer diagnosis

Holistic pillar: Emotional/Mental



Distress in cancer

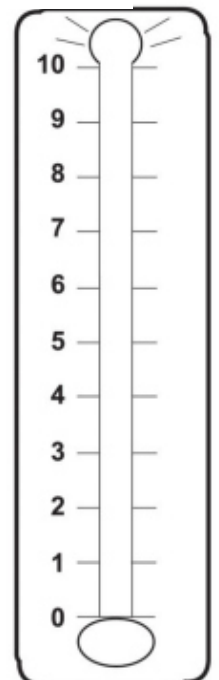
DEFINITION OF DISTRESS IN CANCER

Distress is a multifactorial unpleasant experience of a psychological (ie, cognitive, behavioral, emotional), social, spiritual, and/or physical nature that may interfere with the ability to cope effectively with cancer, its physical symptoms, and its treatment. Distress extends along a continuum, ranging from common normal feelings of vulnerability, sadness, and fears to problems that can become disabling, such as depression, anxiety, panic, social isolation, and existential and spiritual crisis.

NCCN DISTRESS THERMOMETER

Instructions: Please circle the number (0–10) that best describes how much distress you have been experiencing in the past week including today.

Extreme distress



No distress

Holistic pillar: Emotional/Mental



Distress in cancer

- Patient's distress level is ≥ 4
- Analyze “Problem List”

PROBLEM LIST			
Please indicate if any of the following has been a problem for you in the past week including today.			
Be sure to check YES or NO for each.			
YES	NO	<u>Practical Problems</u>	YES NO <u>Physical Problems</u>
<input type="checkbox"/>	<input type="checkbox"/>	Child care	<input type="checkbox"/> <input type="checkbox"/> Appearance
<input type="checkbox"/>	<input type="checkbox"/>	Housing	<input type="checkbox"/> <input type="checkbox"/> Bathing/dressing
<input type="checkbox"/>	<input type="checkbox"/>	Insurance/financial	<input type="checkbox"/> <input type="checkbox"/> Breathing
<input type="checkbox"/>	<input type="checkbox"/>	Transportation	<input type="checkbox"/> <input type="checkbox"/> Changes in urination
<input type="checkbox"/>	<input type="checkbox"/>	Work/school	<input type="checkbox"/> <input type="checkbox"/> Constipation
<input type="checkbox"/>	<input type="checkbox"/>	Treatment decisions	<input type="checkbox"/> <input type="checkbox"/> Diarrhea
		<u>Family Problems</u>	<input type="checkbox"/> <input type="checkbox"/> Eating
<input type="checkbox"/>	<input type="checkbox"/>	Dealing with children	<input type="checkbox"/> <input type="checkbox"/> Fatigue
			<input type="checkbox"/> <input type="checkbox"/> Feeling swollen

Holistic pillar: Emotional/Mental



Distress in cancer

- Identify key issues of concern
- Ask questions to determine the best resources

PROBLEM LIST					
Please indicate if any of the following has been a problem for you in the past week including today. Be sure to check YES or NO for each.					
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		<u>Family Problems</u>	<input type="checkbox"/>	<input type="checkbox"/>	Eating
<input type="checkbox"/>	<input type="checkbox"/>	Dealing with children	<input type="checkbox"/>	<input type="checkbox"/>	Fatigue
			<input type="checkbox"/>	<input type="checkbox"/>	Feeling swollen

Holistic pillar: Emotional/Mental



Distress in cancer

- Identify key issues of concern
- Ask questions to determine the best resources

A total of 20% to 52% of patients show a significant level of distress

PROBLEM LIST	
<input type="checkbox"/>	<input type="checkbox"/> Transportation
<input type="checkbox"/>	<input type="checkbox"/> Work/school
<input type="checkbox"/>	<input type="checkbox"/> Treatment decisions
Family Problems	
<input type="checkbox"/>	<input type="checkbox"/> Dealing with children
<input type="checkbox"/>	<input type="checkbox"/> Breathing
<input type="checkbox"/>	<input type="checkbox"/> Changes in urination
<input type="checkbox"/>	<input type="checkbox"/> Constipation
<input type="checkbox"/>	<input type="checkbox"/> Diarrhea
<input type="checkbox"/>	<input type="checkbox"/> Eating
<input type="checkbox"/>	<input type="checkbox"/> Fatigue
<input type="checkbox"/>	<input type="checkbox"/> Feeling swollen

Holistic pillar: Emotional/Mental



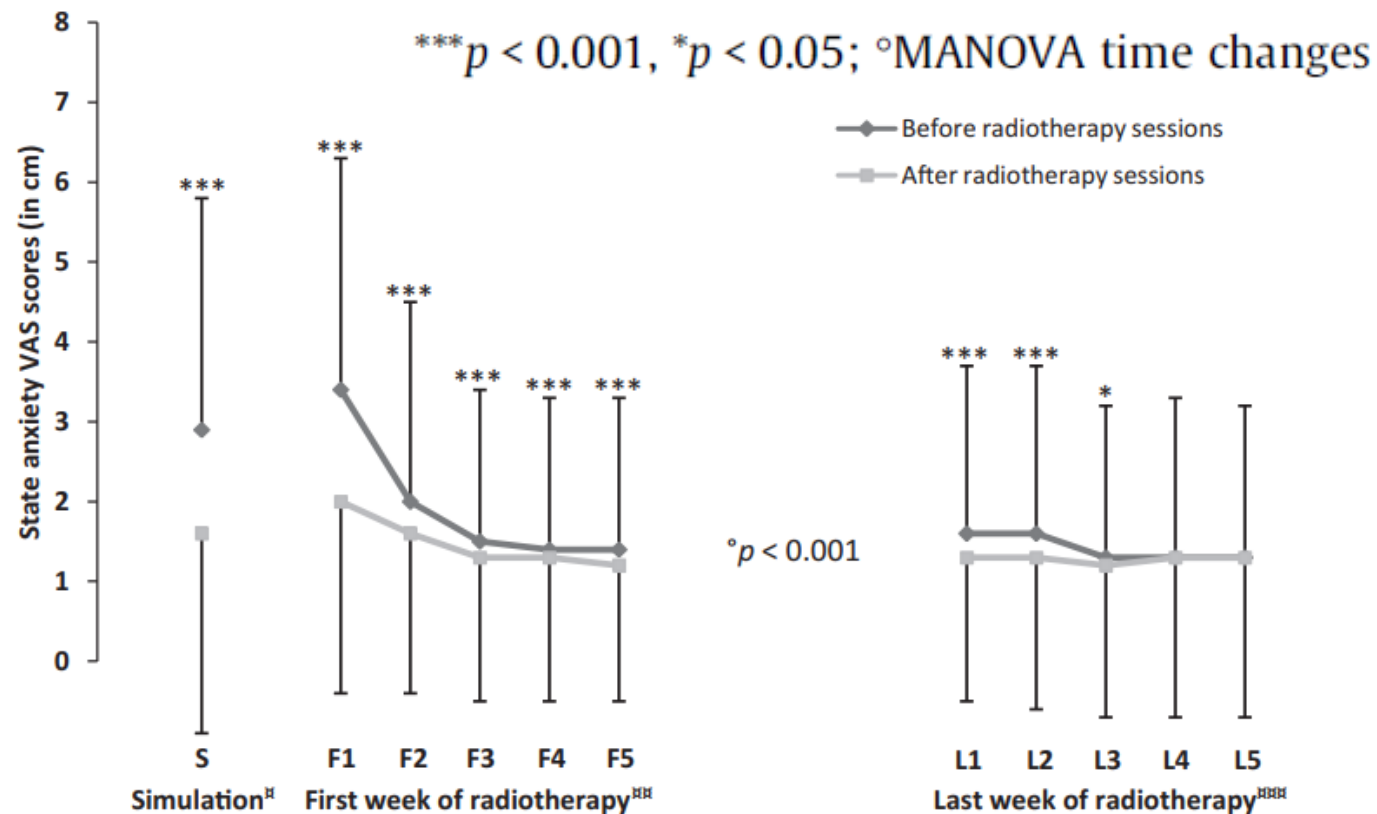
Lewis et al. 2014: longitudinal study (multicenter)

- Non-metastatic breast cancer
- N= 213, completed Visual Analogue Scale (VAS: 0-10 scale)
- Anxiety measured:
 - Before and after RT simulation
 - First and last five RT sessions

Holistic pillar: Emotional/Mental



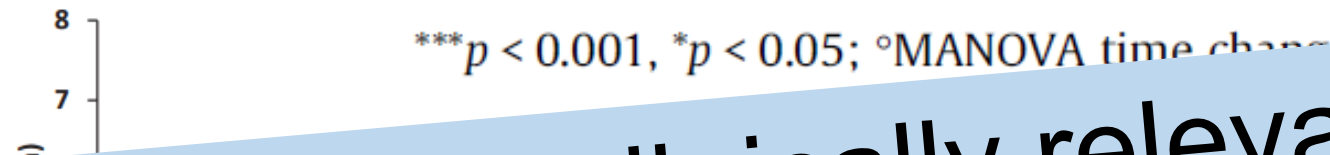
Lewis et al. 2014: longitudinal study (multicenter)



Holistic pillar: Emotional/Mental



Lewis et al. 2014: longitudinal study (multicenter)



Small minority clinically relevant anxiety
Levels remained high throughout treatment

S F1 F2 F3 F4 F5 L1 L2 L3 L4 L5
Simulation[†] First week of radiotherapy^{††} Last week of radiotherapy^{†††}

Holistic pillar: Emotional/Mental



Lewis et al. 2014: longitudinal study (multicenter)

- To optimize care, RT team members should:
 - Offer information about RT at the simulation
 - Check patients' understanding
 - Identify patients clinically relevant anxiety: need support throughout RT

Holistic pillar: Emotional/Mental



Elsner et al. 2017: systematic review

- Effect of RTT-led psychosocial support on patient anxiety
- 378 articles: 12 included (n=1363)

Holistic pillar: Emotional/Mental



Elsner et al. 2017: systematic review

- Reduce anxiety: group and individual education/information sessions effective
- Training in:
 - communication skills
 - detection/management of emotional distress

Holistic pillar: Emotional/Mental



Elsner et al. 2017: systematic review

- Reduce anxiety: group and individual education/information sessions effective
- Training in:
 - communication skills
 - detection/management of emotional distress
- Management and RTTs provide infrastructure to
 - enable interventions and overcome barriers
 - achieve improved patient care and reduce anxiety

Holistic pillar: Emotional/Mental



van Beusekom et al. 2019: systematic review

- Can Communication Skills Training (CKS) help RT members to support patients?
- 177 articles: 9 included (5 RCTs: n=12-313)
- Different training programmes: communication tools and skills

Holistic pillar: Emotional/Mental



van Beusekom et al. 2019: systematic review

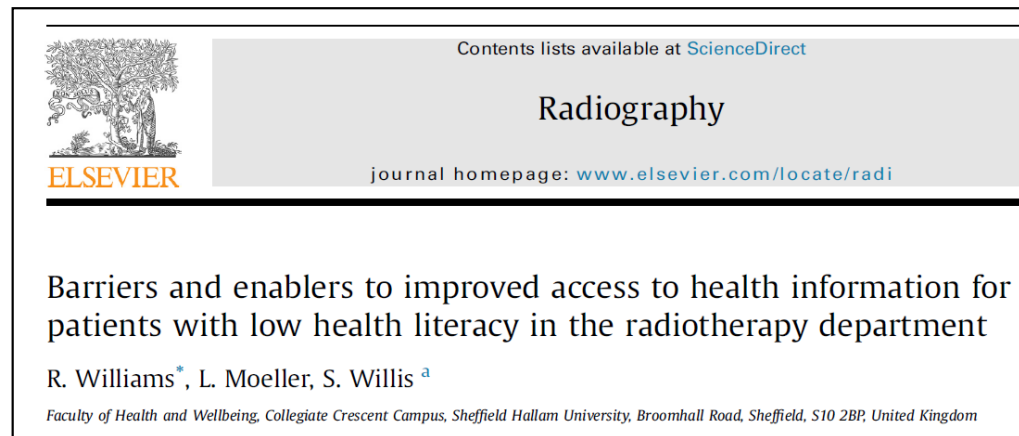
- 4 of 5 different CST programmes increased emotional communicative behaviour RT member
 - Fear of cancer recurrence: none of the included studies took this into consideration
 - Focus on patient anxiety, (general) concerns and depression.
- Limited but high level evidence:
 - RT members' communication skills reduce anxiety and concerns

Holistic pillar: Emotional/Mental



Williams et al. 2018: systematic review

- Literacy: person's ability to read, write and understand information
- Low literacy associated with poor health related knowledge and health outcomes



Holistic pillar: Emotional/Mental



Williams et al. 2018: systematic review

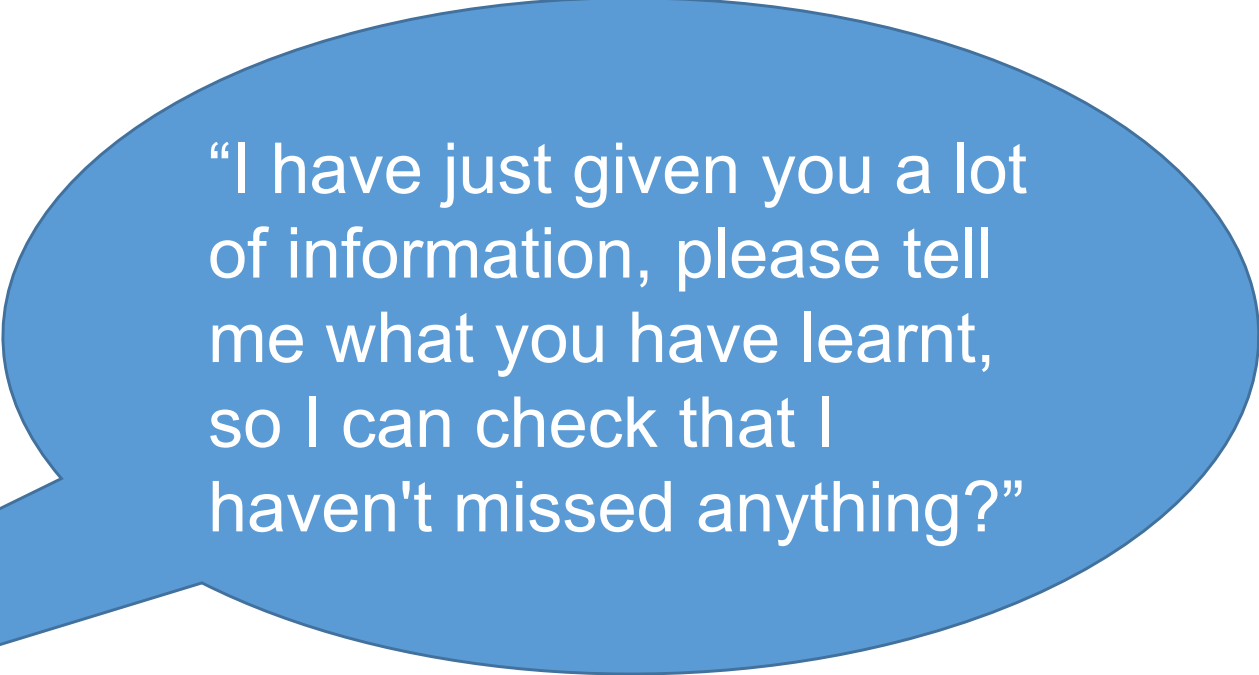
- Radiotherapy: stress and anxiety barriers to effective communication
- Practitioners need to overcome literacy barriers to ensure effective information
- Further research: non written information in radiotherapy

Holistic pillar: Emotional/Mental



Williams et al. 2018: systematic review

- Example “Teach back method”



“I have just given you a lot of information, please tell me what you have learnt, so I can check that I haven't missed anything?”

Well-being --> Central holistic pillars

- **Physical**
- **Emotional / Mental**
- **Spiritual**

Radiotherapy

Aiming at the patient:
A holistic approach

Holistic pillar: Spiritual



Rossetti et al. 2017: RCT

- Breast / Head & Neck cancer (n=78)
- Consultation music therapist
- Selection music of the patients' choice played during simulation

Clinical Investigation

The Impact of Music Therapy on Anxiety in Cancer Patients Undergoing Simulation for Radiation Therapy

Andrew Rossetti, MMT, LCAT, MT-BC,^{*}
Manjeet Chadha, MD, MHA, FACR, FASTRO,[†] B. Nelson Torres, MPH,[‡]
Jae K. Lee, PhD,[§] Donald Hylton, AAS, RTT,[†]
Joanne V. Loewy, DA, LCAT, MT-BC,^{*} and
Louis B. Harrison, MD, FASTRO^{||}

^{}Louis Armstrong Center for Music & Medicine, Department of Music Therapy, Mount Sinai Beth Israel Medical Center; [†]Department of Radiation Oncology, Mount Sinai Downtown Union Square, Mount Sinai Health System, New York, New York; [‡]Moffitt Cancer Center, Biostatistics Shared Resources Core; and [§]Department of Biostatistics and Bioinformatics, Moffitt Cancer Center, and ^{||}Department of Radiation Oncology, H. Lee Moffitt Cancer Center and Research Institute, Tampa, Florida*

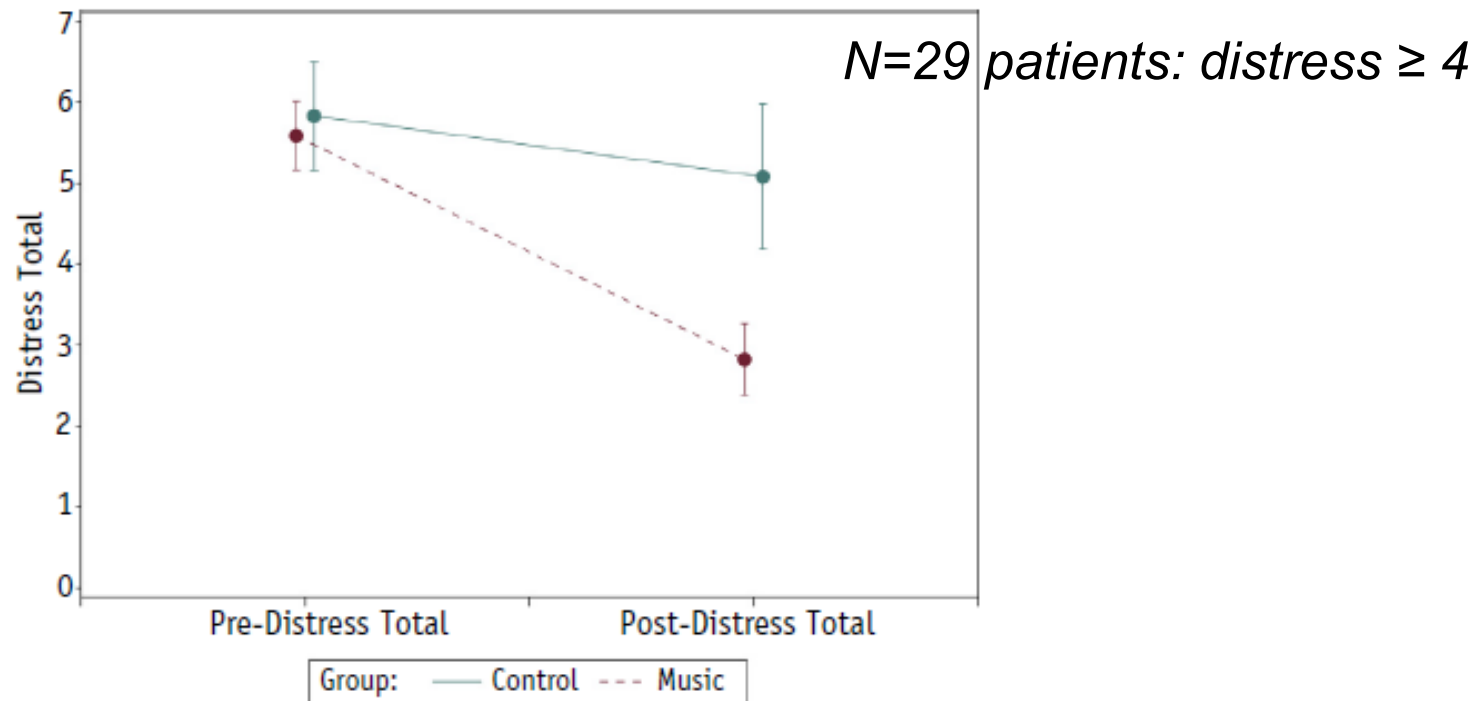
Received Oct 3, 2016, and in revised form Apr 28, 2017. Accepted for publication May 1, 2017.

Holistic pillar: Spiritual



Rossetti et al. 2017: RCT

- MT significantly lowered patient anxiety and distress during the simulation procedure



Holistic pillar: Spiritual



Pearson et al. 2020: cross-sectional survey

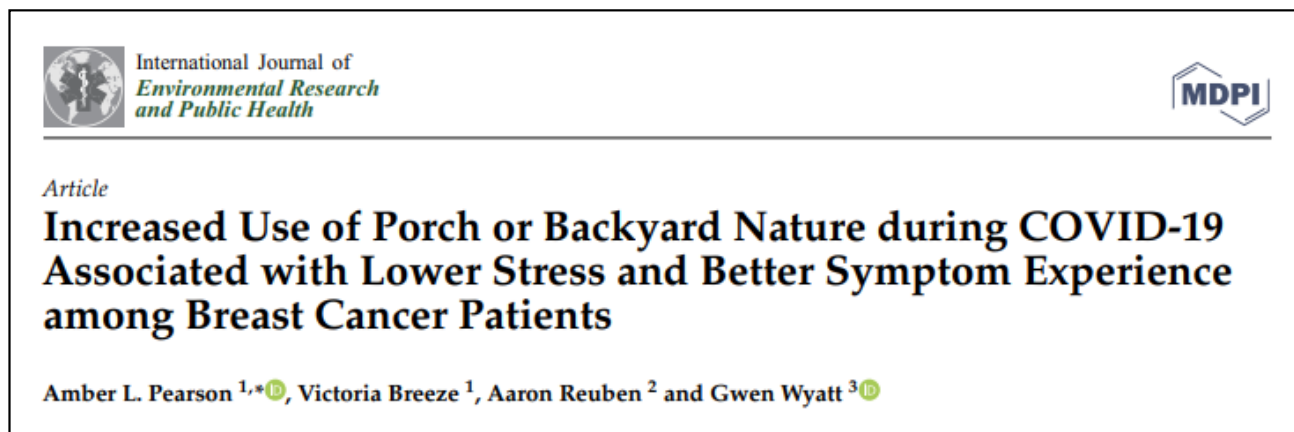
- Breast cancer (n=56)
- Covid pandemic: Spending more time at home and enjoying more passive contact with nature
 - Reduced use of community outdoor space: higher stress and cancer symptoms
 - Increased at-home nature contact: opposite trend

Holistic pillar: Spiritual



Pearson et al. 2020: cross-sectional survey

- Interventions may reduce cancer symptoms and stress:
 - public nature experiences
 - indoor real nature experiences



Pearson et al. 2021 Int. J. Environ. Res. Public Health 18:9102.

Holistic pillar: Spiritual

Haaglanden Medical Center: 2009



Holistic pillar: Spiritual

Haaglanden Medical Center: 2010



Conclusion

Focus: technical improvements



Conclusion



Patient well-being, holistic pillars:

- Physical pillar:
 - Exercise can be helpful in reducing fatigue
 - Beware of the mental impact of the physical strain of RT
- Emotional/mental pillar:
 - Fear of cancer recurrence is present at all time points
 - Patients can experience high levels of anxiety during the radiotherapy workflow
 - Communication is essential to overcome barriers
- Spiritual pillar:
 - Music and nature can be helpful in reducing distress

Take home message



- With better outcomes we should not overlook well-being
- We need to make changes to the workflow and follow-up to make improvements

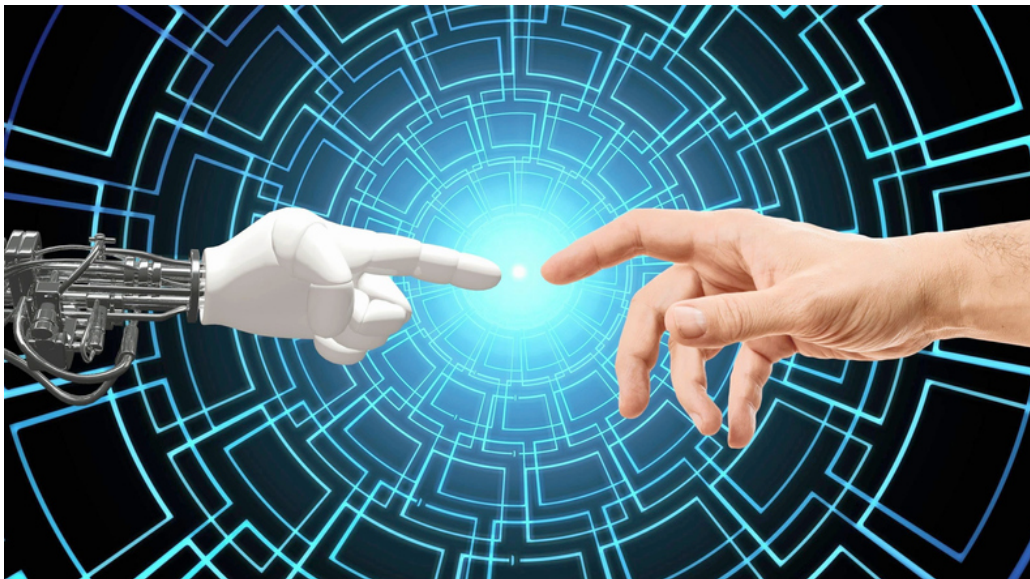
Take home message



- With better outcomes we should not overlook wellbeing
- We need to make changes to the workflow and follow-up to make improvements

Aiming at:

Improving RT technologies & patient well-being



Michelangelo's Creation of Adam
(or creation of human race)