



Can We Work Together To Improve Nutrition Research for Cancer Patients?

5th September 2016



www.cancerandnutrition.nihr.ac.uk



NHS National Institute for Health Research

Welcome

Professor Alan Jackson

NIHR Director of Nutrition Research, Chair of the Cancer & Nutrition NIHR Infrastructure Collaboration

Our experience: Research integral to improved service





Professor Dame Sally Davies Chief Medical Officer (DH) Chief Scientific Advisor (DH)



Health Research

Best Research for Best Health

A new national health research strategy



NIHR health research system



- most integrated clinical research system in the world
- driving research from bench to bedside for the benefit of patients.

Invention



Improving cancer prevention and care. For patients. For clinicians. For researchers



Aim:

facilitate translational research in cancer and nutrition to generate the evidence to improve prevention and care

Objectives:

bring coherence

-creating a framework for future research

–Establishing networks for sharing knowledge between cancer and nutrition stakeholders

Southampton BRC, DH, WCRF, CRUK, BRCs, ECMC, Patient representatives

The nature of the clinical problem



Imperative for clinical nutrition support:

1. Cachexia

oesaphagus

gut resection

pancreas

2. Transplantatiion

Graft vs host: bone marrow transplant

Liver: sarcopaenia

3. Obesity:

cranial radiotherapy.

- 3. Prevention of relapse
- 4. End of life care



National Institute for Health Research

Prevention:

Smoking and diet highest risk

1997 COMA review: CMO, Sir Kenneth Calman

2007: WCRF systematic review: markers of risk weight, height, physical activity; poor diet

to date: continuous update project nature of CAUSAL pathway!

Fruit and vegetables: protective factors, nutrition related mechanistic basis unclear

Challenges for promoting & enabling better research



1. Clinical

- support patients ? Promote cancer
- 2. Obesity
 - body size related therapeutic dosing
 - under treat, excess toxicity
 - fructose related
- 3. Life course
 - size in early life reduced chronic non-communicable disease
 - reduced stunting: increased height increased risk cancer
- 4. Molecular and cellular mechanisms
 - nutrient factors in cancer micro-environment
 - inflammation/immunity: cell responsiveness and polarization
 - metastasis: determinants of EMT transition and invasiveness



NHS

Health Research





NHS National Institute for Health Research



Why does nutrition matter to cancer patients?

Lesley Turner

Patient Representative, Cancer & Nutrition NIHR Infrastructure Collaboration



- Majority of patients reported receiving <u>no nutritional advice</u> from their healthcare team
- Experiences of nutritional care were <u>unsatisfactory</u>, with <u>inconsistent</u> and <u>confusing</u> advice given to patients
- Majority of patients said they would like more nutritional support <u>at all</u> stages of the cancer process

Patient reported common nutritional problems



- Changes in taste or smell
- Appetite loss
- Nausea/vomiting
- Unsure what to eat/not eat
- Unable to be physically active
- Weight loss/gain
- Constipation/diarrhoea
- Conflicting advice
- Difficulties chewing, eating or swallowing

Patient responses



National Institute for Health Research





NHS National Institute for Health Research



Nutrition – what do we already know about its role in cancer, and why should it be a priority for all cancer researchers?

Professor Martin Wiseman

Medical & Scientific Advisor, World Cancer Research Fund



Cancer includes all **types**, **sites** and **stages of cancer**. Stages of cancer include prevention, diagnosis, treatment, survivorship and palliative and end of life care

Nutrition is the set of integrated processes by which **cells**, **tissues**, **organs** and the **whole body** acquire the **energy and nutrients** for **normal structure and function**, which is achieved at body level through **dietary supply**, and the capacity of the body to transform the **substrates and cofactors** necessary for **metabolism**.

All of these domains (diet, metabolic capacity, body composition and level of demand for energy and nutrients) are influenced by levels of physical activity and can vary according to different physiological and pathological or disease states.





<u>Cancer</u> includes all types, sites and stages of cancer. Stages of cancer include prevention, diagnosis, treatment, survivorship and palliative and end of life care

Nutrition

What we eat

What we are

What we [can] do

Nutritional influence through the life course a fundamental exposure at all stages



MRC

susceptibility to cancer, cancer progression, response to treatment and quality of life after diagnosis

Patient guality of life and health status

NHS

National Institute for

Health Research

WCRF International Network



NHS National Institute for Health Research

Who we are

AICR (1982) WCRF UK (1990)

WCRF Netherlands (1994)

WCRF Hong Kong (1997)

WCRF International (1999)



What we do

Fund research on the relationship of nutrition, physical activity and body weight to cancer risk

Interpret the accumulated scientific literature to derive Recommendations for Cancer Prevention

Educate people through our national Health Information programmes

Advocate effective policies to help people and populations to reduce their chances of developing cancer







Nutrition and cancer development

Global variation in cancer incidence and impact of migration



NHS National Institute for Health Research





Continuous Update Project



NHS National Institute for Health Research

SUMMARY OF STRONG EVIDENCE ON DIET, NUTRITION, PHYSICAL ACTIVITY AND PREVENTION OF CANCER





Analysing research on cancer prevention and survival

Nutrition and cancers



Adiposity

Breast (pm), colorectum, endometrium, oesophagus, pancreas, gallbladder, kidney, ovary, prostate (advanced), liver

Physical (in)activity

Colon, breast, endometrium

Meat – red and processed

Colon, rectum

Alcohol

Mpl, breast, colorectum, liver, oesophagus

Plant foods (f&v, pulses, wholegrains)

Mpl, oesophagus, stomach, colorectum (df), lung

Breastfeeding

Breast (mother), obesity (child)

Cancer preventability



Estimates of cancer preventability by appropriate diet, nutrition, physical activity and body fatness

	USA	UK	BRAZIL	CHINA
Mouth, pharynx, Iarynx	63	67	63	44
Oesophagus	63	71	50	33
Lung	36	33	36	38
Stomach	47	45	41	33
Pancreas	19	15	11	8
Gallbladder	21	16	10	6
Liver	30	24	13	7
Colorectum	50	47	41	22
Breast	33	38	22	11
Ovary	5	4	3	1
Endometrium	59	44	37	21
Prostate (advanced)	11	9	5	4
Kidney	24	19	13	8
Total for these cancers	31	32	25	24
Total for all cancers	21	24	18	20

Fatal and non-fatal cancer incidence: SOS



NHS National Institute for Health Research



Sjostrom: Lancet Oncol 2009;10:653

Cancer incidence by weight loss tertile: SOS



National Institute for Health Research



Sjostrom: Lancet Oncol 2009; 10: 653



Nutrition after cancer diagnosis

Pathological features -POSH





	Underweight or	Overweight	Obese	
	Healthy weight	n=784	n=533	
	n=1526			
	(54.0%)	(27.6%)	(18.8%)	
		\frown	\frown	
Mean tumour	20	24	26	U/H vs. Ov: p<0.0001
size/ mm	(0-170)	(0-199)	(0.5-130)	U/H vs. Ob: p<0.0001
Multifocal	12 (30.6%)	220 (30.4%)	130 (27.2%)	NS
Grade 3	879 (59.0%)	485 (63.6%)	331 (63.9%)	U/H vs. Ov: p=0.034
				U/H vs. Ob: p =0.048
		\frown	\sim	
Node positive	736 (49.0%)	419 (54.2%)	284 (54.6%)	U/H vs. Ov: p=0.019
		\smile		U/H vs. Ob: p=0.027
ER negative	483 (31.7%)	273 (34.9%)	213 (40.1%)	U/H vs Ob: p<0.001
HER 2 positive	381 (28.2%)	180 (26.4%)	129 (27.3%)	NS
ER/ PR/ HER 2	305 (20.8%)	176 (23.4%)	136 (26.8%)	U/H vs. Ob: p=0.005
negative				

Copson et al. Ann Onc 26: 2015, 101-112

DIET, NUTRITION, PHYSICAL ACTIVITY AND BREAST CANCER SURVIVAL (BY OUTCOME)

	Outcome	ALL CAUSE MORTALITY			BREAST CANCER MORTALITY			SECOND PRIMARY BREAST CANCER					
		DECREASED RISK		INCREASED RISK		DECREASED RISK		INCREASED RISK		DECREASED RISK		INCREASED RISK	
		Exposure	Timeframe	Exposure	e Timeframe	Exposure	e Timeframe	Exposure	e Timeframe	Exposure	Timeframe	Exposure	Timeframe
STRONG EVIDENCE	Convincing												
	Probable												
LIMITED EVIDENCE	Umited- suggestive	Physical activity Foods containing fibre Foods containing soy	Before diagnosis ≥12 months after diagnosis ≥12 months after diagnosis ≥12 months after diagnosis	Body fatness Total fat Saturated fatty acids	Before dlagnosis <12 months after dlagnosis ≥12 months after dlagnosis Before dlagnosis Before dlagnosis	Physical activity	Before diagnosis	Body fatness ¹	Before diagnosis <12 months after diagnosis			Body fatness	Before dlagnosis <12 months after dlagnosis
STRONG EVIDENCE	Substantial effect on risk unlikely												

STRONG: Evidence strong enough to support a judgement of a convincing or probable causal relationship and generally justify making recommendations **LIMITED**: Evidence that is too limited to justify making specific recommendations

1 Post menopause only

Continuous update Project Report: Diet, Nutrition, Physical Activity and Breast Cancer Survivors: <u>http://www.wcrf.org/sites/default/files/Breast-Cancer-</u> Survivors=2014=Report.pdf

Obesity, physical activity, diet and cancer





Obesity, low activity and poor diet are a cause of several cancers and adverse prognostic factors in diagnosed cancer.

However, the impact of interventions on outcome is less clear.

Nevertheless, weight management in the general population and in cancer survivors is important, both for quality of life and for co-morbidities. Being active may also improve quality of life.



Nutrition and cancer biology

Hallmarks of cancer



National Institute for Health Research



Hanahan & Weinberg (2011) Cell; Hanahan & Coussens (2012) Cancer Cell

Two enabling characteristics for acquiring hallmarks

Genome instability and mutation Tumor-promoting Inflammation

Hallmarks of cancer



NHS National Institute for Health Research



Immediate nutritional relevance

Two enabling characteristics for acquiring hallmarks



NHS

National Institute for

Health Research



Immediate nutritional relevance



Host Factors – genetic, epigenetic, nutritional/metabolic, immune micronutrient macronutrient energy

What determines who is affected?











BLOCK NINE







Nutrition is an important determinant of risk of several cancers

 we do not yet understand what determines which individuals will be affected

Nutrition is an important predictor of outcome after diagnosis

- We do not know what underlies this link
- We understand much of how nutrition can affect cancer biology
- This knowledge has not been explored in patient relevant trials

Patients need and want nutritional advice but the evidence base is lacking



National Institute for Health Research

Thank you

Any questions?

www.cancerandnutrition.nihr.ac.uk



NHS National Institute for Health Research





Can We Work Together To Improve Nutrition Research for Cancer Patients?

5th September 2016



www.cancerandnutrition.nihr.ac.uk



Health Research



Professor Alan Jackson

NIHR Director of Nutrition Research, Chair of the Cancer & Nutrition NIHR Infrastructure Collaboration

www.cancerandnutrition.nihr.ac.uk



National Institute for Health Research

Geography

Lifestyle

Tissue/Site

Cancer type

Life course

Molecular mechanisms: normal growth, abnormal growth

Therapeutic responsiveness, comorbidities

Clarity of purpose: patients first



Prevention, treatment, ongoing support

Conceptual framework soil and seed: toxins vs terroir

Language

Current state of play

Framework for tackling problem

Divide tasks for action – fit for purpose



<u>Cancer</u> includes all **types**, **sites** and **stages of cancer**. Stages of cancer include prevention, diagnosis, treatment, survivorship and palliative and end of life care

Nutrition is the set of integrated processes by which cells, tissues, organs and the whole body acquire the energy and nutrients for normal structure and function, which is achieved at body level through dietary supply, and the capacity of the body to transform the substrates and cofactors necessary for metabolism.

All of these domains (diet, metabolic capacity, body composition and level of demand for energy and nutrients) are influenced by levels of physical activity and can vary according to different physiological and pathological or disease states.

Nutritional influence through the life course - a fundamental exposure at all stages



MRC

NOCRI MRC-T Cancer & Nutrition Workshop

NHS

National Institute for

Health Research

Phase 1 - key activities (2014-15)



March 2014:

•Establishing the Collaboration & stakeholder engagement

Phase One:

Patient experience survey
Clinicians survey
Mapping of UK cancer & nutrition research – report published October 2015

Phase 1 - mapping of UK cancer and nutrition research



- NCRI data, 5 years (2009-2013)
- Nutrition and cancer a predefined primary or secondary research aim/outcome
- 158 awards included (out of 6,579 awards)



Account for **1.8%** of the total cancer research spend recorded in the NCRI database between 2009 and 2013

Percentage of awards per category of cancer research







- PPI is a priority, in order to help improve translational research
- Patient groups and individuals have shown support & enthusiasm for the initiative
- Patient representative on Steering Committee
- Patient responsible for leading work stream 1: Information provision and communication with Cancer Patients and the Public
- Patients on each of the other work streams



Work streams



National Institute for Health Research

- Information provision and communication with cancer patients and the public
- 2. Creating a skilled community of practice
- 3. Identifying major research priorities
- 4. Characterising nutritional status in cancer
- 5. Working with industry



Work streams



Patient and public involvement and engagement

- To ensure patient and public needs are central to the development of the collaboration

Professionals and professional groups

- To develop communities of practice
- To assure quality (training qv nutritional assessment)
- To build capacity (nutrition as main interest, nutrition as part of other practice)

Future research priorities and framework

- To build consensus on future framework for cancer and nutrition research
- To promote collaborations
- To promote coherence and complementarity among the research community in cancer and nutrition

Assessment of nutrition status

 To identify components of nutritional assessment appropriate to different levels of clinical need and complexity, and promote wider acceptance

Commercial engagement

- To identify opportunities for commercial engagement as the collaboration develops

Key activities



NHS National Institute for Health Research

2013 →

 WCRF, Soton BRC propose to NOCRI need for a collaboration

March 2014 \rightarrow

 Establishing the collaboration & stakeholder engagement

Phase One – Task and Finish

- Patient experience survey
- Clinicians survey
- Mapping of UK cancer & nutrition research
- Phase 1 Report

October 2015 →

- Setting aims & objectives for Phase 2 and beyond
- Developing Work Streams

Launched October 2015

NHS National Institute for Health Research

Cancer and Nutrition NIHR infrastructure collaboration

Improving cancer prevention and care. For patients. For Clinicians. For researchers.



Full Report of Phase One July 2015



NHS National Institute for Health Research





Consortium models to bring together the research community for the benefit of patients

Mike Johnson

Divisional Director, Corporate Partnerships, MRC Technology

A quick introduction to MRC Technology



Established 2000 MRC heritage

- Not-for-profit
- We translate early-stage scientific research into commercial opportunity
- We help ensure patient value is created from grant funded research
- We are self-funding

140+ Staff

- Chemists
- Biologists
- Biotechnologists
- Technology transfer managers
- IP and legal
- Commercial experts

Our achievements



Since 2000:

Roche



Keytruda® (pembrolizumab) Keytruda[®] for Injection S MERCK 50 mg/vial Anti-PD-1 Melanoma & NSCLC Actemra® (tocilizumab)

IL-6

RA



biogen idec

Takeda

Two problems, two consortia



National Institute for Health Research

• Translate discovery



- Moving forwards early stage projects to be more attractive to industry partners
- Precompetitive

Progress stalled assets



- Advancing later-stage projects when the risk is too high for industry
- Competitive
- Different approaches to different problems
- Both maximise the value of fundamental research outcomes
- Both rely on industry working closely with third sector (charities & patient groups) and academia
- Both rely on pooling resources and information

Advance novel targets for the treatment of dementias towards the clinic De-risk targets and provide scientific foundation for drug discovery

- Share cost of translation (so more can get done)
- Share disease and target insights (so the right things get done)

Eisai

- Funding partners get option to pursue targets
- Industry partners elect to fund or not



MSD abbvie

DC : Translating fundamental research









Neuro-MAP: Progressing stalled assets



- Research charities from UK and US
- Objective to progress de-prioritised assets from industrial partners to a value inflexion point
- Non-binding MoU to articulate common purpose and project selection process
- Rolling and continuous call for projects
- Comparison of project proposals to own research portfolio
- Individual charities elect to fund or not

Alzheimer's alzheimer's

Society

• Funders form project steering committee





Alzheimer

Research

NOCRI MRC-T Cancer & Nutrition Workshop

mndo

PARKINSON'S



Summary







shared principles

- A common purpose that binds all parties
- A clear evaluation and selection process for research proposals
- Elect to fund (and contribute) at the project level



NHS National Institute for Health Research

How can we work together?



NHS

Introduction	What is our common purpose?What single thing will bind us together?	13:40-13:45
Session 1	 What are the opportunities for joint working? What can we achieve together that we could not achieve individually? What are the benefits for all parties? What are the potential impacts? 	13:45-14:15
Session 2	What are the barriers to joint working?How do we overcome them?	14:15-14:45
Session 3	 How can we make this work? What would the terms of engagement need to be? How could individual organisations be part of such a model in a way that aligns and supports their strategies? What could a consortium model look like? 	14:45-15:15

Key questions to be answered



National Institute for Health Research

- What is this really all about?
 - Nutrition?
 - Exercise?
 - Life style?
- You've heard from our speakers, are you on board?
 - Why/why not?
- What really needs to get done?
 - What role will you play?
 - What's missing that will make it difficult?
- What are the right models to adopt?
- What will you do about it tomorrow?



NHS National Institute for Health Research



NHS National Institute for Health Research

Summing up & next steps

Professor Alan Jackson

NIHR Director of Nutrition Research, Chair of the Cancer & Nutrition NIHR Infrastructure Collaboration

Please complete a feedback form before you leave

Contact details



National Institute for Health Research

Lucy Allen Email: <u>lucy.allen@nihr.ac.uk</u> Phone: 07850 312094

Cancer and nutrition NIHR infrastructure collaboration

www.cancerandnutrition.nihr.ac.uk

Email: <u>cancer_nutrition@nihr.ac.uk</u> Tel: 023 8120 6317

Please complete a feedback form before you leave