BRC Prevention event
Monday 17th September 2018, Nowgen Centre

Burden of cancer attributed to obesity & diabetes:

opportunities for cancer prevention & optimising diabetes management

Professor Andrew G Renehan

PhD FRCS FRCS(GenSurg)

The Christie NHS Foundation Trust

Manchester Cancer Research Centre

NIHR Manchester Biomedical Research Centre

Division of Cancer Sciences, School of Medical Sciences,

Faculty of Biology, Medicine and Health, University of Manchester

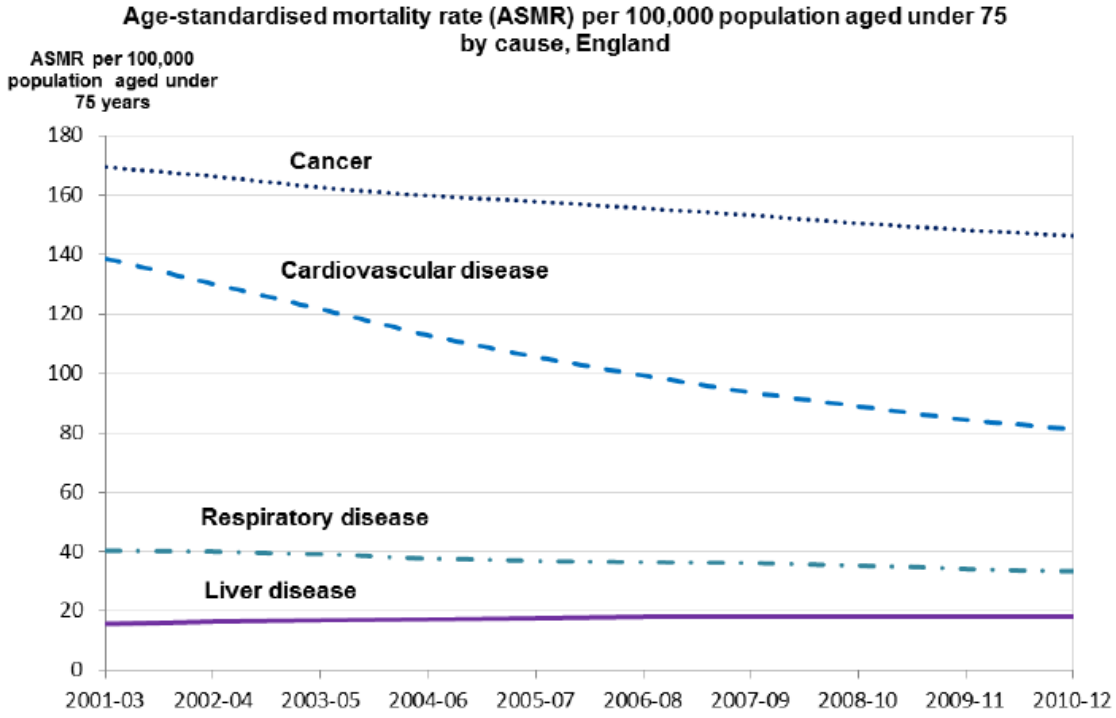
Manchester Academic Health Science Centre

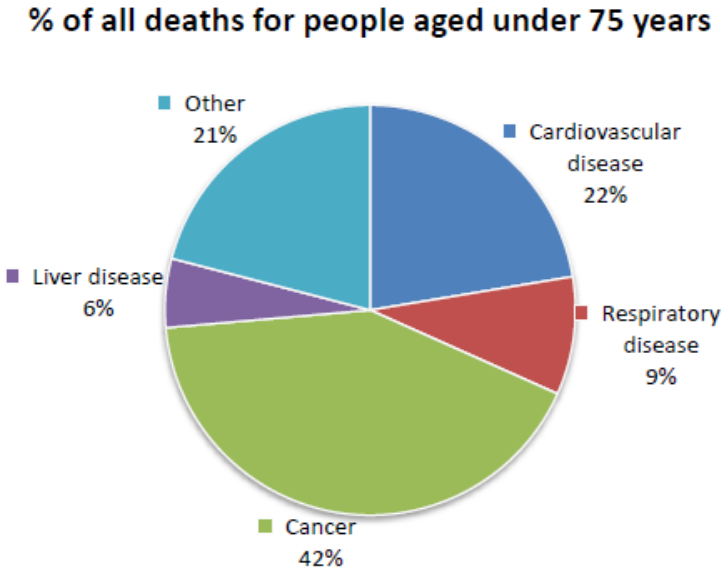
MANCHESTER 1824

CANCER RESEARCH UK

NHS National Institute for Health Research

Top 4 causes of death in UK





Living Well for Longer National Support for Local Action to Reduce Premature Avoidable Mortality
Prepared by The Reducing Premature Mortality Programme in The Department of Health 2014

A third of cancers are preventable

Cases

New cases of cancer, 2015, UK

Deaths

Deaths from cancer, 2016, UK

Survival

Survive cancer for 10 or more years, 2010-11, England and Wales

Preventable cases

Cancer cases are preventable, UK, 2015

Cancer Research UK

Background

- 221 datasets from prospective observational studies
- 20 cancer types
- standardised dose-response meta-analysis
- expressed as risk per 5 kg/m^2

Marcel Zwahlen

Matthias Egger

Body-mass index and incidence of cancer: a systematic review and meta-analysis of prospective observational studies

Andrew G Renehan, Margaret Tyson, Matthias Egger, Richard F Heller, Marcel Zwahlen

Summary

Background Excess bodyweight, expressed as increased body-mass index (BMI), is associated with the risk of some

Lancet 2008; 371: 569–78

Background (IARC 2016): BMI & cancer risk

Obesity-related cancers	
1	Oesophageal adenocarcinoma
2	Gastric cardia
3	Colon and rectum
4	Liver
5	Gallbladder
6	Pancreas
7	Post-menopausal breast
8	Endometrial
9	Ovarian
10	Kidney: renal cell
11	Meningioma
12	Thyroid
13	Multiple myeloma

The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL REPORT 2016

Body Fatness and Cancer — Viewpoint of the IARC Working Group

Béatrice Lauby-Secretan, Ph.D., Chiara Scoccianti, Ph.D., Dana Loomis, Ph.D., Yann Grosse, Ph.D., Franca Bianchini, Ph.D., and Kurt Straif, M.P.H., M.D., Ph.D., for the International Agency for Research on Cancer Handbook Working Group

But ‘once-only’ BMI is a ‘crude’ measure of cumulative adiposity exposure

Global population attributable fraction

Global burden of cancer attributable to high body-mass index in 2012: a population-based study

Melina Arnold, Nirmala Pandeya*, Graham Byrnes, Andrew G Renehan, Gretchen A Stevens, Majid Ezzati, Jacques Ferlay, J Jaime Miranda, Isabelle Romieu, Rajesh Dikshit, David Forman, Isabelle Soerjomataram*

Summary

Background High body-mass index (BMI; defined as 25 kg/m² or greater) is associated with increased risk of cancer. *Lancet Oncol* 2014

World Cancer Research Fund

PAF & excess cases attributed to high BMI

Global summary		No. of cancers
	PAF	
Women	5.4%	345,154
Men	1.9%	136,059
Both genders	3.6%	**481,213**

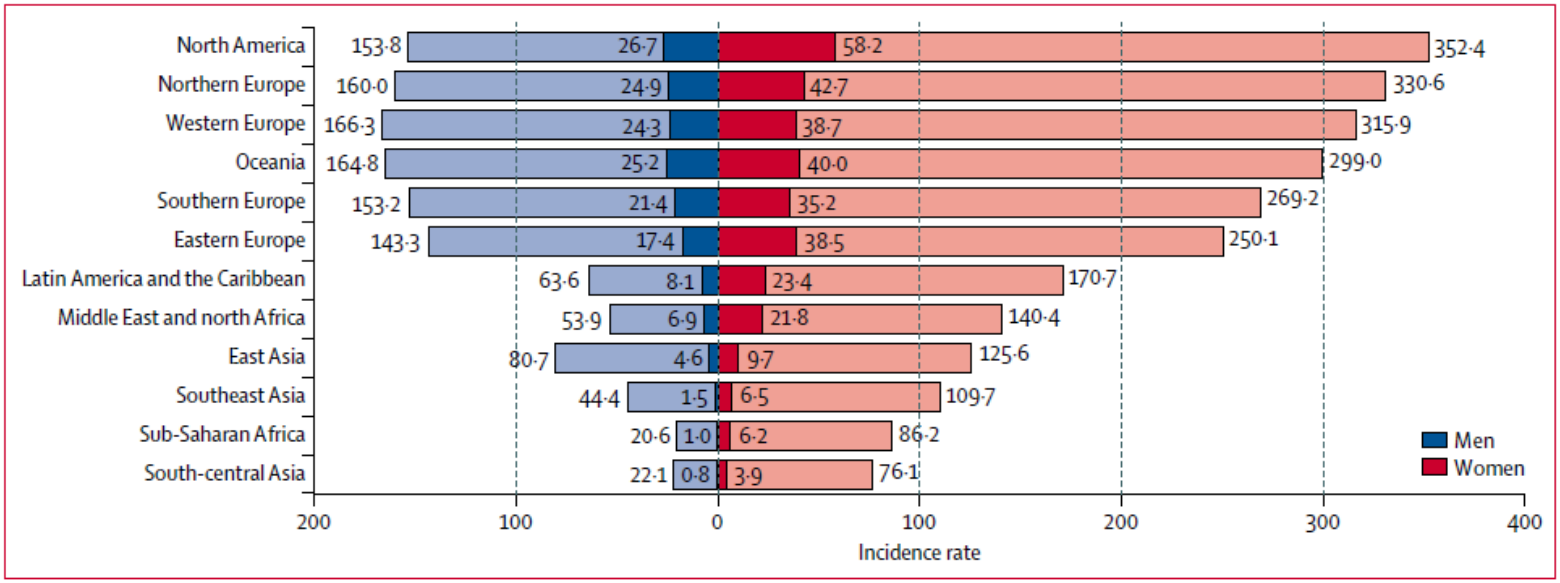


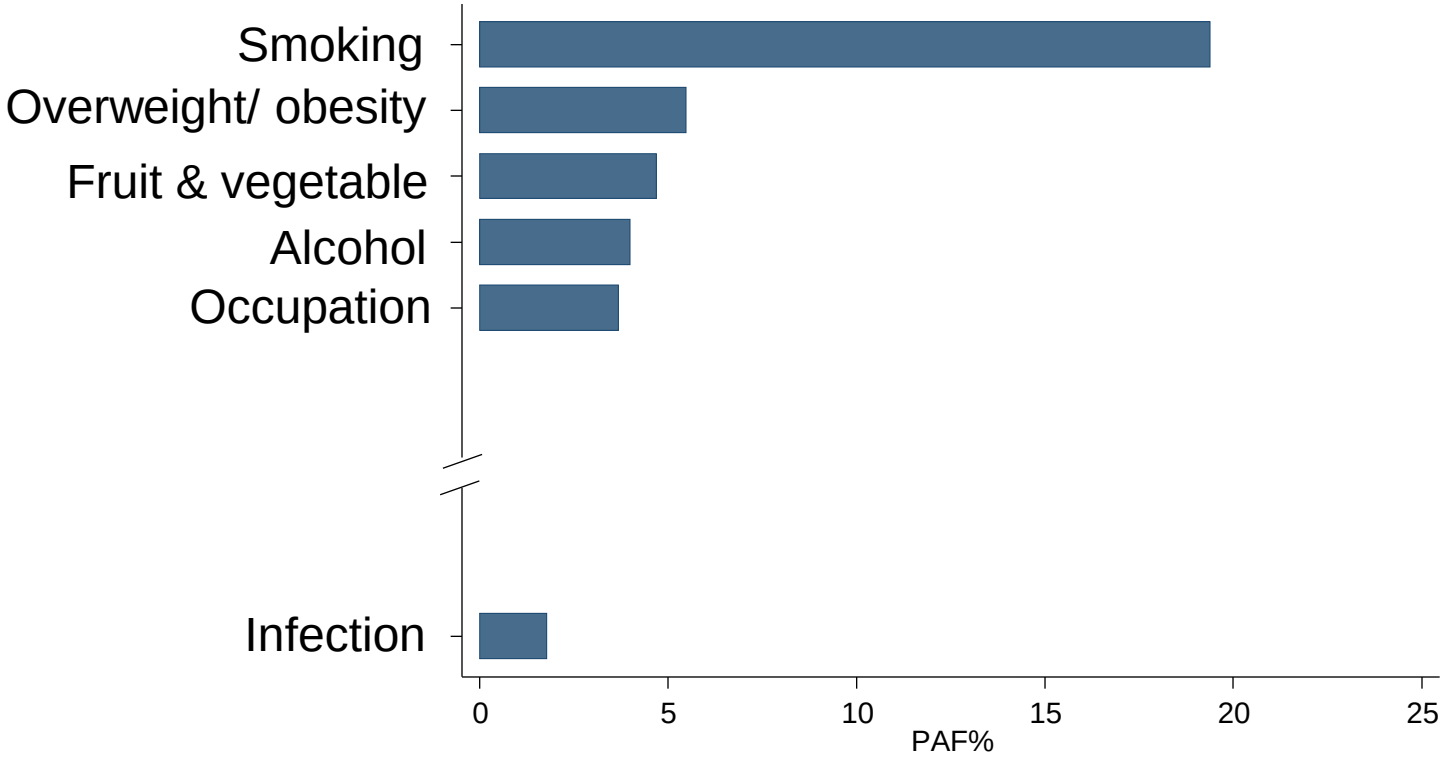
Figure 2: **Age-standardised incidence rate of high-BMI-related cancers and high-BMI-related cancers attributable to high BMI (per 100 000 people) in 2012**
Incidence data are age-standardised to the world standard population. Light bars show total incidence rates of high-body-mass-index (BMI)-related cancers, and dark bars show those attributable to high BMI.

Arnold et al. Lancet Oncol 2014

Comparison with other risk factors (global)

Global estimates		
Risk factor	PAF	Reference
Smoking	21%	*Ezzati et al. 2005*
(Viral) infections	16%	*de Martel et al. 2012*
Elevated BMI	3.6%	*Arnold et al. 2014*

BMI and cancer attributable risk



16.

The fraction of cancer attributable to lifestyle and environmental factors in the UK in 2010

British Journal of Cancer (2011) 105, S77–S81

www.bjcancer.com

Summary and conclusions

DM Parkin*[,1], L Boyd[2] and LC Walker[2]

[1]*Centre for Cancer Prevention, Wolfson Institute of Preventive Medicine, Queen Mary University of London, Charterhouse Square, London EC1M 6BQ, UK;* [2]*Cancer Research UK, Angel Building, 407 St John Street, London EC1V 4AD, UK*

Diabetes & cancer risk

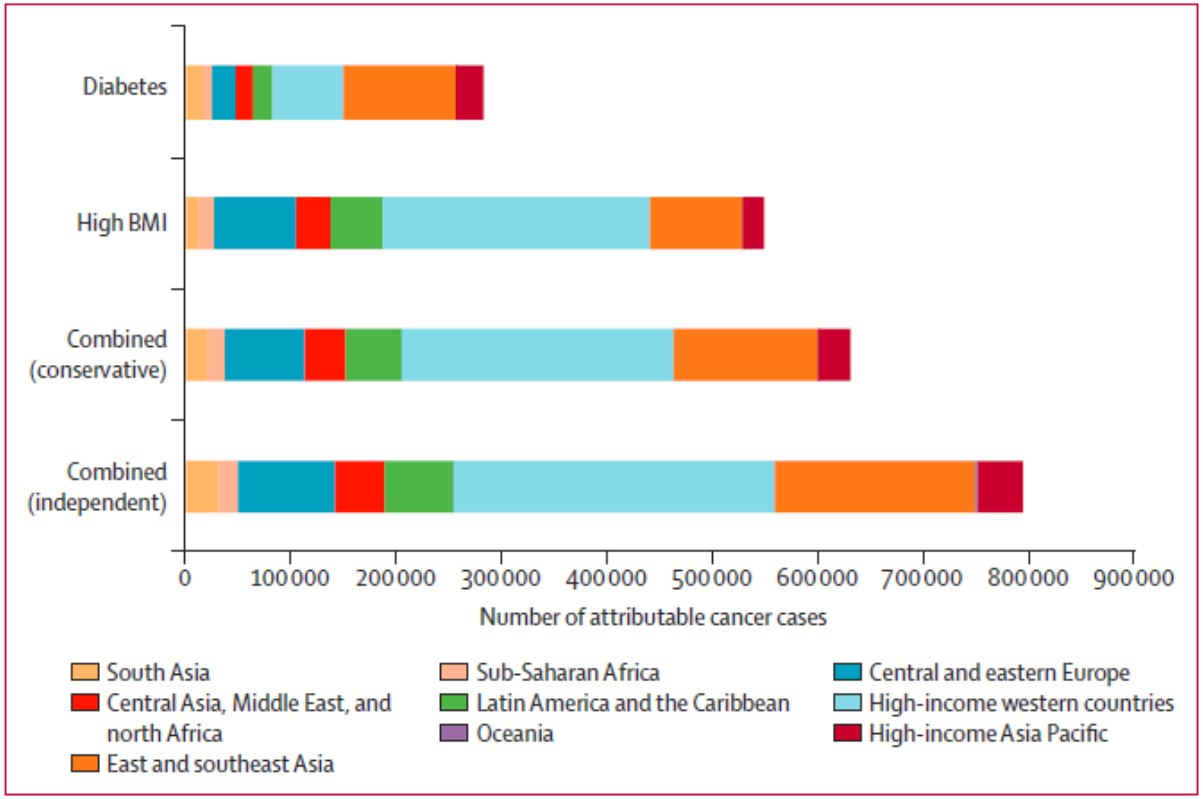


Figure 1: Global cancer cases in 2012 attributable to diabetes and high BMI, individually and combined,

Worldwide burden of cancer attributable to diabetes and high body-mass index: a comparative risk assessment

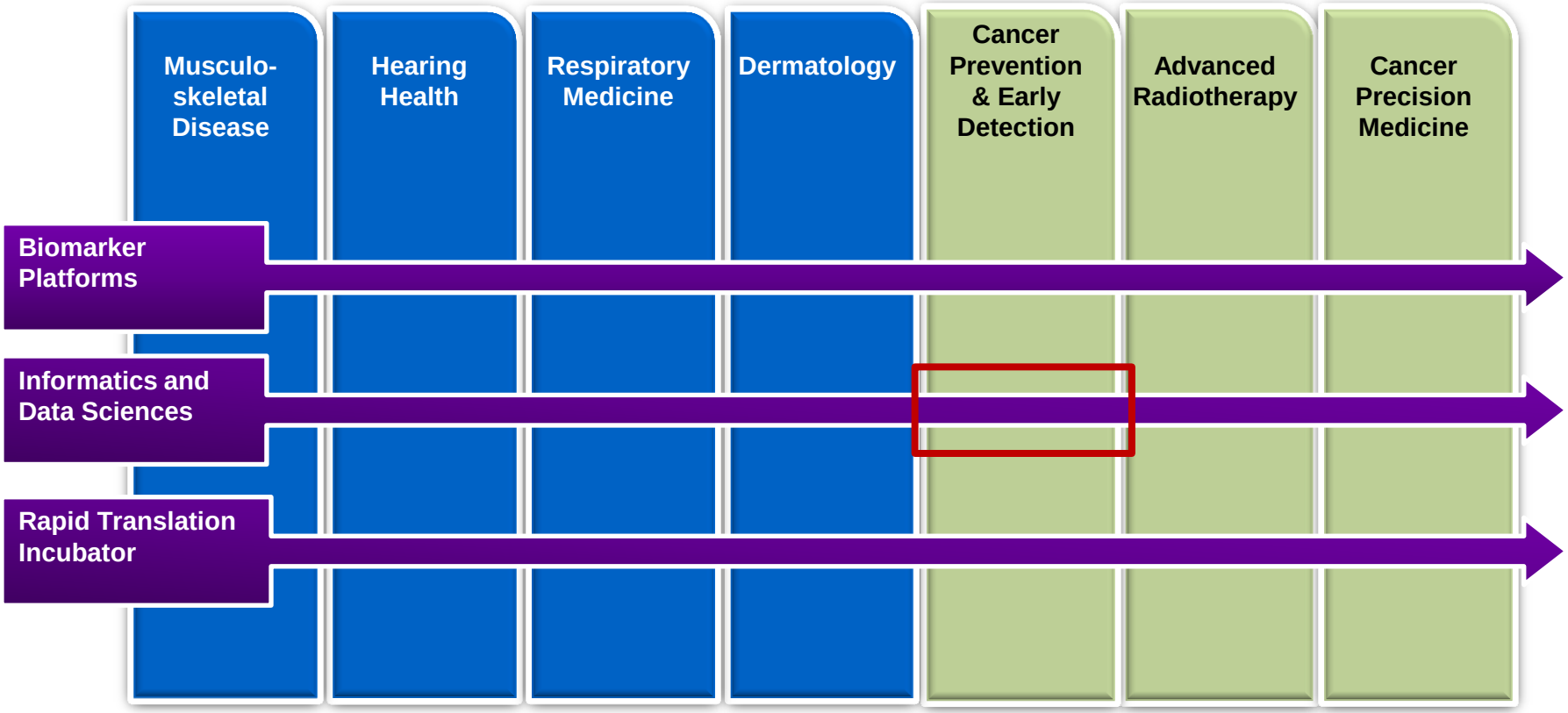
Jonathan Pearson-Stuttard, Bin Zhou, Vasilis Kontis, James Bentham, Marc J Gunter, Majid Ezzati

Summary

Background Diabetes and high body-mass index (BMI) are associated with increased risk of several cancers, and are

Lancet Diabetes Endocrinol 2017

Manchester BRC:
Obesity-cancer & cross-cutting data science



NHS
National Institute for Health Research

Epidemiology MRC HeRC

Prof I Buchan

Dr E Badrick

Dr M Sperrin

Prof T van Staa

Dr H Lennon

Diabetes

Obesity

Cancer

Endometrial cancer team

Dr E Crosbie

Dr V Sivalingam

Dr S Kitson

Dietary interventions

Dr M Harvie

Prof A Howell

Mary Pennington

Prof D French

Clinical & non-clinical students

N Alam PhD student

C Watson PhD student

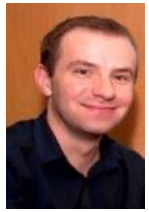
C Slawinski PhD student

K Parmar MD student

Imaging biomarkers & obesity

Prof S Williams

Prof D O'Reilly



Lee Malcomson

PROCAS & breast ca.

Prof G Evans

Prof A Howell

Dr E Woodward

Prof J Cuzick

(Our) Strategies of cancer prevention through weight control

1. Working with national/ European organisations

    - legislation

    - awareness

2. Better understanding mechanisms → target

    - lifecourse epidemiology

    - measurement of ectopic adipose tissue

‘Effectors’

OUR RESEARCH:
Cancer Prevention and Early Detection

Public and patient involvement and engagement

World Cancer Research Fund

CANCER RESEARCH UK

Policy & prevention

Dr Gillian Rosenberg

Media

International Agency Research on Cancer

World Health Organization

NHS
National Institute for Health Research

Cancer and Nutrition
NIHR infrastructure collaboration

BMI PROCAS sub-study


Evans

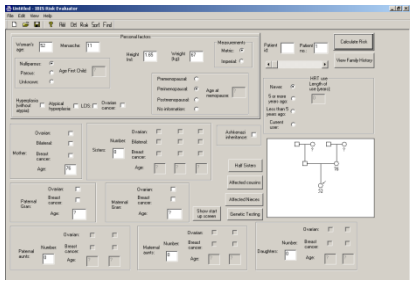

Howell

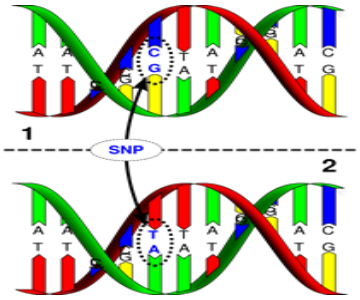

Harvie

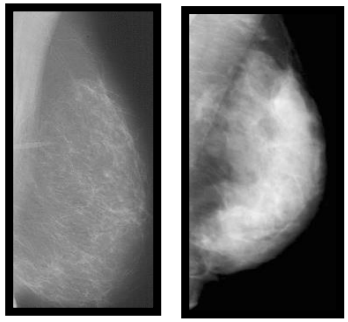

Renehan

PRediction Of Cancer At Screening (PROCAS)

- The analysis included >57,000 women (aged 47–73: median 57 years) recruited between Oct 2009 & June 2015
- Through national breast cancer screening programme
- Region: Greater Manchester







NHS
National Institute for Health Research

Ectopic fat & cancer risk

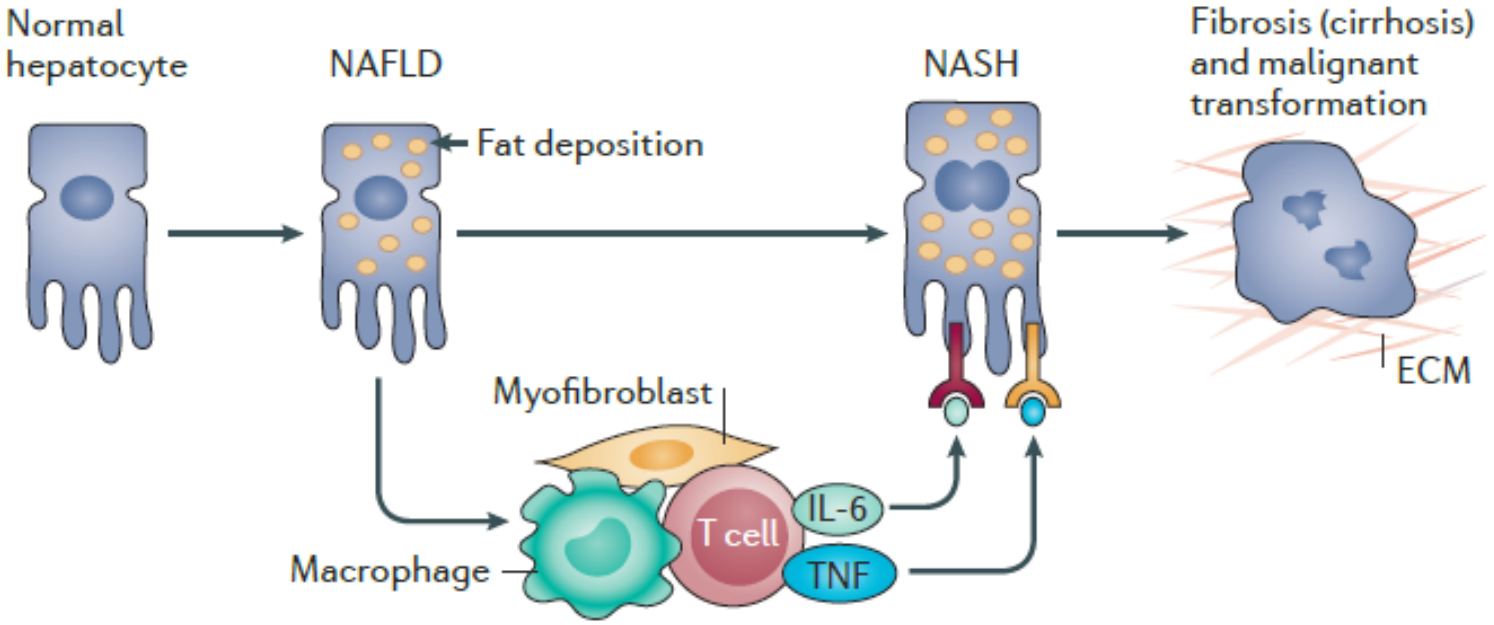


Figure 3 | **Hypothesized steatosis–hepatocellular carcinoma pathway.** In the

REVIEWS

Adiposity and cancer risk: new mechanistic insights from epidemiology

2015

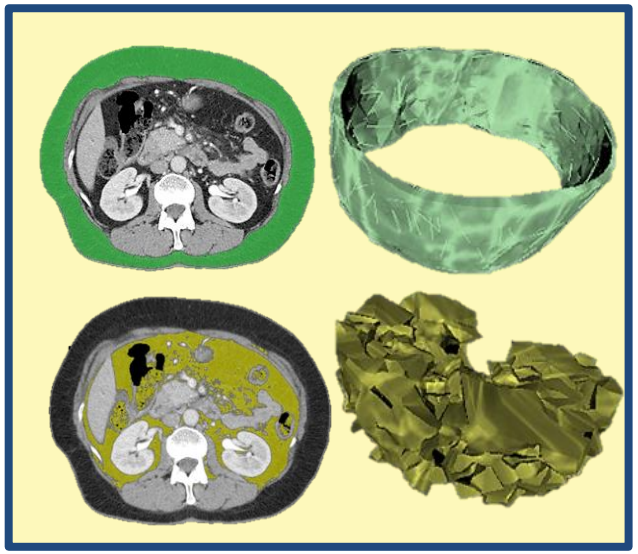
Andrew G. Renehan[1], Marcel Zwahlen[2] and Matthias Egger[2]

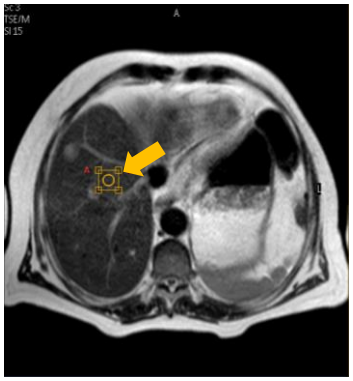
Marcel Zwahlen

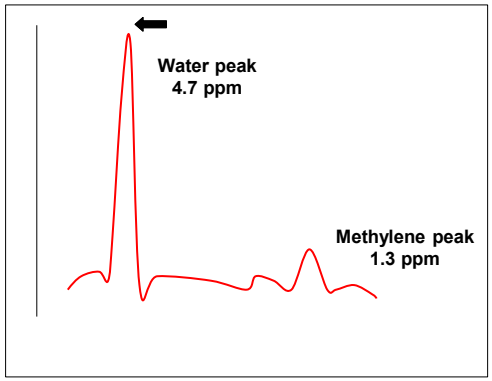
Matthias Egger

MR image quantification of visceral adipose tissue & intra-hepatic fat

Visceral Adipose Tissue (VAT)
Subcutaneous Adipose Tissue (SAT)







Intra-hepatic
fat quantification

NHS
National Institute for
Health Research

Thank you