

**Science and Art of Healthy Living**  
BSLM: The British Society of Lifestyle Medicine

**The Caerphilly  
Collaborative Cohort Study**

Peter Elwood and Janet Pickering

with John Gallacher, Tony Bayer et al.

Division on Population Medicine, Cardiff  
Dementia Platform, Oxford University



**Cardiff**

Mercure Cardiff Holland House Hotel  
June 21<sup>st</sup> 2019




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**Science and Art of Healthy Living**  
BSLM: The British Society of Lifestyle Medicine

**Live *Caer-philly***

'To treat a disease is an admission of failure  
Prevention is the ultimate aim of medical practice.'

Cochrane

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**My Health – whose responsibility?**

**The Caerphilly Collaborative Cohort study**  
1979 -

A wide based long-term prospective study...

- over 400 publications - *from aspirin to angina, from diet to dementia and from hearing to heart disease.*

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### My Health – whose responsibility?

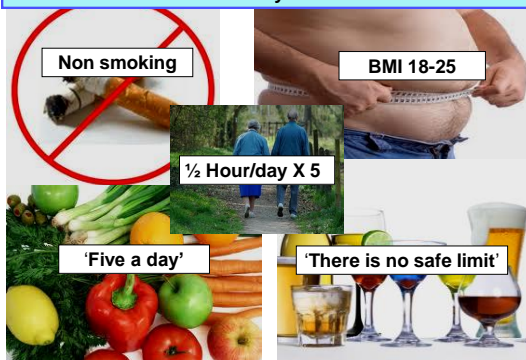
#### Healthy Lifestyles Reduce the Incidence of Chronic Diseases and Dementia: Evidence from the Caerphilly Cohort Study.

Peter Elwood, Julieta Galante, Janet Pickering, Stephen Palmer, Tony Bayer, Yoav Ben Shlomo, Marcus Longley, John Gallacher.

Public Library of Science 2013

<https://doi.org/10.1371/journal.pone.0081877>

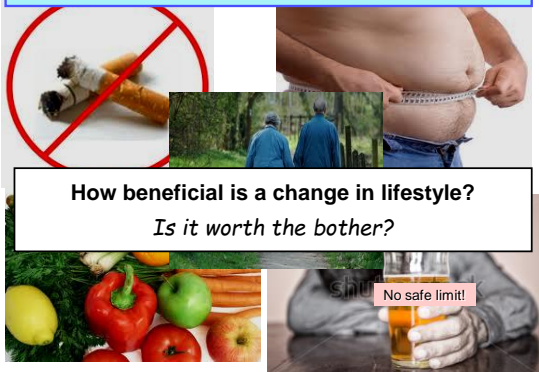
### The five healthy behaviours



### Cost of unhealthy behaviours to NHS Wales



### THE FIVE HEALTHY BEHAVIOURS



How beneficial is a change in lifestyle?  
*Is it worth the bother?*

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### My Health – whose responsibility?



#### THE 35-year CAERPHILLY PROSPECTIVE STUDY 1979 -

2,500 men aged 45-59 yrs: 90% of the eligible population  
questioned and examined every five years, for 35 years

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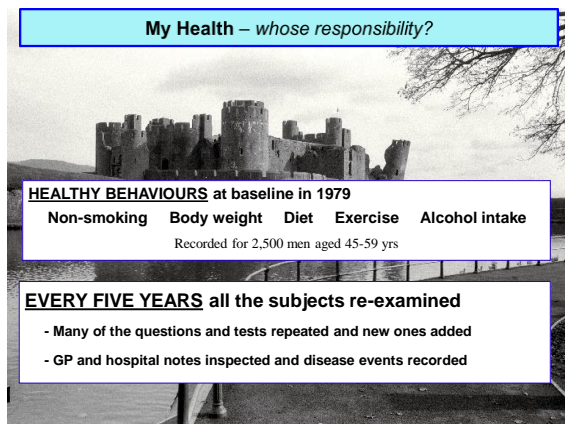
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### My Health – whose responsibility?



#### HEALTHY BEHAVIOURS at baseline in 1979

Non-smoking   Body weight   Diet   Exercise   Alcohol intake

Recorded for 2,500 men aged 45-59 yrs

#### EVERY FIVE YEARS all the subjects re-examined

- Many of the questions and tests repeated and new ones added
- GP and hospital notes inspected and disease events recorded

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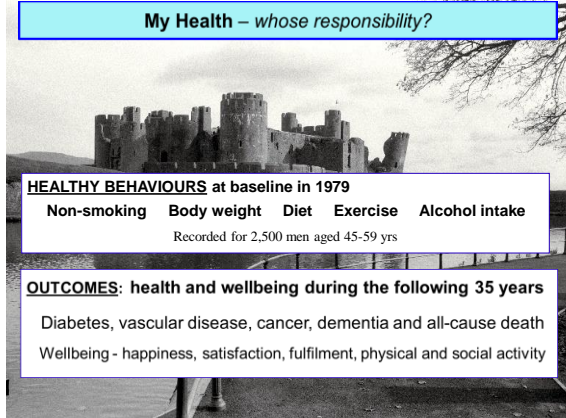
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## My Health – whose responsibility?



**HEALTHY BEHAVIOURS** at baseline in 1979

Non-smoking	Body weight	Diet	Exercise	Alcohol intake
Recorded for 2,500 men aged 45-59 yrs				

**OUTCOMES:** health and wellbeing during the following 35 years

Diabetes, vascular disease, cancer, dementia and all-cause death

Wellbeing - happiness, satisfaction, fulfilment, physical and social activity

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## THE FIVE HEALTHY BEHAVIOURS

### The five healthy behaviours.....

- non-smoking
- a low body weight
- regular exercise
- a healthy diet
- a low alcohol intake



### UNHEALTHY LIFESTYLE

None or one behaviour

### HEALTHY LIFESTYLE

Four or five behaviours

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## THE FIVE HEALTHY BEHAVIOURS

### The five healthy behaviours.....

- non-smoking,
- a low body weight
- regular exercise
- a healthy diet
- a low alcohol intake



and

### New disease

- Diabetes
- Heart disease & stroke
- Cancer
- Cognitive decline
- Dementia
- Wellbeing

Detailed clinical data collected from primary care and hospital records and standard diagnostic criteria applied.

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REDUCTIONS IN DISEASE

HEALTHY BEHAVIOURS*	REDUCTIONS*				
	Diabetes (214 men)	Vascular disease (752 men)	Cancer (648 men)	Cognitive decline (299 men)	Dementia (121 men)
'Unhealthy' (None or one healthy behaviour) Any two Any three 'Healthy' (Four or five healthy behaviours)	100	100	100	100	100
Significance of trend					

\* Reductions based on Odds Ratios, adjusted for age, social class,  
and, for dementia, a base-line cognitive function test (NART)

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Significance of trend	0.001				

\* Confined to men who followed the behaviours consistently  
Reductions based on odds ratios and adjusted for age and social class,  
and for cognitive decline and dementia, also adjusted for a base-line cognitive function test (NART)

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Significance of trend	0.001	0.0005	0.88	0.001	0.006

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In the US Women's Health Study, a 61% reduction in type 2 diabetes was attributable to BMI alone. Hu et al. N Engl J Med 2001; 345:790-7.

US Health Professionals who had adopted the five health behaviours had a 68% reduction in heart disease (Relative risk (RR): 0.13, 95% CI: 0.05-0.33). [Kawachi et al. E. Arch Intern Med 170: 711-8].

The 84,000 women in the Nurses' Health Study who followed five health behaviours had a 85% reduction in heart disease (RR: 0.15, 95% CI: 0.07-0.33). [Kawachi et al. N Engl J Med 2000;343:16-22].

In a study of 10,000 men, four healthy behaviours led to hazard ratios of 0.29 (95% CI: 0.15-0.54) for heart disease, 0.29 (95% CI: 0.15-0.54) for cancer, 0.29 (95% CI: 0.15-0.54) for cognitive decline, and 0.29 (95% CI: 0.15-0.54) for dementia. [Kawachi et al. E. Arch Intern Med 170: 711-8].

In some studies, reduction in cancer is large, up to a hazard ratio of 0.30 (95% CI: 0.15, 0.60) [Ford et al. Arch Intern Med 169: 1355-1362. ]

In another, 112,000 non-smoking subjects, the 4% of subjects who achieved a high score based on body weight, activity, diet and alcohol intake, showed a reduction of only 14% in incident cancer (RR: 0.86; 95% CI: 0.78, 0.94) [McCullough et al. Cancer Epidemiol Biomarkers Prev 20: 1089-1097].

Supporting literature

REDUCTIONS IN DISEASE

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**UK Biobank**  
343,150 subjects; 14,285 cancers in 5 years

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**UK BIOBANK**  
350,000 subjects; 14,500 cancers in 5 years

	Reductions		
	Colorectal cancer	Breast cancer	All cancer
All five healthy behaviours	25%	35%	32%
Significance	0.001	0.001	0.001

Each individual healthy behaviour is associated with about an 8 or 9% reduction

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**REDUCTIONS IN DISEASE**

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**BENEFITS OF A HEALTHY LIFESTYLE:**

1. Reductions in incident disease:
- up to 70% less diabetes
  - up to 60% less heart disease and stroke
  - up to 35% less cancer
  - up to 60% less dementia

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## BENEFITS OF A HEALTHY LIFESTYLE:

1. Reductions in incident disease
2. Delayed onset of disease:
  - vascular disease events delayed by up to 13 years
  - dementia delayed by up to 6 years
  - death from any cause by up to 6 years

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## REDUCTIONS IN DISEASE

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## BENEFITS OF A HEALTHY LIFESTYLE:

1. Reductions in incident disease
2. Delayed onset of disease
3. Disease free on retiring:
  - 10% of subjects who had neglected healthy living
  - 23% of those who had followed a healthy lifestyle

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## REDUCTIONS IN DISEASE

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## BENEFITS OF A HEALTHY LIFESTYLE:

1. Reductions in incident disease
2. Delayed onset of disease
3. Retiring disease free
3. Disease burden in the community reduced

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## BENEFITS OF A HEALTHY LIFESTYLE:

1. Reductions in incident disease
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3. Retiring disease free
4. Disease burden in the community reduced  
- if the subjects in the Caerphilly cohort had each been urged to take up one additional healthy behaviour....

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1. Reductions in incident disease
2. Delayed onset of disease
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4. Disease burden in the community reduced  
- if the subjects in the Caerphilly cohort had each been urged to take up one additional healthy behaviour....  
If only half had done so, there would have been.....

## REDUCTIONS IN DISEASE

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## BENEFITS OF A HEALTHY LIFESTYLE:

1. Reductions in incident disease
2. Delayed onset of disease
3. Retiring disease free
4. Disease burden in the community reduced  
12% less diabetes  
6% less vascular disease  
9% less cancer  
13% less dementia

REDUCTIONS IN DISEASE

Benefits of healthy living.....

.....if half the subjects in the Wales each took up one additional healthy behaviour, there would be:

- 12% less diabetes
- 6% less vascular disease
- 9% less cancer
- 13% less dementia

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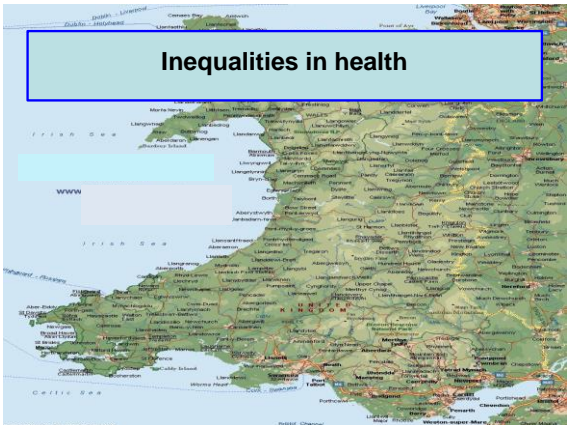
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Inequalities in health



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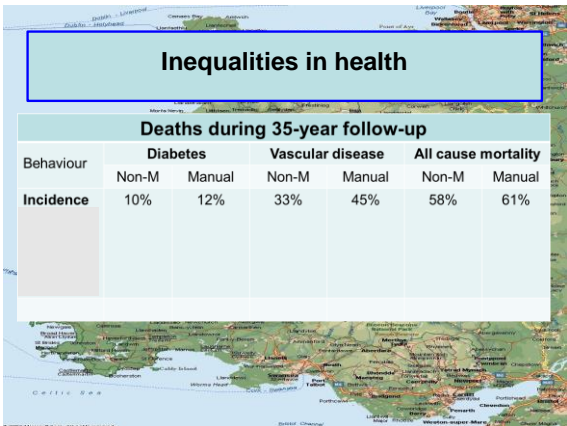
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Inequalities in health



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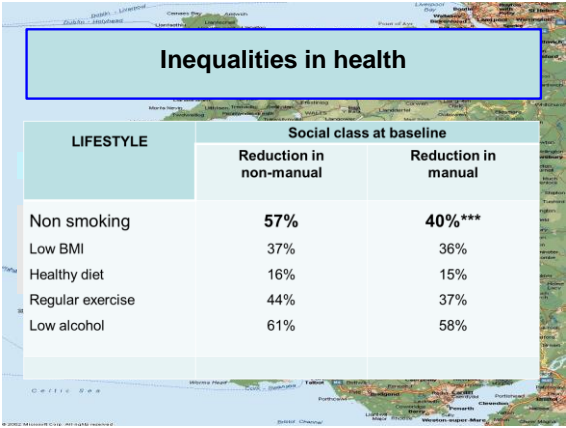
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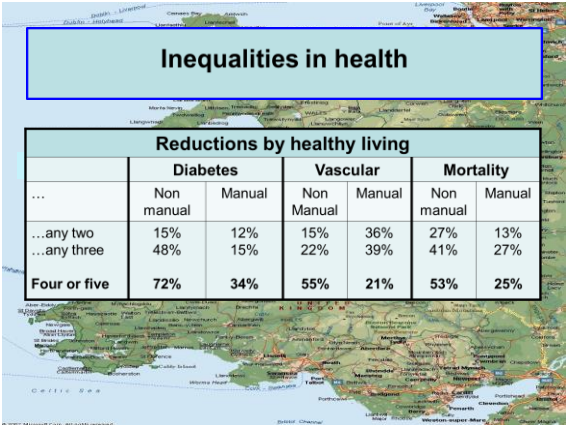
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## Wellbeing

‘.....is when an individual feels he is achieving his/her potential, can cope with the normal tasks and stresses of life and can make a contribution to her/his community’ **Based on a WHO definition**

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### Wellbeing of future generations (Wales) Act 2015

Ms Daisy Cole  
Director of Wellbeing and Empowerment  
Older Peoples Commission for Wales

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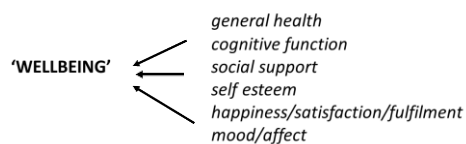
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## Wellbeing in older people



‘Wellbeing’..... What is it?




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### Wellbeing and a healthy lifestyle



'Wellbeing' estimated when the subjects were retired (75-89 yrs)

Questionnaires on:

'General health; Self-esteem; Happiness; fulfilment;  
Interests and hobbies; Physical and social activities'

The average scores for men who had lived a healthy lifestyle  
were about double the scores for men who had lived an  
unhealthy lifestyle all  $P < 0.001$

Preliminary analyses

### Inequality in wellbeing

	Non manual social class	Manual social class	Significance
Self assessed good health	64%	48%	$P < 0.0005$
Good health for age	74%	58%	$P < 0.0005$
Depression	15%	20%	$P = 0.085$
Moderate/extreme anxiety	24%	29%	$P = 0.069$
Coping with daily activities	25.8	24.7	$P = 0.001$
Self value	44.9	44.1	$P = 0.151$
General positive attitude	42.1	39.4	$P < 0.0005$
Number of close social contacts	10.1	9.4	$P = 0.105$

Preliminary analyses

### Wellbeing

#### The good life: from Socrates to Surbiton

John Gallacher

'.... the global evaluation of life.... is directly influenced by  
virtue rather than by success, with success being important  
insofar as it contributes to virtue.

In short.... people derive satisfaction from achieving things  
they consider to be worthwhile: the wisdom of years.'

Quality in Ageing and Older Adults, Vol. 12 Issue: 1, pp.17-25.  
<https://doi.org/10.5042/qaoa.2011.0141>

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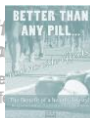
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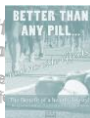
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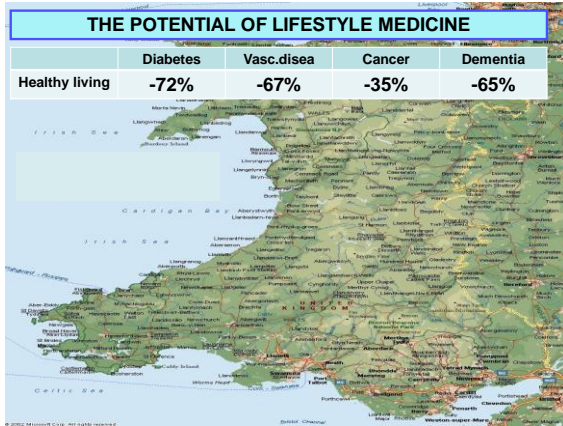
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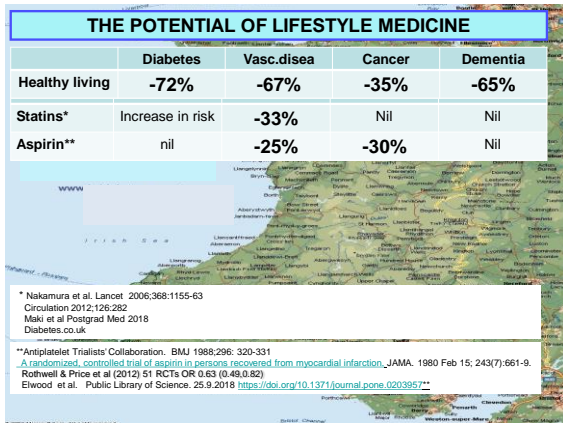
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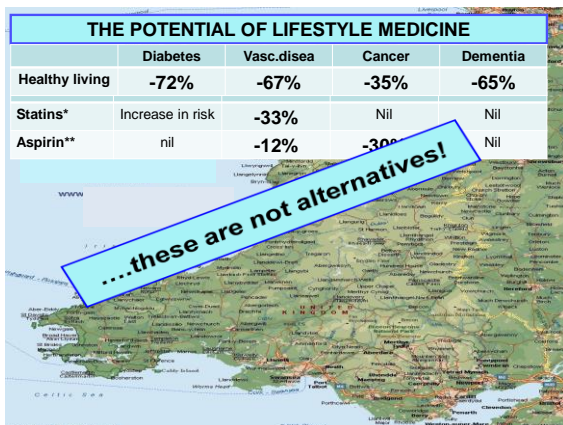
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THE POTENTIAL OF LIFESTYLE MEDICINE				
	Diabetes	Vasc.disea	Cancer	Dementia
Healthy living	-72%	-67%	-35%	-65%
Statins*	Increase in risk	-33%	Nil	Nil
Aspirin**	nil	-12%	-30%	Nil

**SIDE EFFECTS**

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None.... only an improvement in well being

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**SIDE EFFECTS**

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Muscle cramps, increased risk of diabetes

Indigestion, increased risk of GI bleeding

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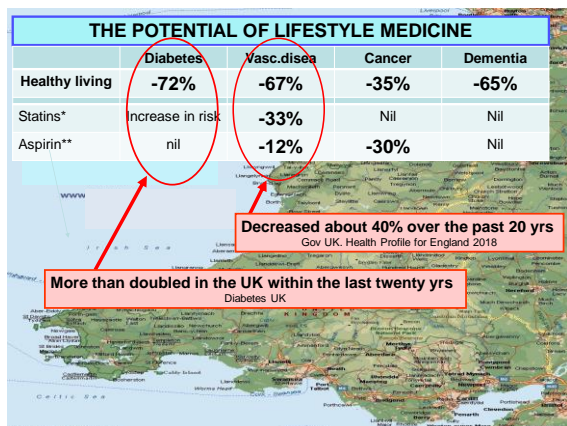
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## FINALLY....

What was the uptake of health behaviours?

	Our estimate	Public Health Wales estimates
	1980	2013
Unhealthy Lifestyle: None or one behaviour	40%	41%
Healthy lifestyle: Four or five behaviours	8%	5%

## FINALLY....

What is the uptake of health behaviours?

	Our estimate	Public Health Wales estimates	
	1980	2013	2016 **
<b>Unhealthy Lifestyle:</b> None or one behaviour	<b>40%</b>	<b>41%</b>	<b>45%</b>
<b>Healthy lifestyle:</b> Four or five behaviours	<b>8%</b>	<b>5%</b>	<b>5%</b>

\*\* 'Health in Wales' <https://www.wales.nhs.uk/healthtopics/lifestyles>

### How were the results publicised?

#### A 'launch' meeting was held

600 people attended  
talks on each of the behaviours  
side-shows by 30 recreational  
evening talk by the Minister of Health  
40 men and their families invited to the meal and the  
evening

- A poster 'Better than any pill...' printed. 1,000 copies distributed with the Minister of Health
- A challenge to Wales – taken up by the BBC the media, Public Health Wales etc
- A web item designed



But that is all past.... What now?

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### How were the results publicised?

[HealthyLivingWales.co.uk](http://HealthyLivingWales.co.uk)




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### What is the situation in Wales now?

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Cost of unhealthy behaviours	Behaviours	Adults 2016/7
10% of the total NHS costs in Wales	None or one	45%
Hale Phillips Jewel 2012	Two	31%
	Three	18%
	Four or five	5%

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What is the situation in Wales now?



*'For a healthier happier and fairer Wales'*

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### What is the situation in Wales now?



*'For a healthier happier and fairer Wales'*

### Our seven priorities are:

- Influencing the wider determinants of health
- Improving mental well-being and resilience
- Promoting healthy behaviours
- Securing a healthy future for the next generation
- Protecting the public from infection and environmental threats
- Supporting the development of a sustainable health and care system focused on prevention and early intervention
- Building and mobilising knowledge and skills to improve health and well-being across Wales

<https://phw.nhs.wales/about-us/our-priorities/>

### What is the situation in Wales now?

**HealthWise Wales** – a web-based national population study



Doeth am Iechyd  
Cymru  
HealthWise  
Wales

Prof Shantini Paranjothy (Principal Investigator)  
Dt Pauline Ashford Watt (Research Manager)

Division of Population Medicine Cardiff University

<https://www.healthwisewales.gov.wales>

### HealthWise Wales – a new resource



**At present 29,000 adults across Wales** – and still growing

1. A core of basic questions are asked at intervals
2. Long-term follow up of disease incidents through linkage to routinely collected healthcare data (SALE, Swansea University)
3. A platform for researchers to question and recruit participants
4. Public and participant involvement embedded throughout



### HealthWise Wales – a new resource



### The BSLM - another new resource



The BSLM aims to establish lifestyle medicine as central to health and wellbeing by promoting the prevention of avoidable life-style-related diseases

### The potential within Wales

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	Diabetes	Vasc. Dis	Cancer	Dementia
Individuals	-72%	-67%	-35%	-65%
Community*	-12%	-6%	-9%	-13%

\* If half the subjects took up one additional behaviour

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### The advantages of Wales

An ideal size for innovation & research in health promotion strategies

Already 29,000 subjects are available for trials

A realistic target has been evaluated

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The Division of Population Medicine, Cardiff University

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### Wales could lead the world!

An ideal size for innovation & research in health promotion strategies  
 Already 29,000 subjects are available for trials  
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### The OKC Million Project



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On Monday April 4<sup>th</sup> 2011 mayor Cornett of Oklahoma announced a city-wide effort to loose 1 million pounds body weight..... The project became known as 'OKC Million'



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Over the following eight years the Mayor gave Oklahoma City a dramatic make-over, putting the entire city on a diet, reshaping roads and neighbourhoods and asking rate-payers for \$777 million to make the city a slimmer, healthier and happier place.

By January 2012, more than 51,000 people had signed up and Oklahoma City reached the target of shedding a million pounds – 38 of which had once belonged to the Mayor himself!

[Jennifer Yang](https://www.thestar.com/news/insight/2015/11/16/oklahoma-mayor-put-his-city-on-a-million-pound-diet-did-it-work.html) Global health reporter Mon., Nov. 16, 2015  
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### The OKC Million Project

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#### To Rob and Sue.....

The mayor of Cardiff is  
 Councillor Diane Elizabeth Rees  
 Her telephone number is  
 029 2087 2087



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### Unhealthy behaviours are responsible for

**10% of NHS costs in Wales**

Making the economic case from prevention in Wales  
 Hale Phillips Jewel 2012

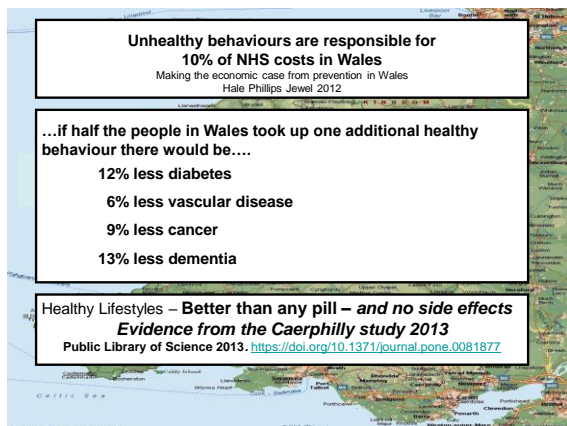
...if half the people in Wales took up one additional healthy behaviour there would be....

- 12% less diabetes
- 6% less vascular disease
- 9% less cancer
- 13% less dementia

Healthy Lifestyles – Better than any pill – and no side effects

**Evidence from the Caerphilly study 2013**

Public Library of Science 2013. <https://doi.org/10.1371/journal.pone.0081877>




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