

2012 Health and Care Conference  
Tom Davis, PruHealth



# Personalising Wellness on an Industrial Scale

1<sup>st</sup> May 2012

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# Agenda

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1. The Chronic Disease burden
2. Individual barriers to change
3. Individual interventions for behavioural change
4. Group interventions for behavioural change
5. Personalised interventions for behavioural change
6. Summary

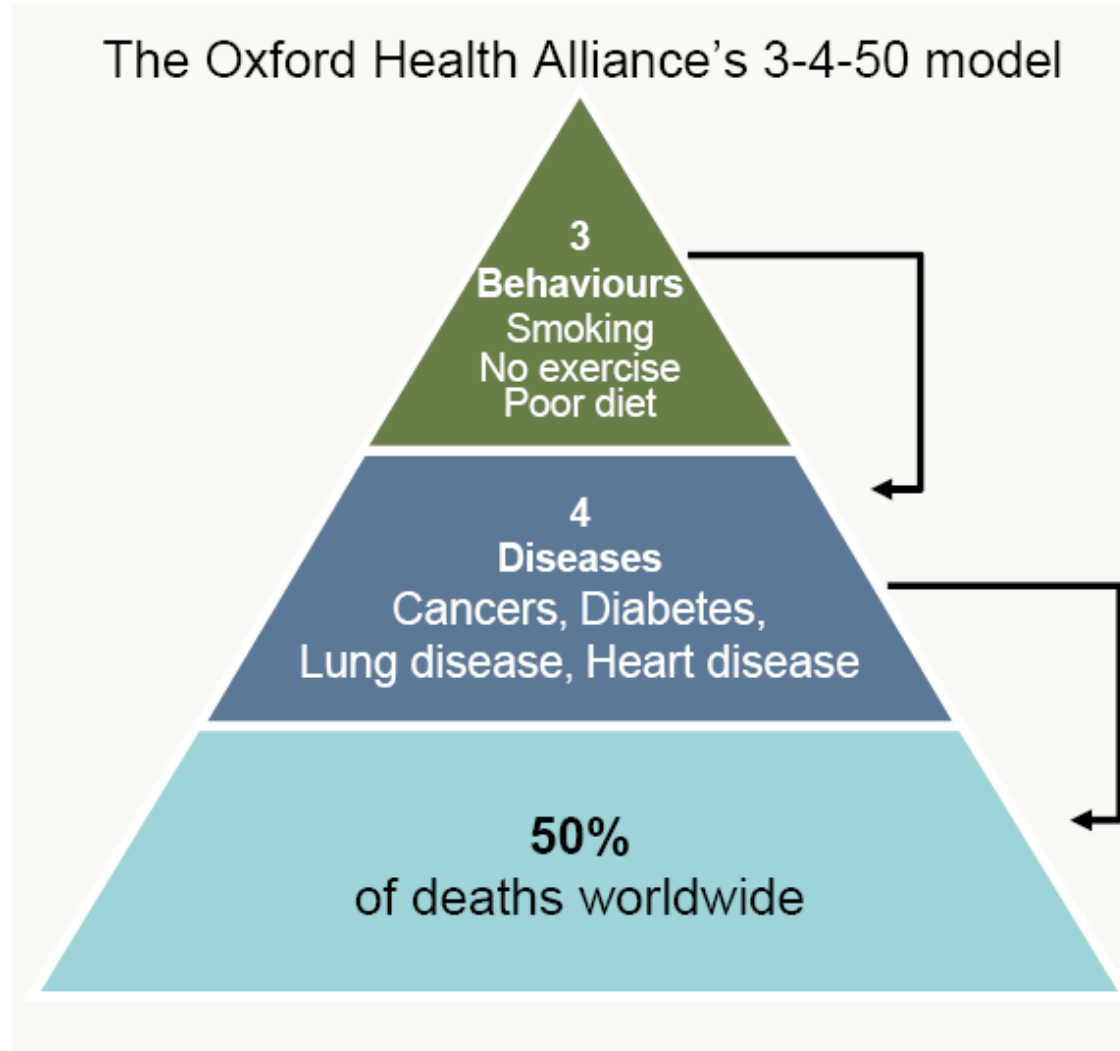
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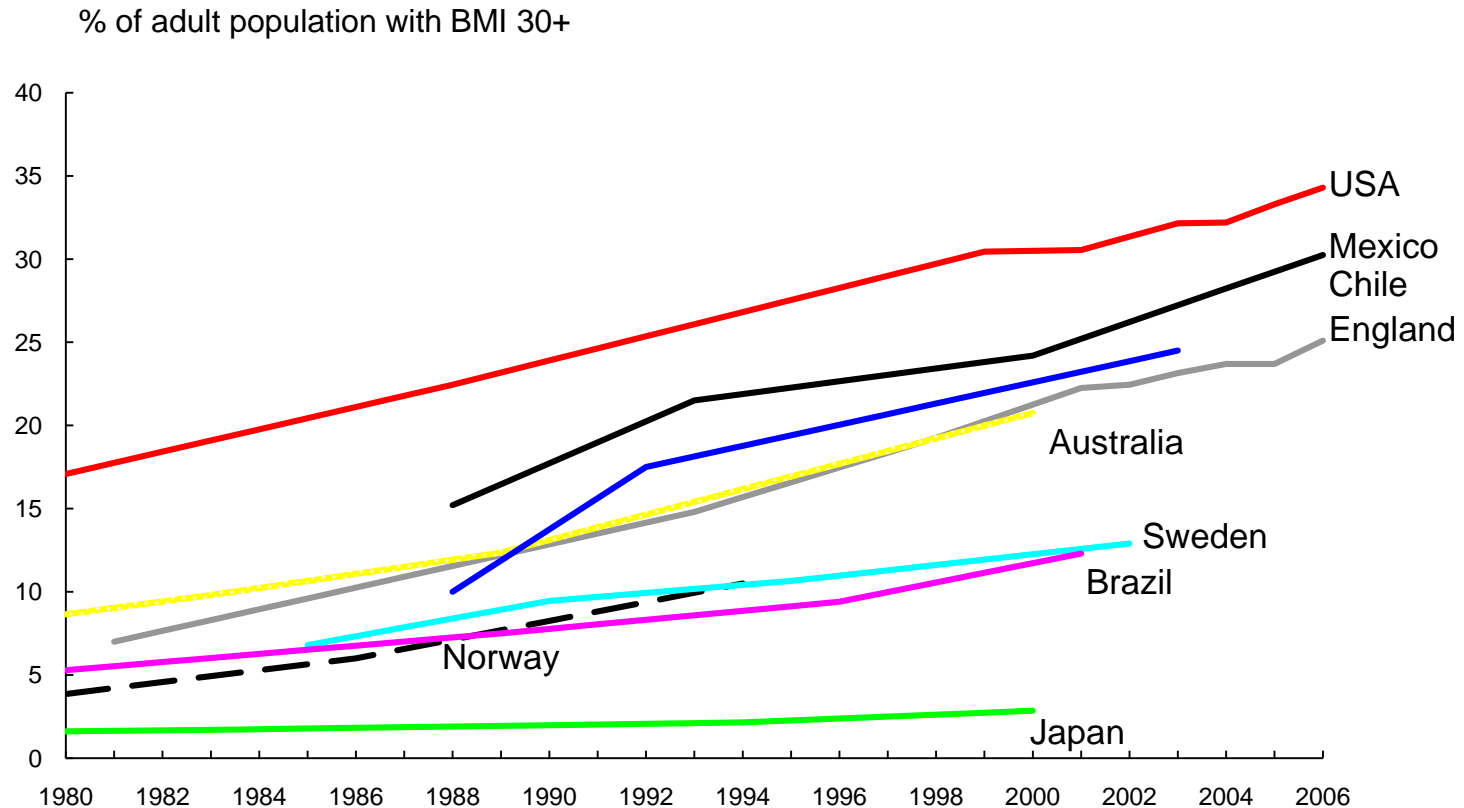
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## 1. The Chronic Disease burden

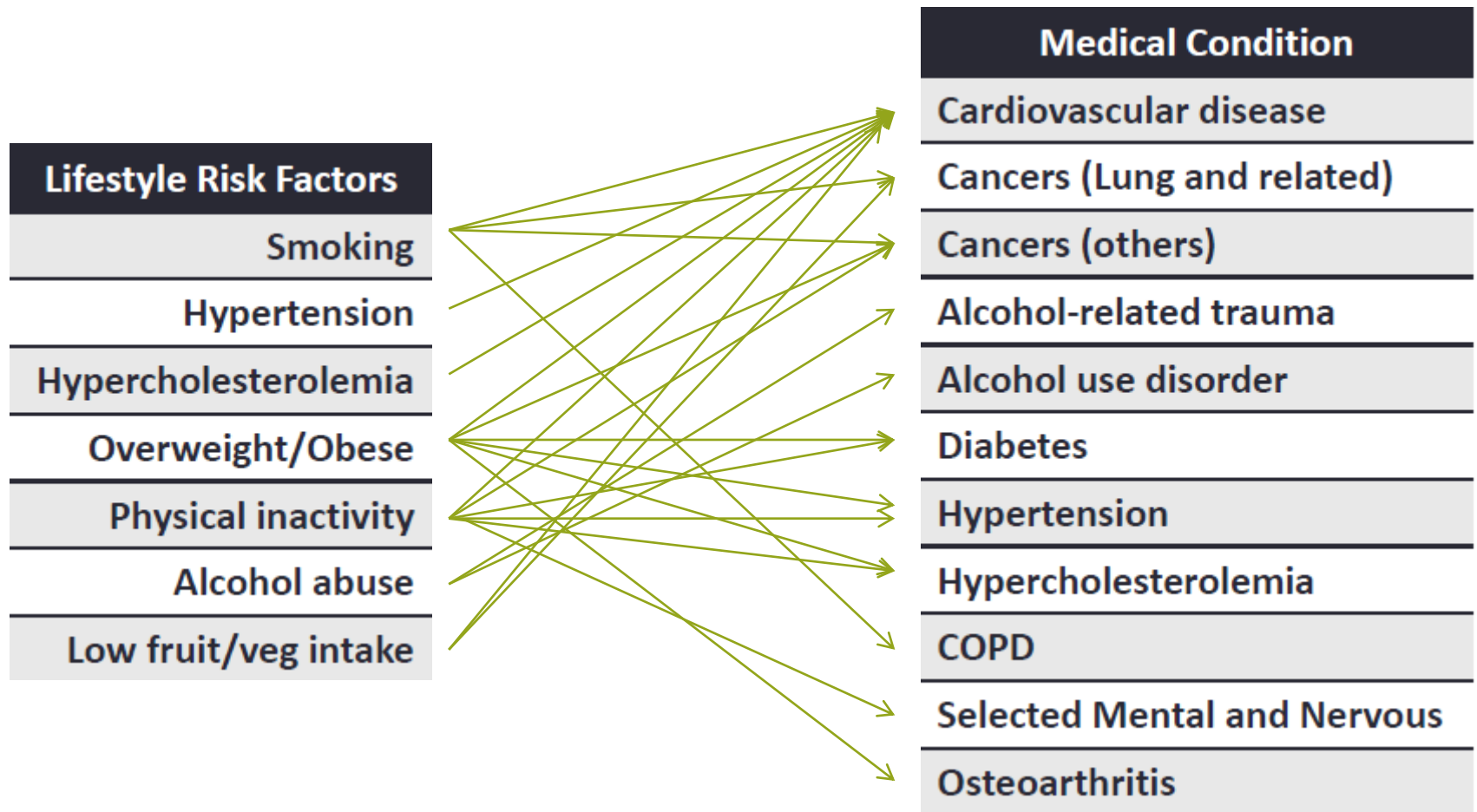
# The social cost of lifestyle behaviours



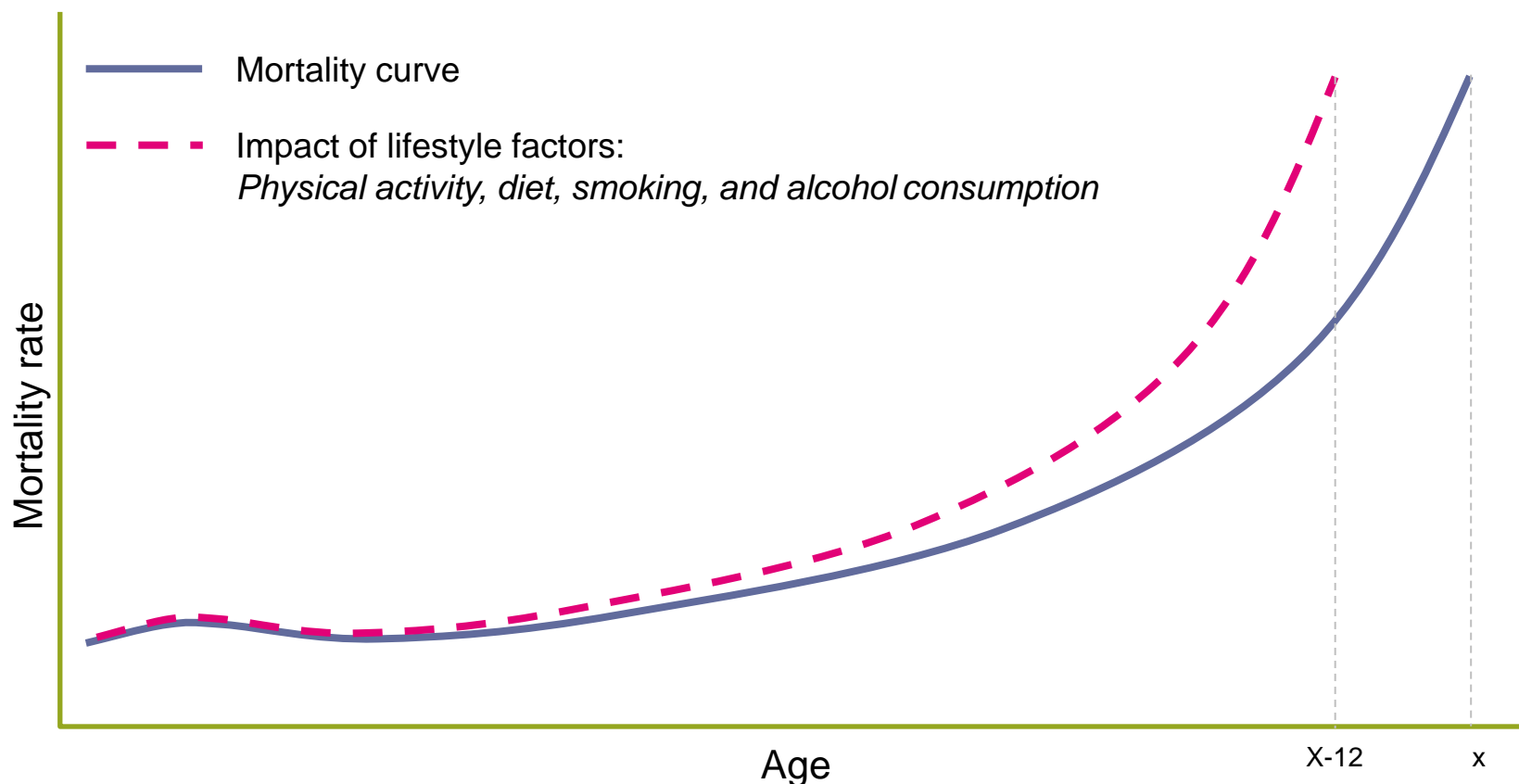
# Obesity rising worldwide



# Association between lifestyle factors and chronic disease



# Impact of lifestyle factors on longevity



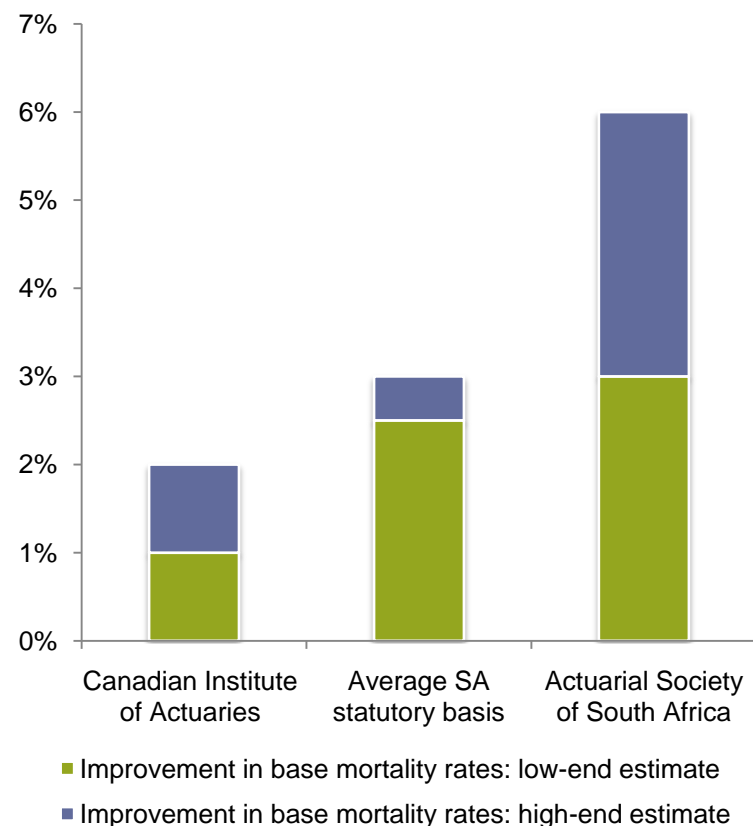
Physical inactivity, poor diet, smoking and alcohol consumption associated with all-cause mortality risk of actual age + 12 years

# Medical/technological advancements

Impact of technological improvement  
on life expectancy



Research literature: improvement in base  
mortality rates





# Medical/technological advancements

the NATIONAL BUREAU of ECONOMIC RESEARCH

## New Drugs: Health and Economic Impacts

NBER Reporter: Winter 2003

Frank R. Lichtenberg <sup>(1)</sup>

Many economists believe that new goods are at the heart of economic progress, and that innovative goods are better than older products because they provide more "product services" in relation to their cost of production. The pharmaceutical industry has among the highest propensities to generate new goods; it is one of the most R and D-intensive industries in the economy. Moreover, in part because of extensive FDA regulation, there is unusually good data about the launch and diffusion of new pharmaceutical goods. I have used these data to perform a number of econometric studies at the individual, disease, and country level, in order to assess the health and economic impacts of the development and use of new drugs.

Most of my studies are based on data covering all medical conditions (diseases) and all drugs. Therefore, they provide evidence about the health and economic impacts of new drugs *in general*, not about specific drugs or their impacts on particular diseases. <sup>(2)</sup>

I hypothesize that people may obtain several kinds of benefits from using newer, as opposed to older, pharmaceutical products: longer life; reduced limitations on activities (including work); and reduced total medical expenditure. In this article, I describe some of the studies I have conducted to estimate the magnitude and value of these benefits, and compare them to the cost of using newer drugs.

### Increased Longevity

In one study using aggregate time-series data <sup>(3)</sup>, I examine the impact of new drugs' approval on the longevity of

## Findings

*Highly statistically significant relationship between the number of new molecular entities (NMEs) approved by the FDA and increased longevity*

- 1 Average new drug increases life expectancy of people born in year of approval by 0.016 years (5.8 days)
- 2 Cost of bringing a new drug to market estimated to be about \$0.5bn (£0.31bn)

Investment to offset 12  
"lost" years

Approved new drugs: 755

Cost: £235bn

# And it's not a new problem!

***“Preventable illnesses make up approximately 70 percent of the burden of illness and the associated costs”***



## **REDUCING HEALTH CARE COSTS BY REDUCING THE NEED AND DEMAND FOR MEDICAL SERVICES**

**JAMES F. FRIES, C. EVERETT KOOP, CARSON E. BEADLE, PAUL P. COOPER, MARY JANE ENGLAND, ROGER F. GREAVES, JACQUE J. SOKOLOV, DANIEL WRIGHT, AND THE HEALTH PROJECT CONSORTIUM\***

Source: New England Journal of Medicine **1993**



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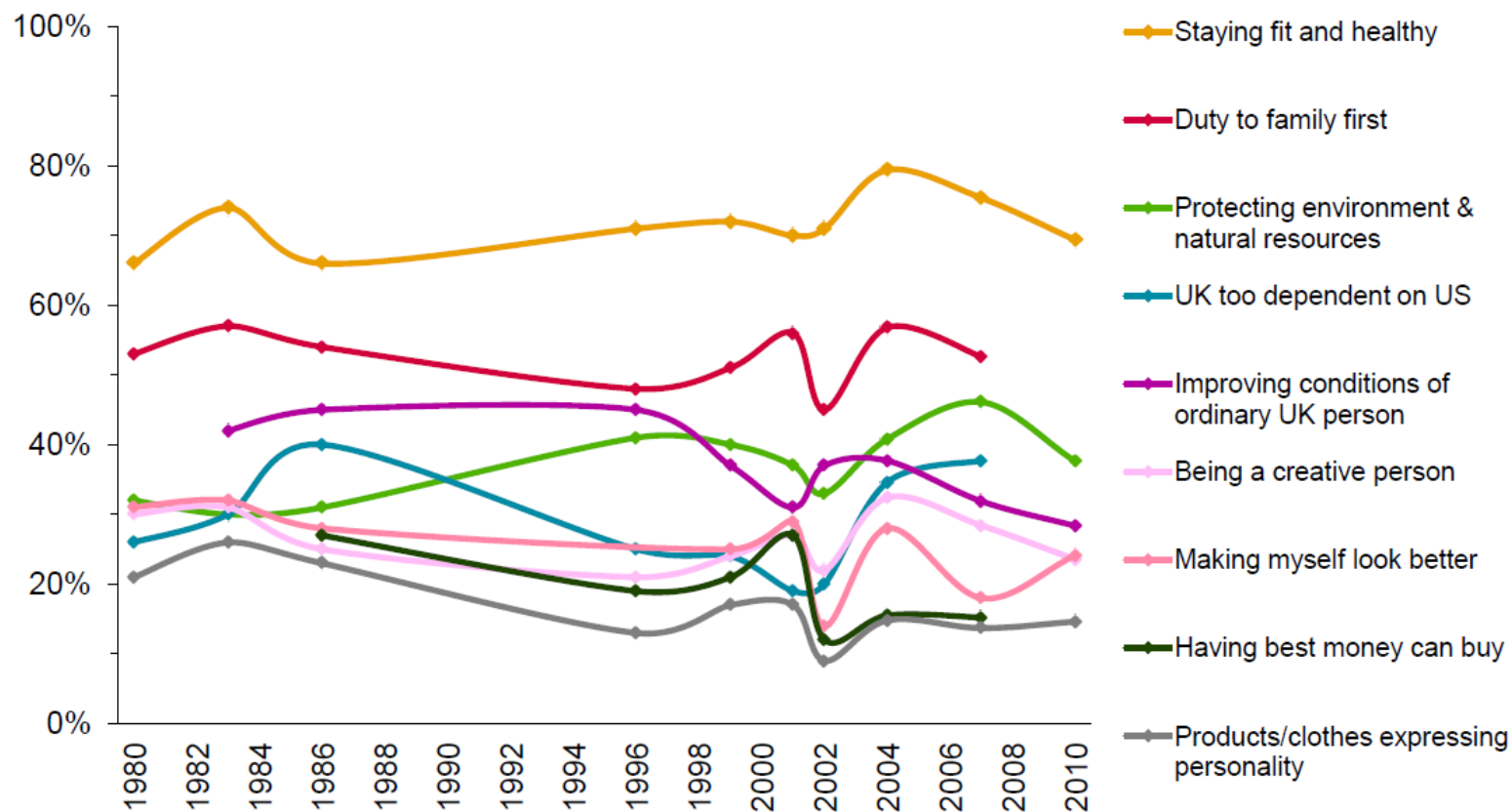
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2. Individual barriers to change

# Health: high self-assessed value...

"For each item, please tell me whether you find you are concerned about it at all"



# Health – high self-assessed cost!

<b>Lack of motivation</b>	<b>37%</b>
<b>Laziness</b>	<b>31%</b>
<b>Cost</b>	<b>30%</b>
<b>Lack of time – work</b>	<b>28%</b>
<b>Lack of time – family</b>	<b>23%</b>

# As individuals we struggle with population and personal risk

**Biggest health issues  
facing the nation (%  
respondents)**

**Individual's health  
concerns (%  
respondents)**

**Obesity/being  
overweight**

**52%**

**9%**

**Poor diet and  
nutrition**

**21%**

**3%**

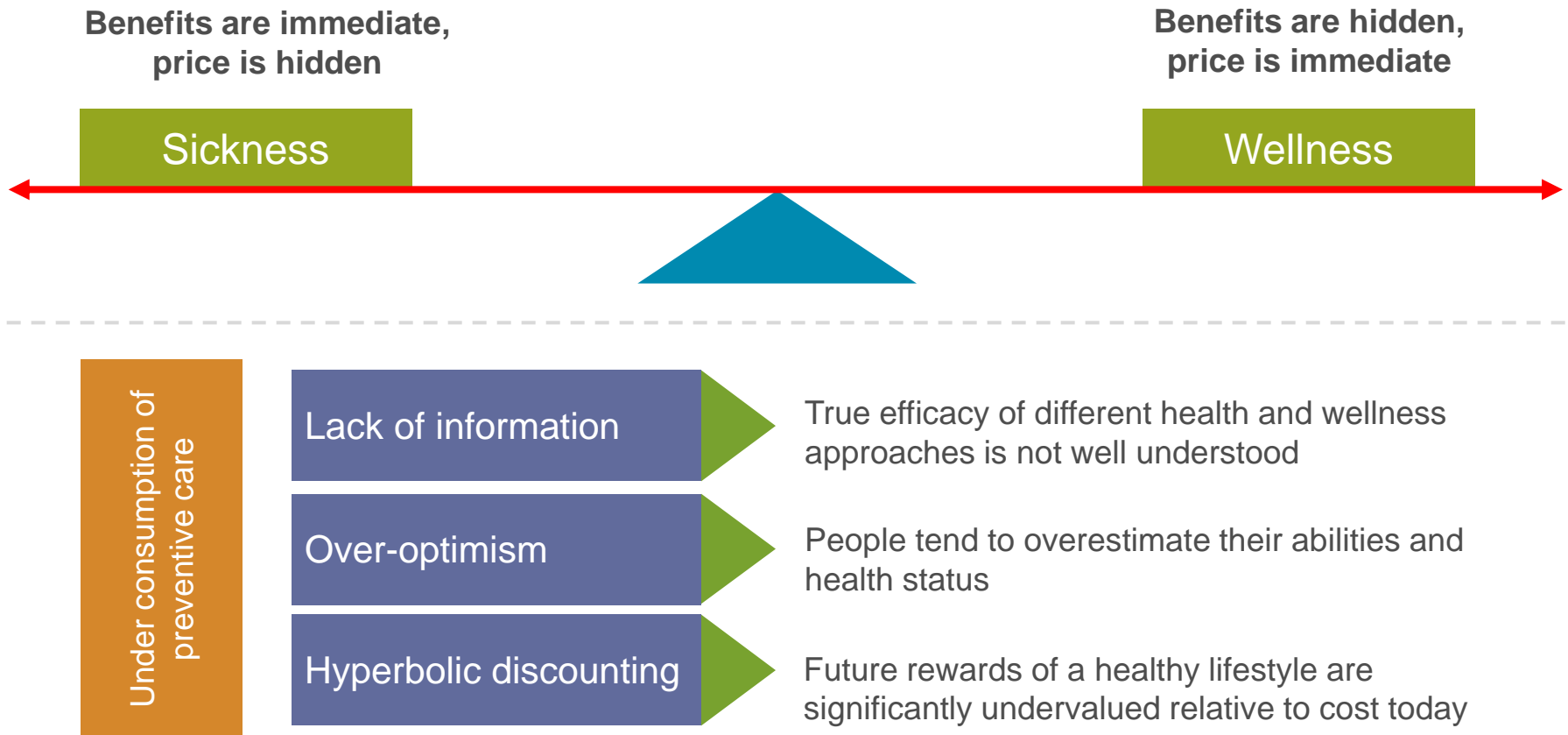
**Lack of physical  
activity**

**18%**

**4%**

Source: PruHealth Vitality Index 2009

# Behavioural factors underlie lifestyle choices: The wellness / sickness paradox



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# Individual Interventions – GP advice on quitting smoking

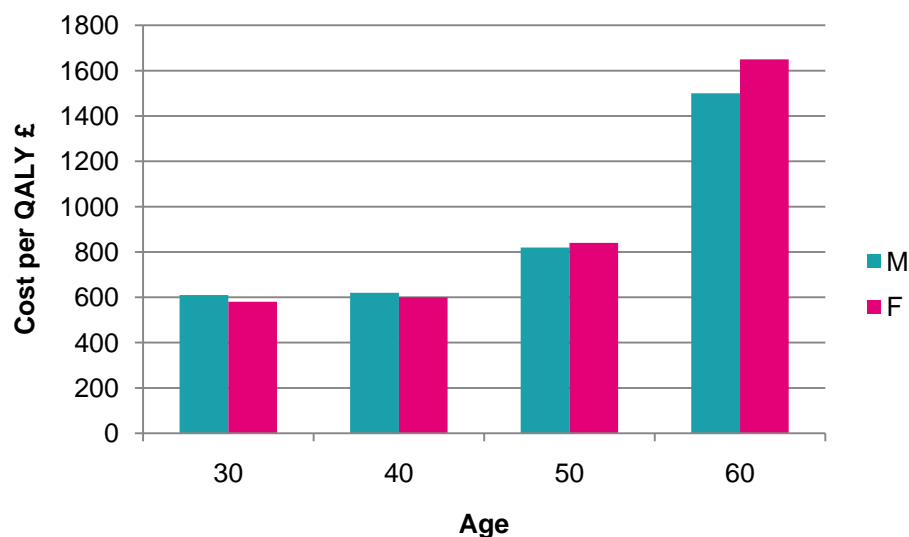
## Significant impact

(although may be catching low-hanging fruit...)

<b>Smoking: Interventions by GP</b>	129,556
<b>Cost per intervention</b>	£22.89
<b>Increase in cost</b>	£2,965,536
<b>Increased number setting a quit date</b>	26,478
<b>Estimated increase in quit smokers @ 4 weeks</b>	14,906
<b>Estimated smokers quit @ 52 weeks</b>	3,727
<b>Cost per additional quitter</b>	£795.69

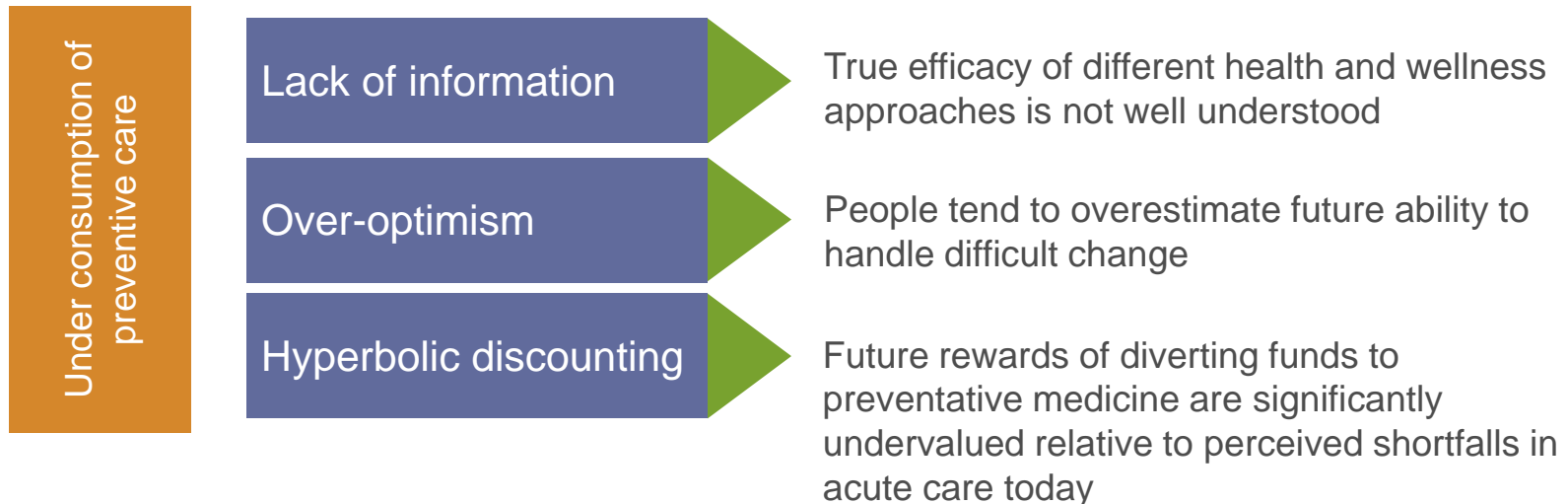
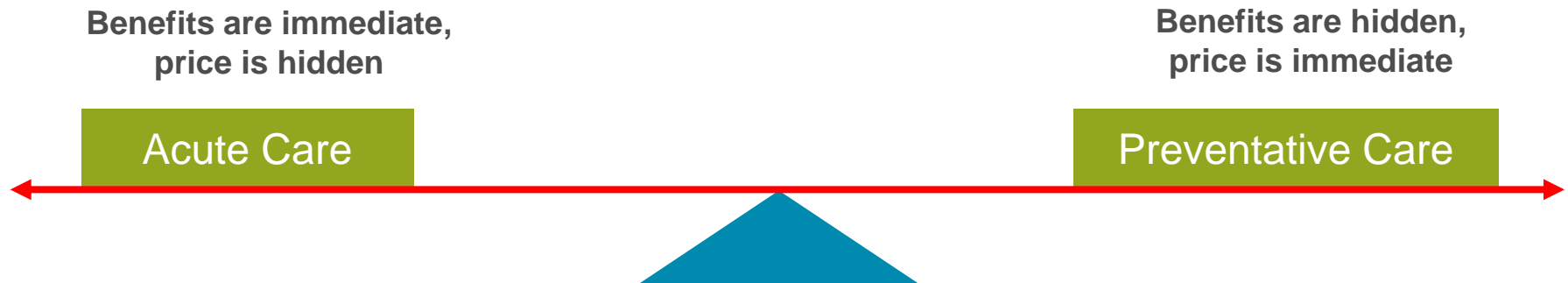
## Cost-effectiveness well below NICE thresholds

## Why not more widely used?



Source: Northwest Public Health Observatory Feb 2011

# Governments are made up of people, too...



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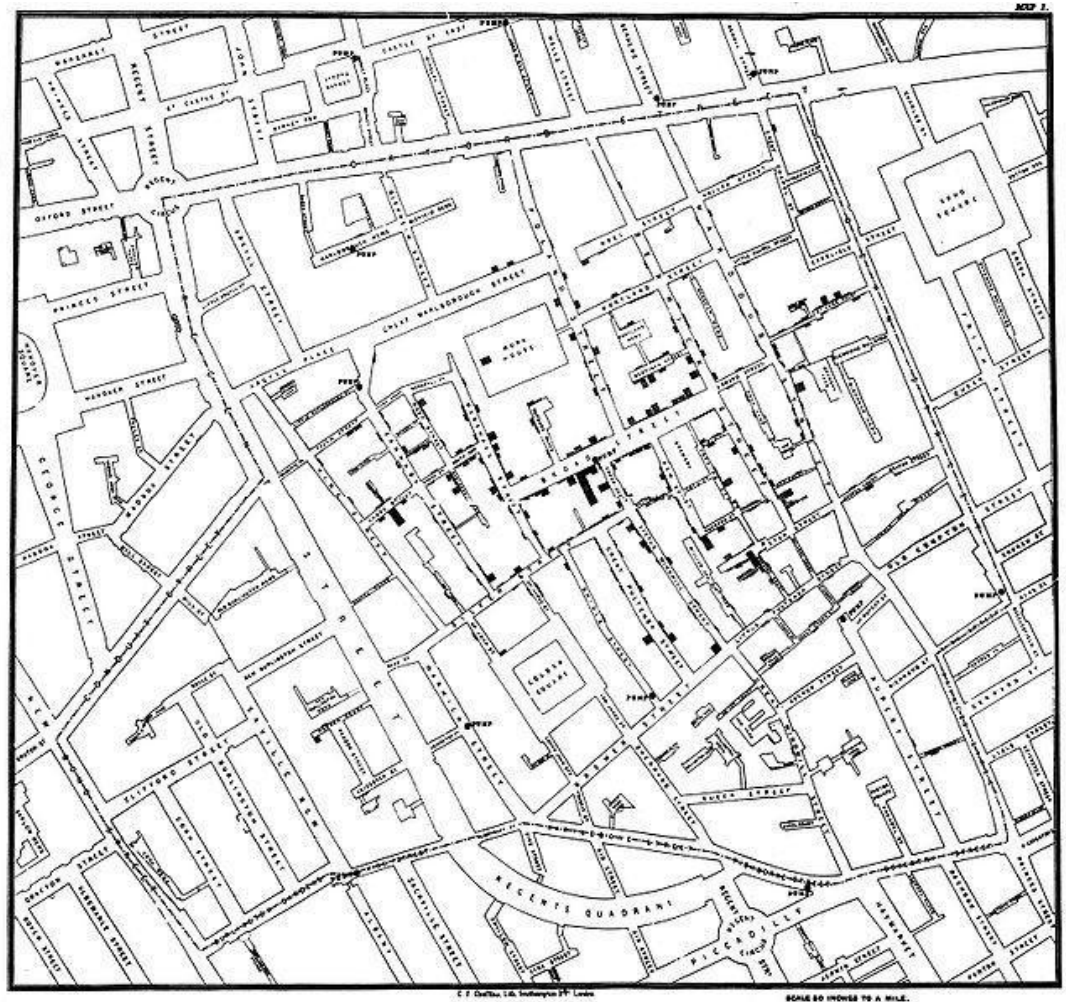
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# Group interventions - regulation



# Group interventions: low individual choice

- 1854 cholera epidemic
- As simple as removing a pump handle?

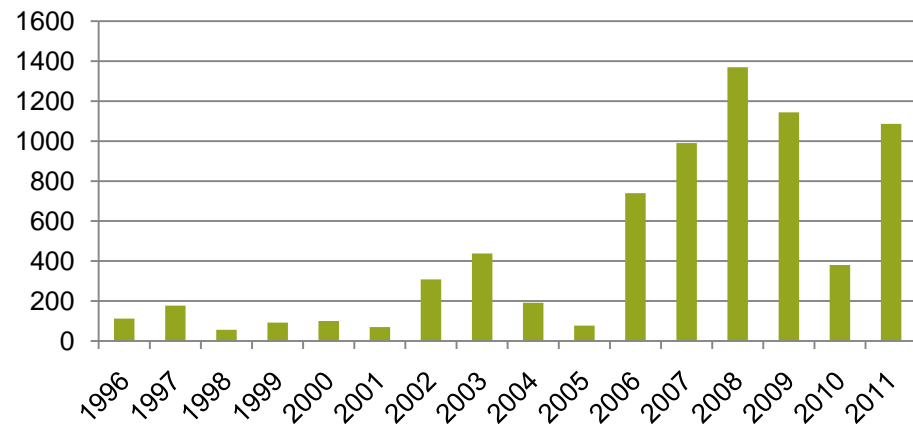


# Group interventions – occasional individual choice

By the mid 1990's routine vaccination against Measles had drastically reduced the prevalence in England and Wales.

But the efficacy of the programme was still subject to the impact of patient choice – e.g. MMR fears in early-mid 2000's.

**Confirmed Measles cases England & Wales**



# Group interventions – large-scale, frequent individual choice

“The failure of the largest and best conducted studies to detect an effect on prevalence of smoking is disappointing. A community approach will remain an important part of health promotion activities, but designers of future programmes will need to take account of this limited effect in determining the scale of projects and the resources devoted to them”

Community interventions for reducing smoking among adults. Secker-Walker et al 2008. Cochrane Tobacco Addiction Group.



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# Critical components of a solution

## Effective

Drawn from solid behavioural economics foundations

## Relevant: Consumer

Emotive; Intuitive; Fun; Rewarding

## Relevant: Society

Non-discriminatory; applicable to all, regardless of health status

## Leverage best practice

Begin with a risk analysis; Use incentives to change behavior; Address multiple risk factors; Provide tailored behavioral change messages

## Scalable

Able to be applied to a large population with low marginal cost; Expanded access to a broad wellness network; Data driven analytic tools

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# Critical components of a solution

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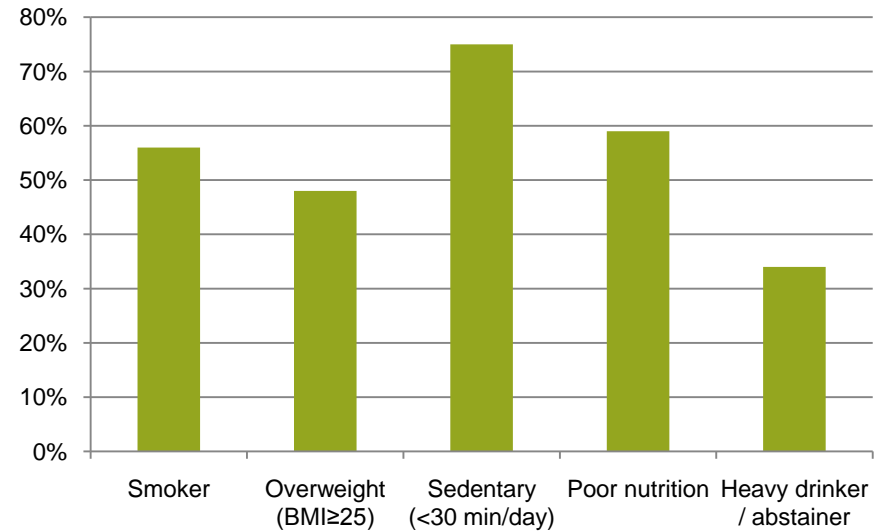
Effective

Drawn from solid behavioural economics foundations

# Telling people isn't enough

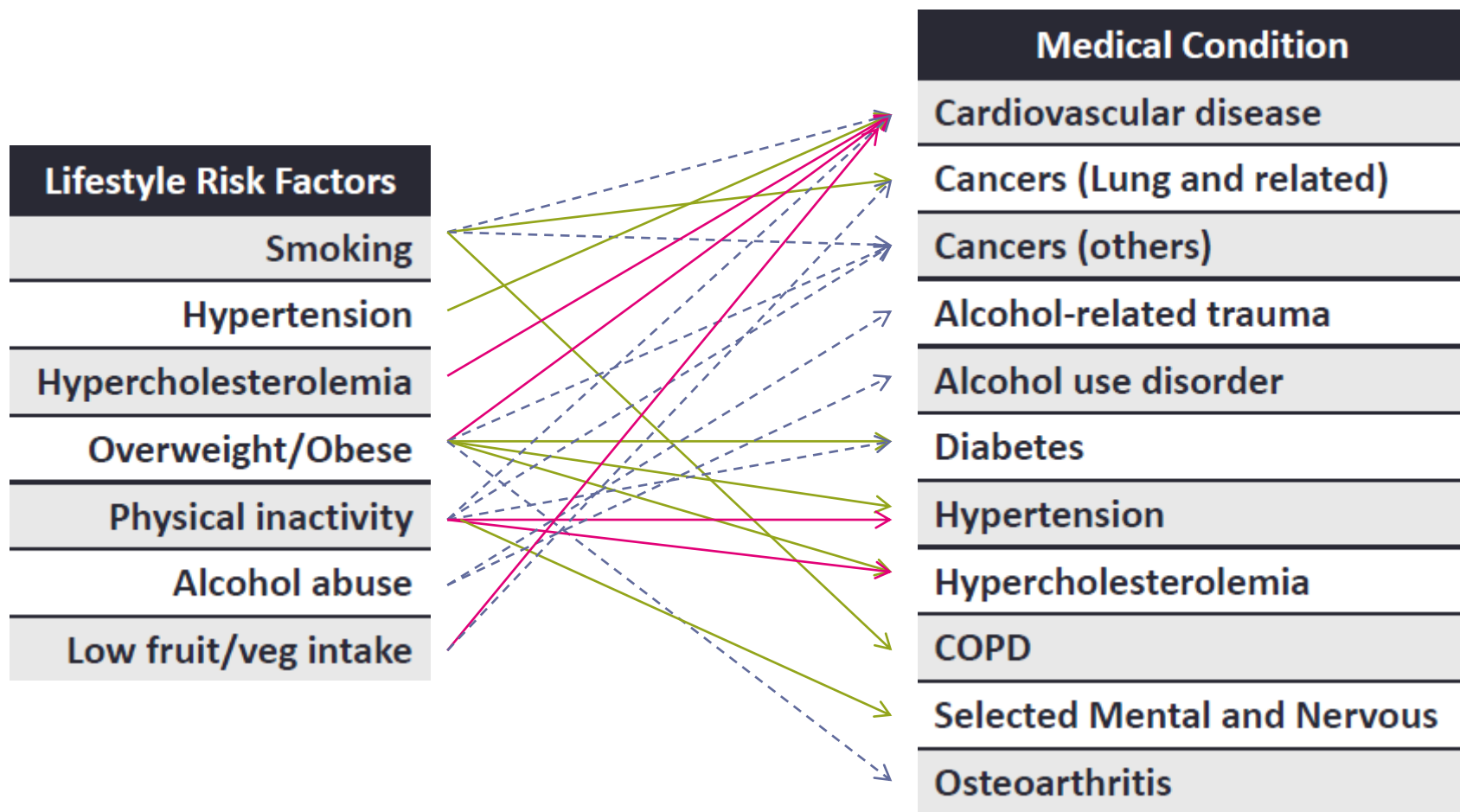


**Nurses Health Study**  
(% of study participants)



Lifestyle choices not necessarily related to lack of education

# Not all preventable conditions are modifiable via lifestyle choices



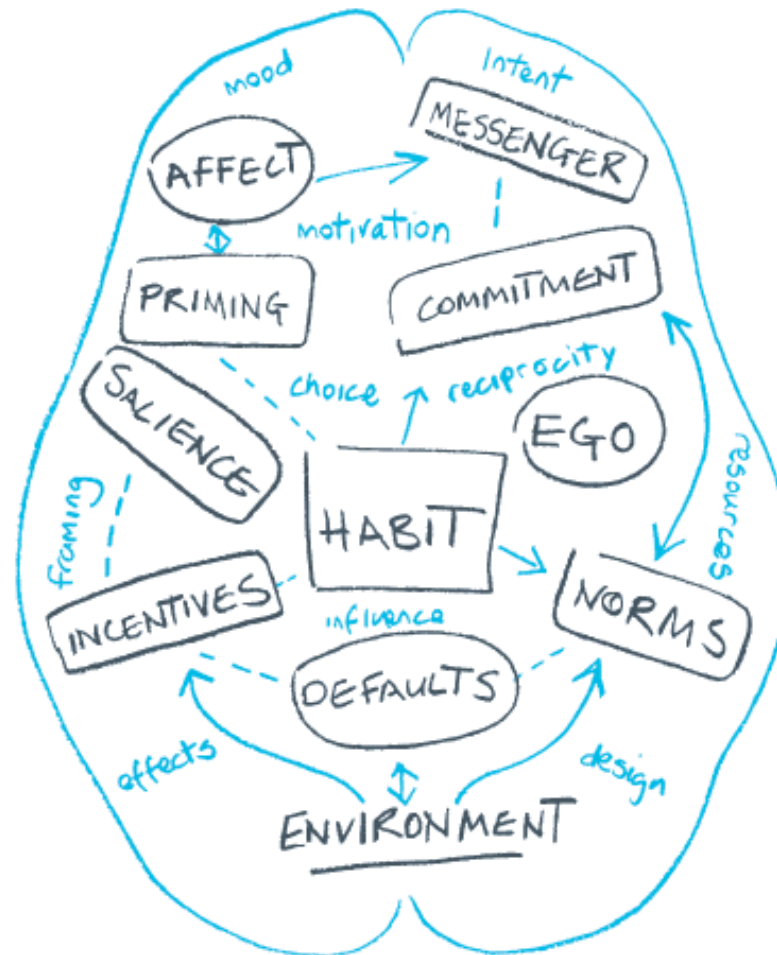
Explained by risk factor:

— >50%

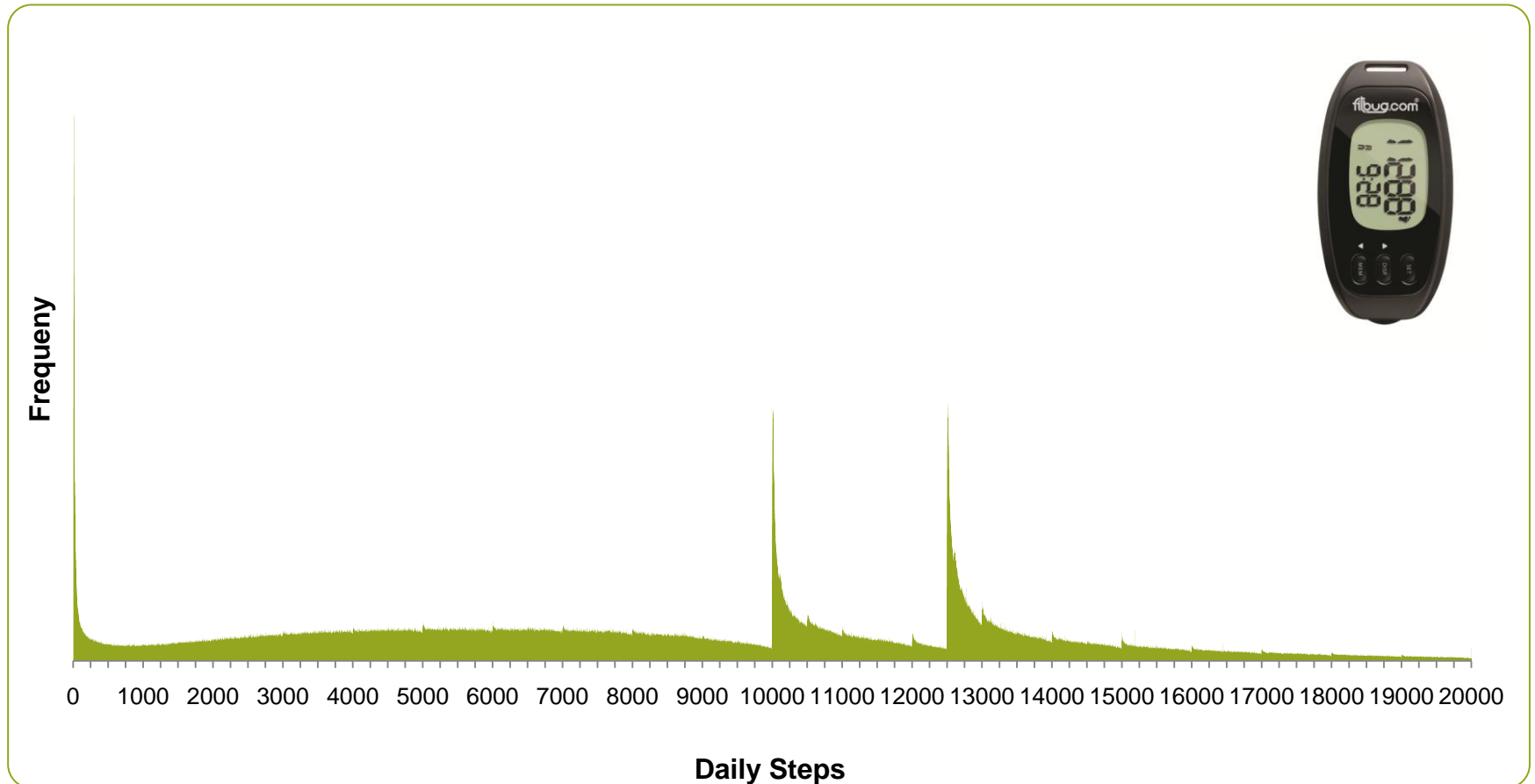
— 25-49%

— 1-24%

# Behavioural change



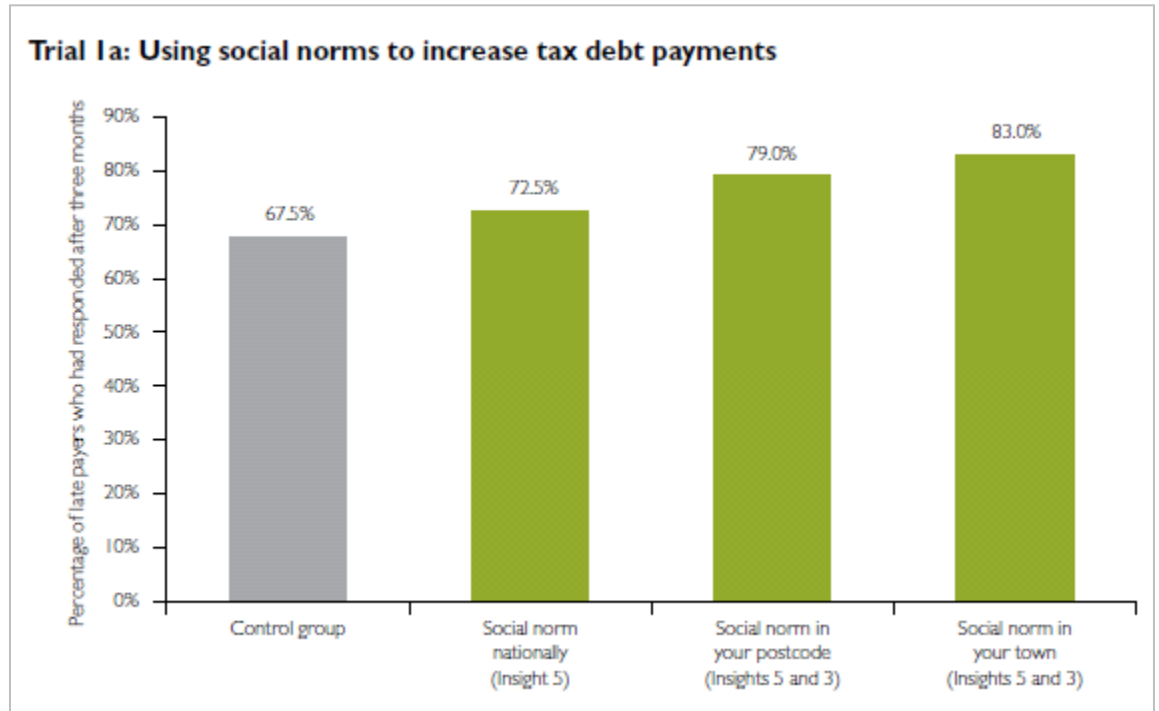
# Use targets & incentives



Source: PruHealth data

# Use social norms

15 percentage point increase in submitted self-assessment forms where the accompanying letter states that ‘9 out of 10 people in your town’ have already submitted their assessment



# Change the default

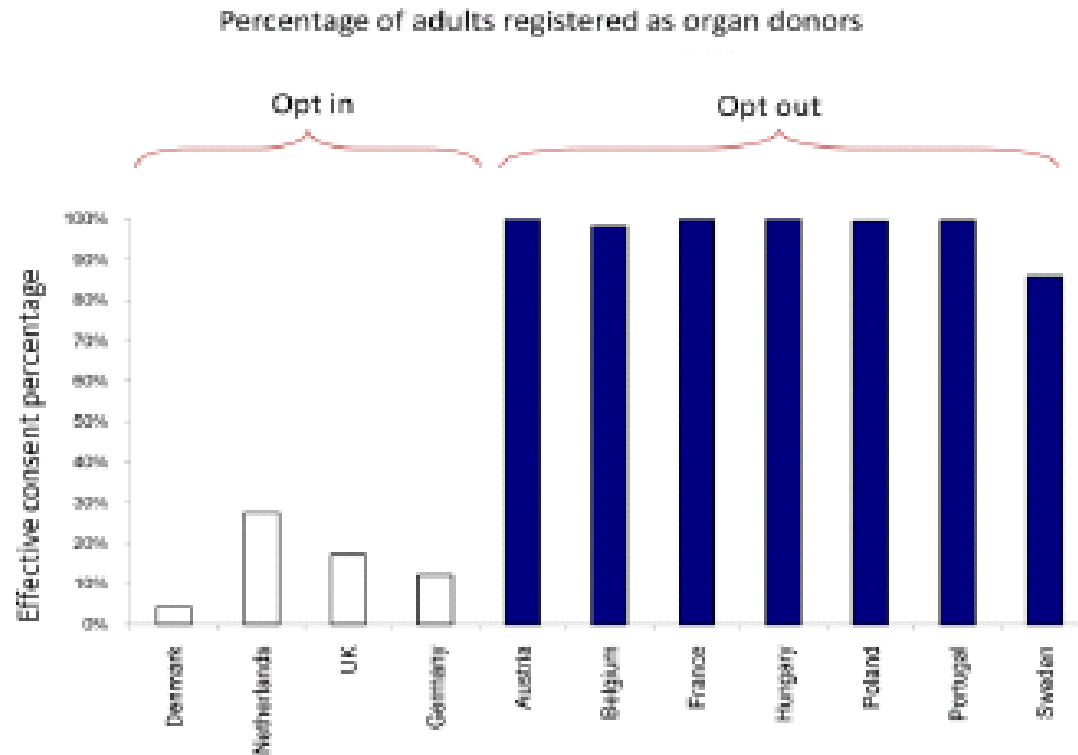


Figure 2: Comparison of organ donation registration in opt-in and opt-out systems<sup>55</sup>



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# Critical components of a solution

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Emotive; Intuitive; Fun; Rewarding

# Rewarding... paying council tax

2011:

£ 25,000 prize draw

15 participating councils

35k new DD mandates

Avg cost: £4,800 per council

3m payback period

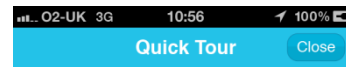
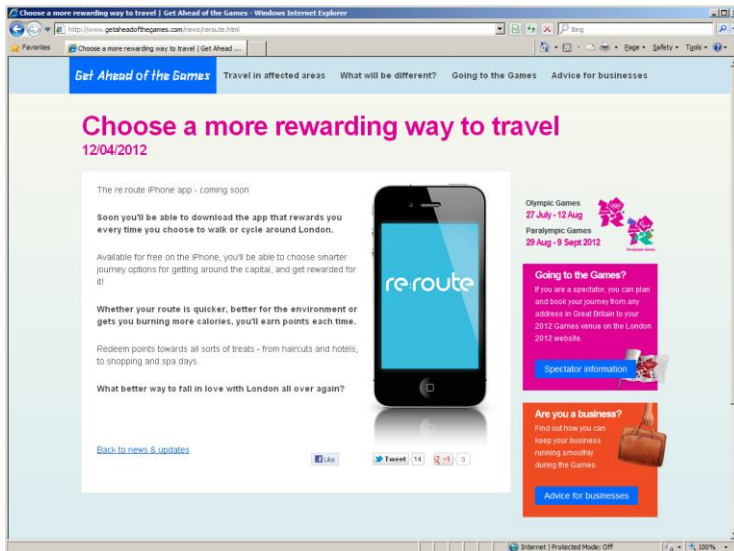
Scheme expanded in 2012 to  
20 councils.



Source: Cabinet Office Behavioural Insights Team Feb 2012

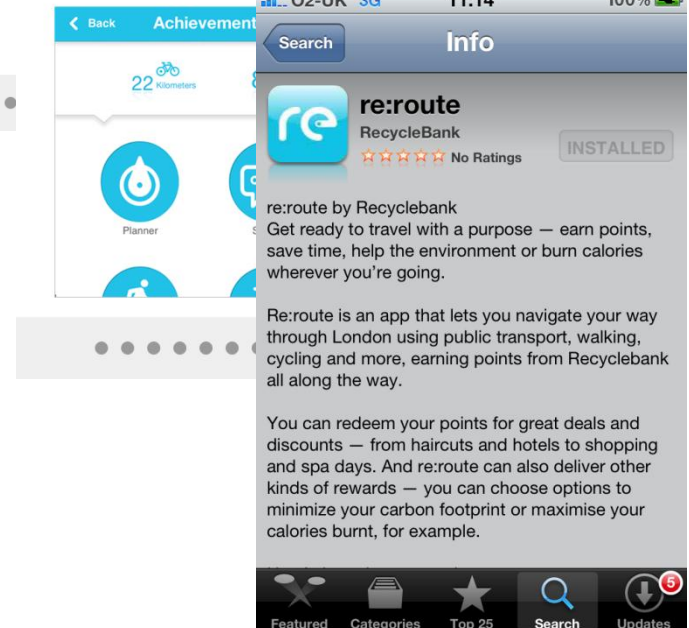
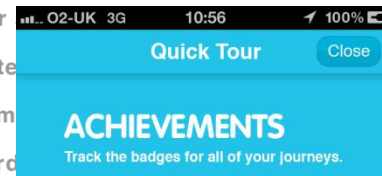
# Rewarding... going by foot/bike

London 2012: real need to reduce strain on public transport



Plan and complete journeys, smarter.

- 1 Launch your
- 2 Enter a route
- 3 Get there sm
- 4 Enjoy reward



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# Fun...

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# ...and maybe even trendy?



# Critical components of a solution

Effective

Drawn from solid behavioural economics foundations

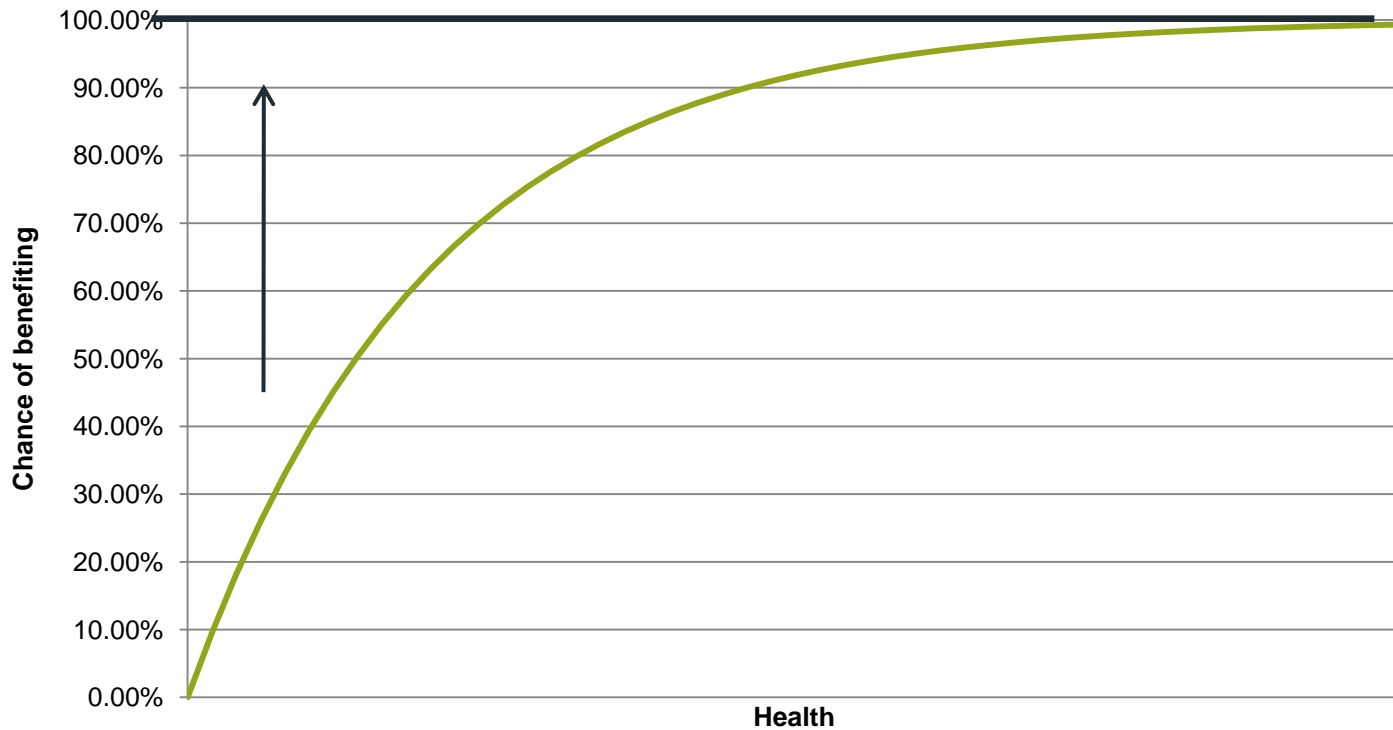
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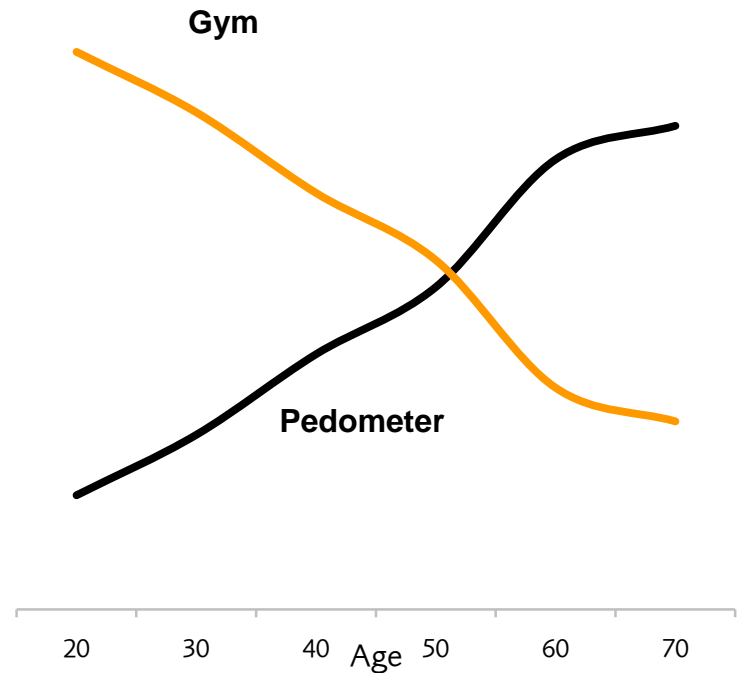
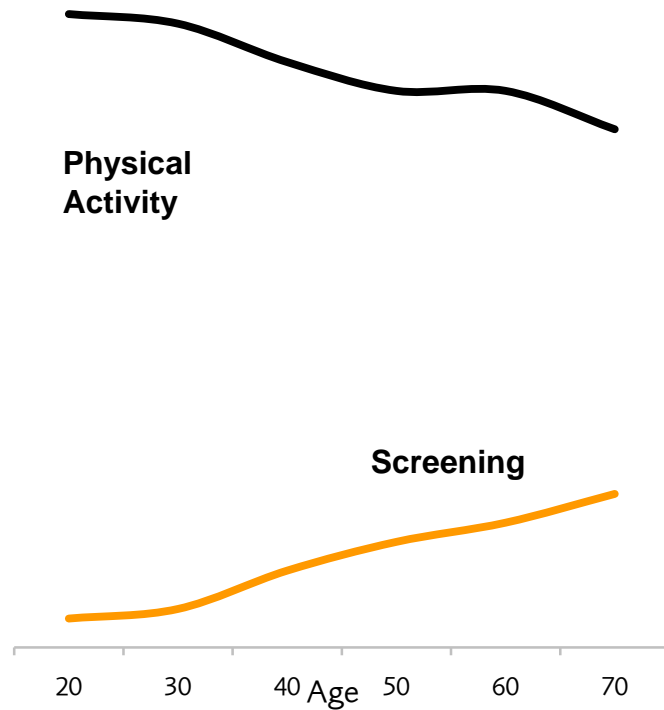
Relevant:  
Society

Non-discriminatory; applicable to all, regardless of health status

# Non-discriminatory solution



# Programme adapting to age



Source: PruHealth data



# Critical components of a solution

## Effective

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## Relevant: Consumer

Emotive; Intuitive; Fun; Rewarding

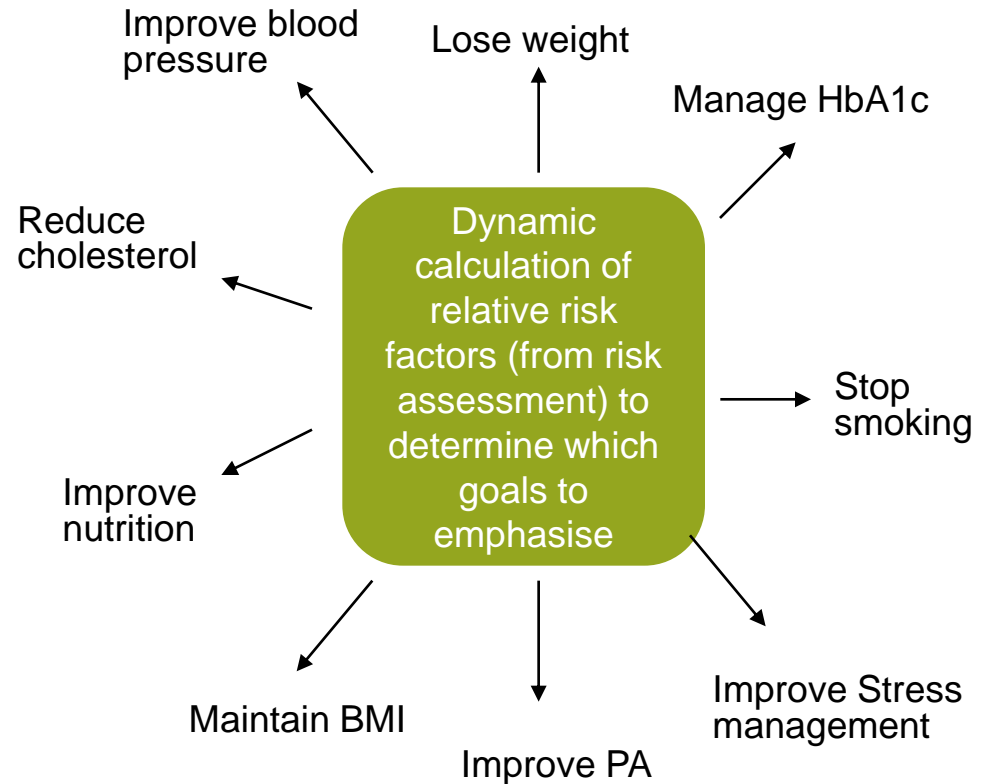
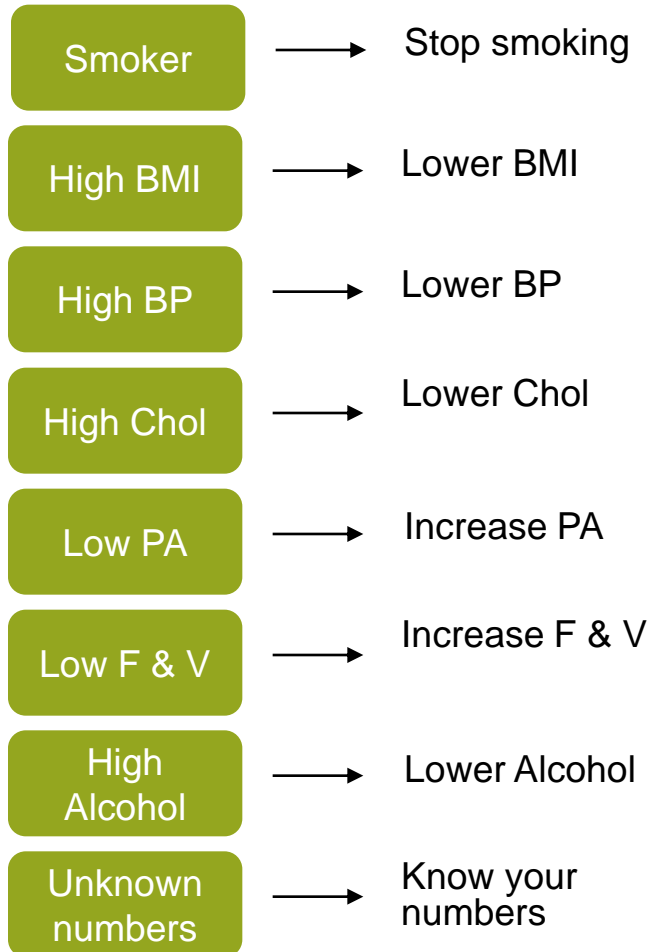
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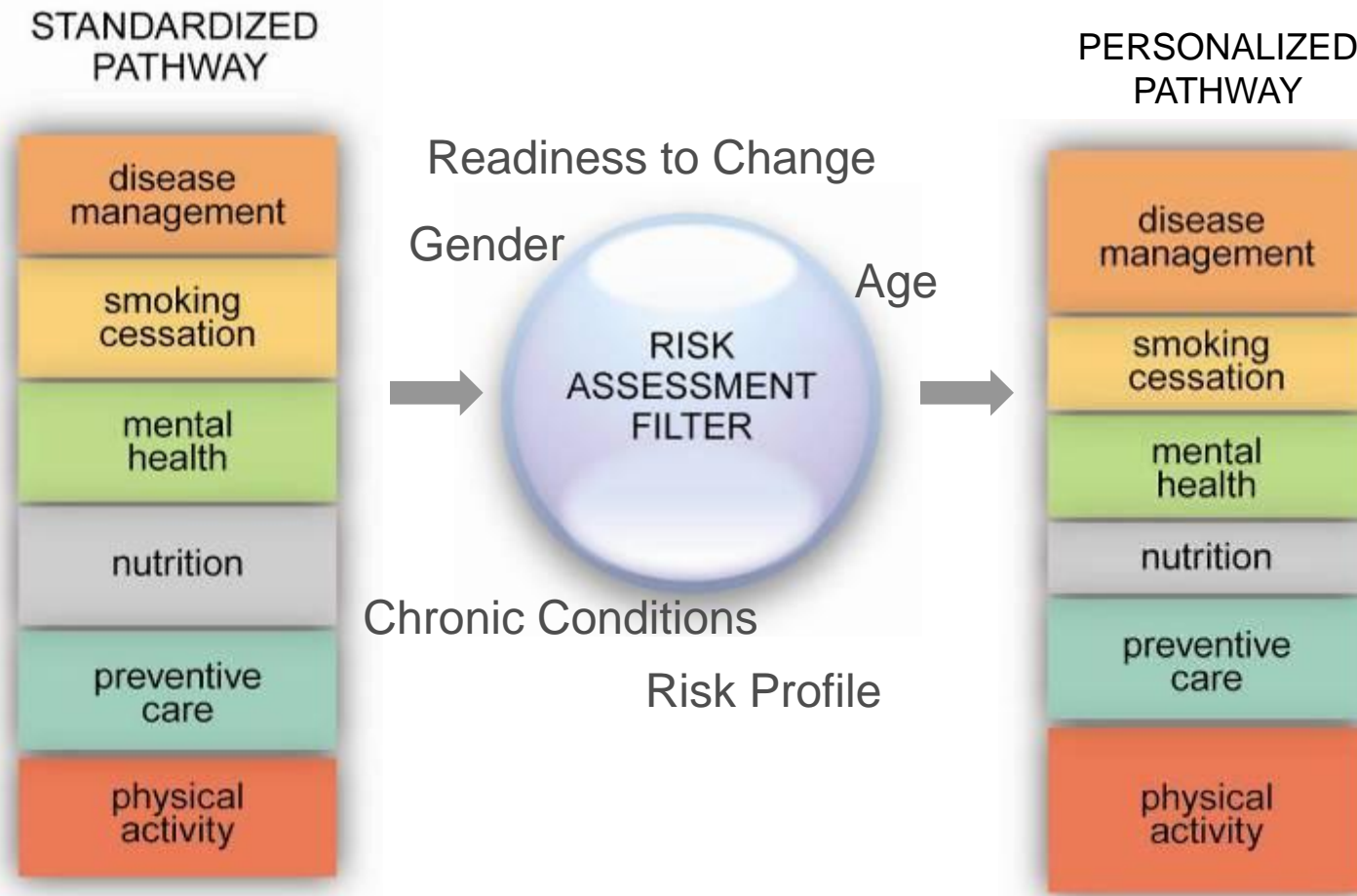
## Leverage best practice

Begin with a risk analysis; Use incentives to change behavior;  
Address multiple risk factors; Provide tailored behavioral change  
messages

# Adapt advice to individuals



# Adapt advice to individuals



# Critical components of a solution

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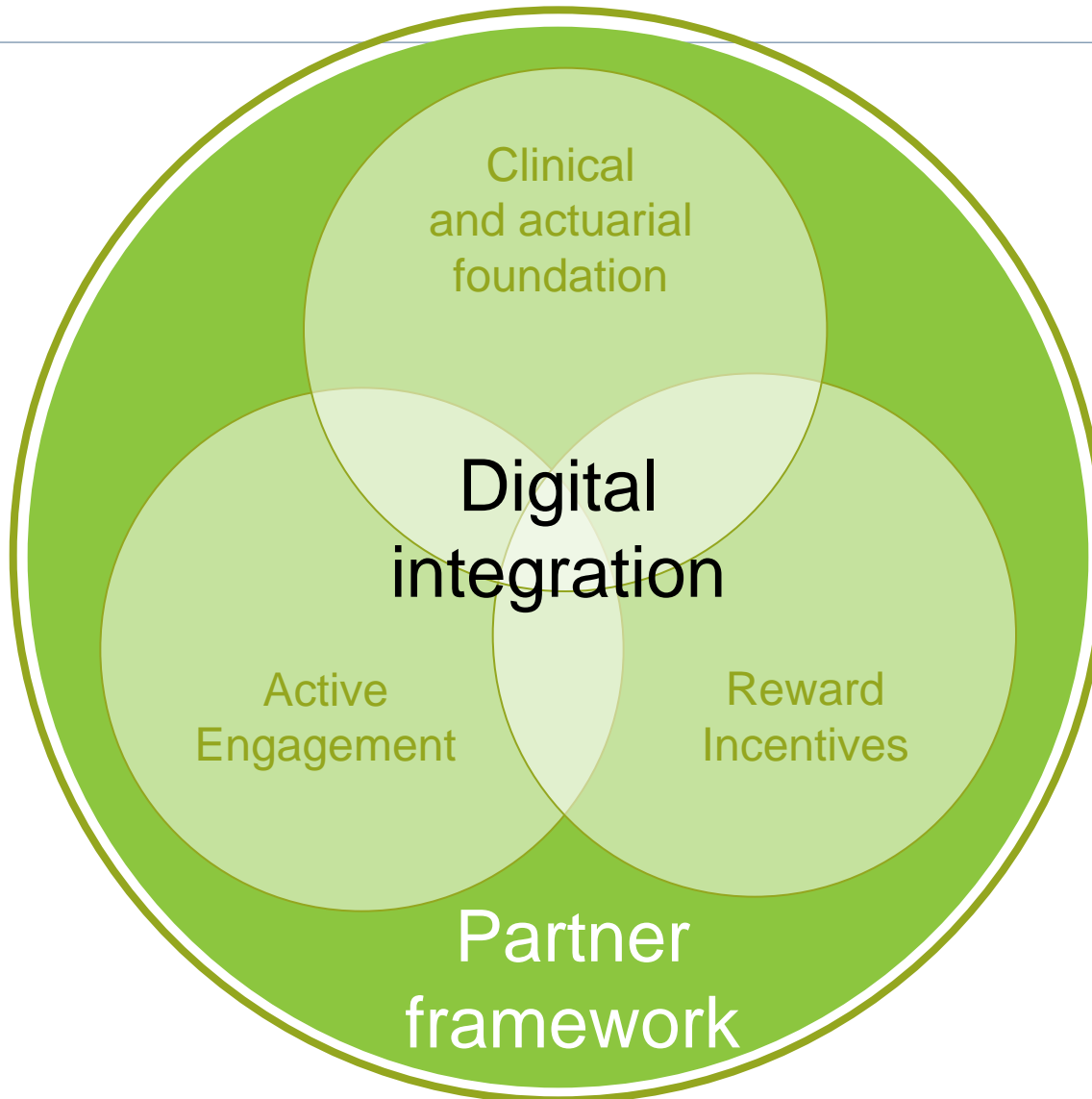
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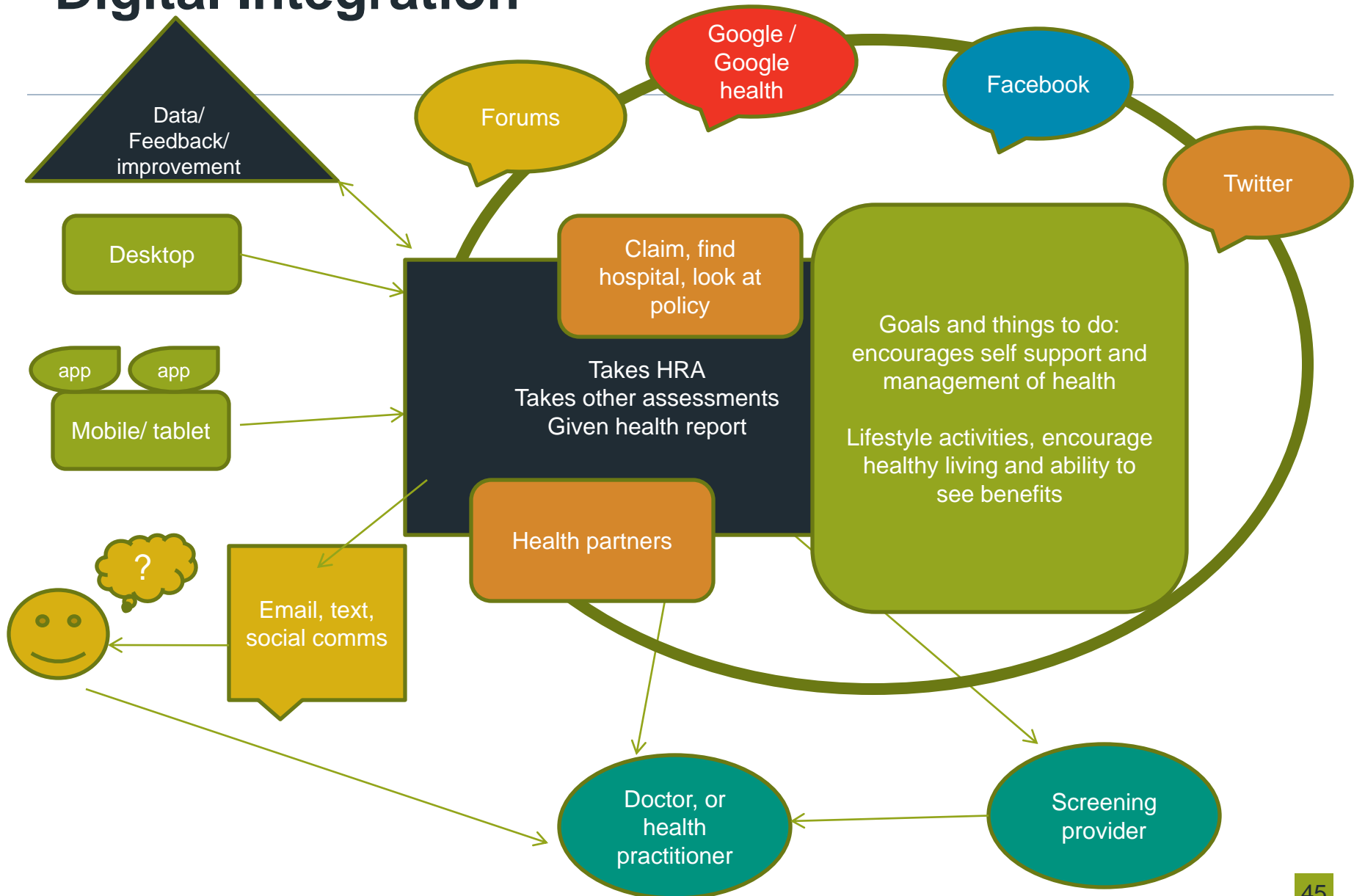
## Scalable

Able to be applied to a large population with low marginal cost; Expanded access to a broad wellness network; Data driven analytic tools

# Achieving scale

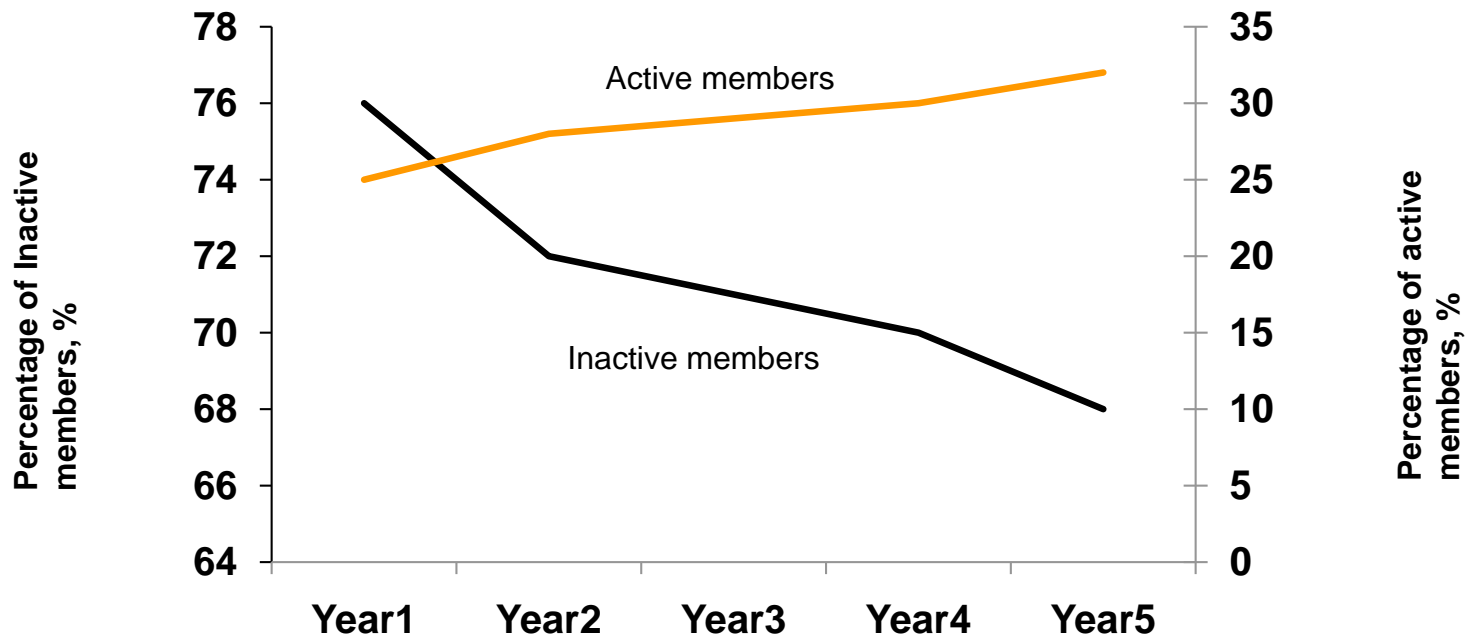


# Digital Integration



# What can this give you?

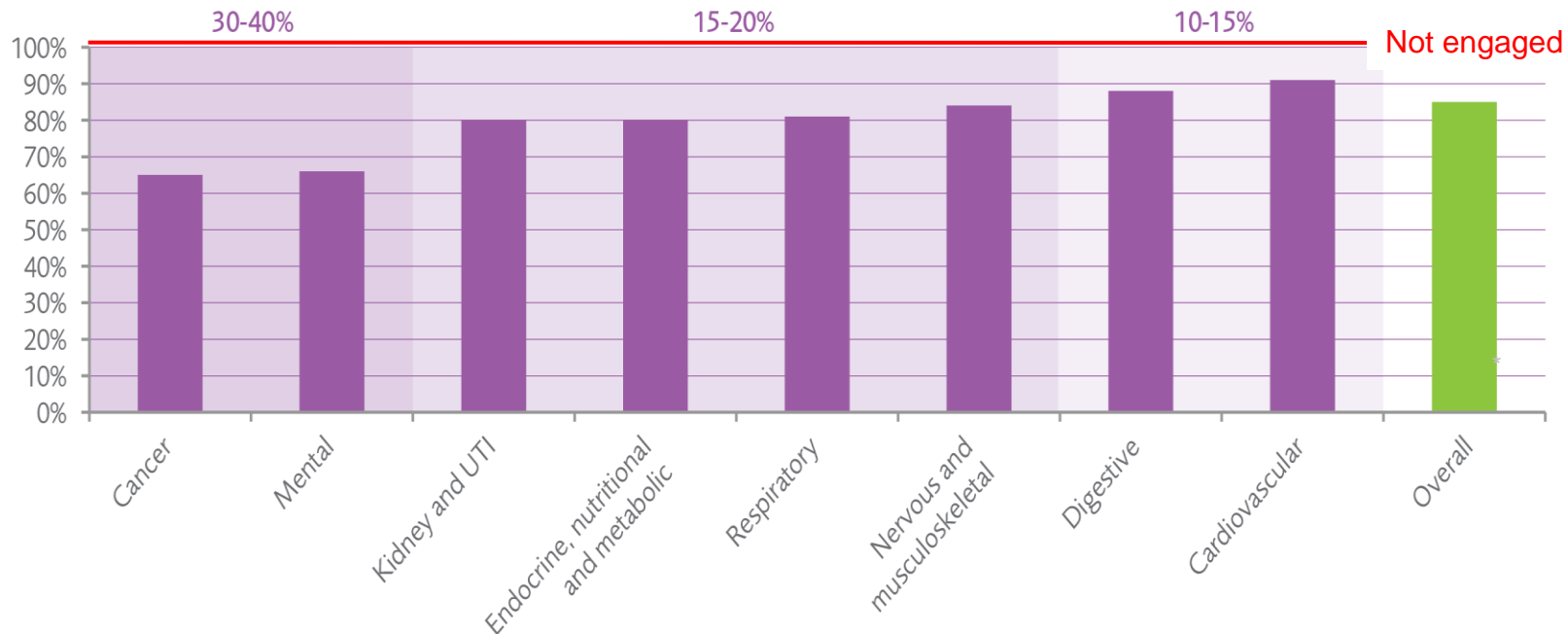
## Percentage of Active and Inactive Vitality members



Source: "Participation in an Incentive-based Wellness Program and health care costs: Results of the Discovery Vitality Insured Persons Study".

# What can this give you?

## Risk-adjusted hospital admission costs: engaged vs. not engaged Vitality members



P < 0.001 for all categories (including overall result) except cancer where P < 0.01

\*Categorisation based on diagnosis-related groupers using ICD-10, CPT-4 and local procedural codes

Source: "Participation in an Incentive-based Wellness Program and health care costs: Results of the Discovery Vitality Insured Persons Study".



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# Summary

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1. We face a large, and growing, burden on healthcare as a result of avoidable illnesses
2. Individual interventions can be effective, but are not scalable
3. Large-scale interventions have scale, but a reduced effect
4. Behavioural economics has insights which can drive a personalised intervention programme – the ‘sweet spot’ with both scale and impact

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# Questions or comments?

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Expressions of individual views by members of The Actuarial Profession and its staff are encouraged.

The views expressed in this presentation are those of the presenter.

