

How to approach the smoker - a leaf from the cardiologist's book

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THE UNIVERSITY OF AUCKLAND
NEW ZEALAND

Which do you respond to?



Speed
Limit



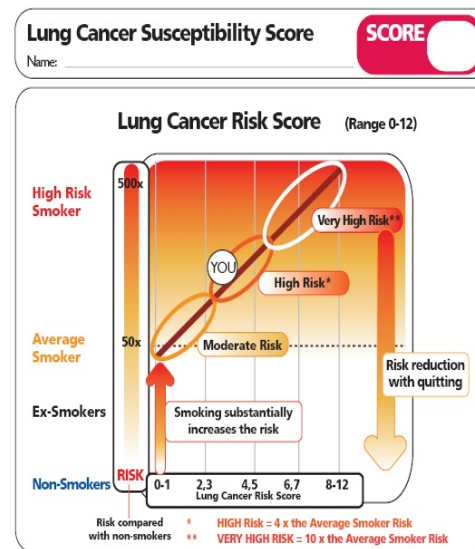
“Public Health Approach”

- Non-personalised
- Health warning
- Recommendation

“What people read”



Speed
Camera



“Personalised Approach”

- Smoker specific risk
- Personal engagement
- Outcome specific

“What people are told
and what will happen
if they don’t listen”

Lung cancer risk test

Only one way to cut lung cancer risk

Dr Robert Young says a susceptibility test for lung cancer risk is no green light for smokers

TOBACCO use and nicotine addiction are enormously important public health issues that warrant a broad-based counterattack.

Tobacco control strategies that include targeted smoking bans, public messaging and higher taxation are the cornerstone of the public health approach and have been shown to help bring smoking rates down.

However, is this public health approach the only effective way to help smokers quit and prevent premature death or prolonged disability? The answer is no.

The cornerstone of prevention of coronary heart disease, another public health issue, has been through risk assessment by the measurement of cholesterol levels prompting appropriate lifestyle change.

Through this personalised risk-based approach, rather than the broad messaging of public health (eating well and exercising regularly), mortality from coronary heart disease has been drastically reduced.

and most lethal complications (80 per cent of those with lung cancer are dead within two years after diagnosis).

The suggestion that smokers receiving a "low risk" result (score) might encourage them to continue smoking is neither supported by the scientific literature nor is it the experience of those who have trialled this or similar tests in smokers.

Such a suggestion is inaccurate on many levels. First, there is no "low risk". The results from this test assign smokers to lung cancer risk levels of moderate, high or very high.

'The Respiragene test is not just a safe test but a valuable tool in the effort to help smokers quit.'

of us who help smokers quit. The scientific literature on these issues is clear — most smokers want to quit and are looking for reasons and help to do so.

The last and most compelling reason why Respiragene is not a "green light to smoking" is that our research and the scientific literature simply do not support this view.

In a randomised trial published in a peer-reviewed journal, it was found that a lung cancer risk test based on a single gene reported quit rates of over 20 per cent greater than achieved in those who were not tested for their risk of lung cancer.

Martin Johnston in his article reports the results of a pilot study by our group showing that among randomly recruited smokers who took the Respiragene test, 32 per cent of them had quit six months later.

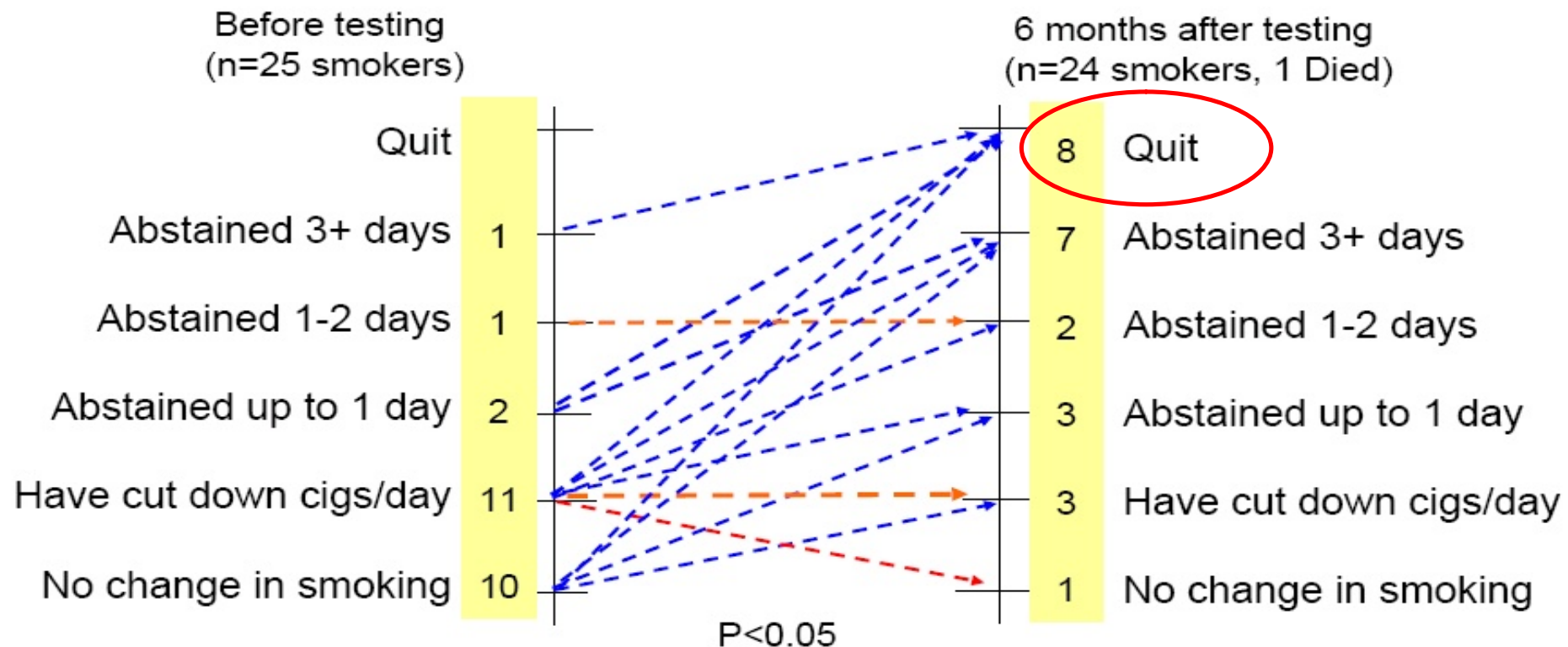
Importantly, we found that the proportion who quit was spread across the different risk groups and "moderate risk" smokers were not discouraged from quitting. These findings are the subject of a second larger study which if confirmed, would make the Respiragene test one of the most cost-effective smoking cessation approaches. To substitute the results of research and published peer-

Lung cancer test and 6 month follow up

6 month data.

32% quit at 6 months

Changes in smoking before and after genetic testing

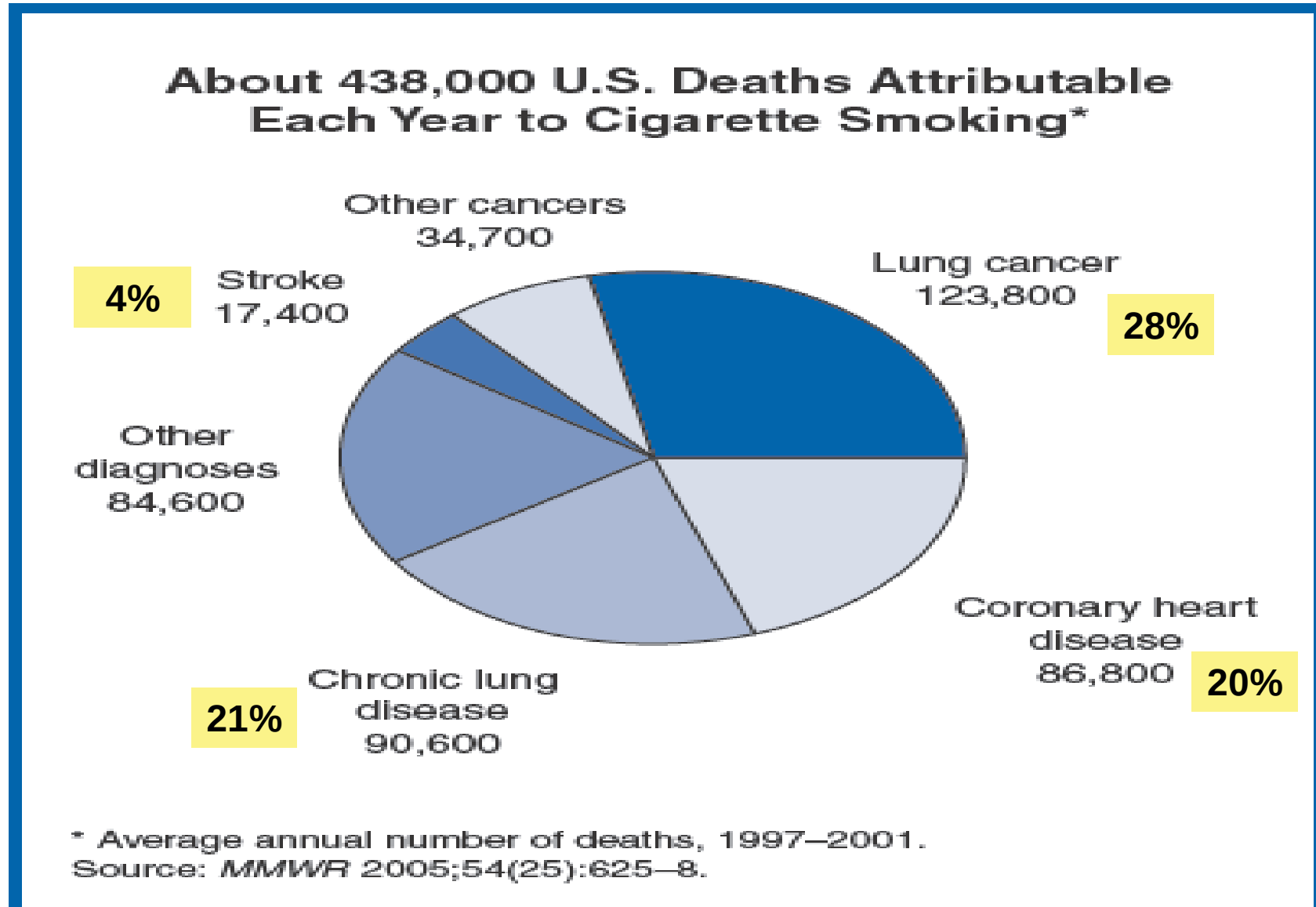


After genetic testing changes in smoking;

21 (84%) greater abstinence (blue) vs 1 (4%) less abstinence (red)
(2 unchanged (orange))

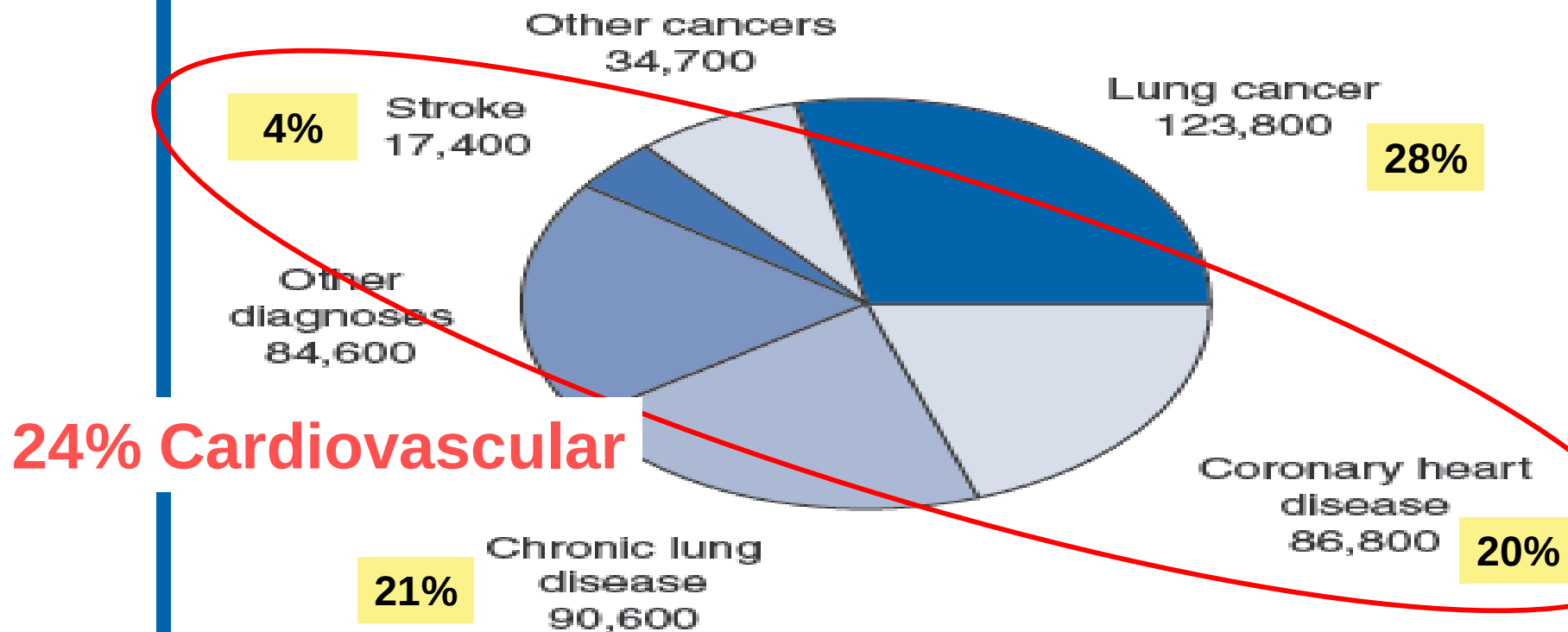
Smoking and the magnitude
of the problem

Smoking and causes of death (preventable)



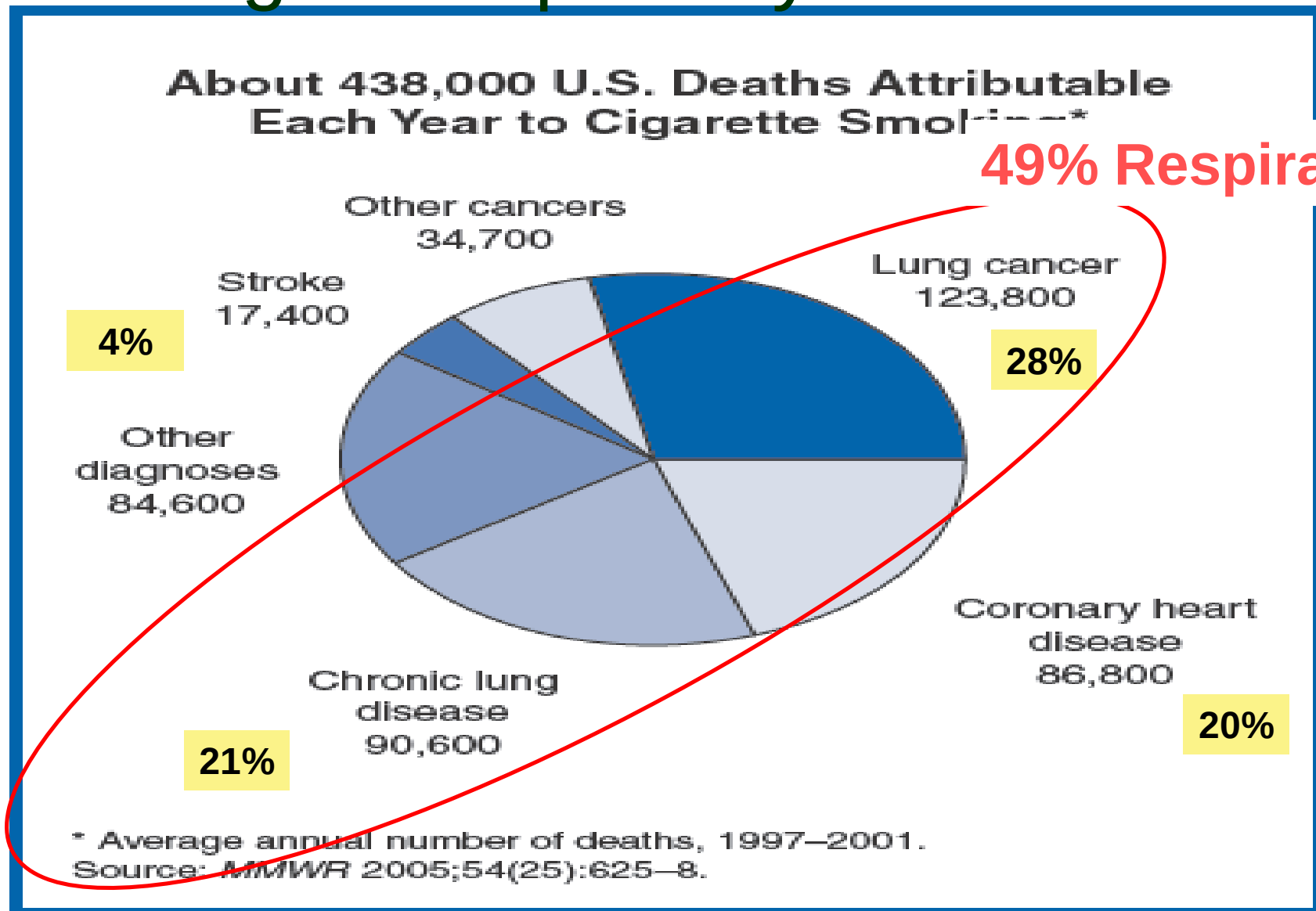
Smoking and causes of death (preventable)

**About 438,000 U.S. Deaths Attributable
Each Year to Cigarette Smoking***



* Average annual number of deaths, 1997–2001.
Source: *MMWR* 2005;54(25):625–8.

Smoking → respiratory related death



Smoking cessation

“Not about how long you live but about how well you live your last 10 years”

“Living independently with minimal burden on family and the health care system”

Risk assessment for CAD prevention

Cardiovascular Risk

- FHx and smoking Hx
- Blood pressure
- Fasting lipids
- Fasting glucose
- BMI
- hsCRP

End organ disease

- Exercise stress test
- Angiogram

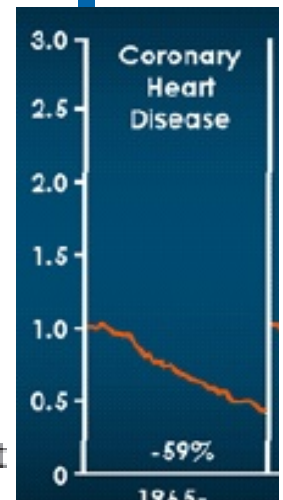
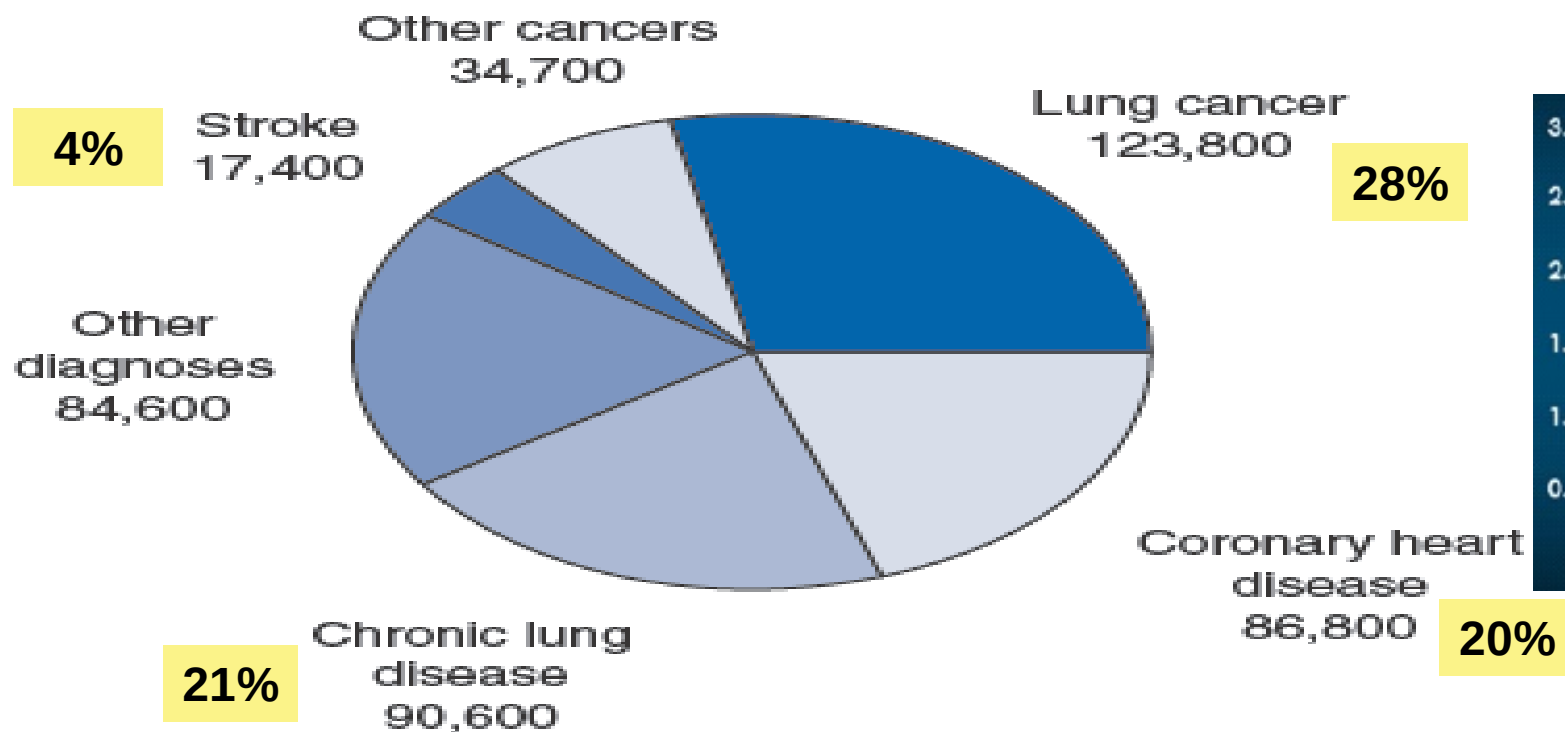
Treatment Options –targeted to high risk individuals

- Changes in diet
- Exercise and weight control
- Cholesterol lowering drugs
- Drugs - lower BP, anti-platelet activity, vascular remodeling

Framingham score to target treatment

Mortality: CAD↓, COPD↑

About 438,000 U.S. Deaths Attributable Each Year to Cigarette Smoking*



* Average annual number of deaths, 1997–2001.
Source: *MMWR* 2005;54(25):625–8.

Smoking and lung disease



Risk assessment for lung disease

Pulmonary (Lung) Risk

- Smoking Hx
- Occupational Hx

End organ disease

- CXR
- Spirometry (peak flow)

Wait until symptoms develop and then diagnose

- Asthma*
- Bronchitis
- COPD
- Lung cancer

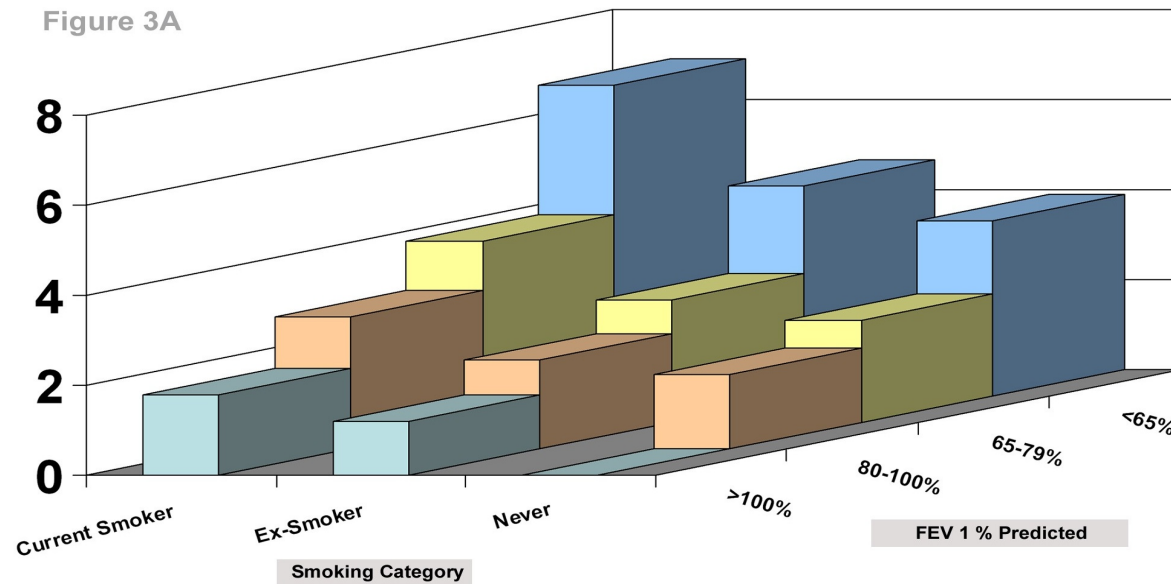
Treatment Options

- Smoking cessation
- Bronchodilators
- Inhaled corticosteroids

Symptom relief only

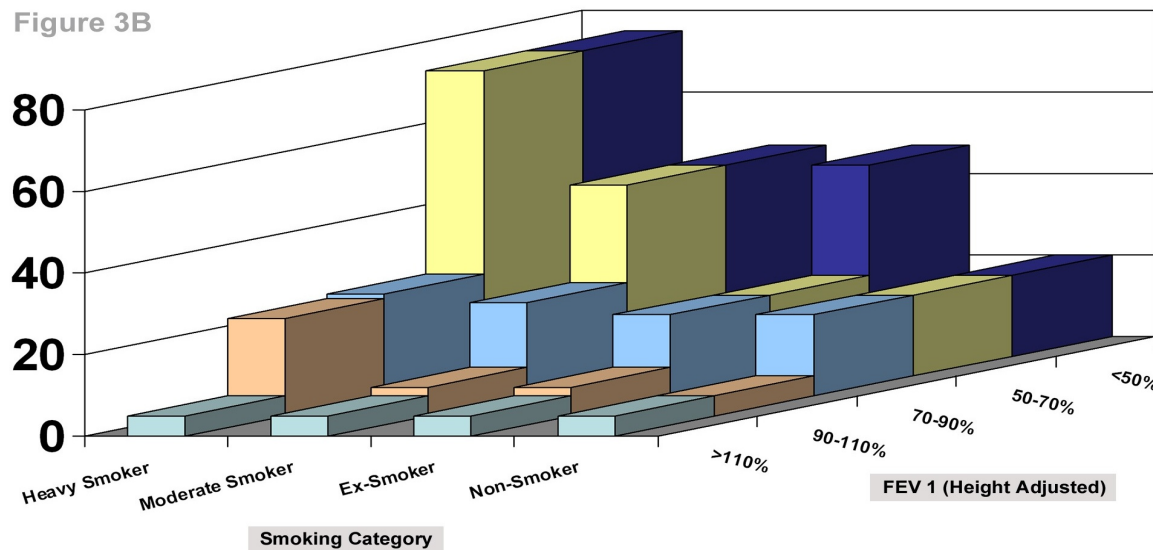
CAD mortality

Figure 3A



All cause mortality

Figure 3B

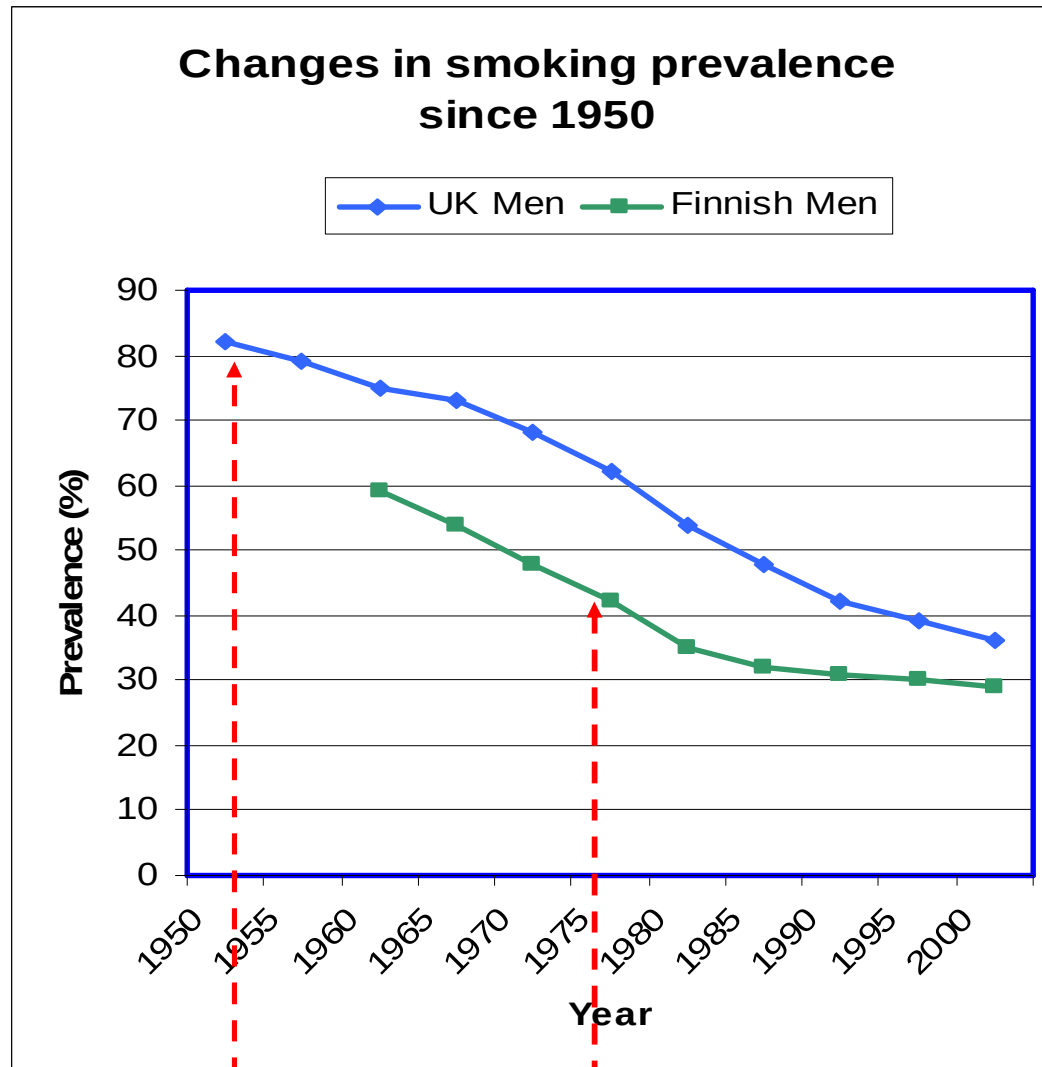


↓FEV₁ and mortality

- predicts CAD and all cause mortality
- independent of smoking status
- additive with smoking status

Young et al. ERJ 2007

Smoking – attitudes of smokers



Smoking prevalence

The link between smoking and lung cancer was made public in the 1950s and 1960s

Public health initiatives in the 1970s continued to reduce smoking rates

Smoking prevalence has levelled out over the last 20 years

“Knowledge and fear motivates”

Link made between smoking and lung cancer

Introduction of public health measures eg taxes, advertising bans and health warnings on cigarettes

Chest 2004;126: 1825-31
BMJ 2000; 321: 323-9

Approach to smoking cessation

Taxes

Restrict smoking in public places

Health warnings

Advertising restrictions

General advice

+



Public policy

Healthcare provider

Taxes

Restrict smoking in public places

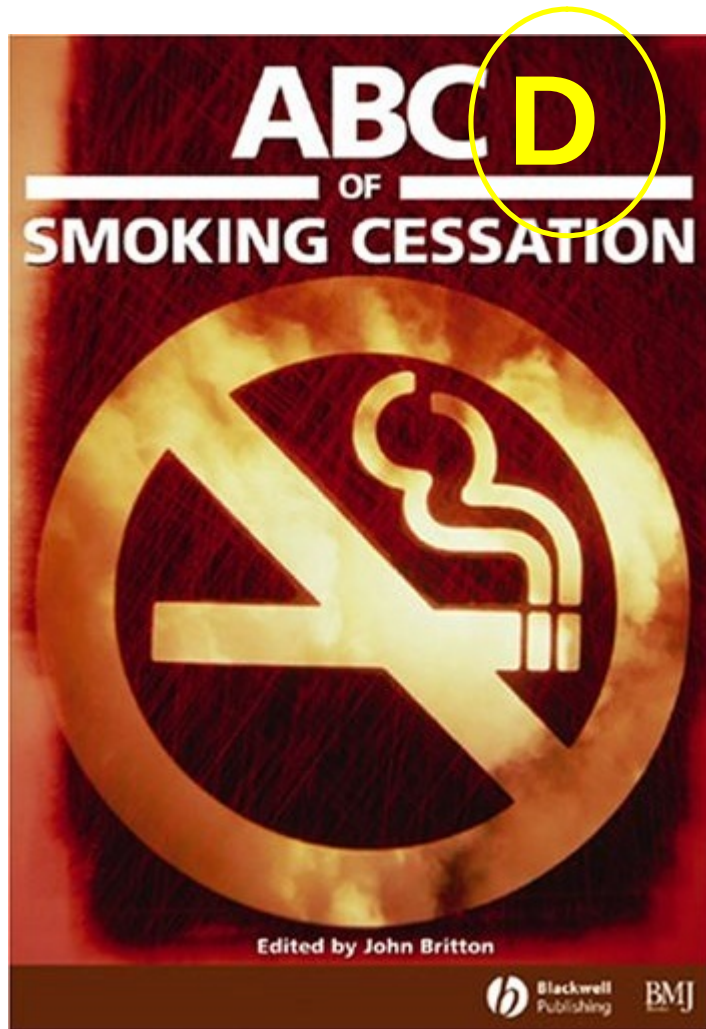
Health warnings

Advertising restrictions

General advice

Non-personalised





Ask

Brief advice

Use tests of risk or organ damage
to “personalise” advice

Cessation

Do testing

Spirometry to assess lung age
(sign of generalised susceptibility
to cardiopulmonary complications)

Take genetic susceptibility tests –
risk tool to assess future risk

CT scan of the lungs to show
lung damage from smoking (nodules)

Risk assessment for CAD prevention

Cardiovascular Risk

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Treatment Options –targeted to high risk individuals

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Framingham score to target treatment

CAD risk profiling – initiator of change

“Reality Check”



“Speed camera”



“Parking Ticket”



“Brush with death”



Smoker's attitudes to smoking: literature review

- Smokers want to know their risk for smoking related complications (>80%) [Nicotine & Tobacco Research 1999; 1: 347-355](#)
- Smokers generally under-estimate their personal risk for lung cancer (>50% of smokers with lung cancer did not think they were at risk) [Thorax 2009; 64: 523-531](#)
- Smokers state fear of lung cancer as their greatest concern and that fear of future poor health motivates them to quit (older smokers) [Cancer 1994; 74: 2055-2061](#)
- Recognition that risk information has inherent value to patients above that of what doctors might act on
» [Cancer Epidemiol Biomarkers Prev 2009; 18: 1953-61](#)

Smoking – a model for quitting

Research article

Open Access

Attitudes to smoking cessation and triggers to relapse among Chinese male smokers

Tingzhong Yang^{*1}, K John Fisher², Fuzhong Li² and Brian G Danaher²

Table 3: Reasons given for attempting to quit

	N *	% of sample (N = 201)	95% C.I.
Health concern (for self and family)	155	77.1	70.7 – 82.7
Cost	108	53.7	46.6 – 60.8
Family pressure	60	29.9	23.6 – 36.7
Advice and example from others	72	35.8	29.2 – 42.9
Restrictions on smoking (in workplace, on public transportation, at home)	53	26.4	20.4 – 33.0
Social stigma	45	22.4	16.8 – 28.8

* Respondents could indicate multiple answers to this item.

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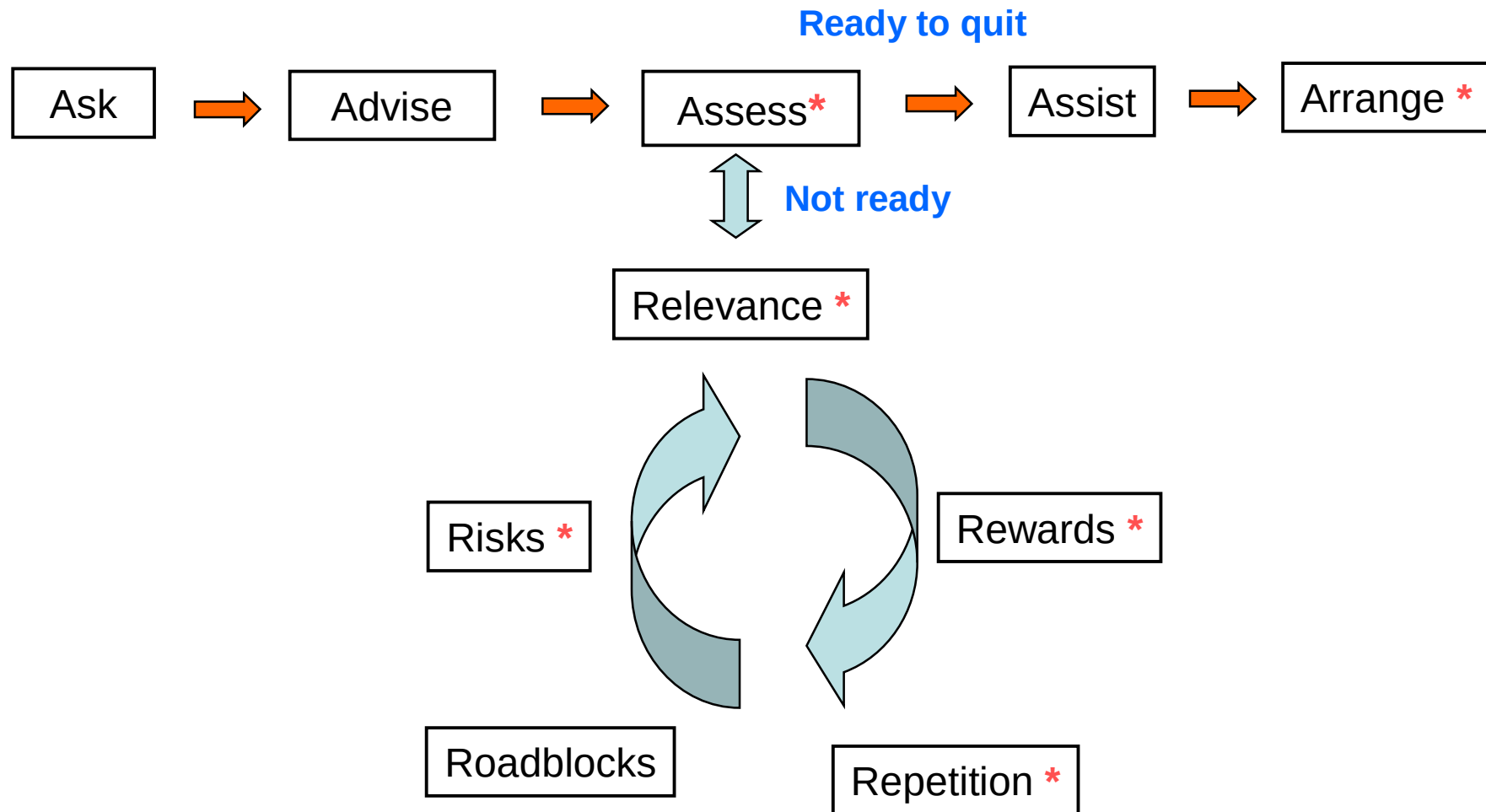
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Engaging smokers in smoking cessation: role of Respiragene *



5As and 5Rs

3Ts – Robert West

“Catastrophic” pathways to smoking cessation: findings from national survey

Robert West, Taj Sohal

BMJ 2006; 332:458-460

Tension = motivational tension is the level of fear and anxiety a smoker experiences that arises from the combined feeling from beliefs, past experiences and the balance of benefit over harms from continued smoking.

Trigger = “events” that alter the motivational tension to a point a smoker acts on their fears and initiates a quit attempt.

Treatment = the provision of smoking cessation services such as pharmacotherapy, counselling or referral to a specialised smoking cessation service

Smoking cessation: Tension

Tension

Trigger

Treatment

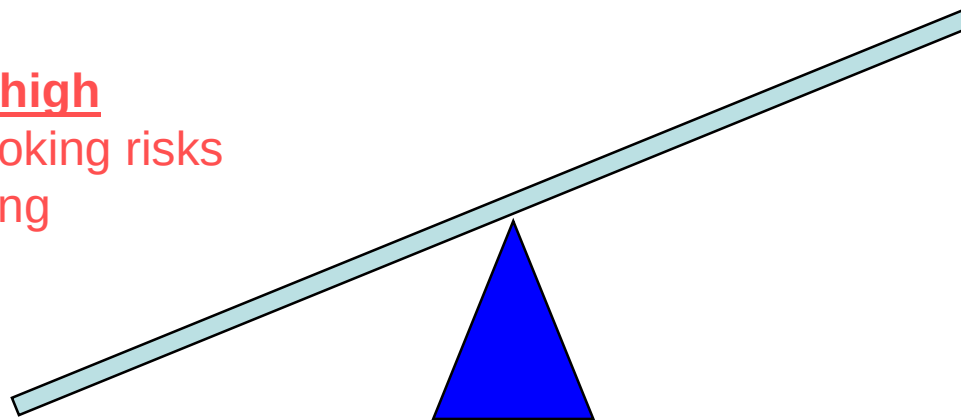
Smoker = Benefits outweigh the harms

Motivational tension low

- fear/anxiety about smoking
- promotes quitting

Optimistic bias high

- denial about smoking risks
- promotes smoking



Smoker

West R et al. BMJ 2006; 332: 458-60

Smoking cessation: the 3 Ts

Tension
Trigger
Treatment

Quitter = Harms outweigh the benefits

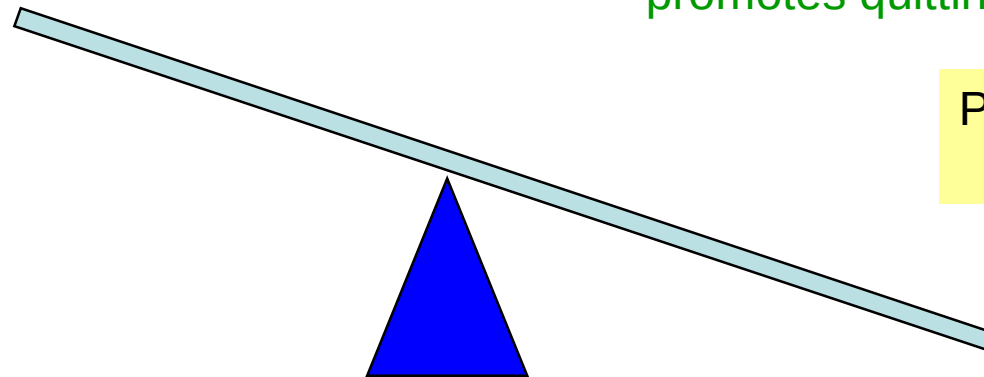
Tip the balance
to achieve quitting

Optimistic bias low

- denial about smoking risks
- promotes smoking

Motivational tension high

- fear/anxiety about smoking
- promotes quitting



Personalised data of vulnerability
ie. Respiragene Test

Ex-smoker

Trigger = "Teachable moment"

"Fear is a powerful motivator" but it must be personalised

CAD risk profiling – initiator of change

“Reality Check”



“Speed camera”



“Parking Ticket”

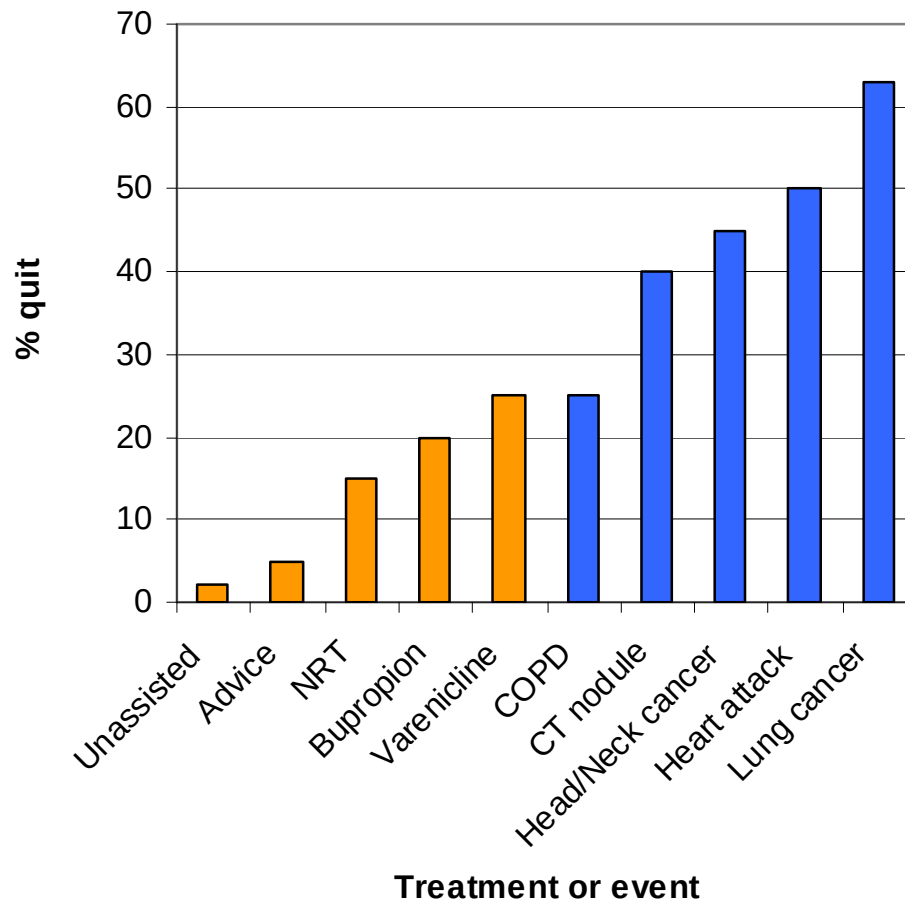


“Brush with death”



Smoking – why people quit

Smoking cessation rate following treatment or event



3 Nothing Treatment Events

Smoking cessation: triggers

- Most smokers quit using cold turkey
- For older smokers, future poor health is the most cited reason for quitting
- Developing lung cancer and COPD are the most feared complications
- Most smokers continue to smoke on the basis the benefits outweigh the harms
- Most smokers overestimate the general risk of lung cancer but underestimate their own risk (below average risk = optimistic bias)
- Smokers quit when the motivational tension favour quitting (trigger)

Young RP, et al. 2009 (PMJ)

“Triggers” to smoking cessation

- News - friend or relative with smoking related illness.
- Diagnosis – heart attack, stroke, PAD, cancer, emphysema
- Risk of poor outcome – adverse test result of risk such as elevated cholesterol, elevated blood pressure, poor lung function, ?elevated genetic predisposition.

Research article

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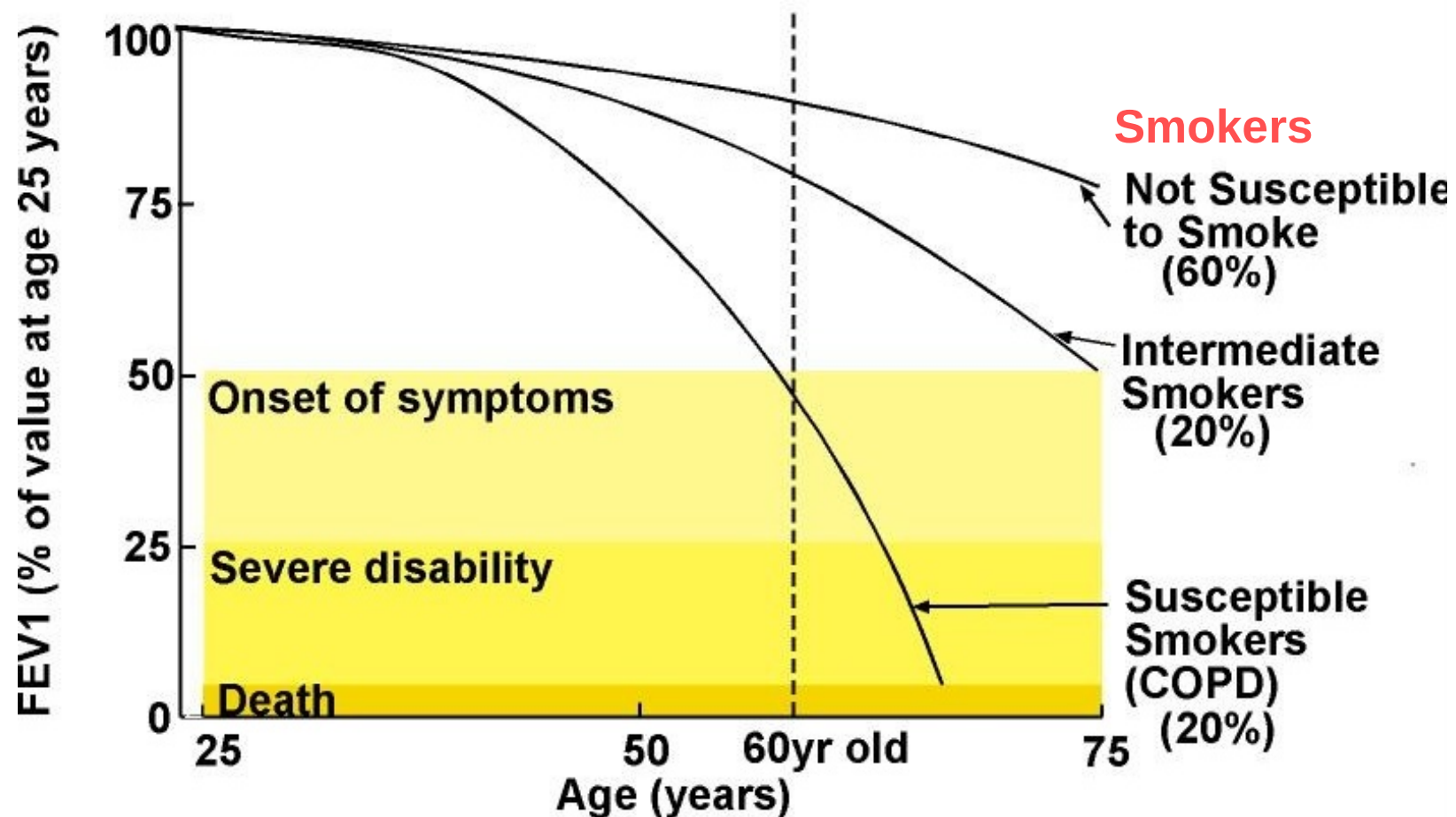


Spirometry as a tool for smoking cessation

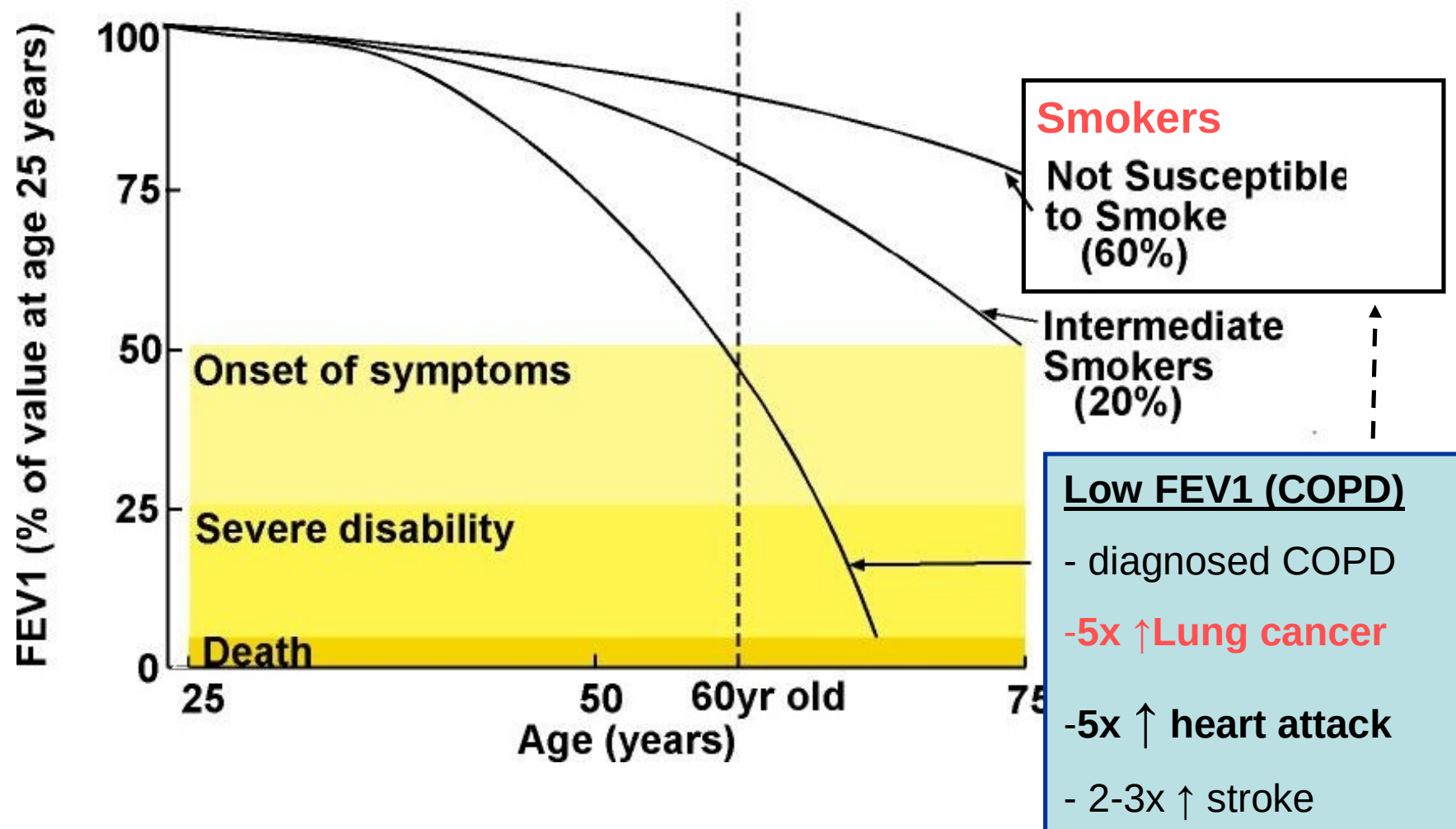
Powerful educative tool

Shown in some studies
to improve quit rates
compared to no lung
function testing

Reduced FEV₁: linked to all cause mortality



Reduced FEV₁: linked to all cause mortality



FEV₁ and Lung Age



Fig 2 | Explaining lung age to participants (adapted from Fletcher and Peto¹¹)

Lung Age is the chronological age at which a person's measured pulmonary function is normal for the person's sex and height.

It is calculated from predicted values.

ID
Age 46 (09/09/1963)
Height 183 cm
Weight 73 kg BMI 21.8
Gender Male
Ethnic Other

Test Date 29/05/2010 16:50:53
Interpretation NLHEP
Predicted ERS/ECCS * 1.00
Value Selection Best Value
BTPS (IN/EX) 1.12/1.02

Parameter	Pred	Lin	Pre Best	Trial 7	Trial 6	Trial 8	%Pred
FVC [L]	5.00	4.00	5.32	5.32	5.04	5.21	106
FEV1 [L]	4.04	3.21	2.73*	2.73*	2.69*	2.51*	68
FEV1/FVC	0.789	0.671	0.514*	0.514*	0.533*	0.482*	65
FEF25-75% [L/s]	4.27	2.56	1.02*	1.02*	1.27*	0.95*	24

Session Quality B (FEV1 Var=0.05L (1.6%); FVC Var=0.11L (2.1%))

Test Result Your FEV1 / Predicted: 68% Your Lung Age: 91

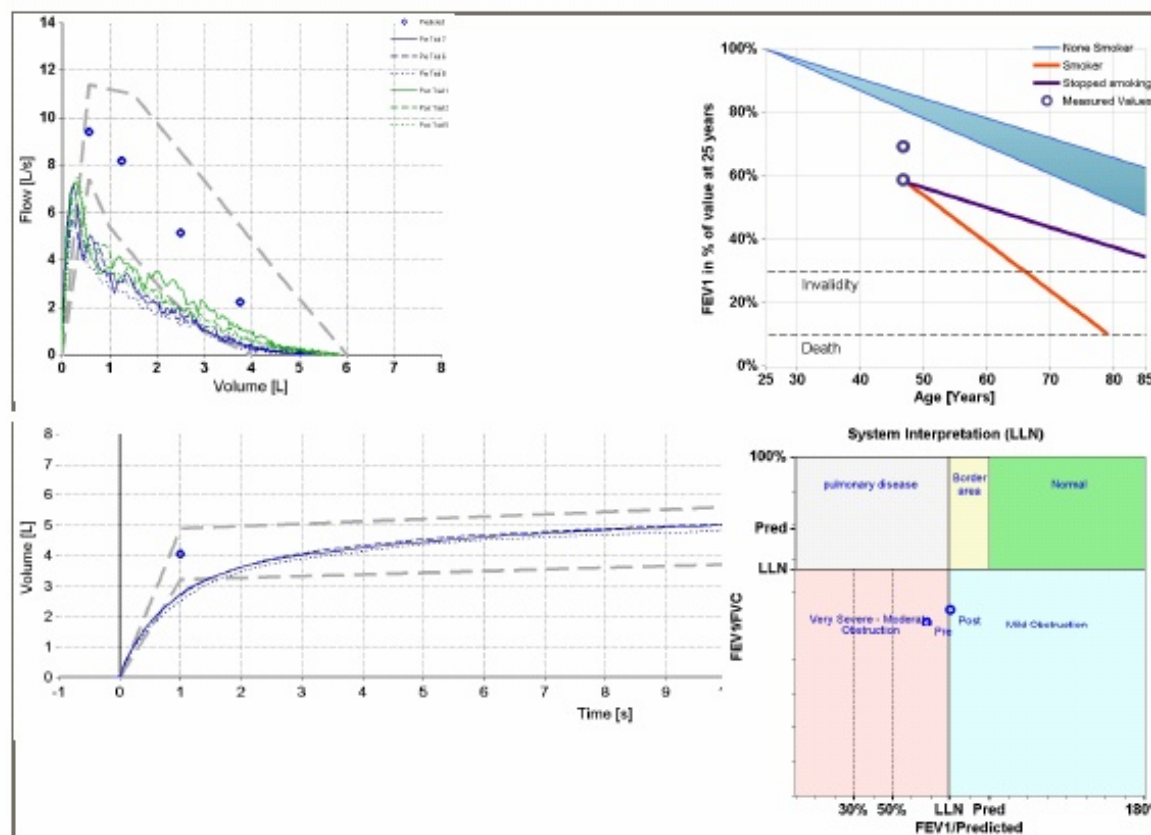
System Interpretation Mild Obstruction

Advantages

- Real-time curves
 - Flow-volume
 - Volume time
- Built in quality control
- Diagnostic interpretation
- Teachable moment for smokers

Spirometry made simple

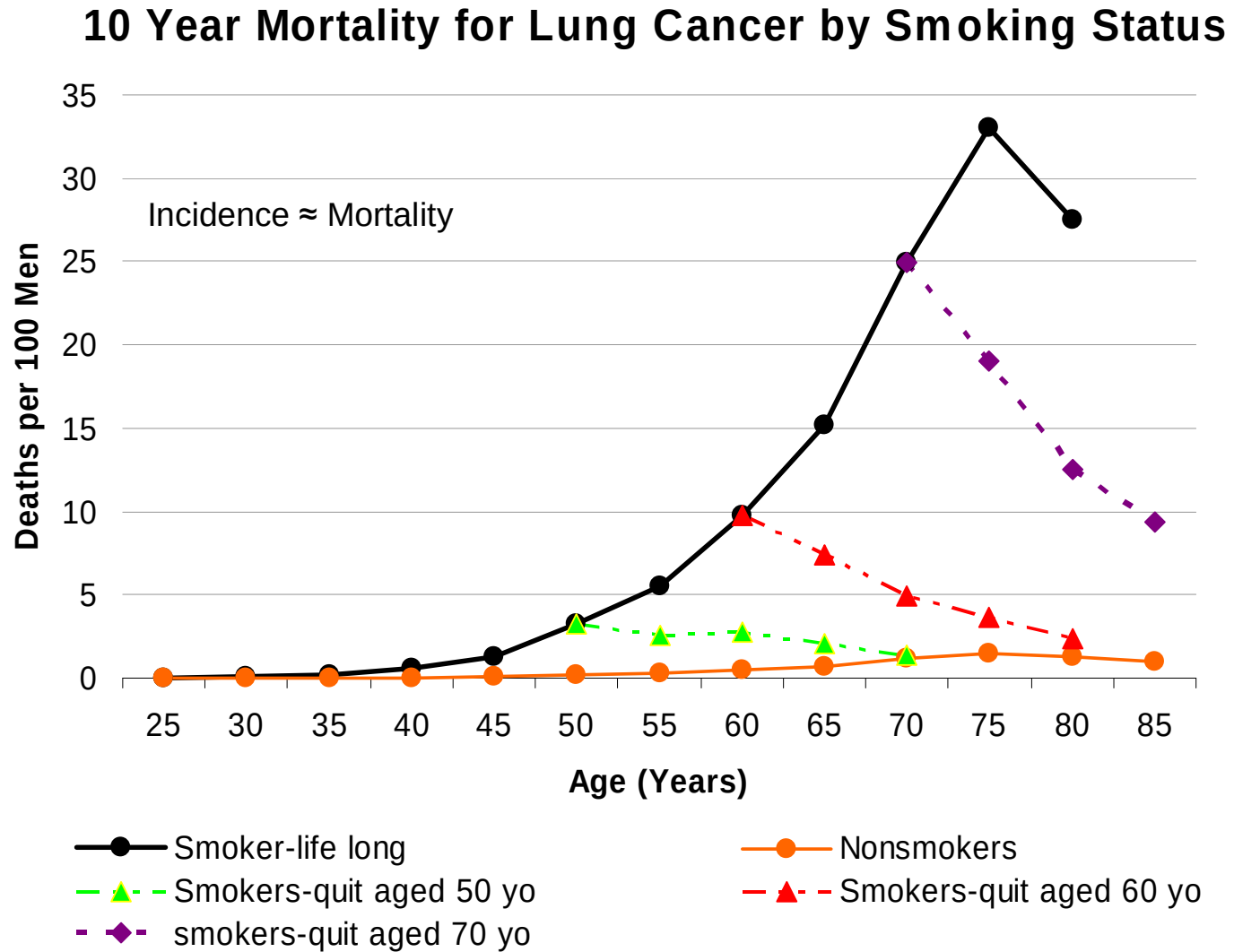
Easy One PC



Smoking and lung disease



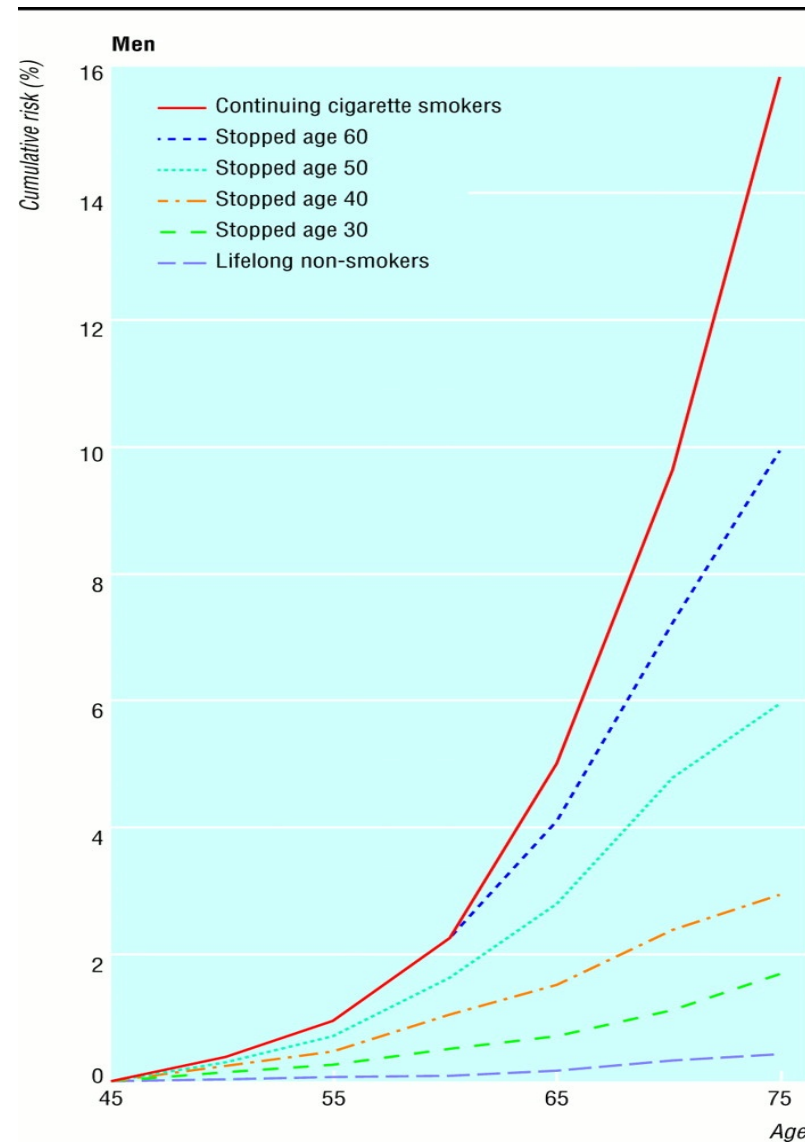
Lung cancer risk increases with age



Risk of lung cancer after quitting

Physicians 50 year prospective study – Doll et al. BMJ

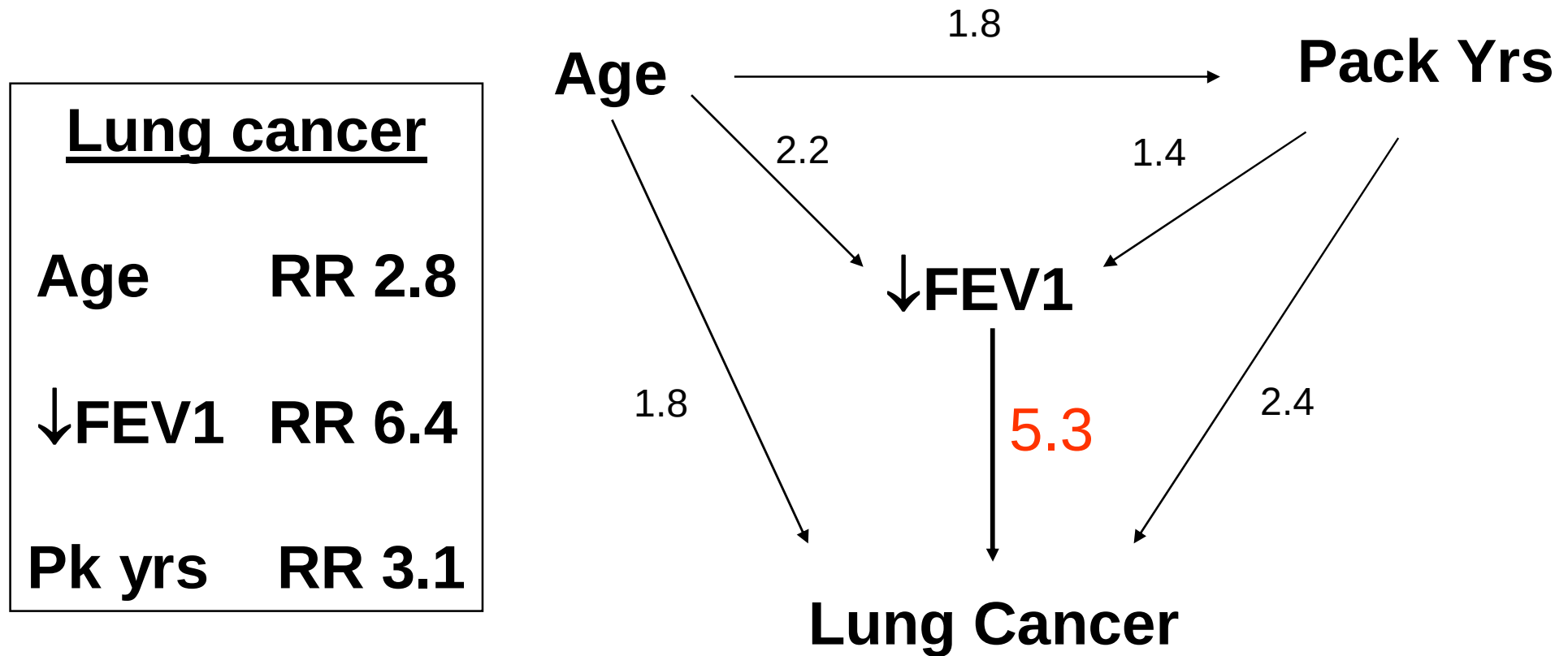
Cumulative % of smokers and ex-smokers diagnosed with lung cancer after quitting at 30,40,50 and 60 yrs of age



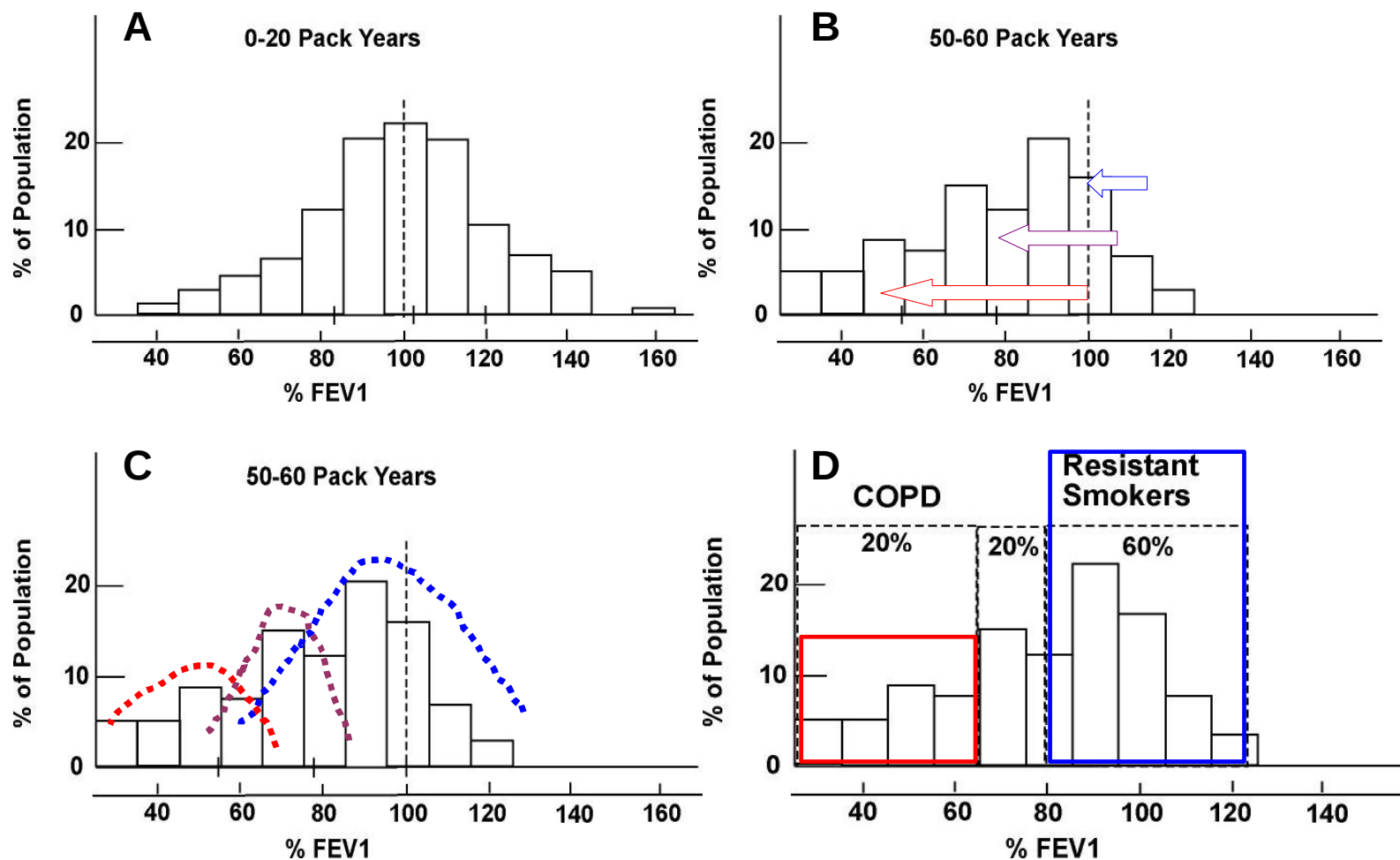
Quitting age	Risk reduction
Never stopped	0%
60 yr	33%
50 yr	66%
40 yr	80%
30 yr	95%
Never started	

Lung Function and Lung Cancer

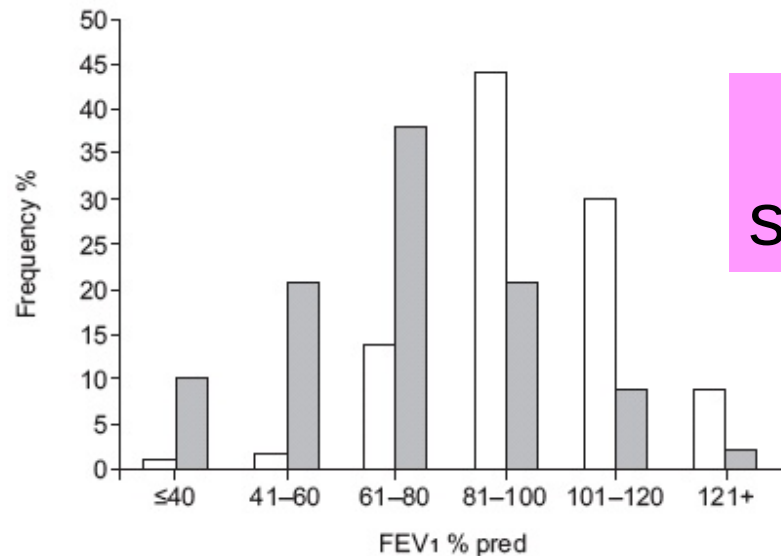
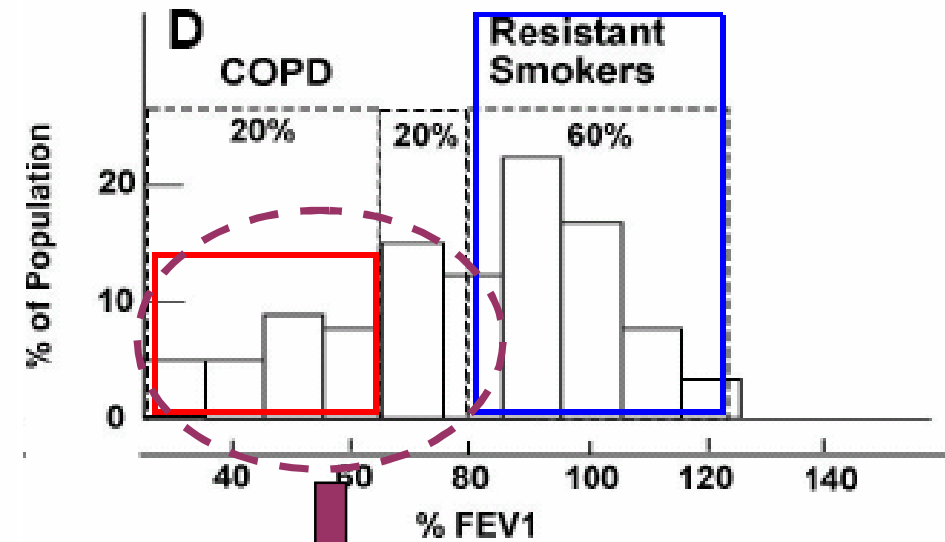
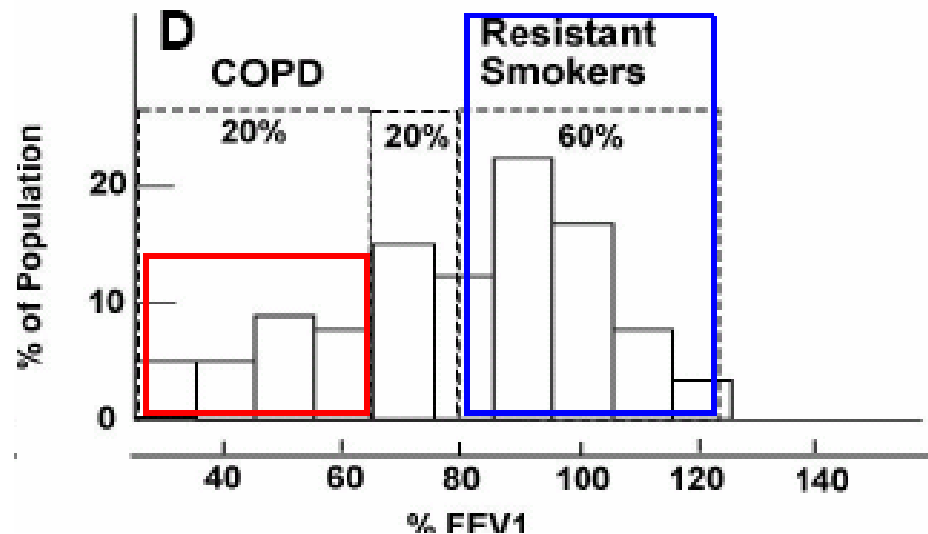
Consistently reported risk of 3-6x for lung cancer in smokers with impaired lung function



Segmentation of Lung Function Decline



Lung cancer occurs in smokers with low FEV₁



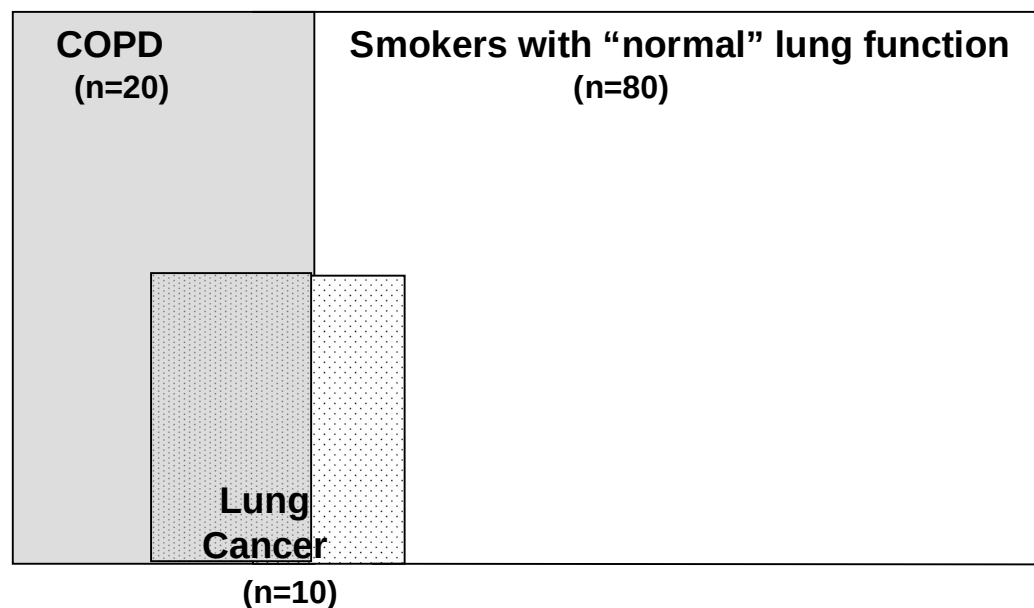
80% of lung cancer occurs in smokers with FEV₁ < 90% predicted

Young RP et al. ERJ 2009; 34: 380-386

COPD prevalence is increased in lung cancer independent of age, sex and smoking history

R.P. Young*, R.J. Hopkins*, T. Christmas[#], P.N. Black[†], P. Metcalf⁺ and G.D. Gamble*

Young RP et al. ERJ 2009; 34: 380-386



Lung cancer develops in

6/20 with COPD (30%)

4/80 with normal lung function (5%)

Lung cancer cases

- 50% have GOLD 2+ COPD
- 67% have GOLD 1+ COPD
- 87% have COPD ± emphysema



Smoking cessation: the potential role of risk assessment tools as motivational triggers

Robert P Young, Raewyn J Hopkins, Melinda Smith, et al.

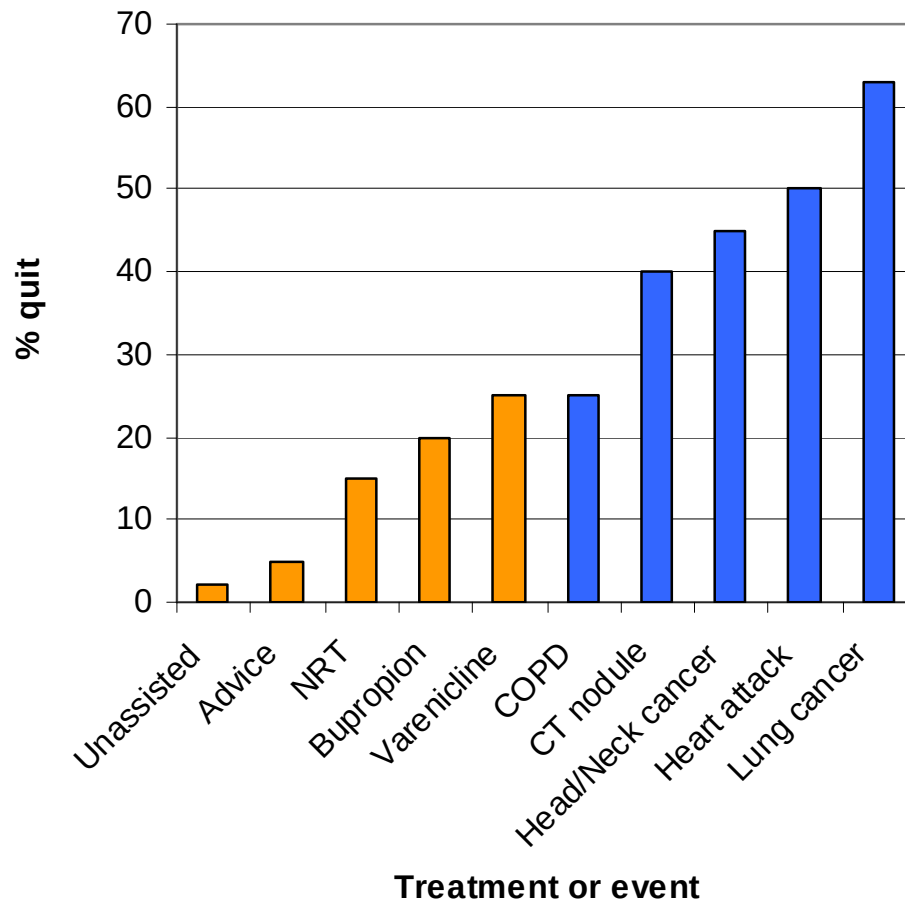
Postgrad Med J 2010 86: 28-33

doi: 10.1136/pgmj.2009.084947

The main thrust of this paper is that smokers are looking for better reasons to quit than just non-personalised public health messages

Smokers are motivated to quit by triggers that raise motivational tension and that these triggers include tests indicating future ill health.

Smoking cessation rate following treatment or event



Smoking cessation: triggers

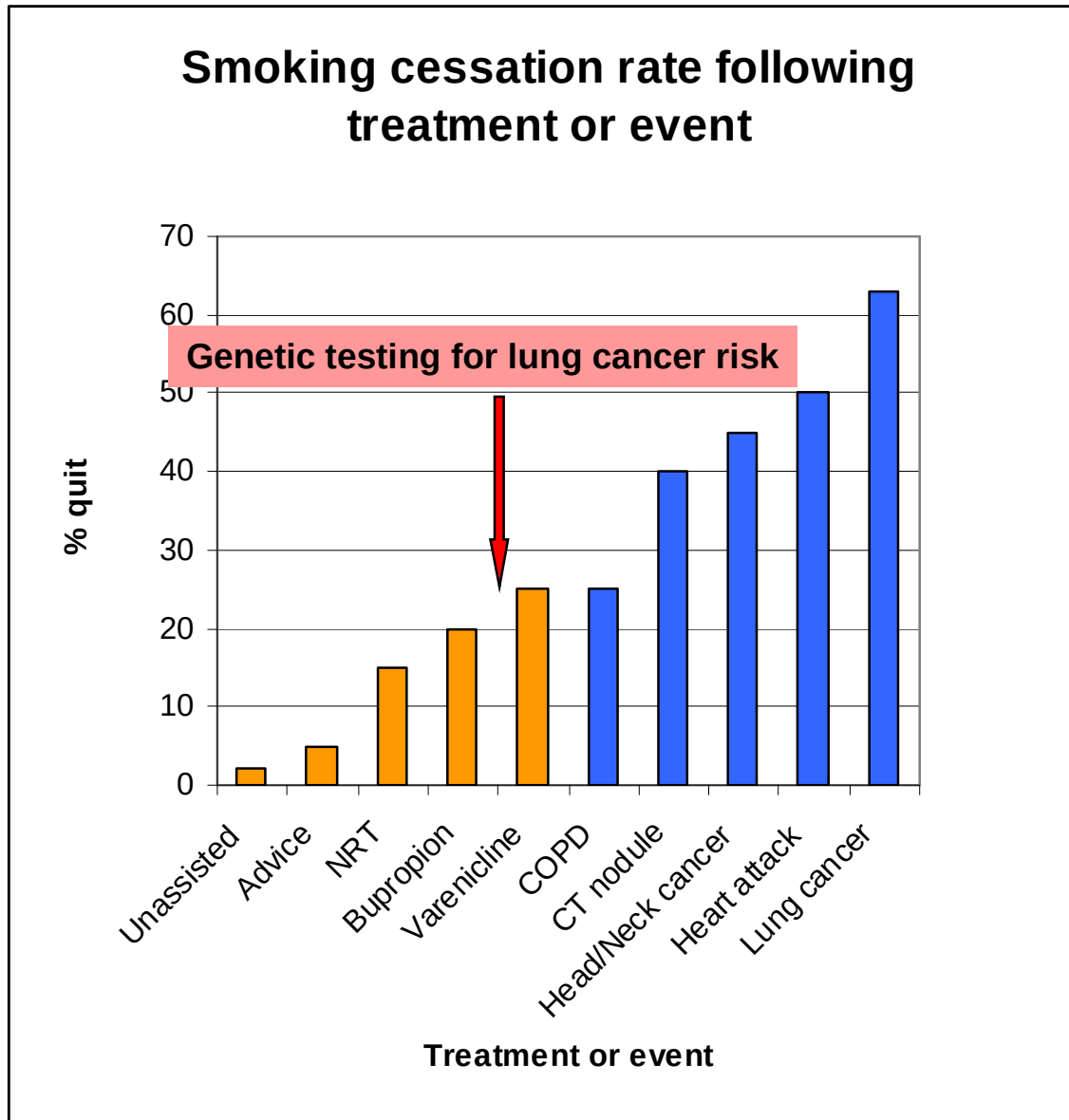
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4 Nothing Treatment Events

Young RP, et al. PMJ 2009; 86: 26-33.

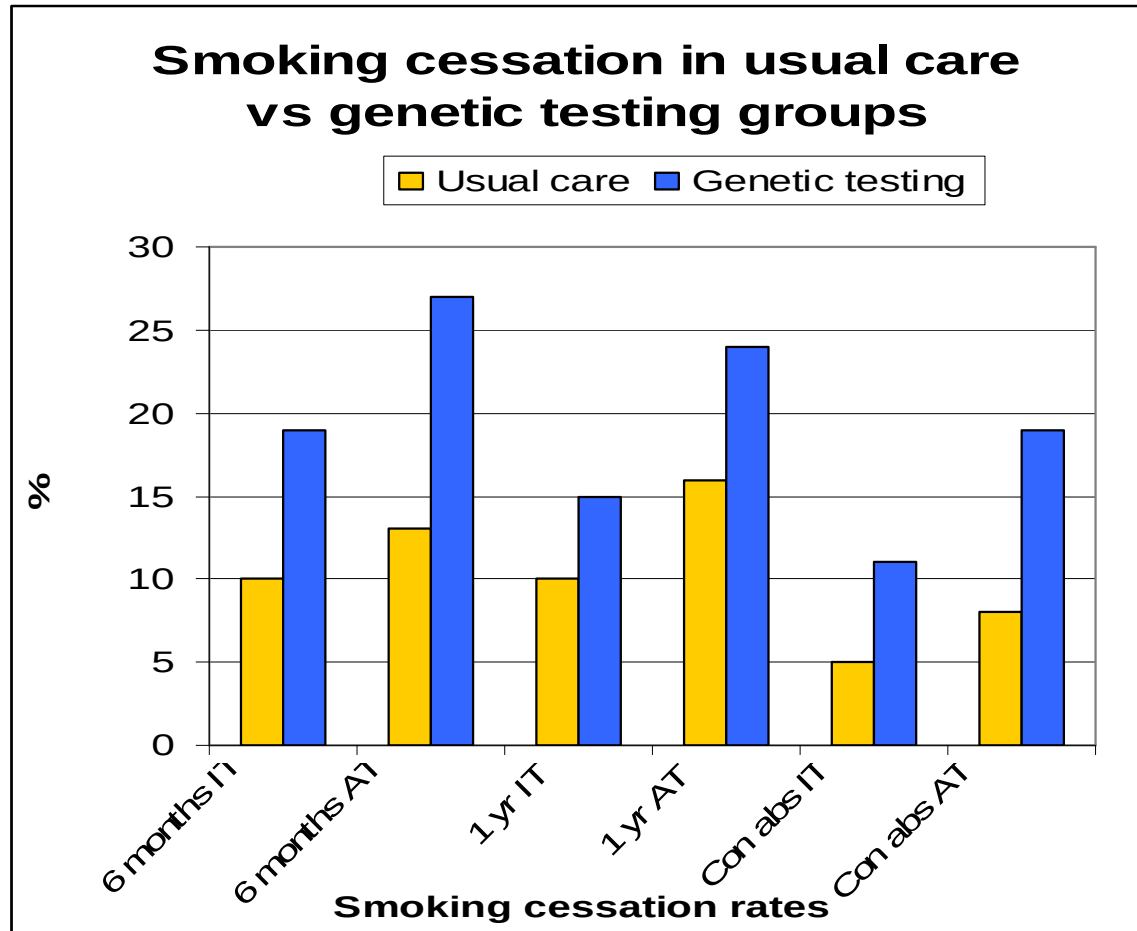
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4 Nothing Treatment Events

Genetic risk of lung cancer and quitting



Genetic testing for risk of lung cancer helps to personalize the risk from continued smoking

Smokers who underwent genetic testing (blue bars) in a randomized trial had higher quit rates than those in a smoking cessation programme alone (yellow bars)

Personalising the risks of smoking helps people choose healthier lifestyle options (eg quitting smoking and preventing relapse)

McBride, C.M., et al: Incorporating genetic susceptibility feedback into a smoking cessation program for African-American smokers with low income. *Cancer Epidemiol Biomarkers Prev.* 2002, 11:521-528

A gene-based lung cancer risk test (Respiragene) for high risk smokers: a “trigger” to smoking cessation

Dr Robert Young

BMedSc, MBChB, DPhil, FRACP, FRCP

Associate Professor of Medicine and Molecular Genetics

Department of Medicine, University of Auckland, Auckland,
New Zealand

Respiragene - Lung cancer susceptibility score

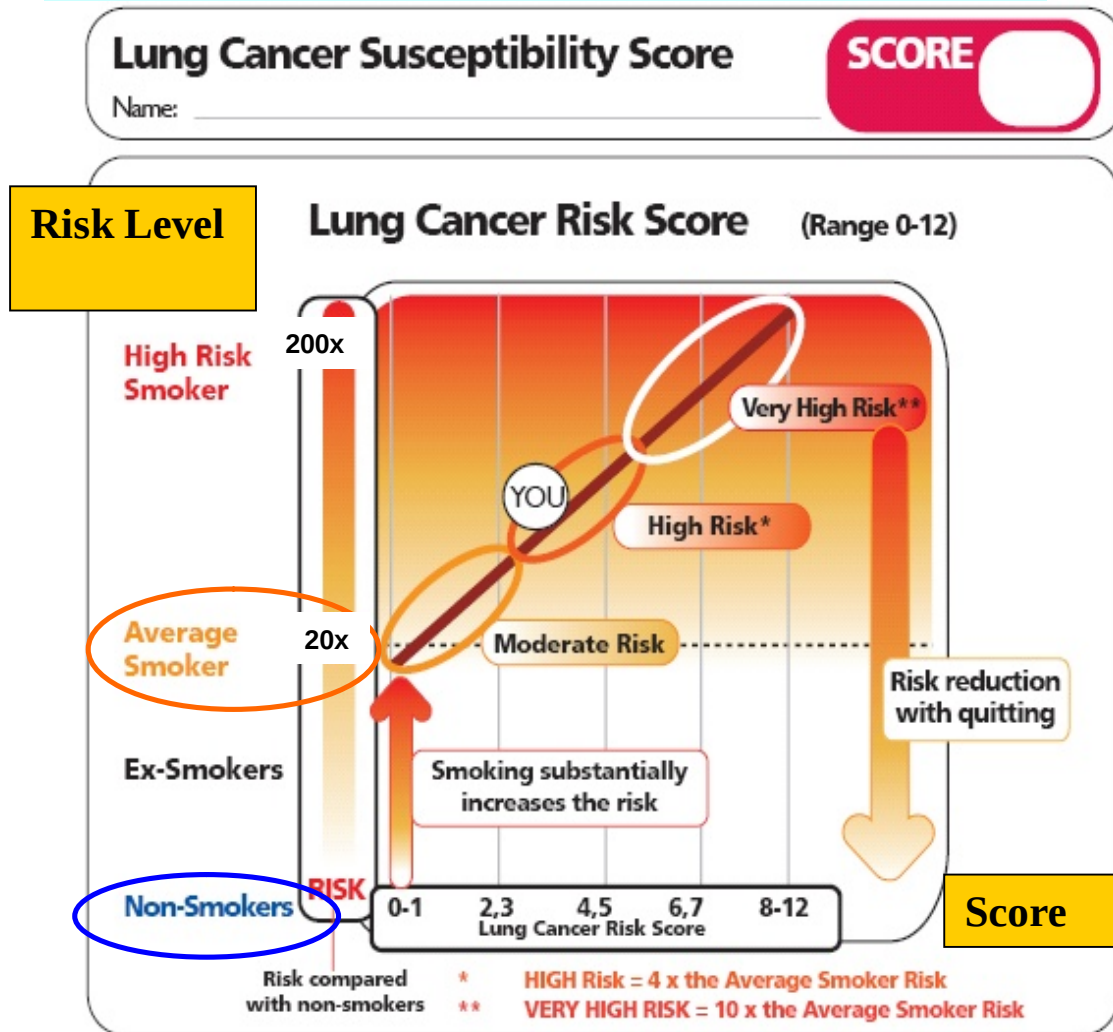
- Based on an algorithm developed in COPD case-control study
- Combines genotypes from protective and susceptible genetic variants (SNPs)
- Makes no assumptions about biological pathways (simple, not hierarchical)
- Modelled on the Gail score - combines age, history of COPD, FHx of lung cancer with genes

Young RP, et al. PlosOne 2009; 4: 3.

Respiragene™ test, motivational tension and quitting

- Personalised tests of risk increase motivational tension
- Respiragene is a gene based personalised test of lung cancer susceptibility
- Respiragene is a test to engage smokers in smoking cessation and a trigger to quitting
- Respiragene does not de-motivate smokers and reminds them that they are at risk of lung cancer

Test for “engagement” and targeting

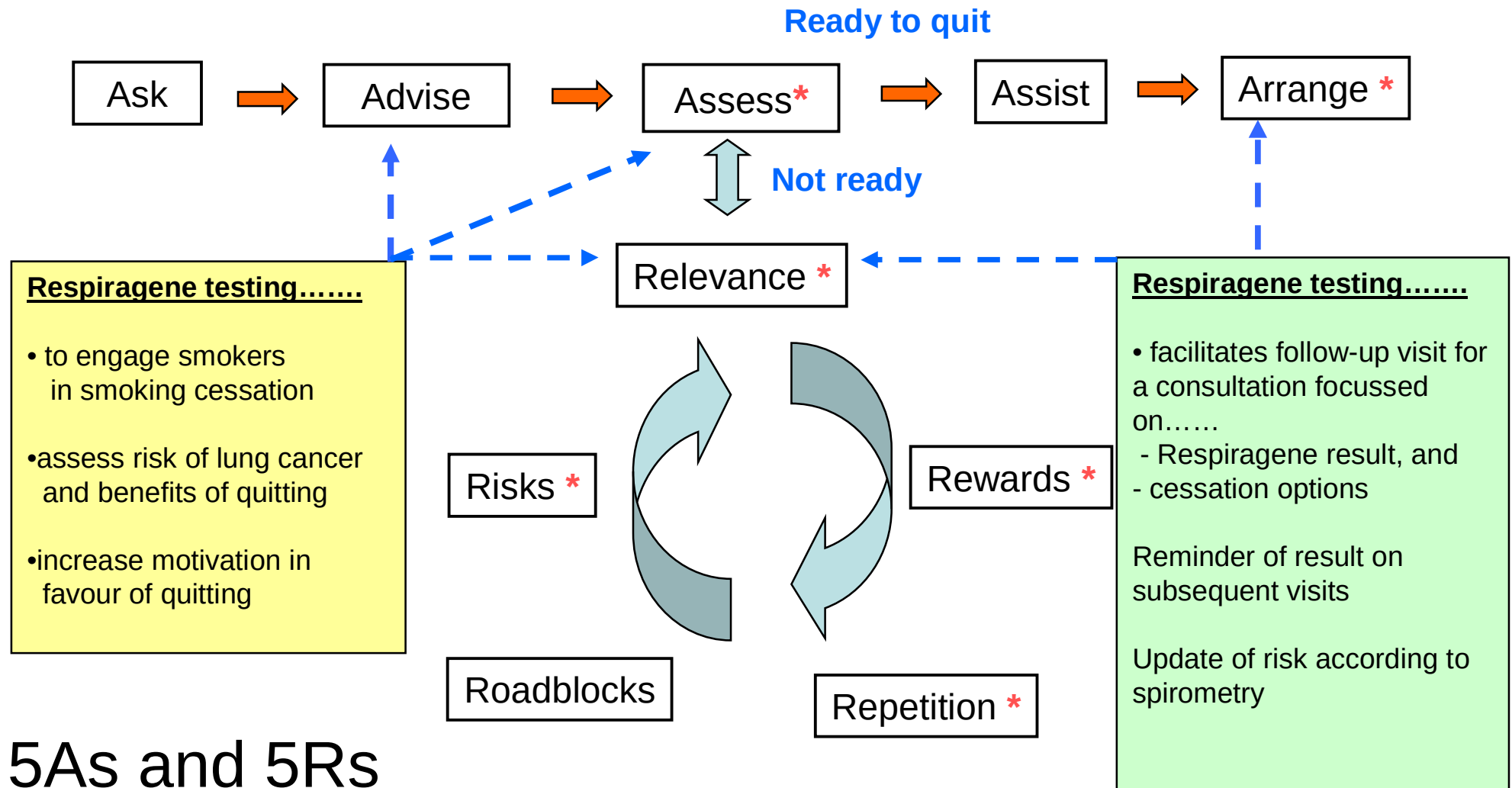


Lung cancer susceptibility score

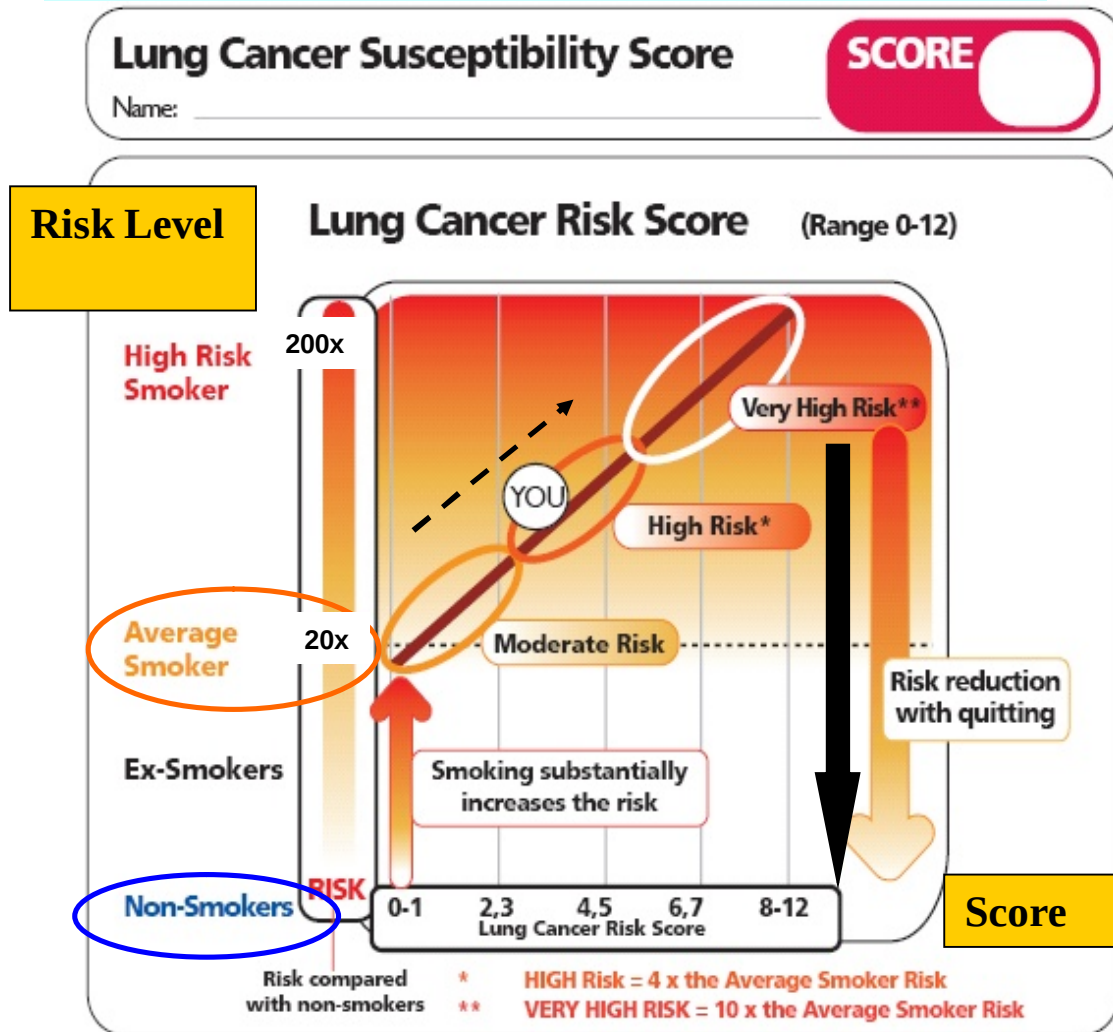
- All smokers at some risk for lung cancer above that of non-smokers
- Factors increasing that risk
 - Increasing age
 - Family history
 - COPD
 - “Bad genes”
- Shows risk reduction with quitting
- Educational tool to promote behaviour change (quitting)
- Target for “screening” those at greatest risk

No smoker is lower than “moderate” (elevated) risk for lung cancer vs nonsmokers

Engaging smokers in smoking cessation: role of Respiragene *



Test for “engagement” and targeting

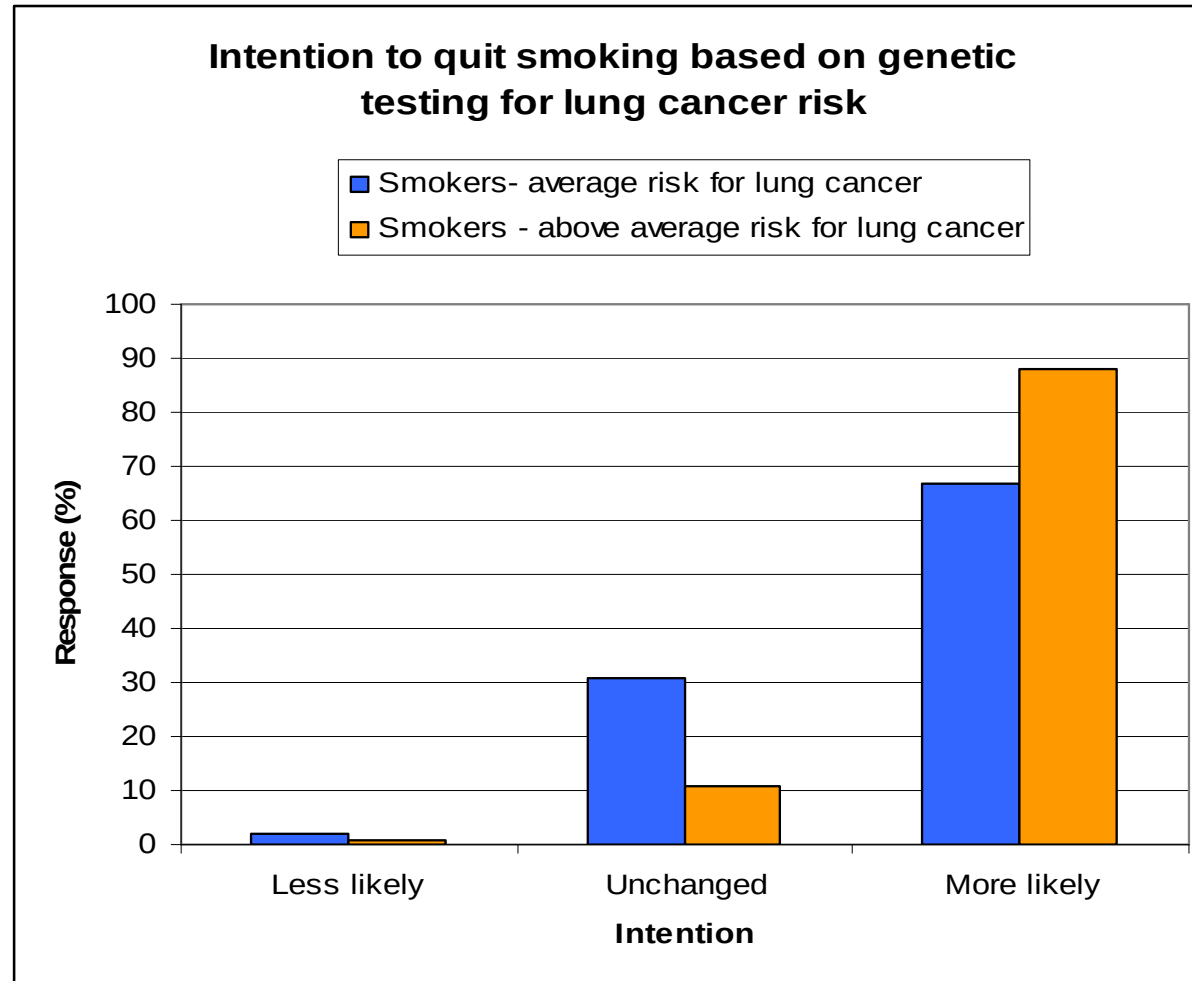


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Genetic testing does not de-motivate smokers from quitting



Telephone survey (n=110)

Smokers at “average risk”

-67%* more likely to quit after testing

-2% less likely to quit

Smokers at “above average risk”

-88% more likely to quit

-1% less likely to quit

-21% improvement in quit intension

Conclusion

Genetic testing motivates quitting and does not de-motivate smokers from quitting

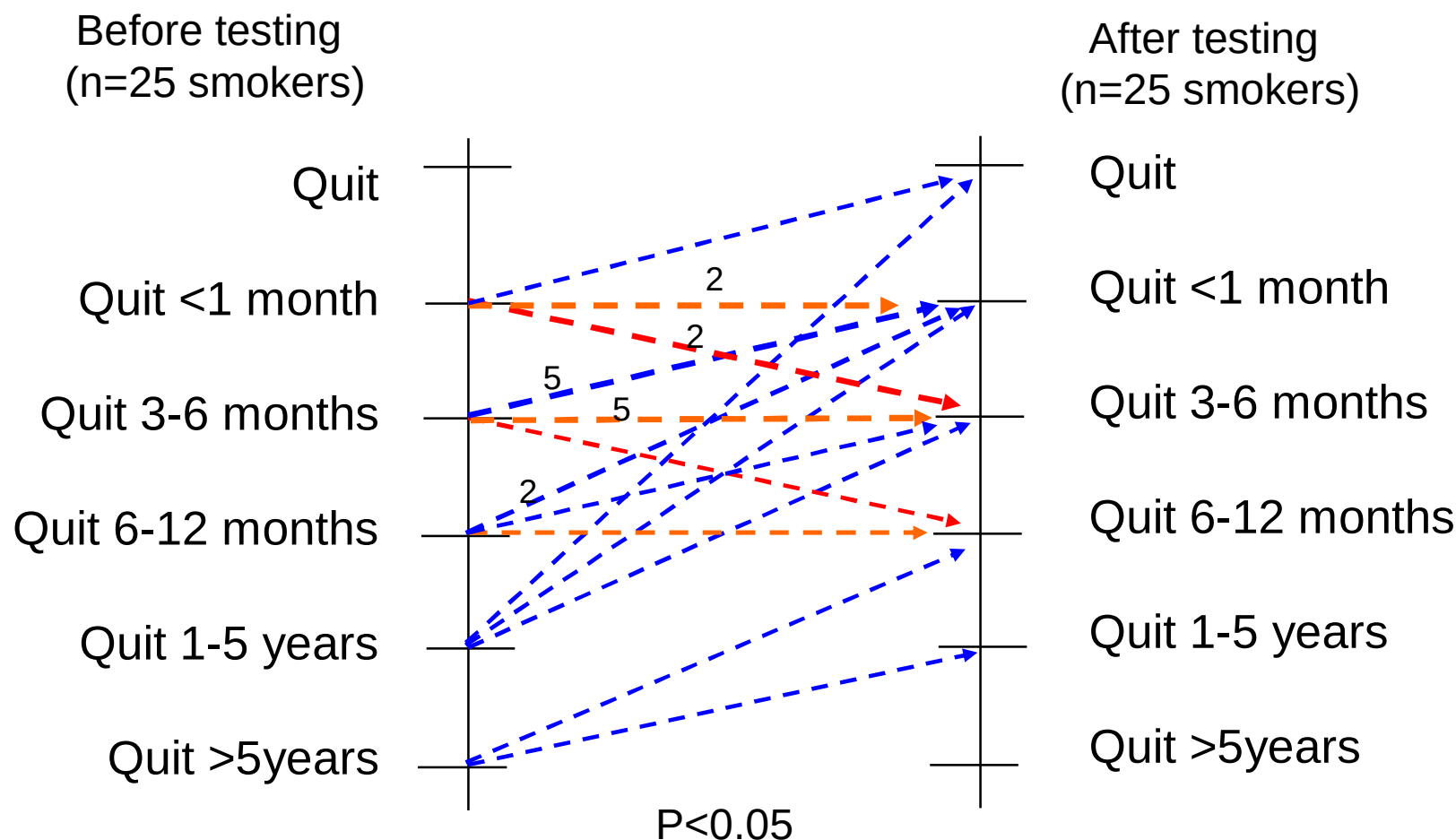
*70% of smokers want to quit

Survey responses from smokers

- Smokers want a reason to quit and help with quitting
- Over 80% said they would take a test assessing risk of lung cancer if offered.
- After testing with the lung cancer test
 - 100% would recommend to family
 - 96% would recommend to smoking friends

Intention to stop smoking before and after genetic testing

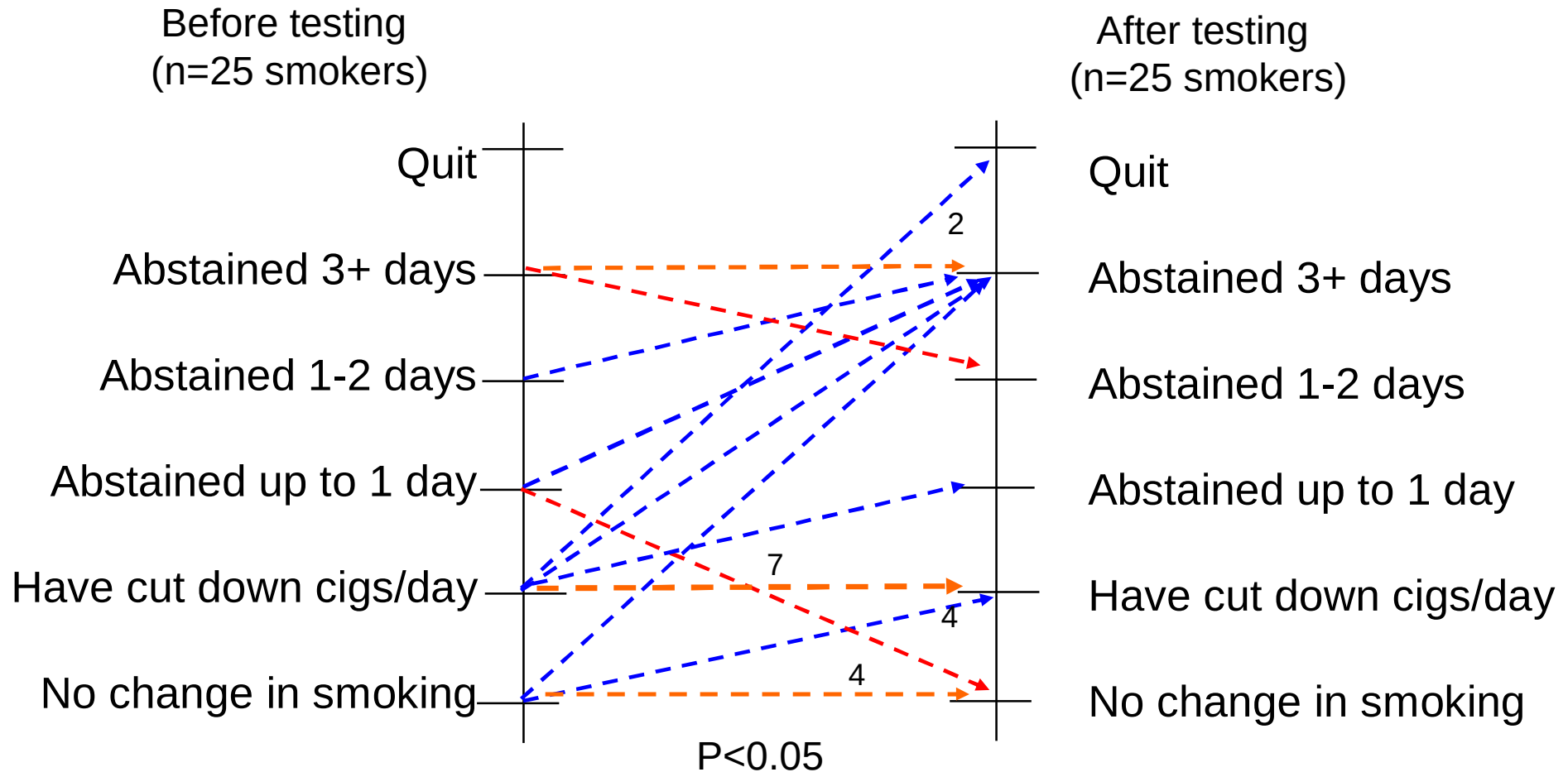
2 week data



After genetic testing intention to quit;

14 (56%) brought forward quitting (blue) vs 3 (12%) delayed quitting (red)
(8 unchanged (orange))

Changes in smoking before and after genetic testing 2 week data

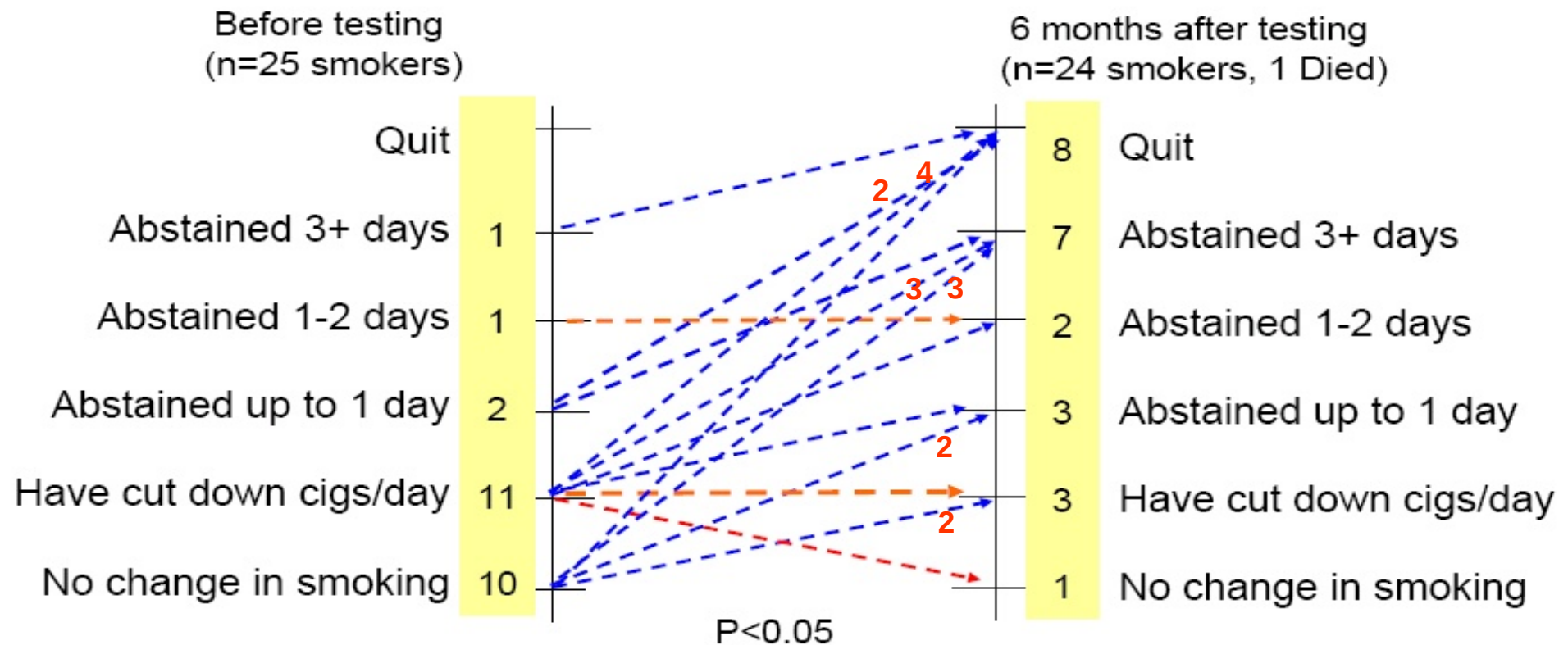


After genetic testing changes in smoking:

12 (48%) greater abstinence (blue) vs 2 (8%) less abstinence (red)
(11 unchanged (orange))

Respiragene : preliminary data in smoking cessation

Changes in smoking before and after genetic testing



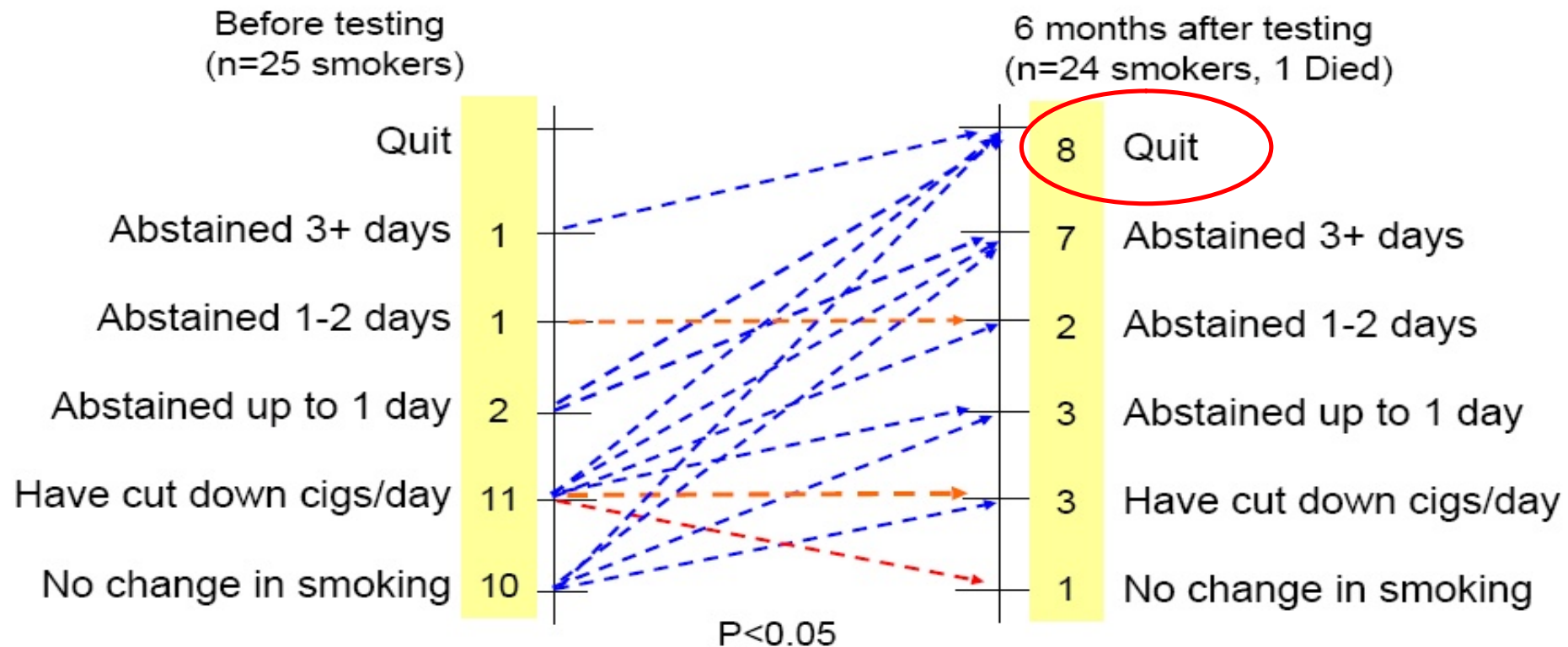
After genetic testing changes in smoking;
21 (84%) greater abstinence (blue) vs 1 (4%) less abstinence (red)
(2 unchanged (orange))

Lung cancer test and 6 month follow up

6 month data.

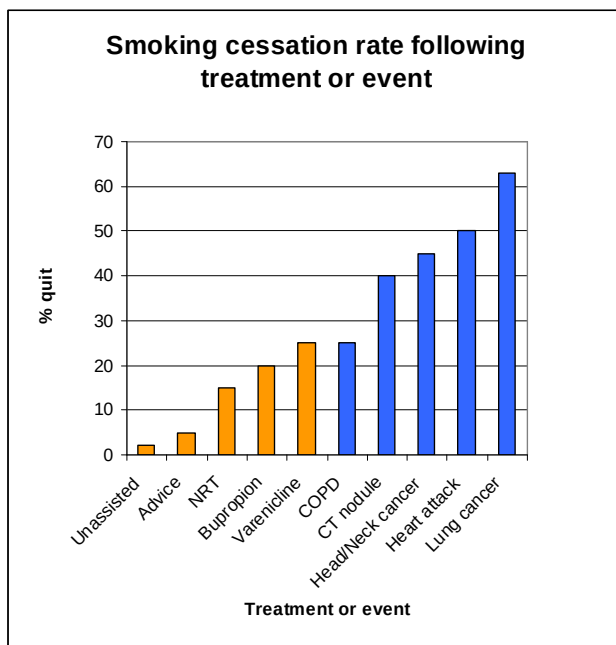
32% quit at 6 months

Changes in smoking before and after genetic testing



After genetic testing changes in smoking;

21 (84%) greater abstinence (blue) vs 1 (4%) less abstinence (red)
(2 unchanged (orange))

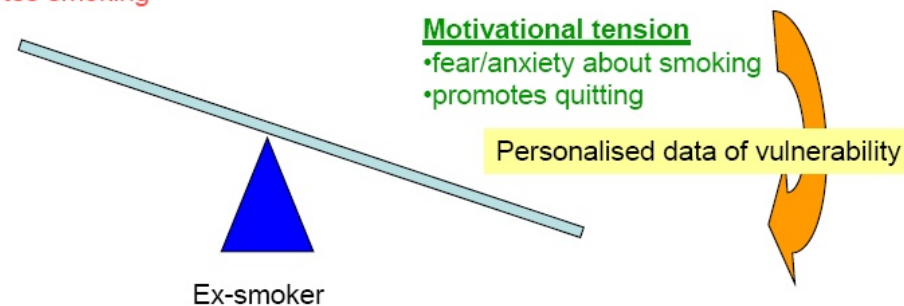


Optimistic bias

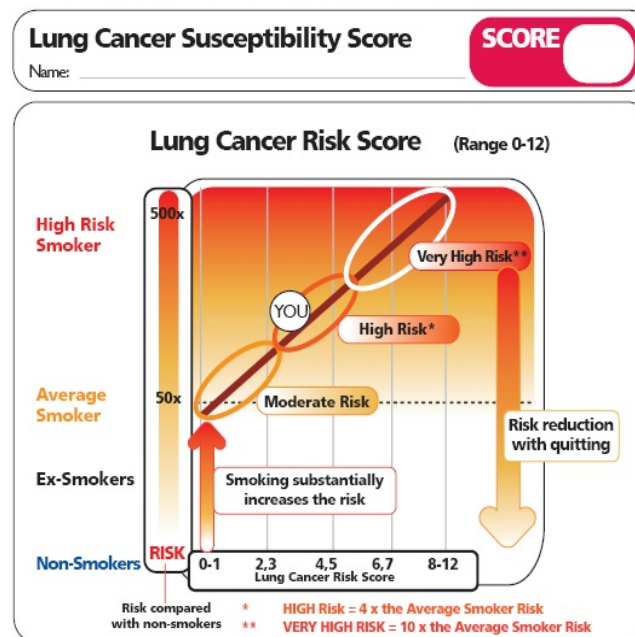
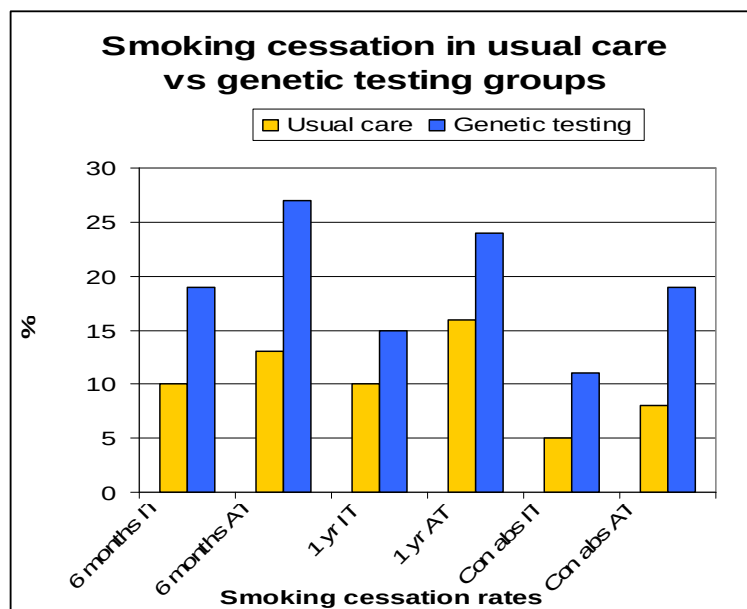
- denial about smoking risk
- promotes smoking

Motivational tension

- fear/anxiety about smoking
- promotes quitting



Questions?



Test results

Respiragene - Lung cancer susceptibility score

- Based on an algorithm developed in COPD case-control study
- Combines genotypes from protective and susceptible genetic variants (SNPs)
- Makes no assumptions about biological pathways (simple, not hierarchical)
- Modelled on the Gail score - combines age, history of COPD, FHx of lung cancer with genes

Young RP, et al. PlosOne 2009; 4: 3.

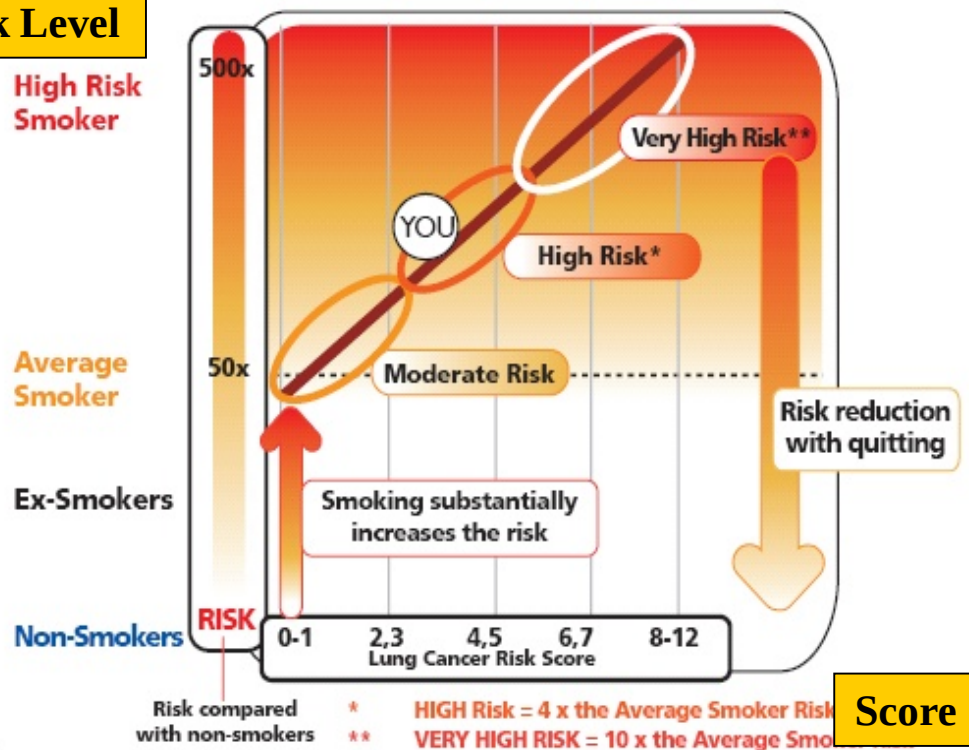
Lung Cancer Susceptibility Score

Name: _____

SCORE

Lung Cancer Risk Score (Range 0-12)

Risk Level



Test results

No one is lower than “average” risk for lung cancer

Lung cancer susceptibility score

- Educational tool to personalise risk and raise awareness of lung cancer
- Refines existing risk conferred by smoking exposure
- Based on age, FHx of lung cancer, COPD and SNP markers
- Target 40+ yr old who are smokers and ex-smokers (quit after 40 yo)
- Aim to motivate smoker to quit or ex-smoker to avoid relapse
- Referenced against the “average” smoker’s risk (Moderate Risk)
- Shows risk reduction with quitting