

Smoking and periodontal treatment: Do our patients need to stop smoking?

Peter Heasman

Danish Society of Periodontology
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Do our patients need to stop smoking?

Yes of course they do!

Thank you for your attention

There is an overwhelmingly literature that confirms a major negative impact of smoking on periodontal health

Bergstrom 2006 J. Evid. Based Dent. Pract 6, 33-41

- Review current demographics
- Clinical and microbiological evidence for quitting smoking
- Attitudes and opinions of dentists in Europe
- New models for delivery of smoking cessation
- Issues surrounding funding and cost-effectiveness
- The role of dentists in promoting smoking awareness

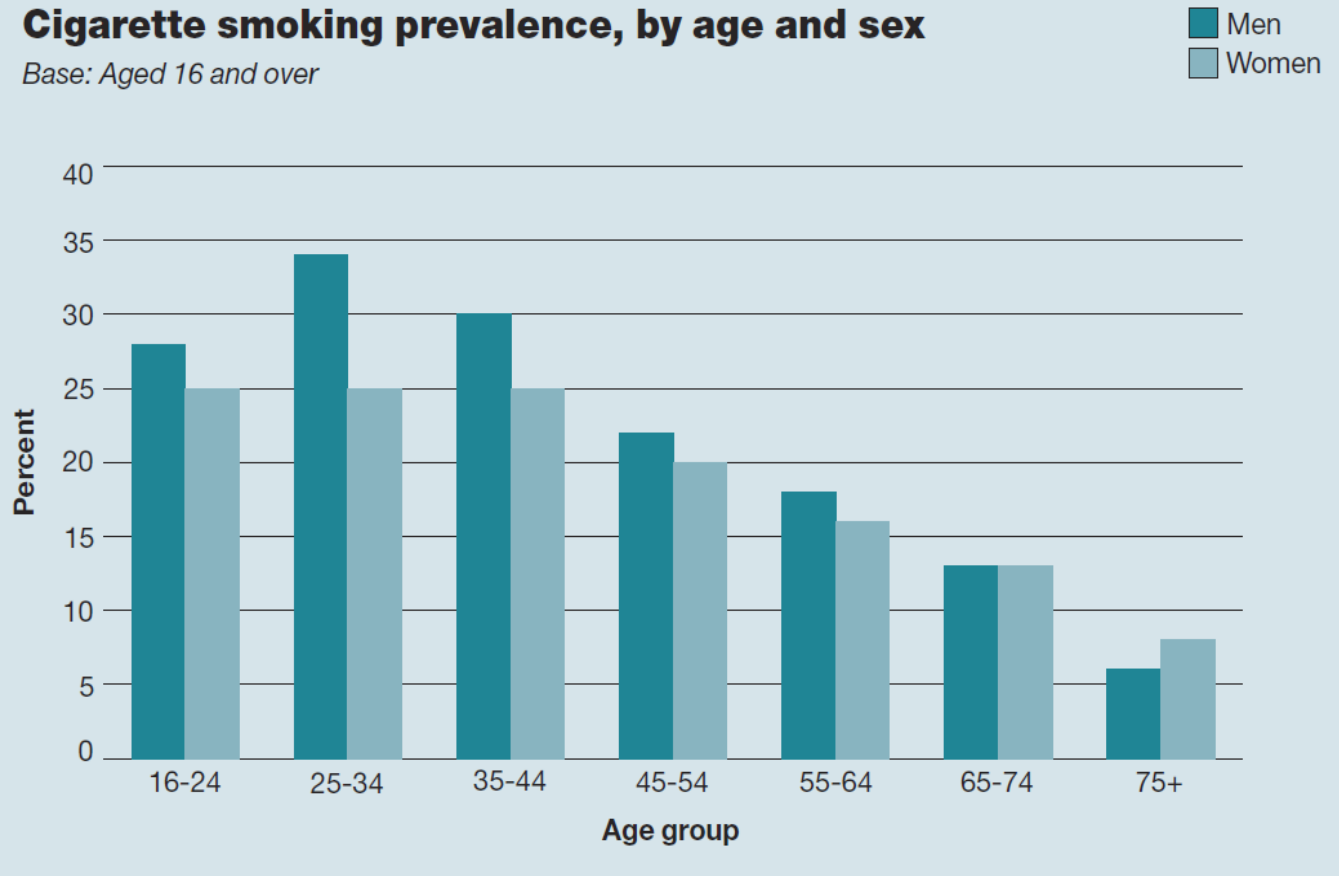
- Tobacco kills 5.4 million people a year
- One in 10 deaths worldwide
- Kills about 50% of all users
- Risk factor for 6 of the 8 leading causes of death (WHO 2008)

So helping tobacco users quit the habit is part of the responsibility of dental health professionals and the practice of dentistry

(Ramseier et al. 2010)

Cigarette smoking prevalence, by age and sex

Base: Aged 16 and over

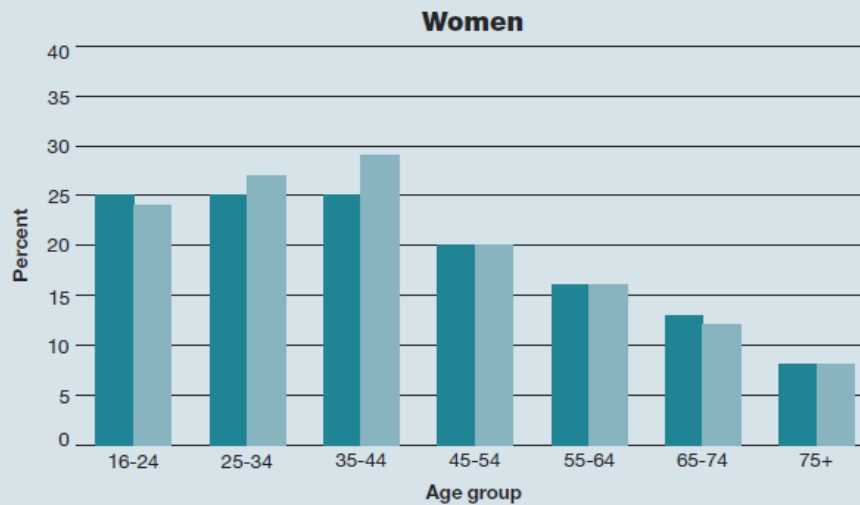
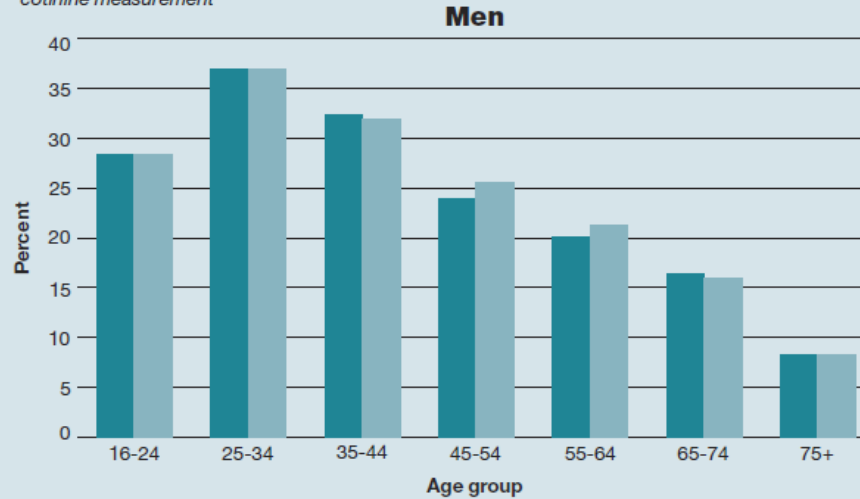


Current smokers were asked to estimate their daily consumption of cigarettes on both weekdays and at weekends. 29% of male smokers and 21% of female smokers reported smoking 20 or more cigarettes per day.

Cigarette, cigar or pipe smoking prevalence compared with proportions with a cotinine value of 15ng/ml, by age

Base: Aged 16 and over; Aged 16 and over with a valid cotinine measurement

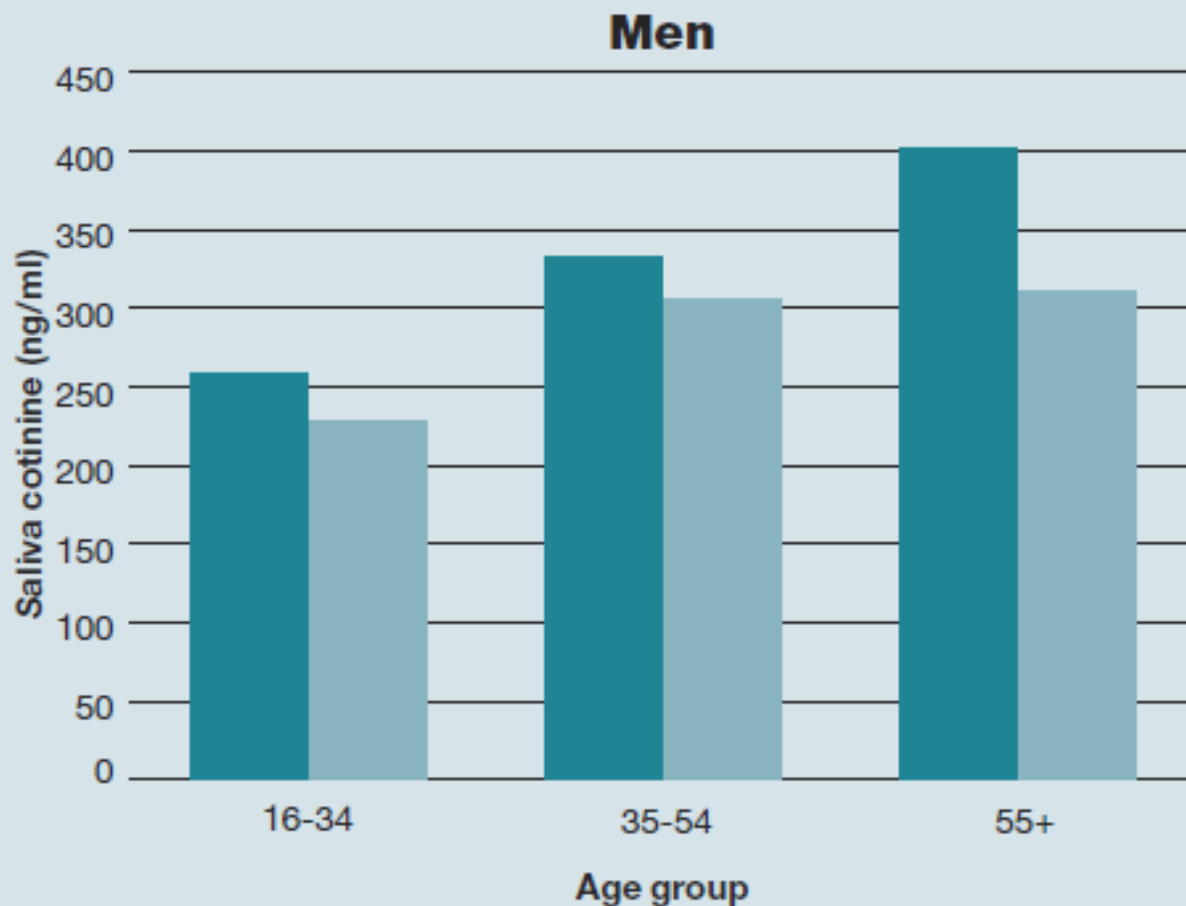
■ Self-reported smoking prevalence
■ % with a cotinine value of 15 ng/ml or more



Mean saliva cotinine levels among self-reported smokers, pre and post 1st July 2007, by age group

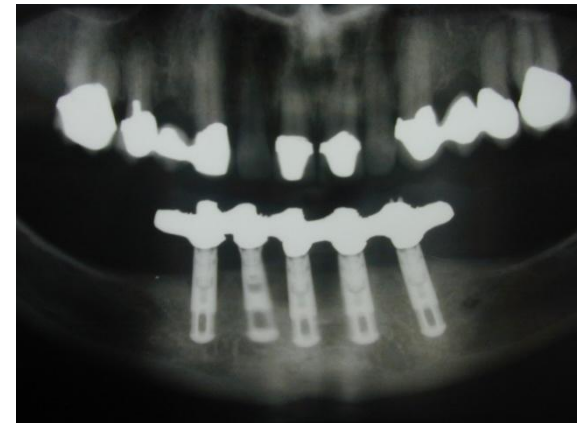
■ Pre 1st July 2007
■ Post 1st July 2007

Base: Self-reported smokers aged 16 and over with valid saliva cotinine



Risks.....

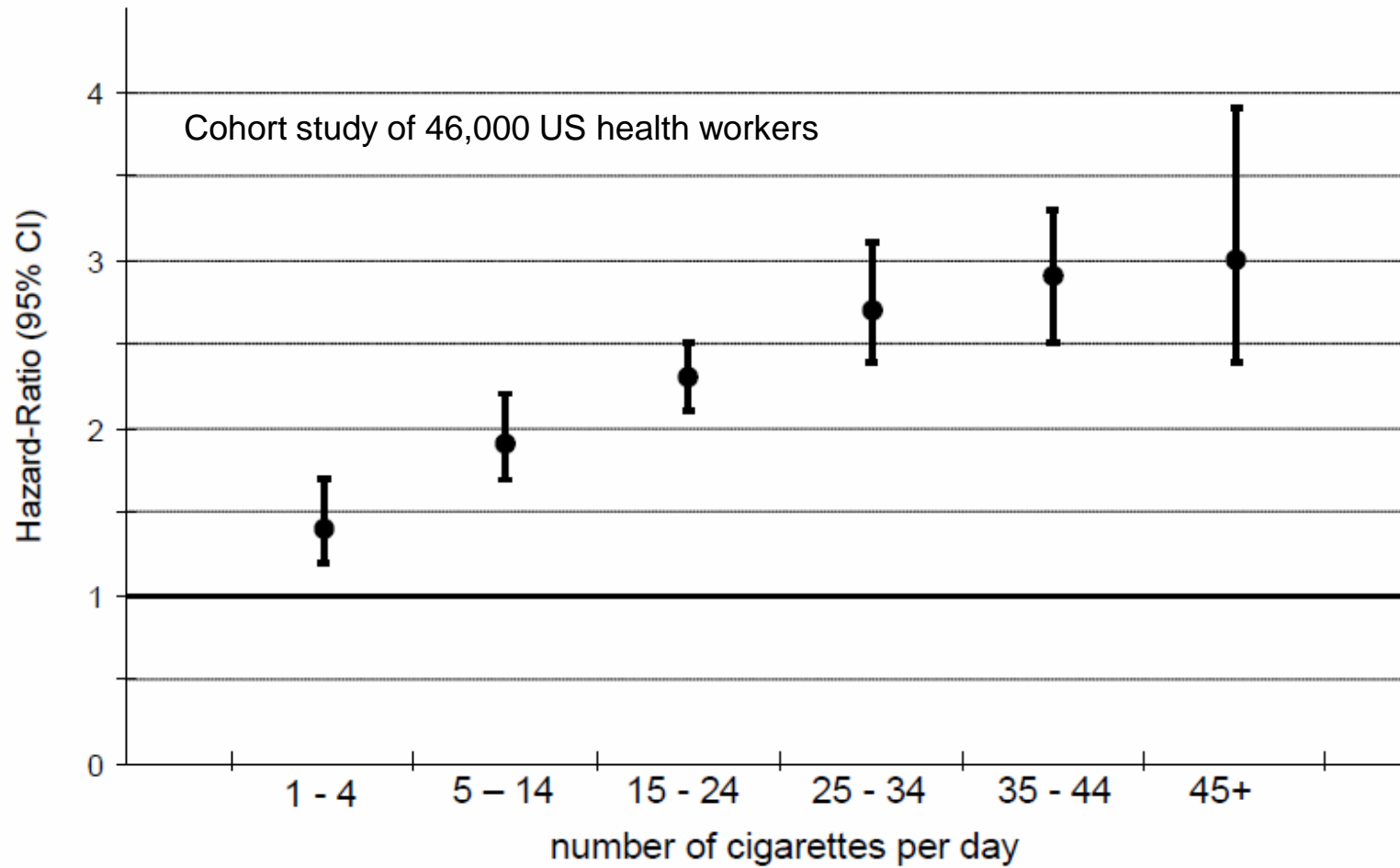
- **Oral cancer** 3.4-19.5x
(Nordlund et al. 1997, Llewellyn et al. 2004)
- **Tooth loss** 2-3x
(Krall et al. 2006, Dietrich et al. 2007)
- **Implant failure** 2-3x
(Hinode et al. 2006, Strietzel et al. 2007)
- **Severe periodontal disease** 1.4-7.1x
(Ojima et al. 2006, Thomson et al. 2007)



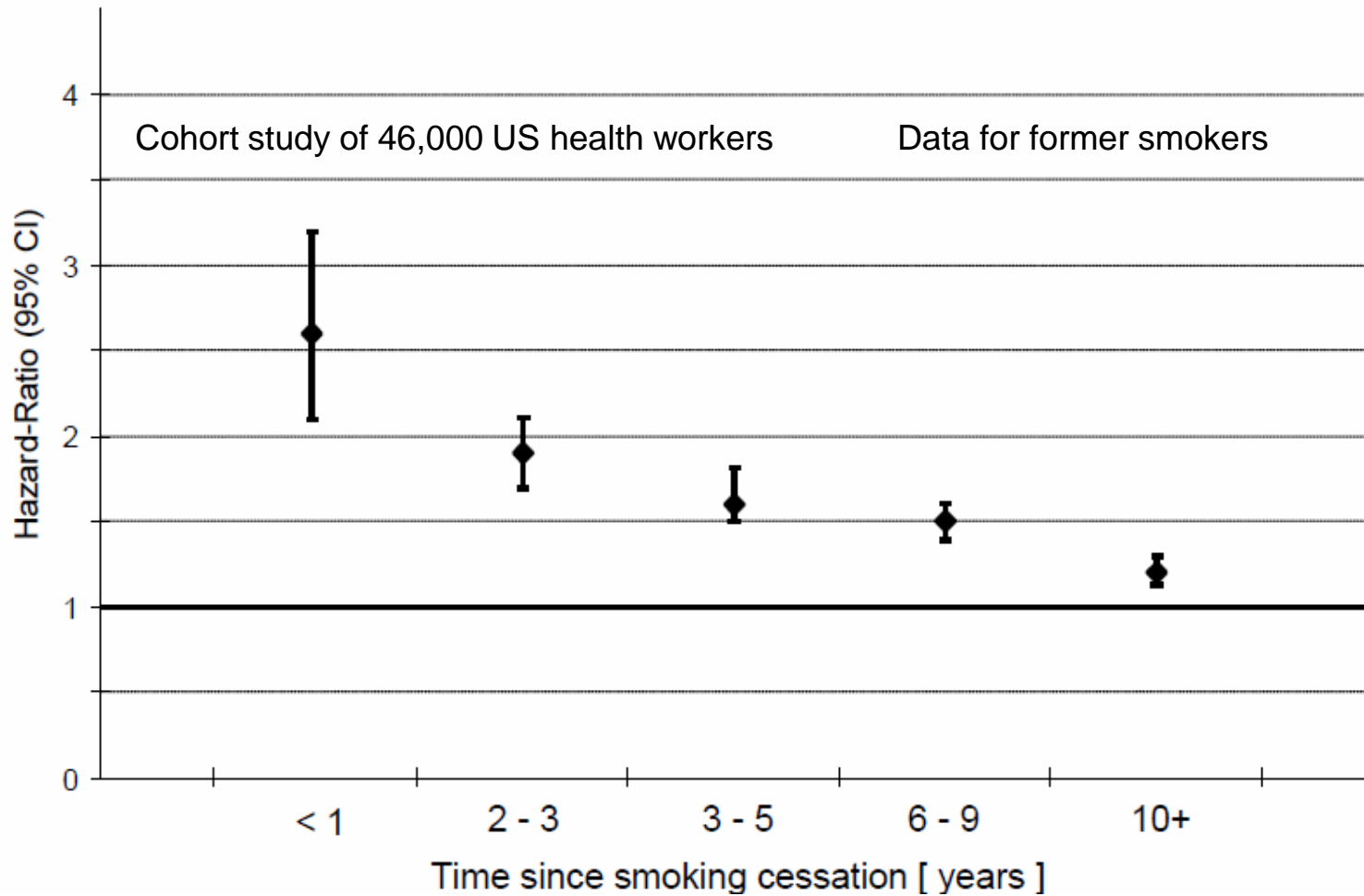
.....and (*ipso facto*), the benefits

- Lower oral cancer incidence
- Improved wound healing
- Reduction in tooth loss
- Fewer implant failures
- Decreased severity of periodontal diseases

Dose-dependant association of current smoking with risk of tooth loss
(Reference: never smokers) Dietrich et al. 2007



Time-dependant association of smoking cessation with risk of tooth loss
(Reference: never smokers) Dietrich et al. 2007



The effect of quitting smoking on chronic periodontitis

P. M. Preshaw¹, L. Heasman¹,
F. Stacey¹, N. Steen²,
G. I. McCracken¹ and
P. A. Heasman¹

¹School of Dental Sciences and ²Centre for Health Services Research, University of Newcastle upon Tyne, Newcastle upon Tyne, UK

Preshaw PM, Heasman L, Stacey F, Steen N, McCracken GI, Heasman PA. The effect of quitting smoking on chronic periodontitis. J Clin Periodontol 2005; 32: 869–879. doi: 10.1111/j.1600-051X.2005.00779.x. © Blackwell Munksgaard 2005.

Almost entirely assessed by cross-sectional or cohort studies

Bergstrom et al. 1991, Haber et al. 1993, Jette et al. 1993, Bolin et al. 1993, Kaldahl et al. 1996, Grossi et al. 1997, Ryder et al. 1999, Preshaw et al. 1999, Tomar et al. 2000, Bergstrom et al. 2000a, Bergstrom et al. 2000b, Haffajee et al. 2001, Meinberg et al. 2001, Jansson et al. 2002, Balijoon et al. 2004, Paulander et al. 2004, Balijoon et al. 2005, Torrungruang et al. 2005, Hughes et al. 2006, Thomson et al. 2007, Do et al. 2008.

Preshaw et al 2005 *Journal of Clinical Periodontology* 32, 869-879.

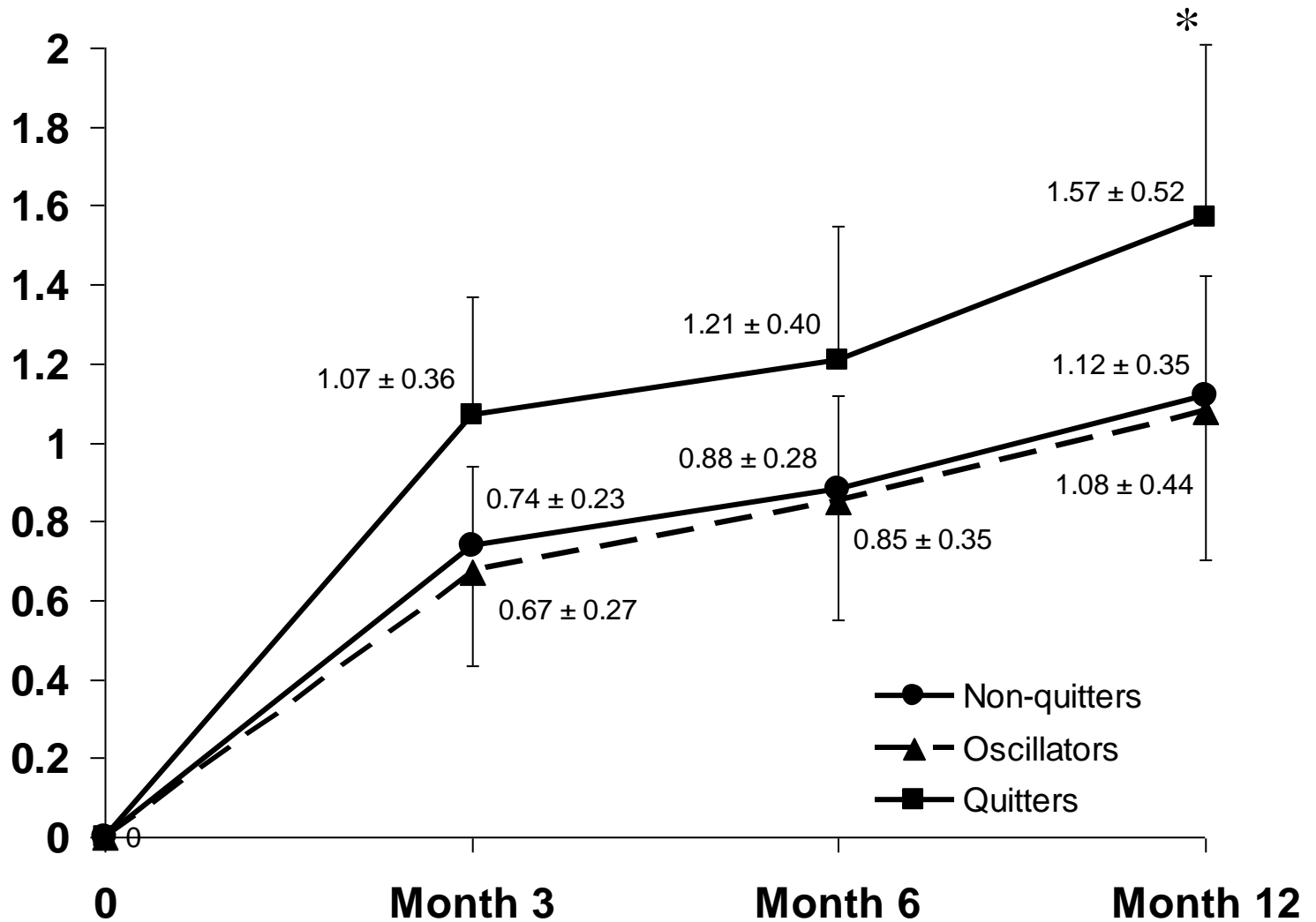
- 12-month, longitudinal, non-blind, parallel group study
- 49 subjects with chronic periodontitis. Chronic smokers
- Received conventional non-surgical treatment over 0-3 months
- Smoking cessation tailored according to patient's individual needs

Preshaw et al 2005 *Journal of Clinical Periodontology* 32, 869-879.

- Compliance was assessed through self-reporting, salivary cotinine levels and CO monitoring
- Assessment of pocket depth, CAL, bone density change and bleeding on probing

Quitters (10); smokers (10) and 'oscillators'(6)

Mean probing depth reduction from baseline (mm) at diseased sites (PD >3mm)



Should quit smoking interventions be the first part of initial periodontal therapy?

Palmer RM. Should quit smoking interventions be the first part of initial periodontal therapy? J Clin Periodontol 2005; 32: 867–868. doi:10.1111/j.1600-051X.2005.00808.x. © Blackwell Munksgaard, 2005.

Focused Perspective on Preshaw et al., *J Clin Periodontol* 2005; 32: 869–879

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Accepted for Publication 12 May 2005

Palmer 2005

- Timely addition to the literature
- Ambitious study
- Difficult to perform
- Requires considerable compliance
- Large, double-blind, randomised, controlled clinical trial (expensive and unpredictable)

.....so perhaps this was a 'one-off'.

A prospective 12-month study of the effect of smoking cessation on periodontal clinical parameters

Rosa EF, Corraini P, de Carvalho VF, Inoue G, Gomes EF, Lotufo JPB, De Micheli G, Pannuti CM. A prospective 12-month study of the effect of smoking cessation on periodontal clinical parameters. J Clin Periodontol 2011; 38: 562–571. doi: 10.1111/j.1600-051X.2011.01723.x.

Ecinele Francisca Rosa¹, Priscila Corraini^{1,2}, Verônica Franco de Carvalho¹, Gislene Inoue¹, Elaine Fueta Gomes¹, João Paulo Becker Lotufo³, Giorgio De Micheli¹ and Cláudio Mendes Pannuti¹

¹Department of Stomatology, Division of Periodontics, School of Dentistry, University of São Paulo, São Paulo, Brazil; ²Department of Periodontology, Faculty of Health Sciences, Aarhus University, Aarhus, Denmark; ³Department of Pediatric, University Hospital, University of São Paulo, São Paulo, Brazil.

Rosa et al 2011 *Journal of Clinical Periodontology* 38, 562-571.

- 12-month, longitudinal, non-blind, parallel group study
- 93 subjects with severe chronic periodontitis. Chronic smokers
- Received conventional non-surgical treatment over 0-2 months
- Smoking cessation tailored according to patient's individual needs

Rosa et al 2011 *Journal of Clinical Periodontology* 38, 562-571.

- Compliance was assessed through self-reporting at interviews and CO monitoring
- Assessment of pocket depth, CAL, and bleeding on probing

Quitters (17); smokers (26) and 'oscillators' (9)

Rosa et al 2011 *Journal of Clinical Periodontology* 38, 562-571.

Sites with initial probing depths $\geq 4\text{mm}$

- Significant difference in mean gain of attachment between quit (1.32mm) and non quit (0.85mm) groups after 12 months
- A non-significant trend towards a greater reduction in probing depths at 12 months in quitters (1.24mm) compared to non quitters (1.09mm)

Rosa et al 2011 *Journal of Clinical Periodontology* 38, 562-571.

- n = 52 rather than 26 after 12 months (but drop-out rate still high)
- Intensive smoking cessation therapy involving a multidisciplinary team
- Reinforcement of counselling and support at 3, 6 and 12 months

Tashkin et al (2001) *Lancet* 357, 1571-1575

Reported continuous quit rates of 16% and 9% for 400+ smokers with chronic obstructive pulmonary disease randomised to bupropion (Zyban) or placebo over 6 months.

Preshaw et al: continuous quit rate over 12 months was 20%

Rosa et al: continuous quit rate over 12 months was 33%

Smoking Affects the Subgingival Microflora in Periodontitis

A.J. van Winkelhoff,* C.J. Bosch-Tijhof,* E.G. Winkel,[†] and W.A. van der Reijden* (2002)

Untreated smokers (88)

Treated smokers (171)

Untreated non-smokers (90)

Treated non-smokers (119)

Mean probing depths and CALs were higher in the TS than the TNS (7.0 vs 6.6 and 5.6 vs 4.7 respectively).

Smoking may select for a specific cluster of periodontal pathogens.

Mean Proportions of the Total Anaerobic Count (%) of Periodontal Pathogens in the Subgingival Plaque of Untreated Smokers (U-S), Untreated Non-Smokers (U-NS), Treated Smokers (T-S), and Treated Non-Smokers (T-NS)

	U-S	U-NS	<i>P</i> Value*	T-S	T-NS	<i>P</i> Value*
<i>Aa</i>						
Mean	2.1	7.2	0.086	5.0	5.9	>0.1
SD	3.1	13.4		7.7	11.7	
Median	0.2	0.9		2	0.65	
<i>P. gingivalis</i>						
Mean	28.1	31.0	>0.1	20.3	19.6	>0.1
SD	20.1	24.3		21.2	18.5	
Median	23	19.5		12	13	
<i>P. intermedia</i> <i>/nigrescens</i>						
			>0.1			
Mean	5.8	6.4		5.0	4.6	>0.1
SD	7.3	9.1		6.1	6.5	
Median	3	3		3	2	
<i>B. forsythus</i>						
Mean	7.2	6.4	>0.1	6.9	5.6	0.07
SD	6.5	5.7		6.2	5.4	
Median	6	5		6	4	

Response of Subgingival Bacteria to Smoking Cessation[▽]

Suzanne L. Delima,¹ Robert K. McBride,¹ Philip M. Preshaw,²
Peter A. Heasman,³ and Purnima S. Kumar^{1*}

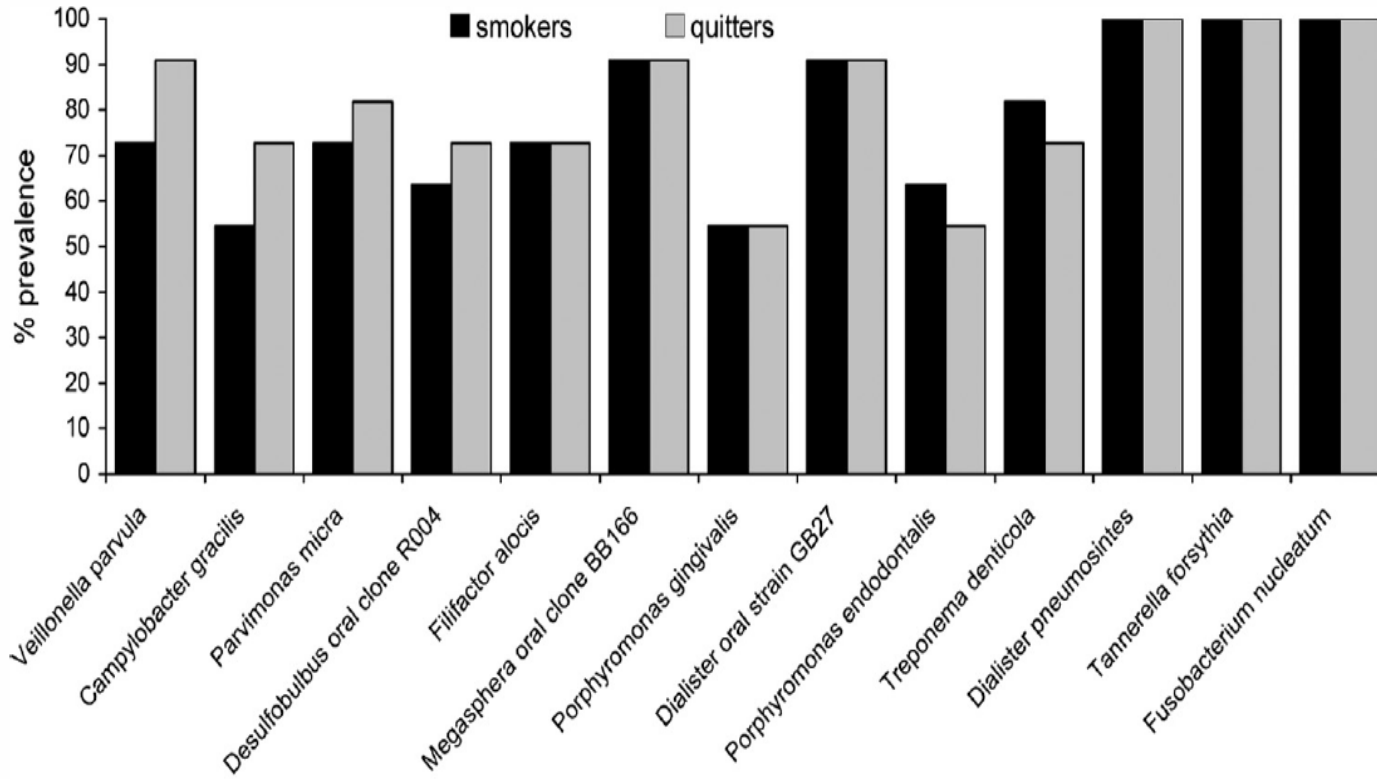
Division of Periodontology, College of Dentistry, The Ohio State University, Columbus, Ohio¹; School of Dental Sciences and Institute of Cellular Medicine, Newcastle University, Newcastle, United Kingdom²; and School of Dental Sciences, Newcastle University, Newcastle, United Kingdom³

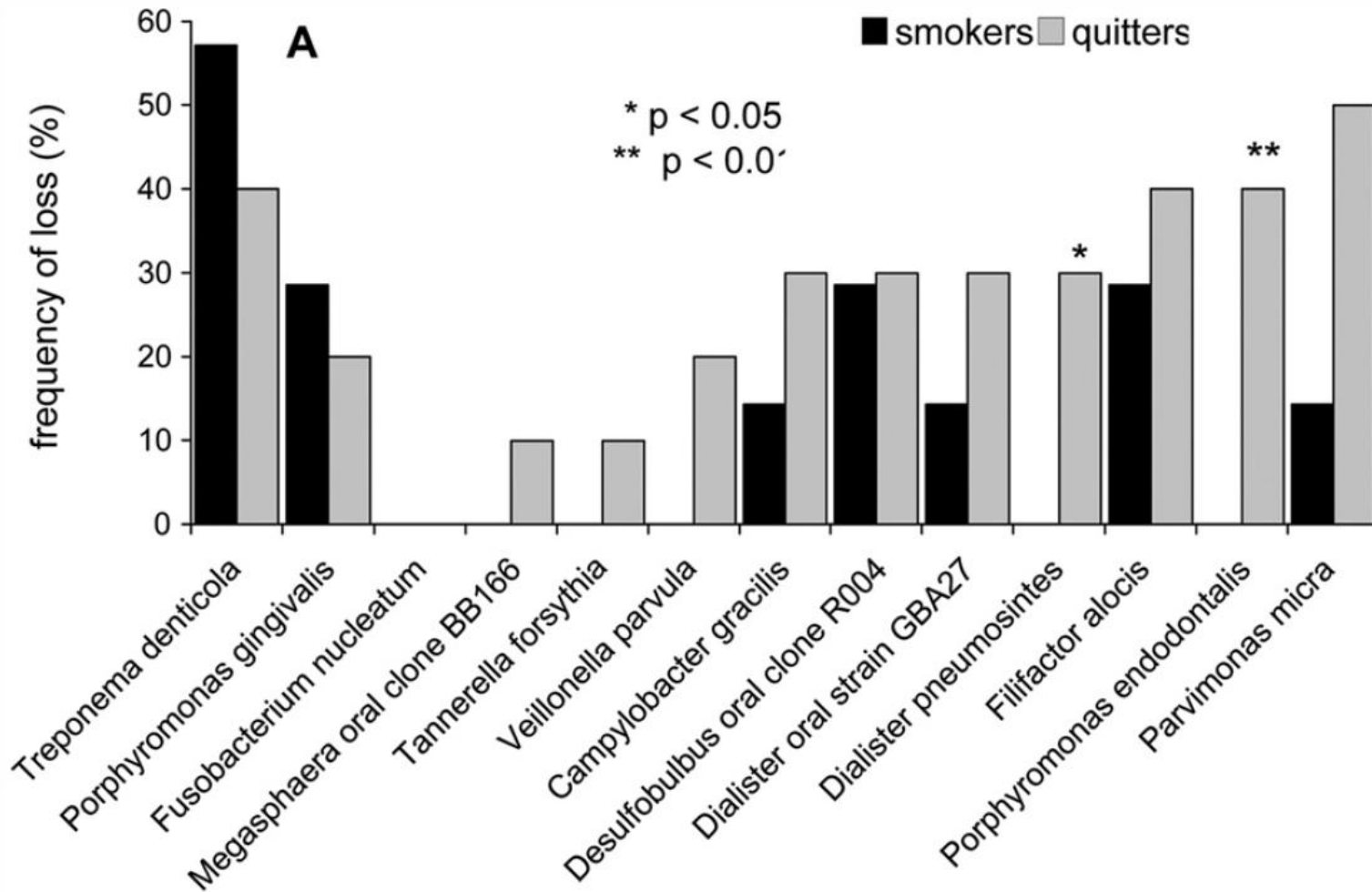
Received 16 September 2009/Returned for modification 21 December 2009/Accepted 9 April 2010

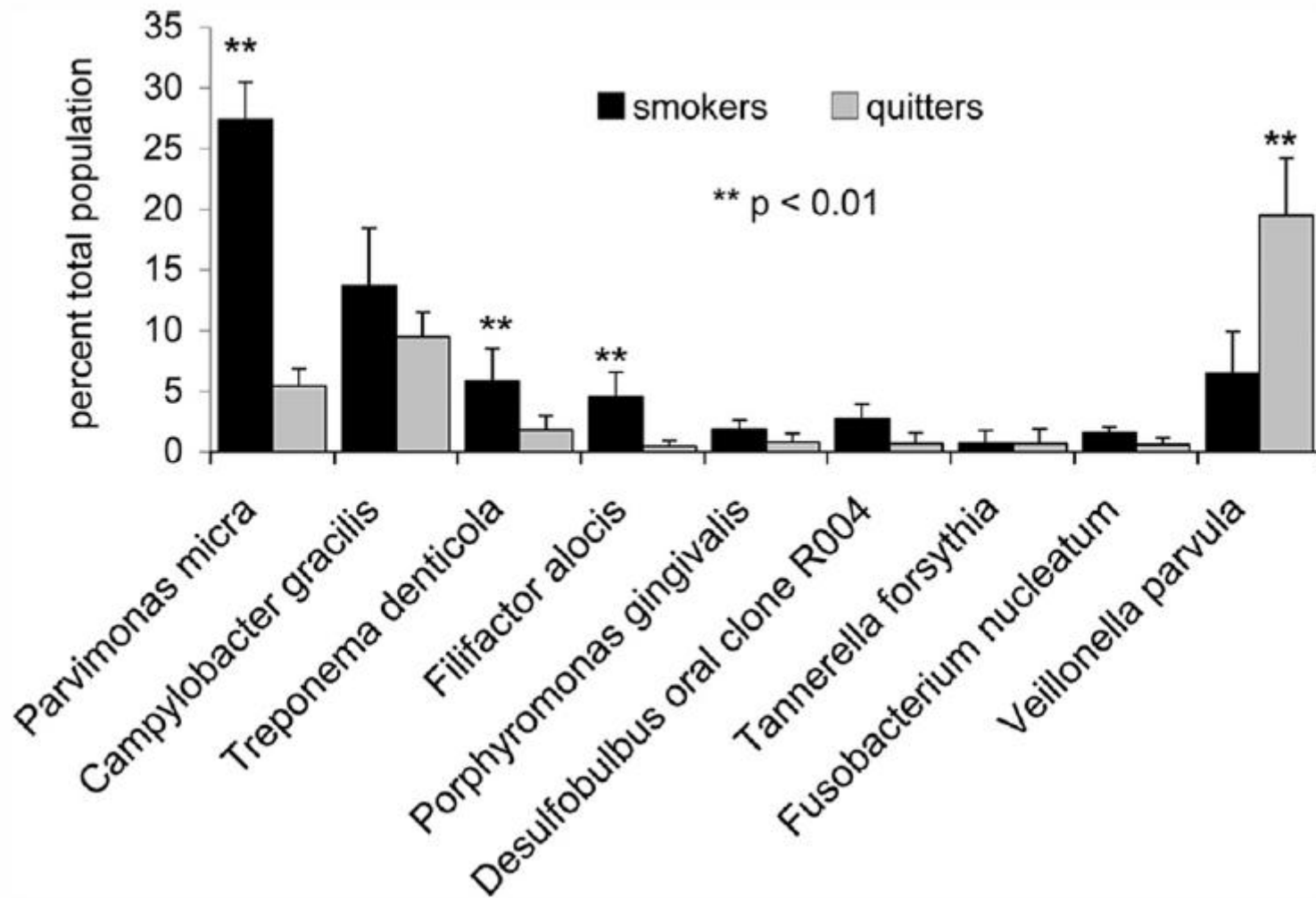
It has been demonstrated that smoking cessation alters the subgingival microbial profile; however, the response of individual bacteria within this ecosystem has not been well studied. The aim of this investigation, therefore, was to longitudinally examine the effect of smoking cessation on the prevalence and levels of selected subgingival bacteria using molecular approaches for bacterial identification and enumeration. Subgingival plaque was collected from 22 smokers at the baseline and 12 months following periodontal nonsurgical management and smoking cessation counseling. The prevalence and abundance of selected organisms were examined using nested PCR and multiplexed bead-based flow cytometry. Eleven subjects successfully quit smoking over 12 months (quitters), while 11 continued to smoke throughout (smokers). Smoking cessation led to a decrease in the prevalence of *Porphyromonas endodontalis* and *Dialister pneumosintes* at 12 months and in the levels of *Parvimonas micra*, *Filifactor alocis*, and *Treponema denticola*. Smoking cessation also led to an increase in the levels of *Veillonella parvula*. Following nonsurgical periodontal therapy and smoking cessation, the subgingival microbiome is recolonized by a greater number of health-associated species and there are a significantly lower prevalence and abundance of putative periodontal pathogens. The results indicate a critical role for smoking cessation counseling in periodontal therapy for smokers in order to effectively alter the subgingival microbiome.

Delima et al 2010 *Journal of Clinical Microbiology* 48, 2344-2349

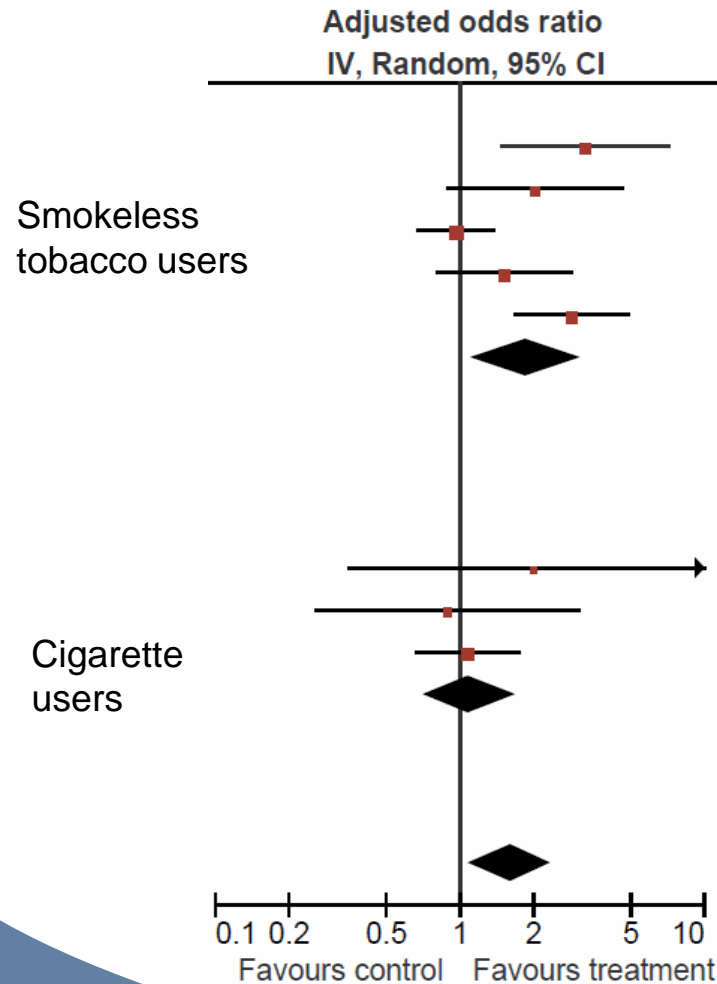
- The same cohorts of quitters and continuous smokers as in the Preshaw study
- Used nested PCR and multiplexed flow cytometry to evaluate the prevalence and abundance of selected subgingival organisms at baseline and 12 months







Systematic review for the effectiveness of smoking cessation in dental practice



In dental settings, brief counselling cessation interventions are more effective than usual care for increasing tobacco abstinence rates

6 studies (Carr and Ebbert 2006)

8 studies (Needleman et al. 2010)

Attitudes of the professionals

A study of 4500 European dentists Allard (2000)

- 1/3 routinely ask patients about smoking habits [34%]
- 2/3 reported that there should be no barrier to providing smoking cessation advice [63%]
- 83% lack of time
- 73% concerned about patient resistance [32%]
- 70% lack of education and materials [72%]
- 64% lack of reimbursement [61%]

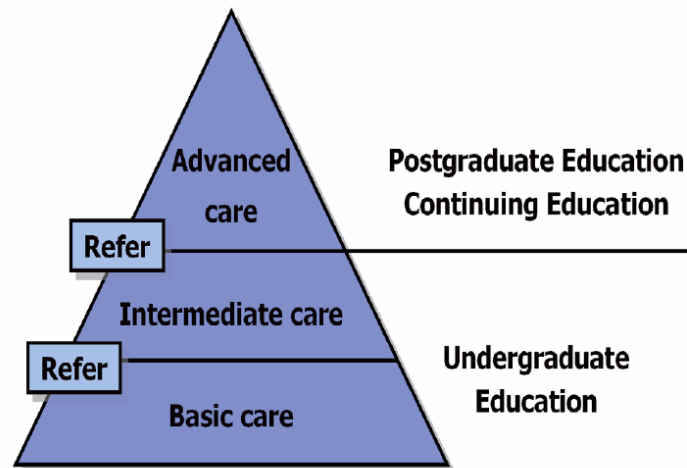
A study of 100 UK dentists Stacey et al. (2006)

Lack of funding remains a critical issue

A 4-stage model for compensation of dental professionals

(Crail et al. 2010)

- Stage 1 Identification and documentation (No payment schedule)
- Stage 2 Brief intervention and discussion (€)
- Stage 3 Motivational interviewing, pharmacotherapy, follow-up (€, €)
- Stage 4 Individual sessions, pharmacotherapy, follow-up (€, €, €)



Linear modelling for smoking cessation

- Plan a quit day
- Period of low stress
- Learn the triggers for smoking so that they may be addressed
- Understand relapse so it won't happen again

There is a need to educate, to learn, to identify 'triggers' and overcome the addiction

The Delusion Gap

(Jarvis et al. 2002)

A Bidirectional model for spontaneous quitting

The total sum of all possible choices available to a dependent smoker can be envisaged as 2 circles connected by a figure 8. The first circle is smoking and the second circle is not smoking. Movement between A and B occurs when a smoker quits smoking or relapses.

Larabie 2010

UK National Smoking Cessation Conference 2010

The Bidirectional model is a better fit for spontaneous or accidental quit attempt

- The 'fed up' moment
- The 'scare'
- A bet or a dare
- Major life changes
- Pregnancy

(Larabie 2010)

Which method is best for the dental surgery?

A systematic review suggests that abrupt and gradual quitting share similar quit rates (Lindson et al. 2010) but population surveys show that abrupt quitting is more successful (West et al. 2001, Cheong et al. 2007).

Perhaps because ‘reducers’ in the general population are less likely to receive behavioural support and to be asked to set goals in a structured manner.

Which method is best for the dental surgery?

Structured

- Cigarettes per day (cpd) reduction
- Specific advice on how to achieve the reduction
- 5-10 cigarettes/week or reduce cpd by $\frac{1}{3}$ each week.

Unstructured

- Only specify that patient should reduce smoking habit
- No goals or methods
- Leave decisions with the patient

Structured reduction methods

- Set an inter-cigarette interval based on the baseline smoking rate
- For example, if a person is awake for 16 hours and smokes 16 cigarettes then the interval is 1 hour
- Over the 1st week, cut smoking by 50% so that the interval becomes 2 hours
- Over the 2nd week, cut smoking by 50% so that the interval becomes 4 hours

Economic evaluations of smoking cessation interventions

An assessment of the costs of a treatment, both to the NHS and to the patient, and the life-years gained as a result of the intervention

Efficacy - Can it work?

Effectiveness - Does it work?

Availability - Does it reach those who need it?

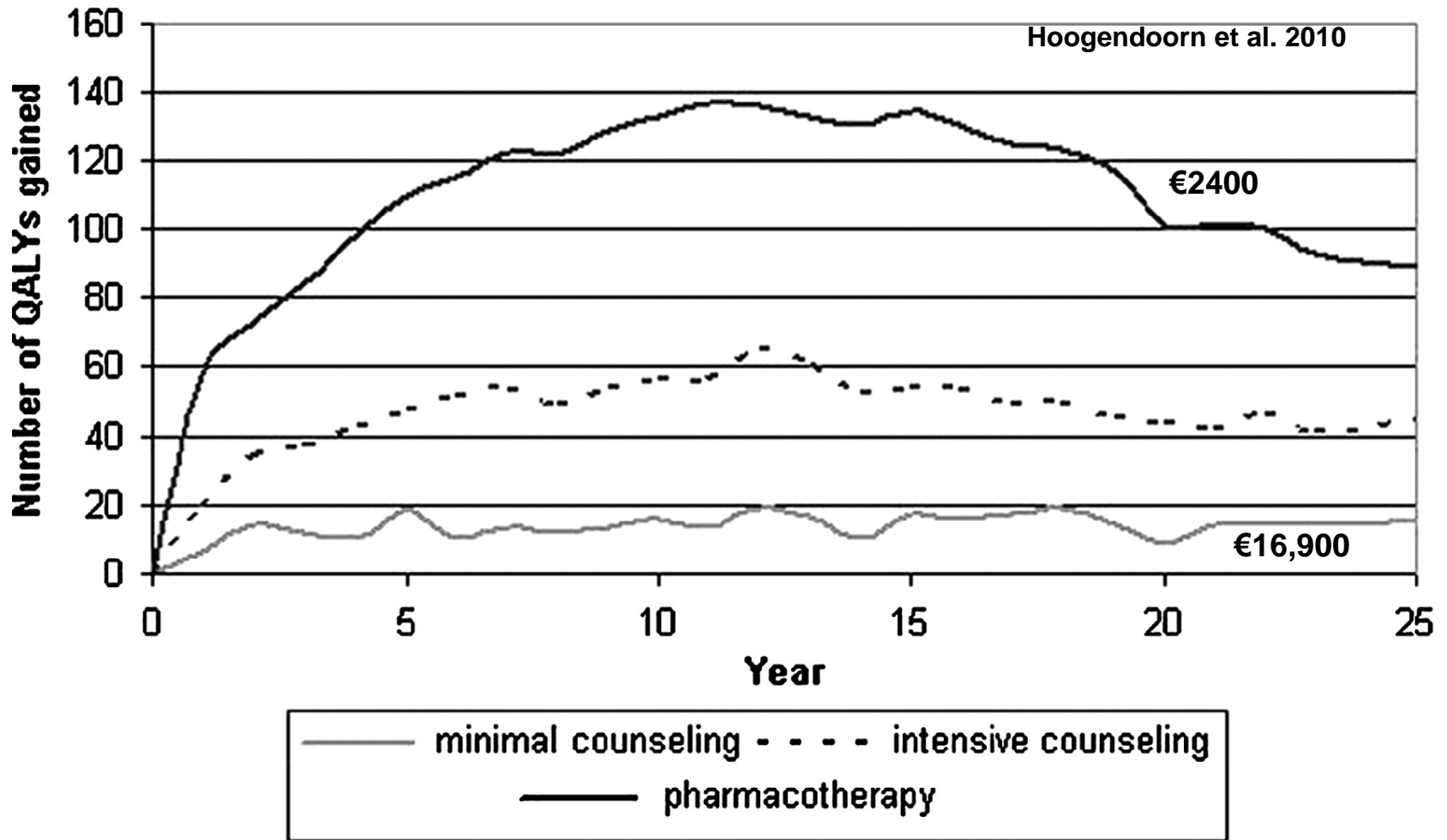
Efficiency - Is it the best use of resources?

An **economic evaluation** addresses efficiency

Smoking cessation interventions are very cost-effective in producing population health gains

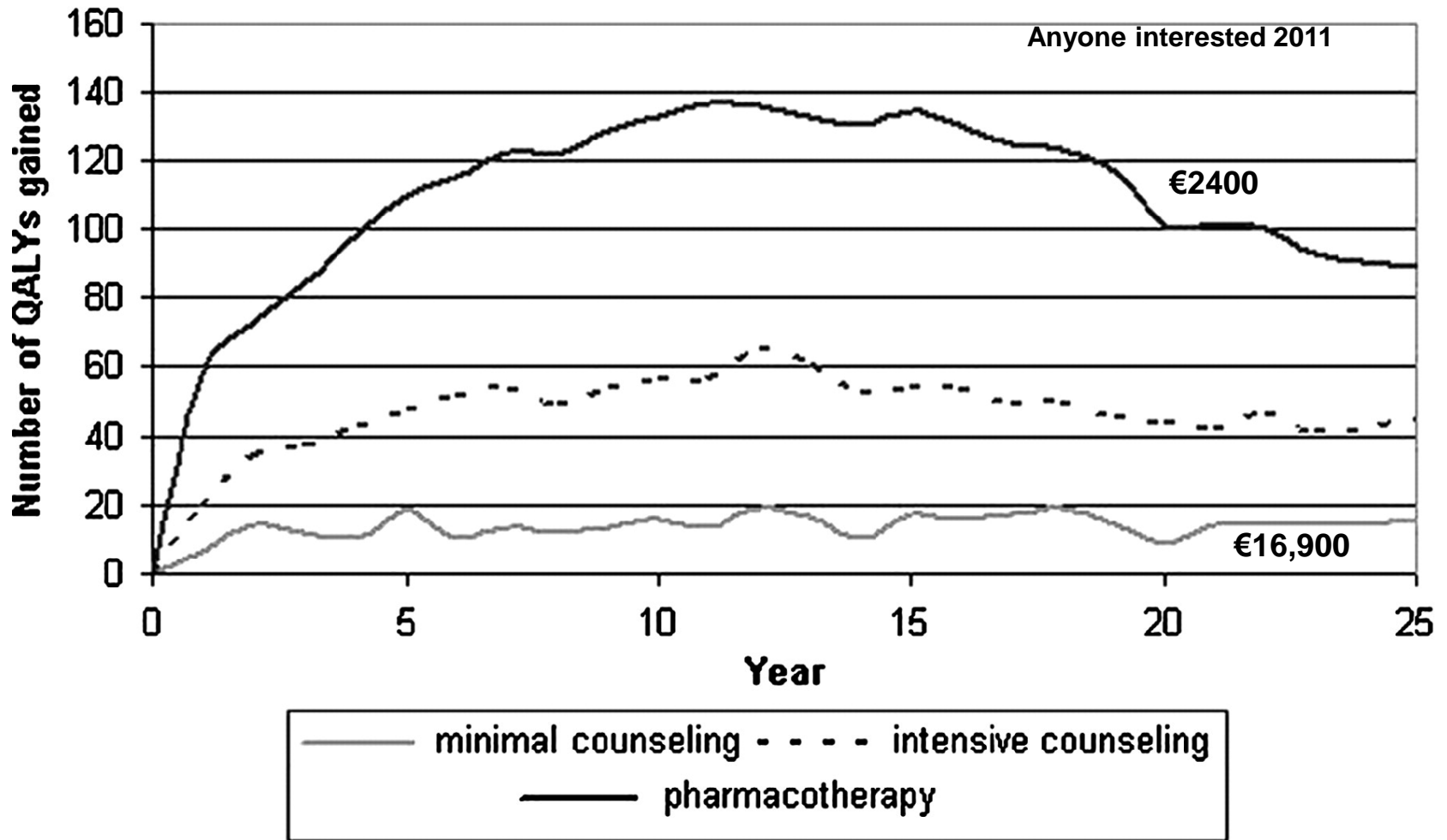
Centre for Health Economics, University of York

Cost-effectiveness of smoking cessation interventions in 300,000 patients with COPD



COPD should be offered the most intensive smoking cessation intervention feasible, not only from a clinical but also from an economic perspective.

Cost-effectiveness of smoking cessation interventions in 300,000 patients with CPD



CPD should be offered the most intensive smoking cessation intervention feasible, not only from a clinical but also from an economic perspective.

Role of the Periodontology Societies

‘Working for the public benefit’

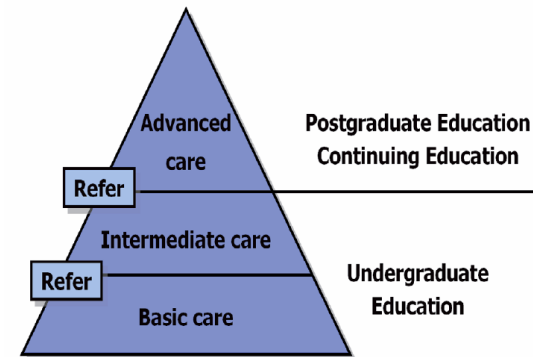
Education material for the public and dental profession

Regional education meetings

E-learning opportunities

Parallel workshop sessions at meetings

Development of the undergraduate curriculum



Do our patients need to stop smoking?

Yes of course they do!

Thank you for your attention