TOBACCO SMOKING AND MULTIPLE SCLEROSIS

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With thanks to Dr Ali Manouchehrinia

Learning objectives

1. To gain knowledge in the role of smoking in the susceptibility to MS
2. To gain knowledge in the role of smoking in the progression of MS
3. To gain knowledge in the effect of smoking on MS treatments
4. To gain knowledge in the role of smoking in the mortality in MS
5. To gain knowledge in potential benefits of smoking cessation in MS

Tobacco smoking and MS (findings from Nottingham MS clinics)
1. Effect on the occurrence of MS
2. Effect on the disease progression
3. Effect on mortality rates and survival

Effects of smoking cessation and scope for cessation interventions

Occurrence of MS:

It is commonly believed that the development of MS is due to some environmental trigger in genetically susceptible people (gene-environment hypothesis).

Known environmental factors influencing MS risk:

1. Vitamin D
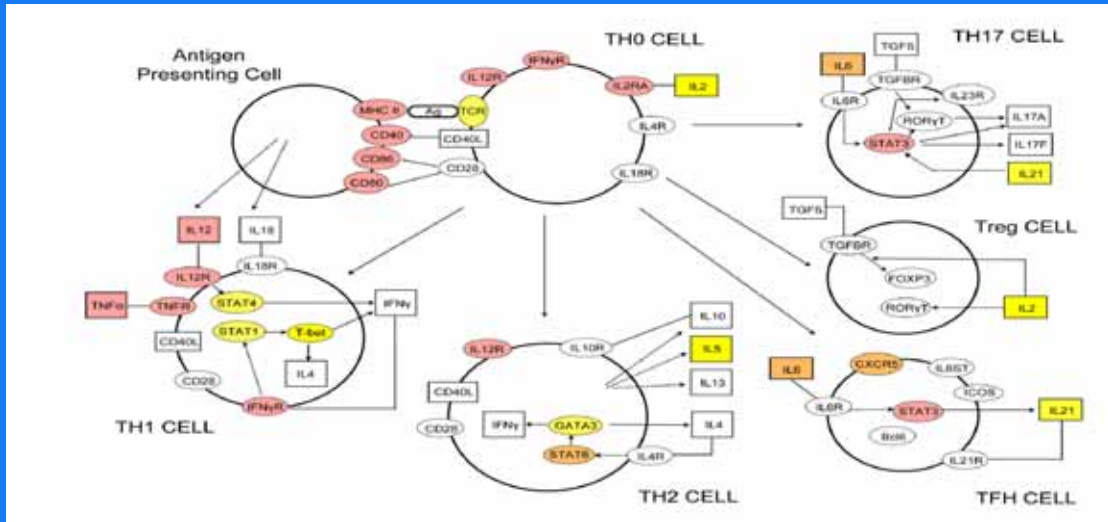2. Infectious (e.g. EBV)
3. Diet (e.g. fatty acids)
4. Smoking

Known genetic factors:

1. HLA-DRB1*15:01 (the most strongly linked genetic factor)
2. IL7R
3. IL2RA
4. CYP27B1
5. TNFRSF1A
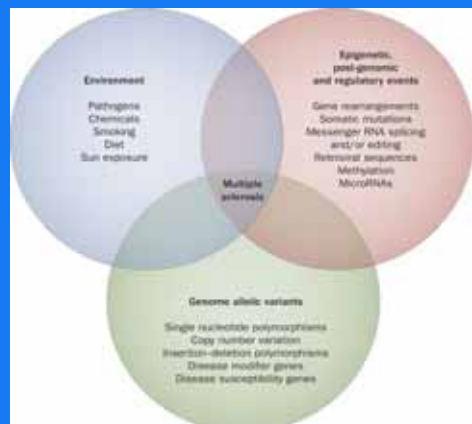
# VIRTUALLY ALL GENES OF MS SUSCERPTIBILITY ARE IMMUNE RESPONSE GENES

Steven Sawcer, International MS Consortium, 2011

Progression:

Like the disease onset, the mechanism underlying progression of the disease is yet to be identified.

Known factors influencing progression in MS:

Age (perhaps the most important factor)

Gender (males have disadvantages)

Ethnicity (black people usually do worse)

Vitamin D

Infection (e.g. urinary and upper respiratory tracts infections)

Smoking
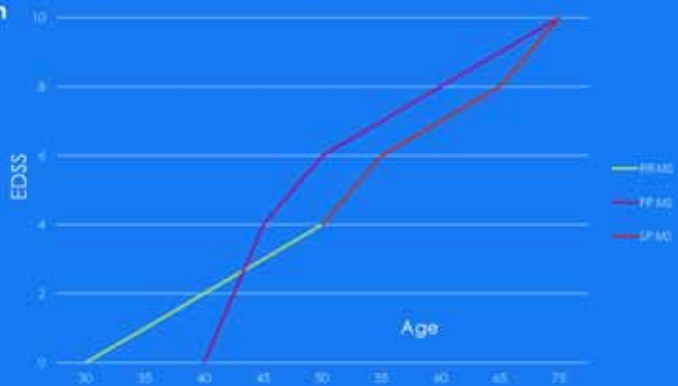
Mortality:

It has been shown that patients with the diagnosis of MS usually live 7 to 14 years shorter than their counterparts in the general population [1].

Common causes of death:

1. MS related causes (e.g. aspiration Pneumonia, sepsis)
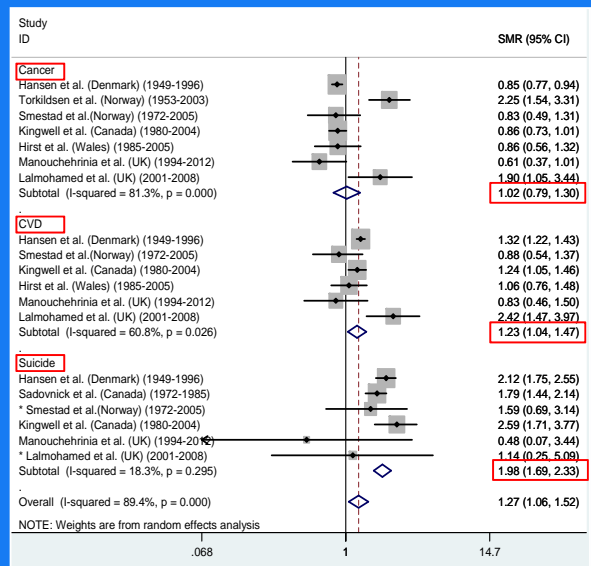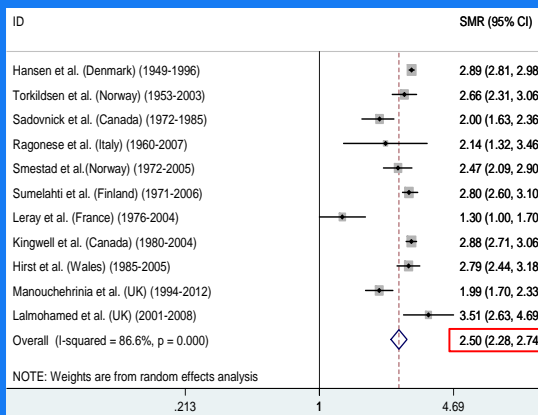2. Cardiovascular diseases
3. Cancer
4. Suicide

Notes:

There is no survival advantage for any type of MS
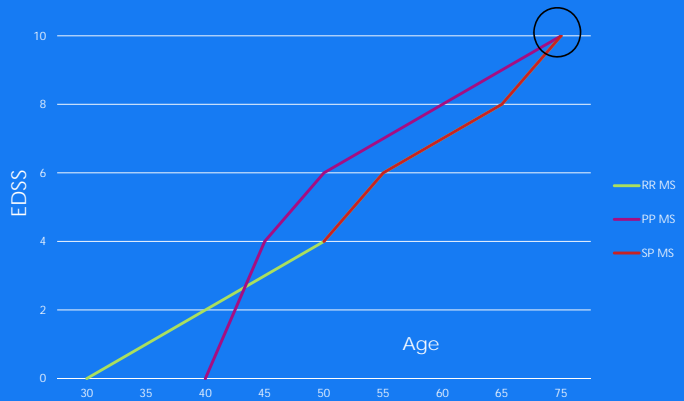
1. Scalfari, A., V. Knappertz, G. Cutter, D. S. Goodin, R. Ashton and G. C. Ebers (2013). "Mortality in patients with multiple sclerosis." Neurology **81**(2): 184-192.

Mortality:

Pooled analysis of standardised mortality ratios (SMR)

ID		SMR (95% CI)
Hansen et al. (Denmark) (1949-1996)		2.89 (2.81, 2.98)
Torkildsen et al. (Norway) (1953-2003)		2.66 (2.31, 3.06)
Sadovnick et al. (Canada) (1972-1985)		2.00 (1.63, 2.36)
Ragonese et al. (Italy) (1960-2007)		2.14 (1.32, 3.46)
Smestad et al.(Norway) (1972-2005)		2.47 (2.09, 2.90)
Sumelahti et al. (Finland) (1971-2006)		2.80 (2.60, 3.10)
Leray et al. (France) (1976-2004)		1.30 (1.00, 1.70)
Kingwell et al. (Canada) (1980-2004)		2.88 (2.71, 3.06)
Hirst et al. (Wales) (1985-2005)		2.79 (2.44, 3.18)
Manouchehrinia et al. (UK) (1994-2012)		1.99 (1.70, 2.33)
Lalmohamed et al. (UK) (2001-2008)		3.51 (2.63, 4.69)
Overall (I-squared = 86.6%, p = 0.000)		2.50 (2.28, 2.74)

NOTE: Weights are from random effects analysis

Study ID	SMR (95% CI)
Cancer	
Hansen et al. (Denmark) (1949-1996)	0.85 (0.77, 0.94)
Torkildsen et al. (Norway) (1953-2003)	2.25 (1.54, 3.31)
Smestad et al.(Norway) (1972-2005)	0.83 (0.49, 1.31)
Kingwell et al. (Canada) (1980-2004)	0.86 (0.73, 1.01)
Hirst et al. (Wales) (1985-2005)	0.86 (0.56, 1.32)
Manouchehrinia et al. (UK) (1994-2012)	0.61 (0.37, 1.01)
Lalmohamed et al. (UK) (2001-2008)	1.90 (1.05, 3.44)
Subtotal (I-squared = 81.3%, p = 0.000)	1.02 (0.79, 1.30)
CVD	
Hansen et al. (Denmark) (1949-1996)	1.32 (1.22, 1.43)
Smestad et al.(Norway) (1972-2005)	0.88 (0.54, 1.37)
Kingwell et al. (Canada) (1980-2004)	1.24 (1.05, 1.46)
Hirst et al. (Wales) (1985-2005)	1.06 (0.76, 1.48)
Manouchehrinia et al. (UK) (1994-2012)	0.83 (0.46, 1.50)
Lalmohamed et al. (UK) (2001-2008)	2.42 (1.47, 3.97)
Subtotal (I-squared = 60.8%, p = 0.026)	1.23 (1.04, 1.47)
Suicide	
Hansen et al. (Denmark) (1949-1996)	2.12 (1.75, 2.55)
Sadovnick et al. (Canada) (1972-1985)	1.79 (1.44, 2.14)
* Smestad et al.(Norway) (1972-2005)	1.59 (0.69, 3.14)
Kingwell et al. (Canada) (1980-2004)	2.59 (1.71, 3.77)
Manouchehrinia et al. (UK) (1994-2012)	0.48 (0.07, 3.44)
* Lalmohamed et al. (UK) (2001-2008)	1.14 (0.25, 5.09)
Subtotal (I-squared = 18.3%, p = 0.295)	1.98 (1.69, 2.33)
Overall (I-squared = 89.4%, p = 0.000)	1.27 (1.06, 1.52)

NOTE: Weights are from random effects analysis

Nottingham MS clinics:

- Clinics were started in 1994
- Over 3,000 patients are registered
- 1,245 patients were routinely followed up

- In 2013 we sent out a comprehensive questionnaire to study the influence of smoking on disease progression.

Age (mean(SD))	52.89 (±11.33)
Sex(female)	71.47 %
Disease phenotype	
RR MS	57.2 %
SP MS	33.3 %
PP MS	9.4 %
DMT (%)	54 %
Disease duration (mean(SD))	19.28 (±10.44)
Latest EDSS score	5.5 (3.5 to 6.5)

Smoking

SOME NUMBERS ABOUT SMOKING

20% of the world's population

900 million men and 200 million women

>16 million Americans live with a disease caused by smoking

Worldwide 900000 people die of second hand smoke (75% women and children)

1 in 5 deaths in the USA caused by smoking

Life expectancy 10 years shorter in smokers than in never smokers

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Diseases linked to smoking

Almost any organ

Cardiovascular

Cancer

Diabetes

COPD

Inflammatory –e.g. Rheumatoid arthritis

Infectious (increased susceptibility to Tb)

Smoking-related illness in the United States costs more than $300 billion each year, including: Nearly $170 billion for direct medical care for adults. More than $156 billion in lost productivity, including $5.6 billion in lost productivity due to secondhand smoke exposure.

8 Apr 2016 CDC

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Tobacco smoking in our cohort:

At the age of EDSS score 4 and 6, still **20%** were smoking.

1. Mean age at the start of regular smoking was **17.5** (SD ±4.4).
2. Our patients smoked for an average duration of **22.8** (SD ±13.4).
3. Average smoking intensity was **18.7** (SD ±12.5) cigarettes per day.
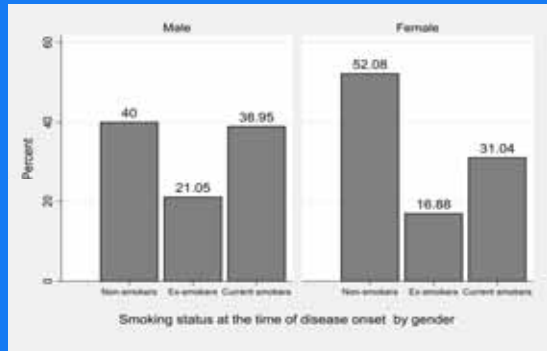
Tobacco smoking and risk of MS: a case-control study

Background:

There is ample epidemiological evidence that tobacco smoking is a significant trigger in the development of MS.

1. Tobacco smoking increases the risk of MS by **50%** [1].
2. Presence of DRB1*15 and absence of A*02 and smoking is shown to increase the risk of MS by 13.5 times [2]
3. Decreased risk of MS was found in the Swedish snuff-takers (Smokeless tobacco) [3].
4. The risk of MS for ever-smokers was only significant among the cases with high anti-EBNA titers [4].

   * Exposure to parental and environmental tobacco smoke has also been shown to increase the risk of MS

1. Handel, A. E., A. J. Williamson, et al. (2011). "Smoking and multiple sclerosis: an updated meta-analysis." PLoS One **6**(1): e16149
2. Hedstrom, A. K., et al.(2011). "Smoking and two human leukocyte antigen genes interact to increase the risk for multiple sclerosis." Brain **134**(Pt 3): 653-664.
3. Hedstrom, A., J. Hillert, T. Olsson and L. Alfredsson (2013). "Nicotine might have a protective effect in the etiology of multiple sclerosis." Mult Scler 19(8): 1009-1013.
4. Simon, K. C., et al. (2010). "Combined effects of smoking, anti-EBNA antibodies, and HLA-DRB1*1501 on multiple sclerosis risk." Neurology **74**(17): 1365-1371.
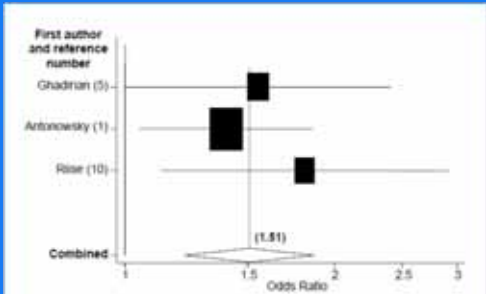
First author and reference number

Ghadirian (5)

Antonovsky (1)

Riise (10)

(1.51)

Combined

Odds Ratio

Figure 1 Metanalysis of retrospective studies using ever:never smoking prior to MS onset. The size of the black rectangles is inversely proportional to the confidence interval.
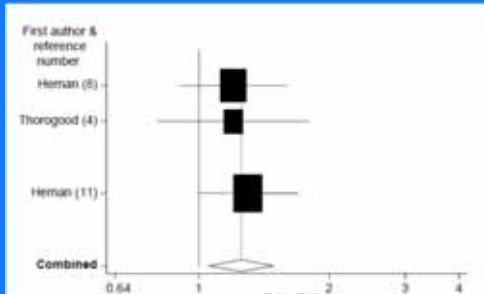

First author & reference number

Hernan (8)

Thorogood (4)

Hernan (11)

Combined

Odds Ratio

Figure 2 Metanalysis of prospective studies using most conservative analysis. The size of the black rectangles is inversely proportional to the confidence interval.

Hawkes MSJ 2007

Smoking and Multiple Sclerosis: A Meta-Analysis

Study or Subgroup	Weight	IV, Random, 95% CI	IV, Random, 95% CI
Antonovsky 1965	10.8%	1.40 [1.05, 1.86]	
Carlens 2010	9.2%	1.90 [1.39, 2.59]	
Ghadirian 2001	4.6%	1.60 [1.03, 2.48]	
Hedstrom 2009	33.4%	1.50 [1.27, 1.77]	
Hernan 2001	11.3%	1.60 [1.21, 2.12]	
Hernan 2005	12.6%	1.30 [1.00, 1.69]	
Jafari 2009	4.1%	1.09 [0.68, 1.74]	
Riise 2003	3.9%	1.81 [1.13, 2.91]	
Simon 2010	4.6%	1.50 [0.97, 2.32]	
Thorogood 1998	5.4%	1.20 [0.80, 1.80]	
Total (95% CI)	100.0%	1.48 [1.35, 1.63]	

Test for overall effect: Z = 8.22 (P < 0.00001)

Figure 1. Forest plot of smoking and multiple sclerosis risk (conservative model).
doi:10.1371/journal.pone.0016149.g001

Handel et al 2011 PlosOne

1. **Tobacco smoking and risk of MS: a case-control study**

2. Tobacco smoking and risk of MS progression: a cohort study

3. Tobacco smoking and risk of premature death: a cohort study

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## Tobacco smoking and risk of MS: a case-control study

Results:

		Male	Female	Total
Control	Number	386	966	1349
	Age (mean)	54.55	52.30	52.94
Case	Number	193	483	676
	Age (mean)	54.55	52.26	52.93

1. **Individual smoking:**

   1. Regular smokers were 64% (OR 1.64, 95%CI: 1.35 to 1.99, $P < 0.001$) more likely to develop MS than non-smokers.
   2. Ever-smoking was associated with 44% (95%CI: 1.19 to 1.74, $P < 0.001$) increase in risk of MS.

2. **Parental smoking:**

   - No influence of parental smoking during patients' childhood on the risk of MS was observed.

   HOWEVER, MS patients were 50% more likely to become regular smokers if either of parents smoked regularly during their childhood. They were 85% more likely to smoke if both parents were smokers.

Tobacco smoking and risk of MS: a case-control study

Interpretation:

1. There is a modest but significant influence of smoking on the risk of MS.

2. It is unlikely that smoking alone can explain the development of MS.

3. Based on our findings, parental smoking during patients' childhood is unlikely to influence the risk of MS , HOWEVER, an indirect influence may exist.

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1. Tobacco smoking and risk of MS: a case-control study

2. **Tobacco smoking and risk of MS progression: a cohort study**

3. Tobacco smoking and risk of premature death: a cohort study

Tobacco smoking and risk of MS progression: a cohort study

Background:

Studies have reached contradicting conclusions.

1. Studies have shown higher risk of transition to SP MS (3.5 times) [1].

2. Higher level of disability was observed [2].

3. Higher disease activity on MRI of smokers was shown [3].

4. Higher risk of transition to CD MS [4].

1. Hernan, M. A., et al. (2005). "Cigarette smoking and the progression of multiple sclerosis." Brain **128**(Pt 6): 1461-1465.
2. Pittas, F., et al. (2009). "Smoking is associated with progressive disease course … ." J Neurol **256**(4): 577-585.
3. Zivadinov, R., et al. (2009). "Smoking is associated with increased lesion volumes and brain atrophy in multiple sclerosis." Neurology **73**(7): 504-510.
4. Di Pauli, F., et al. (2008). "Smoking is a risk factor for early conversion to clinically definite multiple sclerosis." Mult Scler **14**(8): 1026-1030

Tobacco smoking and risk of MS progression: a cohort study

Method:
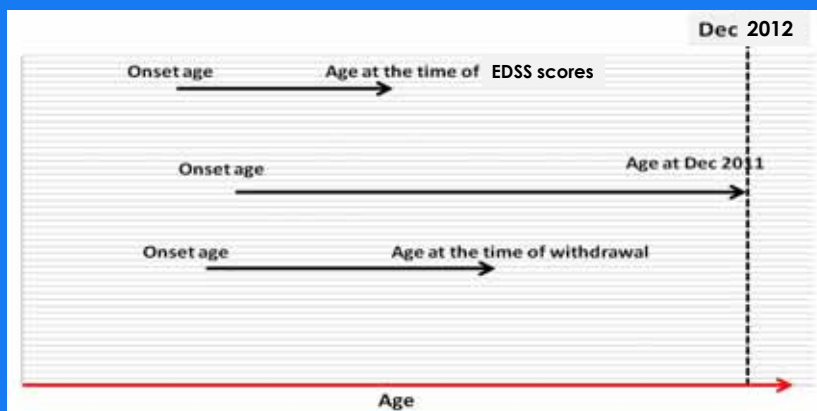
Tobacco smoking and risk of MS progression: a cohort study

Outcome measures:

1. Risk of PP MS
2. Risk of reaching EDSS scores 4 and 6
3. Risk of transition to SP MS
4. Disease severity (MSSS, range 0–9.5)
5. PDDS and MSIS-29 Scores
6. Effects of comorbidities

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Risk of developing PP MS:

- We could not find any association between smoking and having progressive onset MS (PP MS).

	n	Odds ratio (95%CI)	P-value
Smoking (ever vs. never)	1166	0.82 (0.54 to 1.24)	0.36
Pack-years smoked	615	1.00 (0.98 to 1.02)	0.90
Gender (female vs. male)	1166	0.34 (0.22 to 0.52)	< 0.001
Onset age	1166	1.09 (1.07 to 1.11)	< 0.001

Risk of reaching EDSS score milestones 4 and 6:

1. Risk of reaching EDSS 4:

1. Current smokers had **88%** (95%CI: 1.43 to 2.48, *P* < 0.001) higher risk of reaching EDSS score 4 compared with non-smokers.

2. Ex-smokers had no increased risk of reaching EDSS score 4 compared with non-smokers (**HR: 0.93**, 95%CI: 0.72 to 1.20, *P* = 0.6).
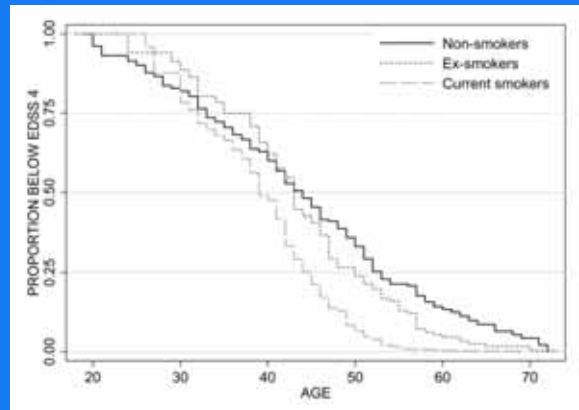
Risk of reaching EDSS score milestones 4 and 6:

2. Risk of reaching EDSS 6:

1. Current smokers had **66%** (95%CI: 1.17 to 2.35, *P* = 0.004) higher risk of reaching EDSS score 6.

2. There was no increased risk of reaching EDSS score 6 in ex-smokers (**HR: 0.81**, 95%CI: 0.58 to 1.12, *P* = 0.21) whether they quit before or after MS onset.
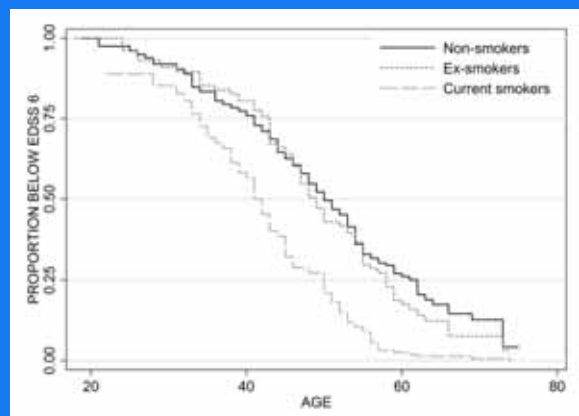
Age at the time of EDSS score milestones 4 and 6:

Smoking status	Median time to EDSS 4 from onset (95%CI)	Median time to EDSS 4 from birth (95%CI)
Non-smokers	16 (14 to 19)	50 (48 to 51)
Ex-smokers	15 (12 to 18)	51 (47 to 52)
Current-smokers	11 (9 to 12)	45 (42 to 47)
	Median time to EDSS 6 from onset (95%CI)	Median time to EDSS 6 from birth (95%CI)
Non-smokers	22 (19 to 25)	54 (53 to 55)
Ex-smokers	20 (15 to 23)	54 (52 to 55)
Current-smokers	16 (13 to 20)	50 (47 to 53)

Risk of transition to SP MS:

- We found that current smokers have **2.38 times** (95%CI: 1.39 to 4.08, $P = 0.001$) higher risk of developing SP MS.

- The risk of transition to SP MS was not increased amongst ex-smokers compared with non-smokers (HR: **0.9**, 95%CI: 0.54 to 1.51, $P = 0.71$).

- Each unit increase in the pack-years smoking was associated with **1%** (95%CI: 1.001 to 1.02, $P = 0.03$) increased risk of developing SP MS
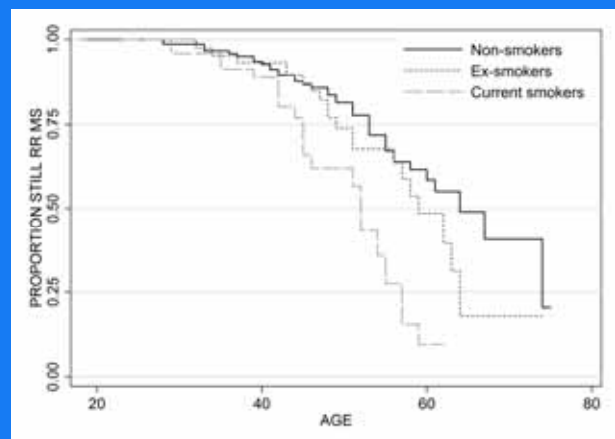
Disease severity (MSSS):

- the average MSSS was **0.8** (95%CI: 0.26 to 1.35, P = 0.004) and **0.35** (95%CI: -0.07 to 0.77, P = 0.1) higher in current and ex-smokers respectively

- Those with pack-years smoked* more than 10 had an average **0.62** (95%CI: 0.17 to 1.06, P = 0.006) MSSS higher than non-smokers (zero pack-years).

We looked at the odds of being in upper quartile MSSS (MSSS > 7.5) compared with lower quartile (MSSS < 2.5)

	Odds ratio (95%CI)	P-value
Smoking status		
Non-smokers	---	---
Ex-smokers	1.3 (0.7 to 2.42)	0.39
Current smokers	2.88 (1.29 to 6.43)	0.01
Pack-years		
Non-smokers	---	---
1 to 10	1.06 (0.45 to 2.49)	0.88
More than 10	2.17 (1.17 to 4.02)	0.01

* Number of pack-years = (number of *cigarettes* smoked per day **x** number of years smoked)/20 (1 pack has 20 cigarettes)

PDDS and MSIS-29 score:

- **PDDS**: The average PDDS score was **0.71** (95%CI: 0.25 to 1.17, P = 0.002) score and **0.27** (95%CI: -0.07 to 0.63, P = 0.12) score higher in current and ex-smokers compared with non-smokers respectively.
- **MSIS-29:** MSIS-29, MSIS psychological scale and MSIS physical scale scores were significantly higher amongst ever-smokers.

|	Never-smoked		Ever-smoked		P-value *
	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)	
Feeling unwell?	2.40 (±1.24)	2 (1 to 3)	2.74 (±1.30)	3 (2 to 4)	< 0.001
Problems sleeping?	2.45 (±1.40)	2 (1 to 4)	2.66 (±1.37)	3 (1 to 4)	= 0.020
Feeling mentally fatigued?	2.92 (±1.34)	3 (2 to 4)	3.36 (±1.31)	4 (2 to 4)	< 0.001
Worries related to your MS?	2.38 (±1.27)	2 (1 to 3)	2.73 (±1.39)	3 (2 to 4)	= 0.001
Feeling anxious or tense?	2.44 (±1.28)	2 (1 to 4)	2.78 (±1.34)	3 (2 to 4)	< 0.001
Feeling irritable, impatient, or short tempered?	2.43 (±1.26)	2 (1 to 3)	2.92 (±1.33)	3 (2 to 4)	< 0.001
Problems concentrating?	2.68 (±1.34)	2 (2 to 4)	3.06 (±1.30)	3 (2 to 4)	< 0.001
Lack of confidence?	2.48 (±1.39)	2 (1 to 4)	2.84 (±1.44)	3 (2 to 4)	< 0.001
Feeling depressed?	2.11 (±1.29)	2 (1 to 3)	2.61 (±1.40)	2 (1 to 4)	< 0.001

* P-values from Wilcoxon-Mann-Whitney test

Effects of comorbidity:

- As expected the prevalence of concomitant comorbid diseases was significantly higher in ever-smokers (58% in ever-smokers vs. 42% in never-smokers, P = 0.002).

- When the analysis was limited to the patients with no concomitant medical condition:

    1. the average MSSS was still significantly higher in ever-smokers compared with never-smokers (Coef: **0.89**, 95%CI: 0.46 to 1.32, P < 0.001).

    2. Average PDDS score was also significantly **0.77** (95%CI: 0.31 to 1.23, P = 0.001) score higher in ever-smokers compared with never-smokers.

    3. Ever-smokers had **34%** (95%CI: 1.02 to 1.75, P = 0.03) higher risk of reaching EDSS score 6.

Effects of smoking intensity and time since smoking cessation:

- As seen, the risk of progression in ex-smokers were similar to non-smokers.

- We found that each cigarette smoked was associated with **3%** (95%CI: 1.01 to 1.05, P < 0.001) increased risk of reaching EDSS score 6.

- Each year increase in the time since cessation of smoking was associated with **5%** (HR: 0.95, 95%CI: 0.93 to 0.97, P < 0.001) decreased risk of reaching EDSS score 6.
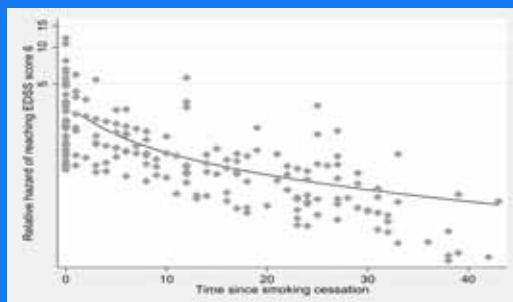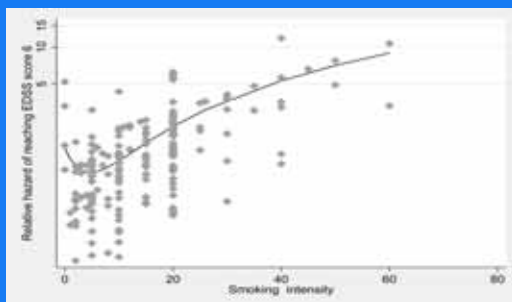
Tobacco smoking and risk of MS progression: a cohort study

Interpretation :

1. Current smokers reach EDSS scores 4 and 6 in shorter time.

2. Smokers have higher levels of physical and psychological disability.

3. Disease was more severe in smokers.

4. Although smokers had higher levels of comorbid conditions, it appeared that the influence of smoking is independent of the presence of comorbid conditions.

5. Those who gave up smoking could do as well as non-smokers

BRAIN

Tobacco smoking and disability progression in multiple sclerosis: United Kingdom cohort study

Ali Manouchehrinia, Christopher R. Tench, Jonathan Maxted, Rashid H. Bibani, John Britton and Cris S. Constantinescu

Manouchehrinia, A., C. R. Tench, J. Maxted, R. H. Bibani, J. Britton and C. S. Constantinescu (2013). "Tobacco smoking and disability progression in multiple sclerosis: United Kingdom cohort study." Brain.

Tobacco smoking: effects on disease modifying treatments for MS

Increased risk of NAbs to natalizumab and IFN-beta *(Hedstrom et al 2013;Hedstrom et al 2014)*

Increased risk of side effects of fingolimod (decreased lung capacity)

No clear effect on progression in BENEFIT

1. Tobacco smoking and risk of MS: a case-control study

2. Tobacco smoking and risk of MS progression: a cohort study

3. **Tobacco smoking and risk of premature death: a cohort study**

Tobacco smoking and risk of premature death: a cohort study

Background:

Mortality in patients with MS has been studied in several populations but not many studies have evaluated environmental factors associated with increased mortality risk.

1. The two largest survival studies in MS estimated an almost 3-fold increased mortality risk in MS patients relative to the general population [1,2]

2. In the UK, it has been suggested that current smokers with MS have **6.7**-fold increased mortality rate compared with the sex- and age-matched counterparts without MS [3].

1. Bronnum-Hansen H, et al. Trends in survival and cause of death in Danish patients with multiple sclerosis. Brain : a journal of neurology. 2004 Apr;127(Pt 4):844-50.
2. Kingwell E, van der Kop M, Zhao Y, et al. Relative mortality and survival in multiple sclerosis: findings from British Columbia, Canada. JNNP. 2012 Jan;83(1):61-6.
3. Lalmohamed A, et al. Causes of death in patients with multiple sclerosis and matched referent subjects: a population-based cohort study. European journal of neurology 2012 Jul;19(7):1007-14.

Tobacco smoking and risk of premature death: a cohort study

Results:

1. We studied 923 patients.
2. The 923 patients contributed a total of 18,717 person-years of data.
3. There were 80 (46 males and 34 females) deaths recorded in our cohort.

	Deceased (n = 80)	Alive (n = 843)	P-value
Sex (female %)	34 (42%)	610 (72%)	< 0.001
Last recorded EDSS (median(IQR))	7.5 (±1.5)	5.5 (±3.5)	< 0.001
Age at the onset (mean)	35 (±10.67)	32(±9.74)	= 0.02
Disease duration (median)	20 (±17)	15 (±14)	< 0.001
Type of MS			
Relapsing-remitting	9 (11%)	445 (52%)	< 0.001
Primary-progressive	16 (20%)	87 (10%)	
Secondary-progressive	55 (69%)	311(37%)	
DMT ≥ 1 year	13 (16%)	384 (45%)	< 0.001

Tobacco smoking and risk of premature death: a cohort study

Results:
1. Survival age and role of smoking

- Estimated survival age was 76 years (95% CI: 74 to 79) for all patients.
- Estimated survival age was:
  - **81** (95%CI: 78 to 83) years in non-smokers,
  - **78** (95% CI: 75 to 81) years in ex-smokers and
  - **71** (95% CI: 68 to 74) in current smokers
  (P < 0.001).

2. Risk of premature death:

1. Current smokers were at higher risk of death, with a hazard ratio relative to never smokers of **2.70** (95% CI: 1.59 to 4.58; *P* < 0.001) and

2. The hazard ratio was **1.30** (95% CI: 0.72 to 2.32; *P* = 0.37) for ex-smokers.
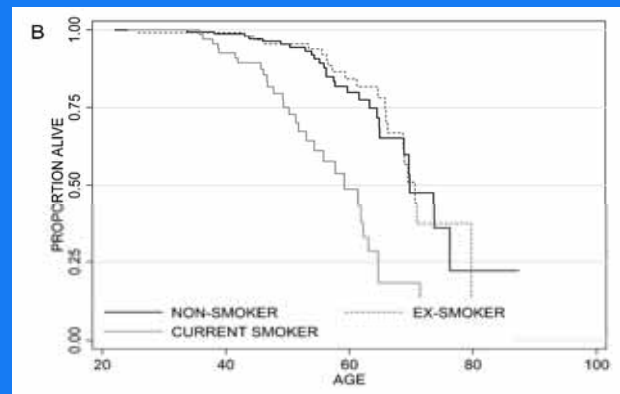
Survival compared with the UK general population.

Results:

- Our patients had 2-fold increased risk of premature death compared with people without MS in the UK general population

- When stratified by smoking status never-smokers did not have any excess mortality

	SMR (general population)	SMR (male British doctors)
Overall	1.99 (1.70 to 2.33)	-----
Male	2.41 (1.95 to 2.96)	-----
Female	1.80 (1.40 to 2.30)	-----
Non-smokers	1.27 (0.87 to 1.86)	1.12 (0.63 to 1.97)
Ex-smokers	1.96 (1.27 to 3.0)	0.54 (0.26 to 1.14)
Current smokers	3.83 (2.71 to 5.42)	1.84 (1.24 to 2.72)

Tobacco smoking and risk of premature death: a cohort study

Interpretation :

- In our MS population current smoking was associated with more than 2.5-fold increased risk of death.

- Current smokers and ex-smokers with MS had a reduction of about 10 and 3 years in their life expectancy relative to non-smokers with MS.

- Non-smokers with MS could live as long as people in the general population.

In general:

1. Smoking is associated with higher risk of MS development.

2. Smoking influences progression of disability.

3. Smoking is associated with higher risk of premature death.

4. Smoking results in a significant reduction in patients life expectancy.

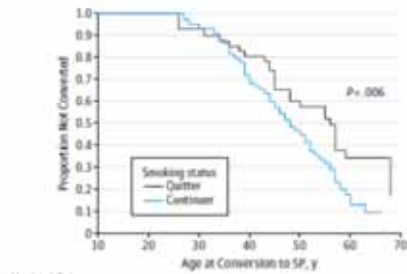**Clinical Implications:**

Smoking cessation in MS

Original Investigation

Effect of Smoking Cessation on Multiple Sclerosis Prognosis

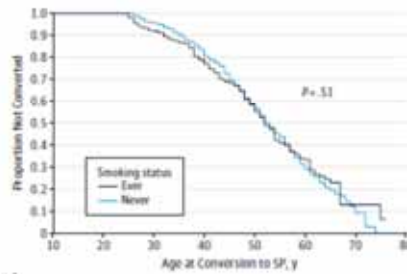Ryan Ramanujam, PhD; Anna-Karin Hedström, MD; Ali Manouchehrinia, PhD; Lars Alfredsson, PhD;

Each smoke-free year was associated with 0.96 (95% CI: 0.95 to 0.97) times decreased risk of reaching EDSS 4.0 and 0.97 (95%CI: 0.95 to 0.98) times decreased risk of reaching EDSS 6.0. Current smokers showed a significantly higher level of disability in all the self-reported outcomes with the highest negative impact of smoking on the MSIS-29 psychological scale where current and ex-smokers had a 0.8 (95%CI: 0.41 to 1.19) and 0.56 (95%CI: 0.18 to 0.94) increase in the median score compared with non-smokers

Manouchehrinia A, Tanasescu R, Constantinescu C, manuscript in preparation
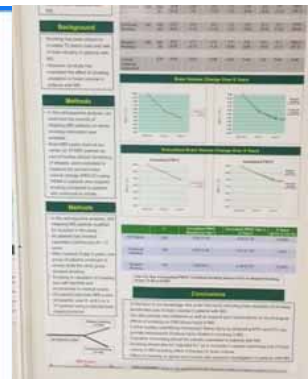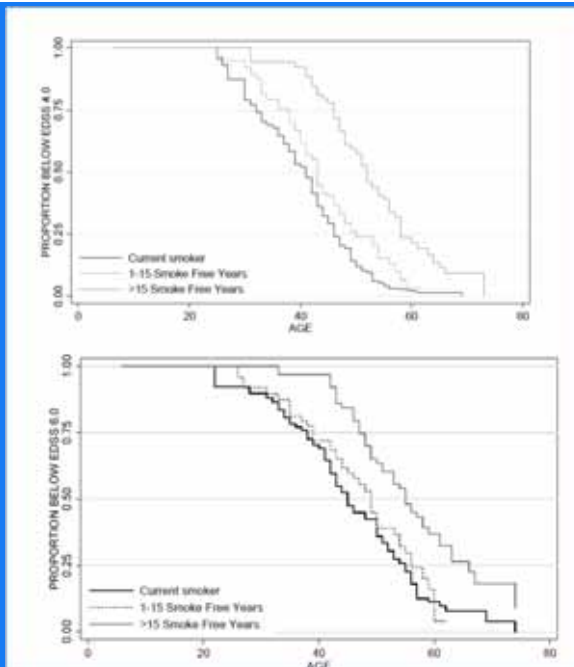
Omar Khan, ECTRIMS poster 2015

Work in progress:

1. Further investigation into major aspects of smoking (e.g. the effects of age at smoking initiation)

2. A qualitative assessment of smoking cessation programmes

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ORIGINAL ARTICLE

Identifying Barriers to Smoking Cessation in Rheumatoid Arthritis

PIP AIMER,[1] LISA STAMP,[1] SIMON STEBBINGS,[1] NATALIA VALENTINO,[1] VICKY CAMERON,[1] AND GARETH J. TREHARNE[1]

3. Clinical trials of smoking cessation

4. Active and effective intervention strategies.

"The battle is far from being over. Unless the prevalence of smoking is reduced substantially, the number of smokers will increase in the world in the next several decades, mostly due to population expansion in low- and middle-income countries. Measures to tackle the epidemic remain seriously under-funded."

Margaret Chan, Director-General, WHO, 2012

Thank you for your attention