

Vervolmakingscyclus voor Verzekeringsgeneeskunde  
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# Multiple Chemical Sensitivity

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# Multiple chemical sensitivity (MCS)

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- Meervoudige Chemische Overgevoeligheid
- Idiopathic Environmental Intolerance (IEI)
- Toxicant-Induced Loss of Tolerance (TILT)
- Environmental Illness (EI)
- Syndrome X

# Bronnen

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- Das-Munshi J., Rubin G.J., Wessely S. Multiple chemical sensitivities: review. *Curr Opin Otolaryngol Head Neck Surg* 2007, 15, 274-280

# Bronnen

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- Hoge Gezondheidsraad Publicatie nr 8356 (Juli 2010) <http://www.health.belgium.be/>



Hoge  
Gezondheidsraad

**PUBLICATIE VAN DE HOGE GEZONDHEIDSRAAD nr. 8356**

Intolerantie of hypergevoeligheid  
voor fysische en chemische milieufactoren  
Juli 2010

## Multipele Chemische Intolerantie

+ Intolerantie voor elektromagnetische velden  
(Idiopathic Environmental Intolerance  
attributed to Electromagnetic Fields, IEI-EMF)

- Radiofrequenties en microgolven
- “electrical/electromagnetic hypersensitivity”  
 (“electric smog”)

# Bronnen

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- Valkenburg E. Als chemische stoffen en geuren je ziek maken. Uitg. Schors. Amsterdam 2007.  
ISBN 978-90-6378-729-5

ELS VALKENBURG

# Als chemische stoffen en geuren je ziek maken



Een naslagwerk over de  
onbegrepen milieuziekte MCS

(Multiple Chemical Sensitivity of Meervoudige Chemische Overgevoeligheid)

- I. Wat is MCS?
- II. De persoonlijke situatie
- III. Anderen aan het woord
- IV. Het ABC van MCS
- V. Films, boeken, enz
- VI. Internetadressen en telefoonnummers
- VII. Informatievoorziening



www.the-abc-of-mcs.com  
www.het-abc-van-mcs.nl  
www.das-mcs-abc.de

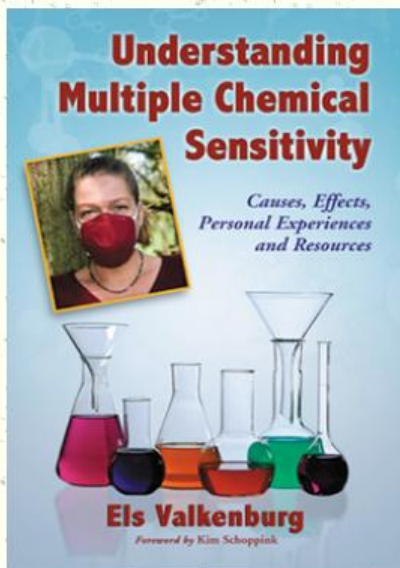
# MCS

## Multiple Chemical Sensitivity Meervoudige Chemische Sensitiviteit Multiple Chemikalien-Sensitivität



*Click on the cover for more information about MCS and the book:*

Understanding  
Multiple Chemical Sensitivity



Causes, Effects, Personal Experiences  
and Resources



*Klik op de omslag voor meer informatie over MCS en het boek:*

Als Chemische Stoffen  
en Geuren je Ziek maken



Een naslagwerk over de  
onbegrepen milieuziekte MCS -  
meervoudige chemische overgevoeligheid



*Klicken Sie auf das Cover, um mehr über MCS und das Buch zu erfahren:*

MCS - Wenn chemische Substanzen  
und Duftstoffe krank machen



Erfahrungen - Informationen - Adressen  
zur Multiplen Chemikalien-Sensitivität

# MCS

## Definities

## Voorkomen

# Multiple chemical sensitivities

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Cullen MR. Workers with multiple chemical sensitivities. *Occup Med State Art Rev* 1987, 2, 655-62.

“... an acquired disorder characterized by recurrent symptoms, referable to multiple organ systems, occurring in response to demonstrable exposure to many chemically unrelated compounds at doses far below those established in the general population to cause harmful effects. No single widely accepted test of physiologic function can be shown to correlate with symptoms.”

# MCS (Cullen 2005)

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1. Acquired, usually after a clearly evident (not necessarily serious) event caused by environmental exposure (solvent intoxication, respiratory tract irritation, pesticide poisoning, ...)
2. Multiple symptoms referable to several organs symptoms (CNS)
3. Characteristically and predictably precipitated by a perceived environmental exposure (+ persistent complaints between exposures)

# MCS (Cullen 2005)

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4. Precipitating agents are multiple and chemically diverse
5. Doses are at least 2 orders of magnitude lower than established thresholds for acute effects
6. No test of physiologic function can explain the symptoms (nonspecific clinical abnormalities, such as mild bronchospasm or neuro-psychologic dysfunction, are insufficient to explain illness)
7. No other organic disease that can better explain the pattern of symptoms

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# Als chemische stoffen en geuren je ziek maken



Een naslagwerk over de  
onbegrepen milieuziekte MCS

(Multiple Chemical Sensitivity of Meervoudige Chemische Overgevoeligheid)

## I. Wat is MCS?

# Wat zijn de meest voorkomende symptomen bij MCS ?(Valkenburg, vraag 6)

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- Algehele malaise
- Ademhalings- en luchtwegproblemen
- Auto-immuunsysteemafwijkingen
- Black-outs
- Chronische vermoeidheid
- Concentratieproblemen
- Depressie
- Desoriëntatie
- Duizeligheid
- Gewrichts- en spierpijnen
- Griepachtige verschijnselen
- Hartritmestoornissen
- Hoofdpijn
- Huidaandoeningen
- Longproblemen
- Maag- en/of darmproblemen
- Ontstekingen
- Oor-, neus-, keel- of bijholteproblemen
- Ontstekingen
- Overgevoeligheid voor elektromagnetische velden
- Problemen met kortetermijngeheugen
- Vergiftigingsverschijnselen (trillen, misselijkheid enz)
- (voedsel)allergieën en -intoleranties

# Welke stoffen kunnen een reactie uitlokkende? (Valkenburg, vraag 7)

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## Voorbeelden

- Was- en schoonmaakmiddelen
- Verzorgingsproducten, deodorant, zeep, shampoo, crème, tandpasta enz
- Alle parfumhoudende producten
- Sigaretten- en sigarenrook
- Medicijnen
- Synthetische toevoegingen in eten en drinken
- Uitlaatgassen
- Insecticiden, bestrijdingsmiddelen enz
- Kit, verf, lijm enz
- Luchtverfrissers en geurzuilen
- Nieuwe bouwmaterialen en meubelen
- Nieuwe of pas gestoomde kleding
- Nieuwe vloerbedekking
- Rookgassen uit open haarden, kachels van BBQ's
- Papier, inkt, kranten, boeken, tijdschriften, toners van printers enz
- Palstics, weekmakers (ftalaten), rubber enz
- Smog en fijnstof
- Verbrandingsgassen van geisers, ovens en gasfornuizen enz

# MCS epidemiology

Das-Munshi *et al.* 2007

**Table 1 Epidemiological surveys examining MCS prevalence**

Reference	Year/population	Criteria	Total sample	Prevalence	Risk factors
Hausteiner <i>et al.</i> [14]	2005/Germany	Self-reported chemical sensitivity or doctor-diagnosed MCS	2032	9% of sample reported sensitivity to odours; 0.5% reported physician-diagnosed MCS	
Carlsson <i>et al.</i> [15]	1999–2000/community survey, Scania, Sweden	During the past 14 days, have you experienced annoyance from: breathing air that smells of chemicals or other smells?	13 604	12.5% of sample reported some or much annoyance to chemicals; 16.2% reported some or much annoyance to other smells	Female sex
Caress and Steinemann [16,17]	1999–2000/community survey, Georgia, USA	Ever been diagnosed with MCS? Consider yourself sensitive to everyday chemicals?	1582	12.6% of sample reported sensitivity to chemicals; 3.1% reported previous medical diagnosis of MCS	Female sex
Levallois <i>et al.</i> [18]	1998/community survey, California, USA	Ever been diagnosed with MCS? Consider yourself sensitive to everyday chemicals?	2063	24.4% of sample reported sensitivity to chemicals	Female sex
Kreutzer <i>et al.</i> [19]	1995/community survey, California, USA	Ever been diagnosed with MCS? Consider yourself sensitive to everyday chemicals?	4046	15.9% of sample reported sensitivity to chemicals; 6.3% reported previous medical diagnosis of MCS	Female sex (for self-report MCS); Hispanic ethnicity (for doctor-diagnosed MCS)
Meggs <i>et al.</i> [20]	1993/rural population of North Carolina, USA	Reports of feeling ill after smelling odours	1027	33% reported feeling ill after smelling odours/chemicals	
Bell <i>et al.</i> [21]	1993/college psychology students, USA	Self-reported chemical sensitivity or doctor-diagnosed MCS	643	66% reported feeling ill after smelling one or more chemicals	Female sex

Black *et al.* 2000 US Military Gulf War 1990-91 Questionnaire 5% vs 2.5%

**! Culture-bound entity**

# Raadpleging Beroeps- en Milieuaandoeningen UZ Leuven

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- Specifieke raadpleging binnen Afdeling Longziekten sinds 1987
- UZ Gasthuisberg
- ½ dag per week (dinsdagochtend)
- 2 assistenten (bedrijfsartsen)
- 8-12 patiënten, 2-3 nieuwe patiënten/week
- uit gans Vlaanderen (+ Brussel & Wallonië, NL)
- Verwijzingen vooral door pneumologen & arbeidsgeneesheren, maar ook andere specialisten, huisartsen, verzekeringsartsen + “zelf-verwijzingen”

# Raadpleging Beroeps- en Milieuaandoeningen UZ Leuven

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- Vooral (~80%) respiratoire aandoeningen
  - Astma (beroepsastma, work-aggravated asthma, rhinitis)
  - Asbest
  - Andere longziekten (pneumoconiosen & andere ILD, kanker, ...)
- Ook andere aandoeningen (inwendige, neuro)
- Vooral beroepsmatig milieu (ook zelfstandigen), soms ook huiselijk of algemeen milieu
- Hoofdzakelijk diagnostisch (+ follow-up)
- Ook administratieve en medicolegale problemen

# Raadpleging Beroeps- en Milieuaandoeningen UZ Leuven

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- Masterthesis Els ADAMs & M. MEEUSEN
- 01.01.2003-21.12.2008
- 733 nieuwe patiënten
  - Niet respiratoire aandoeningen: 159 (22%)
    - Huid: 28 (18%)
    - OPS: 24 (15%)
    - Chronische intoxicatie: 31 (19%)
    - Psychosomatische aandoeningen: 23 (14%)
      - MCS : 9 (6%)
      - Hyperventilatiesyndroom: 7 (4%)
      - CVS : 4 (3%)
      - Andere: 3 (2%)
  - Andere of niet gespecificeerd: 53 (33%)

# MCS

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“Moeilijke” patiënten!

- Diagnose en differentieel diagnose
- Vaak “medical shopping”
- Invalidierend (sociaal isolement)
- Probleem van “erkenning van de ziekte”
- Controversieel
- Moeilijke therapie

# Perceived Treatment Efficacy for Conventional and Alternative Therapies Reported by Persons with Multiple Chemical Sensitivity

Pamela Reed Gibson, Amy Nicole-Marie Elms, and Lisa Ann Ruding *EHP* 2003, 111, 1498-1504

School of Psychology, James Madison University, Harrisonburg, Virginia, USA

Multiple chemical sensitivity (MCS) is a condition in which persons experience negative health effects in multiple organ systems from exposure to low levels of common chemicals. Although symptoms experienced from particular chemicals vary across persons, they are generally stable within persons. The sensitivities often spread over time, first to related chemicals and then to other classes of chemicals. This study examined self-reported perceived treatment efficacy of 101 treatments used by 917 persons with self-reported MCS. Treatments examined included environmental medicine techniques, holistic therapies, individual nutritional supplements, detoxification techniques, body therapies, Eastern-origin techniques, newer therapies, prescription items, and others. The three most highly rated treatments were creating a chemical-free living space, chemical avoidance, and prayer. Both creating a chemical-free living space and chemical avoidance were rated by 95% of respondents as helpful. Results for most therapies were mixed. Participants had consulted a mean of 12 health care providers and spent over one-third of their annual income on health care costs. We discuss this drain on personal resources and describe respondents' attitudes toward the possibility of healing from MCS. *Key words:* chemical hypersensitivity, chemical injury, environmental allergy, environmental illness, environmental sensitivity, multiple chemical sensitivity. *Environ Health Perspect* 111:1498–1504 (2003). doi:10.1289/ehp.5936 available via <http://dx.doi.org/> [Online 9 April 2003]

**Table 2. Perceived efficacy of 101 treatments tried by 917 persons with MCS.**

	Number tried	Very harmful (%)	Somewhat harmful (%)	No noticeable effect (%)	Somewhat helpful (%)	Very helpful (%)	Help:harm ratio <sup>a</sup>
<b>Environmental medicine and oasis techniques</b>							
Chemical avoidance	875	0.5	0.3	4.7	38.0	56.5	118.6
Chemical-free living space	820	0.1	0.5	4.5	38.6	56.2	155.2
P-N for chemicals with preservative	159	22.0	18.1	25.4	27.1	7.3	0.9
P-N for chemicals without preservative	218	11.9	12.8	28.3	31.4	15.5	1.9
P-N without glycerin or preservative	178	12.5	8.3	25.0	30.2	24.0	2.6
Sauna at clinic	151	7.1	7.7	20.6	30.3	34.2	4.4
Sauna at home	245	7.1	11.4	19.6	38.8	23.1	3.4
Rotation diet	560	1.6	4.1	22.1	44.0	28.2	12.7
Air filter (to prevent exposure)	786	1.8	4.2	11.8	47.5	34.6	13.7
Charcoal mask	598	4.5	8.3	9.8	55.1	22.3	6.0
Aluminum foil to seal off-gassing	253	5.6	5.3	14.7	35.7	38.7	6.8
Personal oxygen to cope with exposures	326	2.9	4.4	14.2	39.8	38.6	10.6
<b>Individual nutritional supplements</b>							
Intravenous magnesium	175	4.2	6.8	25.5	40.6	22.9	5.8
Buffered vitamin C powder	516	4.0	8.8	29.4	37.3	20.5	4.5
Other vitamin C	683	2.8	6.7	38.8	35.3	16.4	5.5
Vitamin E supplements	709	2.1	5.1	53.1	29.3	10.3	5.4
Coenzyme Q10	517	2.5	5.8	51.4	28.8	11.5	4.9
Magnesium supplements	644	2.3	3.8	41.4	34.4	18.0	8.6
Calcium supplements	663	2.6	5.2	56.6	25.0	10.6	4.6
Chromium supplements	399	3.8	4.5	57.8	22.2	11.8	4.1
Other mineral supplements	666	2.0	5.7	43.4	35.0	13.9	6.4
Grapefruit seed extract	325	7.7	11.6	43.3	27.6	9.8	1.9
Echinacea	515	5.6	11.8	48.6	23.0	11.0	2.0
Goldenseal	299	5.8	13.5	48.4	21.5	10.9	1.7
Siberian ginseng	283	5.9	15.0	48.3	26.2	4.5	1.5
Milk thistle seed	458	3.2	6.5	41.6	33.6	15.1	5.0
Garlic	555	5.2	10.2	46.5	25.9	12.2	2.5
Acidophilus	661	0.9	3.2	44.0	32.8	19.2	12.7
DHEA	352	8.2	15.1	46.4	20.7	9.5	1.3
Thyroid supplements	406	3.8	8.4	39.8	28.1	19.9	3.9
<b>Holistic therapies</b>							
Homeopathy with homeopathic doctor	401	4.9	9.1	32.6	33.8	19.5	3.8
Over-the-counter homeopathy	425	4.0	6.8	36.6	40.1	12.6	4.9
Bach flower remedies	236	2.5	6.6	50.2	29.6	11.1	4.5
Acupuncture	422	3.9	6.3	36.0	32.5	21.3	5.3
Herbal medicines	650	4.2	7.6	24.5	41.8	22.0	5.5
Macrobiotic diet	182	13.5	15.1	24.0	33.3	14.1	1.7
Juicing	315	4.4	8.8	42.0	31.2	13.6	3.4
Aromatherapy	127	19.8	20.6	19.1	30.5	9.9	1.0
Chelation	131	11.0	13.2	27.2	31.6	16.9	2.0
Neural therapy	56	10.7	10.7	28.0	36.0	14.7	2.4
<b>Detoxification</b>							
Remove mercury dental fillings	425	3.1	6.1	47.1	27.3	16.5	4.8
Hulda Regehr Clark's parasite program	87	18.7	9.3	36.4	27.1	8.4	1.3
Coffee enemas	146	5.4	14.3	32.0	32.7	15.6	2.5
Colonics	222	4.8	8.4	28.2	38.3	20.3	4.4
Liver flushes	148	9.6	9.6	25.5	35.7	19.7	2.9
Oil pulling	25	3.8	3.5	33.3	33.3	13.1	4.8

Gallbladder flushes	95	3.8	9.5	33.3	36.2	17.1	4.0
UltraClear	232	8.7	27.0	30.3	22.8	11.2	1.0
Hydrogen peroxide therapy	123	17.4	13.2	40.3	15.3	13.9	1.0
Eastern origin techniques							
Meditation	423	0.7	2.1	43.3	41.2	12.6	19.2
Yoga asans (postures)	260	3.0	5.9	41.9	37.4	11.9	5.5
Tai chi	154	3.2	9.0	54.5	21.8	11.5	2.7
Qi gong	109	3.3	6.5	40.7	36.6	13.0	5.1

*Continued, next page*

**Table 2. Continued.**

	Number tried	Very harmful (%)	Somewhat harmful (%)	No noticeable effect (%)	Somewhat helpful (%)	Very helpful (%)	Help:harm ratio <sup>a</sup>
Body therapies							
Traditional chiropractic	498	2.2	6.1	47.4	31.8	12.5	5.3
Chiropractic with applied kinesiology	278	3.2	3.6	41.7	35.6	15.8	7.5
Network chiropractic	63	11.6	15.1	36.0	23.3	14.0	1.4
Chiropractic with contact reflex analysis	57	18.6	5.7	32.9	28.6	14.3	1.8
Best chiropractic	29	7.1	14.3	38.1	23.8	16.7	1.9
Applied kinesiology without chiropractic	191	7.1	5.6	32.0	34.0	21.3	4.4
Alexander technique	38	4.9	4.9	68.3	19.5	2.4	2.3
Trager	31	7.1	14.3	50.0	23.8	4.8	1.3
Reiki	170	2.7	4.8	44.6	34.4	13.4	6.4
Acupressure	308	1.0	3.5	28.3	46.0	21.2	14.9
Massage	501	0.8	7.9	32.5	39.4	19.4	6.8
Touch for health	75	2.5	1.3	41.8	35.4	19.0	14.3
Polarity balancing	117	3.3	4.9	45.9	29.5	16.4	5.6
Reflexology	204	2.4	2.4	38.5	43.4	13.2	11.6
Rolfing	60	7.8	14.1	35.9	26.6	15.6	1.9
Osteopathic adjustment	171	5.0	5.5	44.2	30.4	14.9	4.3
Craniosacral work	270	4.0	2.6	36.6	36.6	20.1	8.6
Total body modification	42	8.6	6.9	29.3	36.2	19.0	3.6
Newer therapies							
Mycrohydrin	57	10.8	15.4	53.8	10.8	9.2	0.8
Oxygen therapy	162	5.6	5.1	20.3	44.1	24.9	6.4
Eye movement desensitization and reprocessing	64	15.8	7.9	51.3	17.1	7.9	1.1
Neurolinguistic programming	37	8.8	2.9	64.7	17.6	5.9	2.0
Prescription items							
Nizoral	153	16	17.8	25.2	31.3	9.8	1.2
Nystatin	402	7.9	14.5	33.2	31.9	12.5	2.0
Diflucan	249	9.9	14.5	28.9	31.4	15.3	1.9
Prozac	183	37.6	21.5	25.8	9.7	5.4	0.3
Zoloft	148	45.5	22.7	23.4	5.8	2.6	0.1

Prozac	183	37.6	21.5	25.8	9.7	5.4	0.3
Zoloft	148	45.5	22.7	23.4	5.8	2.6	0.1
Elavil	149	33.9	23.6	27.3	9.7	5.5	0.3
Other antidepressants	306	32.4	17.6	27.2	17.6	5.1	0.5
Neurontin	100	19.6	15.7	24.5	24.5	15.7	1.1
Other antiseizure medicine	76	37.6	12.9	24.7	16.5	8.2	0.5
Antibiotic therapy for <i>Mycoplasma fermentans</i>	38	17.4	13.0	21.7	21.7	26.1	1.6
Acyclovir (Zovirax)	68	19.8	13.6	40.7	18.5	7.4	0.8
Transfer factor	64	13.2	13.2	26.5	30.9	16.2	1.8
Valium	125	23.1	21.6	34.3	17.2	3.7	0.5
Xanax	134	25.0	20.8	27.8	19.4	6.9	0.6
Glutathione in nasal spray	54	16.2	17.6	35.3	25.0	5.9	0.9
Glutathione in nebulizer	33	18.0	10.0	22.0	26.0	24.0	1.8
Other							
Changed residence	513	2.9	4.5	6.0	42.3	44.3	11.7
Enzyme potentiated desensitization	61	19.1	10.3	17.6	20.6	32.4	1.8
Nambudripad desensitization	207	3.8	3.8	38.6	31.0	22.9	7.1
Magnets	265	11.1	9.0	48.4	20.4	11.1	1.6
Prayer	609	0.7	0.7	34.4	35.6	28.6	48.3
Faith healer	127	3.1	1.6	51.6	25.8	18.0	9.3
Exercise	763	4.3	10.4	23.7	40.3	21.3	4.2
Hypnosis	111	7.1	6.3	60.3	16.7	9.5	1.9
Psychotherapy to cure MCS	200	6.6	8.0	65.3	15.5	4.7	1.4
Psychotherapy to cope with MCS	362	3.8	7.0	24.1	47.7	17.3	6.0
Support group	520	1.5	7.2	15.5	42.3	33.6	8.7

\*Ratio of number reporting help to persons reporting harm.

Average \$ 51000, \$ 7000 in previous year (15% of income)  
Average \$ 57000 for making home “safer”

**Table 3. The highest rated of 101 treatments.**

Treatment	Number tried	Harmed (%)	No effect (%)	Helped (%)	Help:harm ratio
→ Chemical-free living space	820	0.6	4.5	94.8	155.2
→ Chemical avoidance	875	0.8	4.7	94.5	118.6
→ Prayer	609	1.4	34.4	64.2	48.3
Meditation	423	2.8	43.3	53.8	19.2
Acupressure	308	4.5	28.3	67.2	14.9
Touch for health	75	3.8	41.8	54.4	14.3
→ Air filter (to prevent exposure)	786	6.0	11.8	82.1	13.7
Rotation diet	560	5.7	22.1	72.2	12.7
Acidophilus	661	4.1	44.0	52.0	12.7
→ Relocation	513	7.4	6.0	86.6	11.7
Reflexology	204	4.8	38.5	56.6	11.6
→ Personal oxygen to cope with exposures	326	7.3	14.2	78.4	10.6
Faith healing	127	4.7	51.6	43.8	9.3
→ Support group	520	8.7	15.5	75.9	8.7
Craniosacral work	270	6.6	36.6	56.7	8.6
Magnesium supplements	644	6.1	41.4	52.4	8.6
Chiropractic with applied kinesiology	278	6.8	41.7	51.4	7.5
Nambudripad desensitization (NAET)	207	7.6	38.6	53.9	7.1
Aluminum foil to seal offgassing	253	10.9	14.7	74.4	6.8
Massage	501	8.7	32.5	58.8	6.8
Oxygen therapy	162	10.7	20.3	69.0	6.4
Reiki	170	7.5	44.6	47.8	6.4
Other mineral supplements	666	7.7	43.4	48.9	6.4
→ Charcoal mask	598	12.8	9.8	77.4	6.0
Psychotherapy to cope with MCS	362	4.5	24.1	65.0	6.0
Intravenous magnesium	175	11.0	25.5	63.5	5.8
Polarity balancing	117	8.2	45.9	45.9	5.6
Herbal medicines	650	11.8	24.5	63.8	5.5
Other vitamin C	683	9.5	38.8	51.7	5.5
Vitamin E supplements	709	7.2	53.1	39.6	5.4
Yoga asans (postures)	260	8.9	41.9	49.3	5.5
Traditional chiropractic	498	8.3	47.4	44.3	5.3
Acupuncture	422	10.2	36.0	53.8	5.3
Qi gong	109	9.8	40.7	49.6	5.1
Milk thistle seed	458	9.7	41.6	48.7	5.0

**Table 4.** Treatments rated more likely to harm than help.

	Number tried	Harmed (%)	No effect (%)	Helped (%)	Help:harm ratio
Zoloft	148	68.2	23.4	8.4	0.1
Prozac	183	59.1	25.8	15.1	0.3
Elavil	149	57.5	27.3	15.2	0.3
Other antidepressants	306	50.0	27.2	22.7	0.5
Valium	125	44.7	34.3	20.9	0.5
Antiseizure medications (other than Neurontin)	76	50.5	24.7	24.7	0.5
Xanax	134	45.8	27.8	26.3	0.6
Microhydrin	57	26.2	53.8	20.0	0.8
Acyclovir (Zovirax)	68	33.4	40.7	25.9	0.8
P-N for chemicals with preservative	159	40.1	25.4	34.4	0.9
Glutathione in nasal spray	54	33.8	35.3	30.9	0.9
UltraClear	232	35.7	30.3	34.0	1.0
Hydrogen peroxide	123	30.6	40.3	29.2	1.0

# MCS

Functional syndrome

Somatoform disorder

# Functional somatic syndromes

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- Symptoms = subjective experience of changes in body
- Disease = objectively observable abnormalities in body
- If no objective changes explain the patient's subjective experience, after appropriate medical assessment : “medically unexplained symptoms” or “functional somatic symptoms” or “somatoform disorder”

# Functional somatic syndromes

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- Gastroenterology → *irritable bowel syndrome, non-ulcer dyspepsia*
- Gynaecology → *premenstrual syndrome, chronic pelvic pain*
- Rheumatology → *fibromyalgia*
- Cardiology → *atypical or non-cardial chest pain*
- Respiratory medicine → *hyperventilation syndrome*
- Infectious diseases → *chronic (postviral) fatigue syndrome*
- Dentistry → *temporomandibular joint dysfunction, atypical facial pain*
- Ear, nose and throat → *globus syndrome*
- Allergy, toxicology → *multiple chemical sensitivity*

Wessely et al. *Lancet* 1999, 354, 936-39

# Functional somatic syndromes

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- Frequent (+20% of consultations in primary care)
- Generally persistent
- Sometimes severe and disabling
- Conventional medical therapy generally ineffective → frustration of patient and doctor
- High cost (repeated investigations, disability)

# Functional somatic syndromes

---

*Wessely et al. Lancet 1999, 354, 936-39*

- Large overlap in definitions of functional somatic syndromes
  - Fatigue
  - Headache
- Patients with one functional syndrome often meet diagnostic criteria for other syndromes
- Patients with different functional syndromes share non-symptom characteristics
  - Sex: women>men (except chest pain)
  - Emotional disorder: anxiety and depression
  - Physiology: altered functioning of CNS
  - History of childhood maltreatment and abuse
  - Difficulties in doctor-patient relationship

# Functional somatic syndromes

---

*Wessely et al. Lancet 1999, 354, 936-39*

- All functional syndromes respond to the same therapies
  - General: pay attention, explain, limit investigations, rehabilitation not cure
  - Antidepressants
  - Psychological therapy (cognitive behavioural)

# Toxicology and functional syndromes

---

- Frequent “specific” attributions
  - Mercury, especially dental amalgam
  - Other metals (As, Pb, ...)
  - Formaldehyde and other indoor VOCs (solvents)
  - Fungi and mycotoxins (*Stachybotrys*, ...)
  - Asbestos
  - Pesticides
- No proof of causation for low dose exposure
  - Careful epidemiology
  - Experimental studies
  - Well conducted therapeutic interventions

# Toxicology and functional syndromes

---

- Sometimes no specific attribution
  - “All” (odorous) chemicals (synthetic)
- Often “since” a well-defined “toxic” event

➤ MCS ?

# Differentieel diagnose

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- Astma
  - Beroepsastma
  - RADS
- Hyperventilatiesyndroom
- Andere longziekte
- Sick building syndrome

# Asthma

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- variable dyspnoea + wheezing
- nonspecific bronchial hyperresponsiveness
  - ! also cough, mucus hypersecretion, ...
  - ! repeated episodes of “bronchitis”
- + document by pulmonary function tests
  - ≠ hyperventilation syndrome
  - ≠ upper airway disorders
  - ≠ other causes of episodic dyspnoea

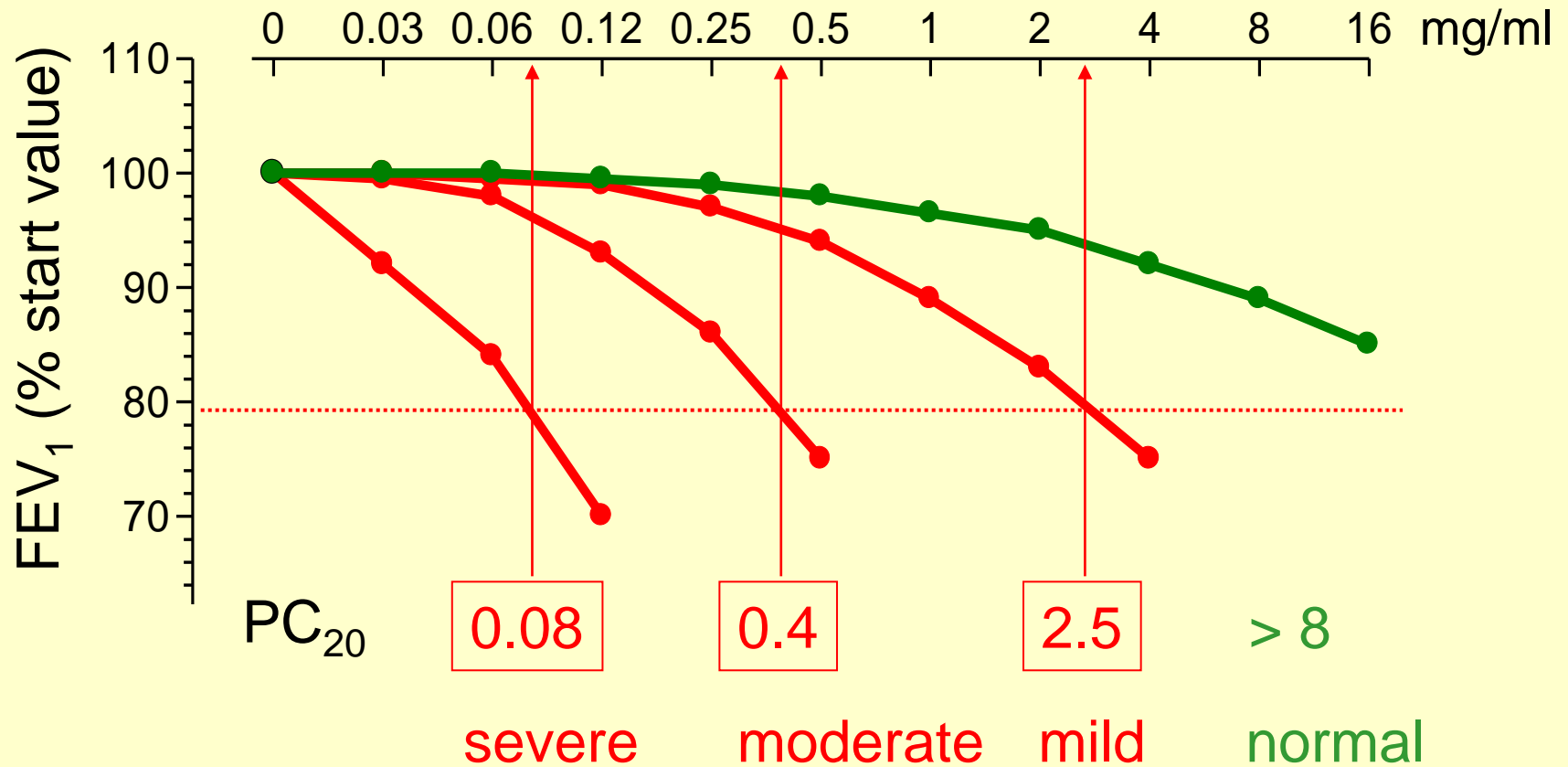
# Pulmonary function in asthma

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- Spirometry
  - Often (usually) normal values !
  - Airflow obstruction:
    - low  $FEV_1$  and  $FEV_1/FVC$
    - reversible ( $FEV_1$  +12%) after administration of  $\beta_2$ -agonist (e.g. salbutamol)
    - large (> 20%) daily variations in PEF
- Nonspecific bronchial hyperresponsiveness
  - Exaggerated response to histamine or methacholine
    - Low  $PC_{20}$  or  $PD_{20}$  (threshold for  $FEV_1$  -20%)

# Histamine test

Histamine aerosol (2 min)



# Occupational asthma

## Definitions

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- Occupational asthma

Asthma that is **caused** (specifically) by exposure to an agent present at work

- Work-aggravated asthma

Pre-existing asthma that is **aggravated** (non-specifically) by work (cold, exercise, irritants)

# Occupational asthma

## Types

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1. Occupational asthma caused by immunological (allergic) sensitisation
2. Occupational asthma not caused by immunological sensitisation

# Occupational asthma

## Types

---

1. Occupational asthma caused by **immunological** sensitisation  
(occupational asthma “*stricto sensu*”)
  - symptom-free latency period  
“**occupational asthma with latency**”\*
  - reaction to (extremely) low amounts
  - “minority” of exposed workers

\* Bernstein IL, Chan-Yeung M, Malo JL, Bernstein DI. (Eds)  
*Asthma in the workplace* (2<sup>nd</sup> Ed.) Marcel Dekker, 1999

# Occupational asthma

## Types

---

### 2. Occupational asthma “without” immunological sensitisation

- caused by irritants (“irritant-induced”)
  - single exposure (**RADS**)
  - multiple peaks
- caused by organic dust and microbial contaminants (**asthma-like syndrome**)

# RADS

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Brooks SM, Weiss MA, Bernstein IL. Reactive airways dysfunction syndrome (RADS): persistent asthma syndrome after high level irritant exposure. *Chest*, 1985, 8, 376-84

= *de novo* asthma caused by an acute inhalation injury

# RADS - criteria

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1. Documented **absence of preceding** respiratory complaints
2. Onset of symptoms after a **single** specific exposure incident
3. Exposure to gas, smoke, fume or vapour present in very **high** concentration and with **irritant** properties
4. **Onset** of symptoms **within 24 h** after exposure
5. **Persistence** of symptoms for at least **3 months**
6. Symptoms simulate **asthma** (cough, wheezing, dyspnoea)
7. Pulmonary function tests may show airflow **obstruction**
8. Positive **methacholine/histamine** test
9. Other disease ruled out

# RADS - criteria (3')

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3. Exposure to gas, smoke, fume or vapour present in **very high** concentration and with irritant properties
- yes, in typical cases
    - inhalation injury requiring medical treatment (emergency room admission, infirmary, ...)
  - some cases do **not** appear to involve “very high” concentrations, nor clinically severe injury needing (immediate) medical attention

# Asthma and cleaning agents

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Medina-Ramón *et al.* *OEM* 2005, 62, 598-606

- (Nested) case-control study of female cleaners (30-65 y)
- 40 cases (asthma or chronic bronchitis) – 155 controls
- Higher risk of asthma if use of bleach (dose-related)
- Higher risk of asthma if reported inhalation incident (frequent!)

# Medina-Ramón *et al.* *OEM* 2005, 62, 598-606

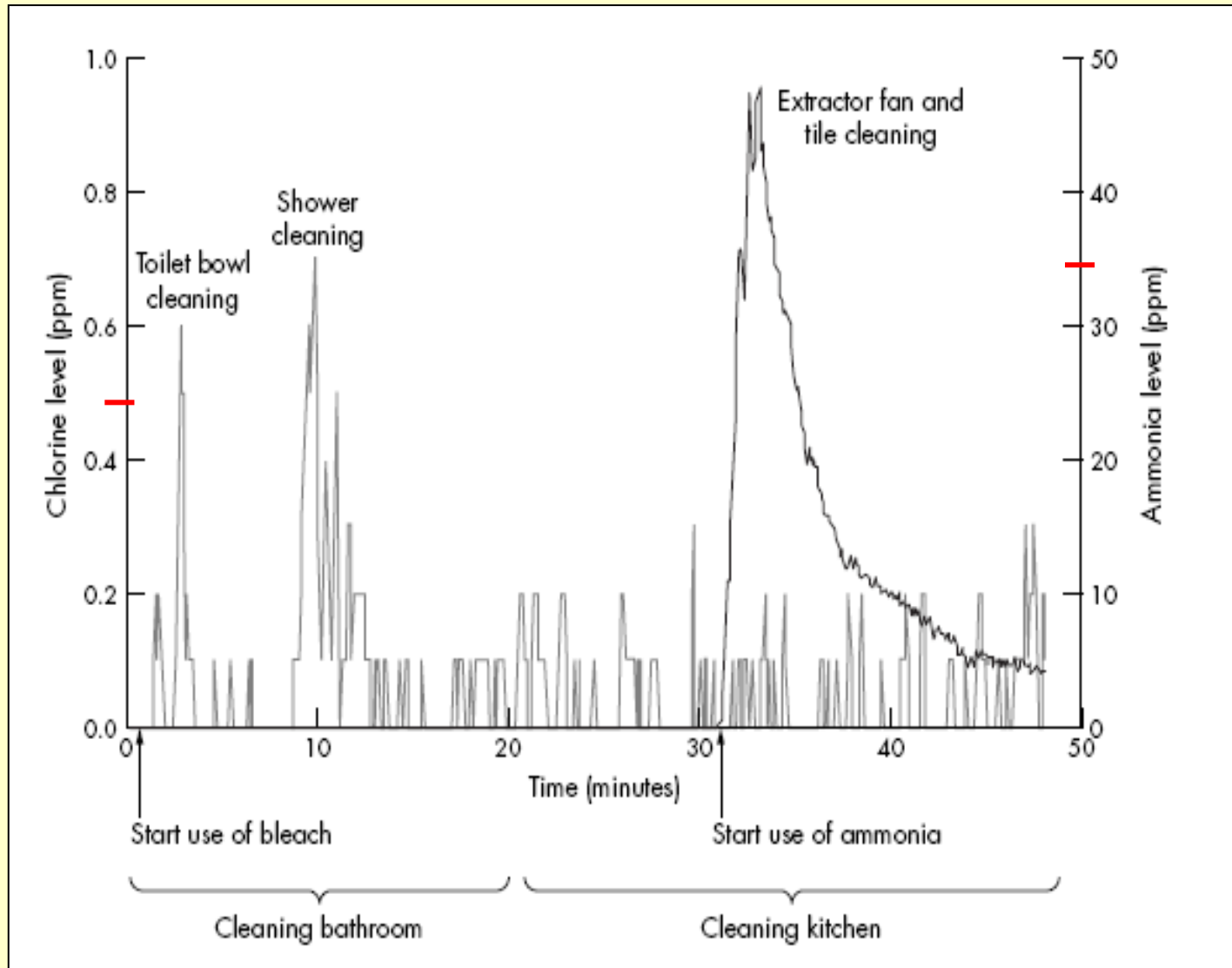
**Table 4** Multivariate associations (adjusted odds ratios and 95% confidence intervals) between asthma/chronic bronchitis symptoms, and risk factors

	Controls (n = 152*)	All cases (n = 40)	OR (95% CI)	Asthma (n = 24)	OR (95% CI)	Chronic bronchitis without asthma (n = 16)	OR (95% CI)
Bleach (both undiluted and diluted)							
<364 times/year	56	8	1.0	3	1.0	5	1.0
364–640 times/year	53	11	3.3 (0.9 to 11)	9	10 (1.7 to 60)	2	0.9 (0.1 to 6.5)
≥640 times/year	43	21	4.9 (1.5 to 15)	12	12 (2.3 to 67)	9	2.6 (0.6 to 12)
Use of liquid multi-use cleaning products							
<266 times/year	50	20	1.0	13	1.0	7	1.0
266–480 times/year	51	12	0.3 (0.1 to 0.8)	6	0.2 (0.0 to 0.7)	6	0.3 (0.1 to 1.6)
≥480 times/year	51	8	0.2 (0.1 to 0.6)	5	0.1 (0.0 to 0.5)	3	0.2 (0.0 to 1.3)
Washing dishes							
<376 times/year	64	10	1.0	8	1.0	2	1.0
376–520 times/year	37	12	3.2 (1.0 to 10)	6	2.0 (0.5 to 8.9)	6	7.5 (1.0 to 53)
≥520 times/year	51	18	3.1 (1.1 to 8.9)	10	3.8 (1.0 to 14)	8	6.5 (0.9 to 47)
Inhalation of an important quantity of vapours, gas, or fumes related to cleaning agents							
Never	73	9	1.0	5	1.0	4	1.0
Ever	79	31	2.3 (0.9 to 6.1)	19	3.8 (1.0 to 14)	12	0.9 (0.2 to 4.3)
Employment in non-domestic cleaning							
Never	101	9	1.0	5	1.0	4	1.0
Ever	51	31	8.5 (3.2 to 23)	19	12 (3.2 to 46)	12	7.9 (1.6 to 39)
Smoking							
Never	127	25	1.0	19	1.0	6	1.0
Currently	15	11	4.1 (1.1 to 15)	2	0.5 (0.1 to 3.9)	9	22 (3.6 to 137)
Formerly	10	4	5.3 (1.1 to 25)	3	5.5 (0.9 to 33)	1	8.9 (0.5 to 173)

Multiple logistic regression analyses adjusted for all listed variables and age tertile.

\*Three controls had missing values for one or more of the exposure variables and were not included in this multivariate model.

TLV-  
STEL



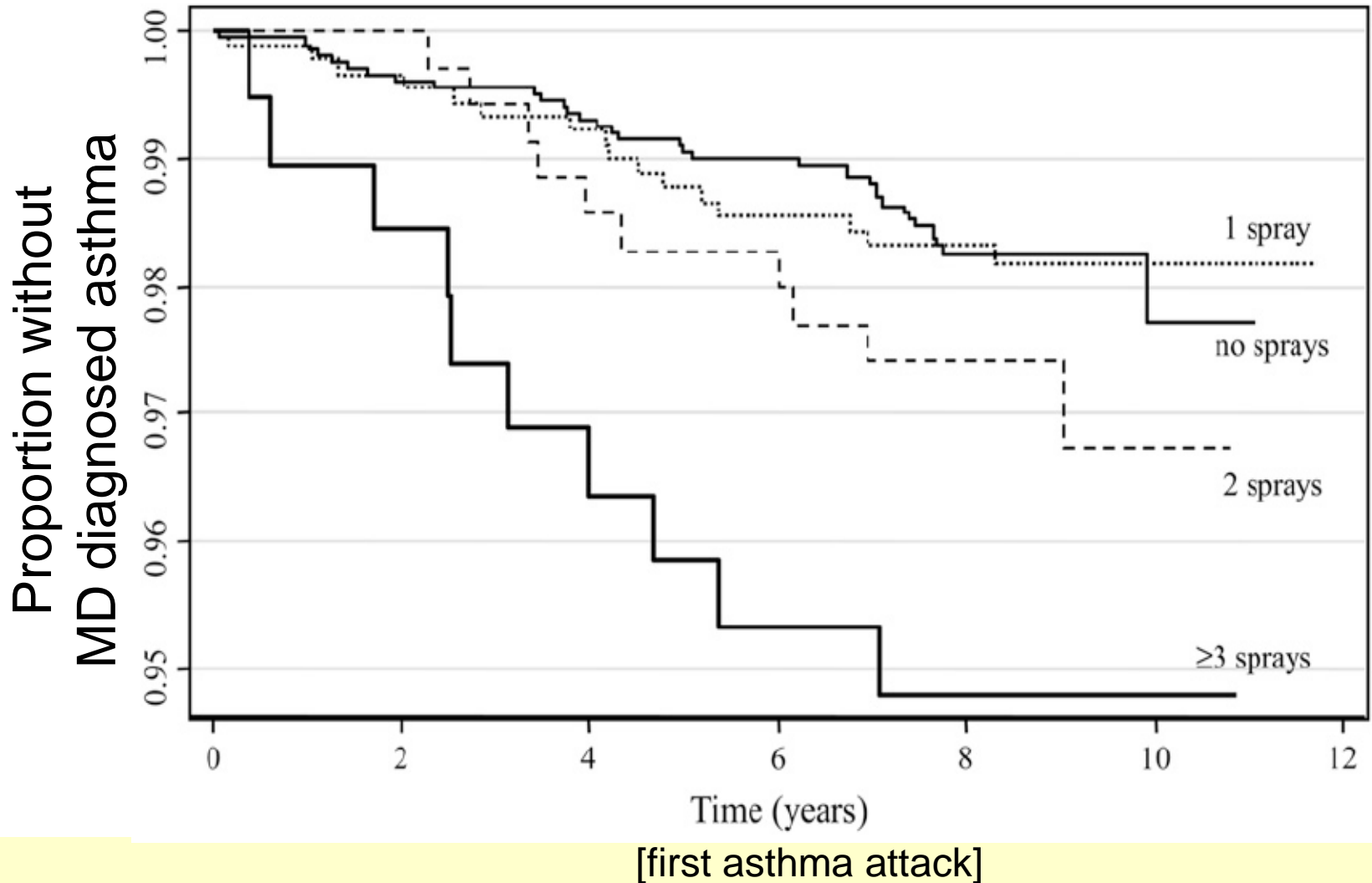
# Asthma and cleaning agents

---

Zock *et al.* *AJRCCM* 2007, 176, 735-741

- use of cleaning sprays  $\geq 1$  d/w: RR 1.49 for incidence of asthma symptoms/medication
- use of cleaning sprays  $\geq 4$  d/w: RR 2.11 for incidence of physician-diagnosed asthma
- sprays for glass-cleaning, furniture and air-refreshing
- no association with cleaning products not applied as sprays
- no modification of risk by atopy

# Zock *et al.* AJRCCM 2007, 176, 735-741



# RADS

## Comorbidity – Differential diagnosis

- **Structural** lesions (case reports)
  - Bronchial polyps, strictures, bronchiectases
  - Bronchiolitis obliterans
    - Mainly described (6 weeks) after NO<sub>2</sub>
  - Tracheo-bronchomalacia
    - Ghanei *et al.* *AJRCCM*, 2006,173, 304-9 (sulphur mustard)
  - Pulmonary fibrosis (?)
- **follow-up after inhalation injury requires:**
  - Pulmonary function, including DL<sub>co</sub>
  - Imaging (CT & HRCT)
  - Bronchoscopy

# RADS

## Comorbidity – Differential diagnosis

---

- Upper airway disorders

- Nasal hyperreactivity and rhinitis (RUDS)

Meggs WJ. *J Toxicol Clin Toxicol* 1994; 32: 487-501

- Anosmia/hyposmia
- Vocal cord dysfunction
- Obstructive Sleep Apnea ??

# RADS

## Comorbidity – Differential diagnosis

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- **Neuropsychiatric** symptoms  
caused by central anoxia (CO, ...) or  
neurotoxicity (solvents):
  - Parkinson, ...
  - Cognitive defects (OPS), ...

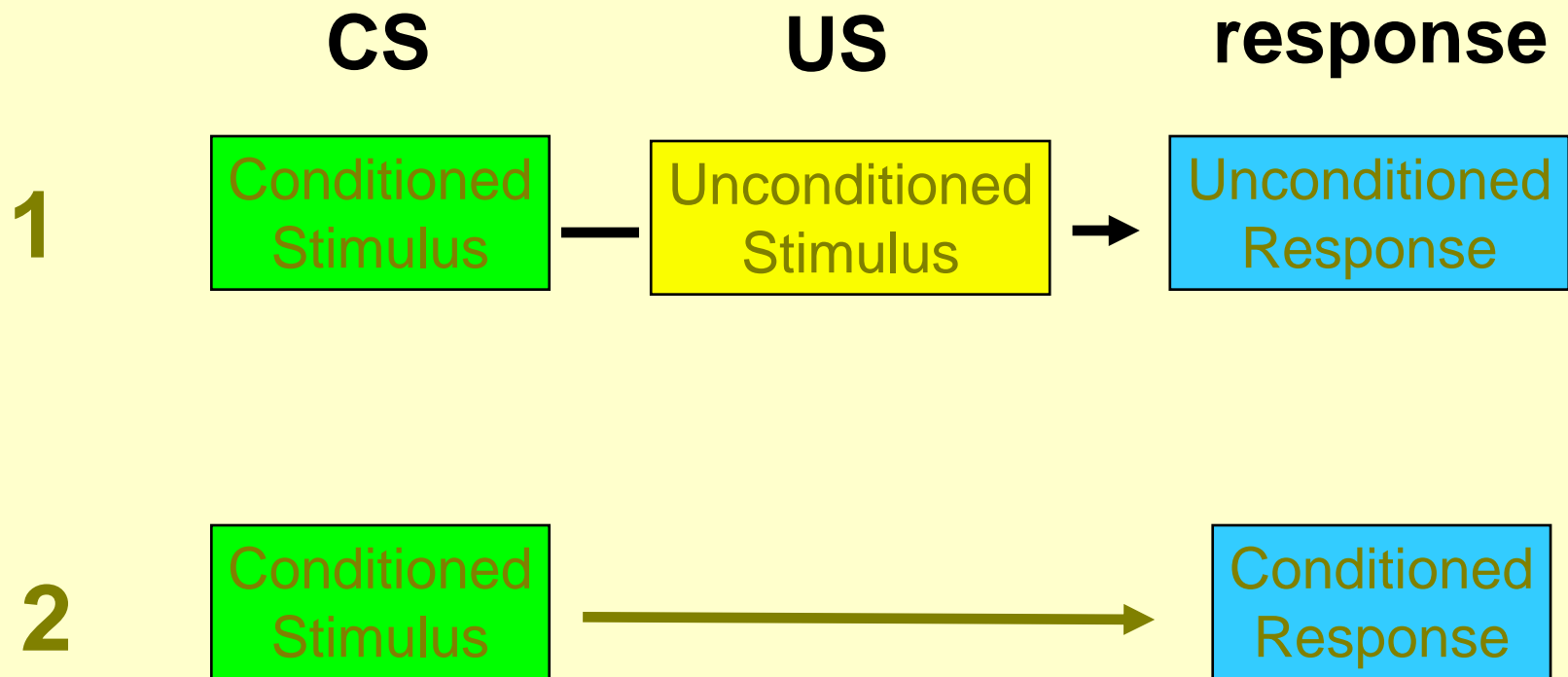
# RADS

## Comorbidity – Differential diagnosis

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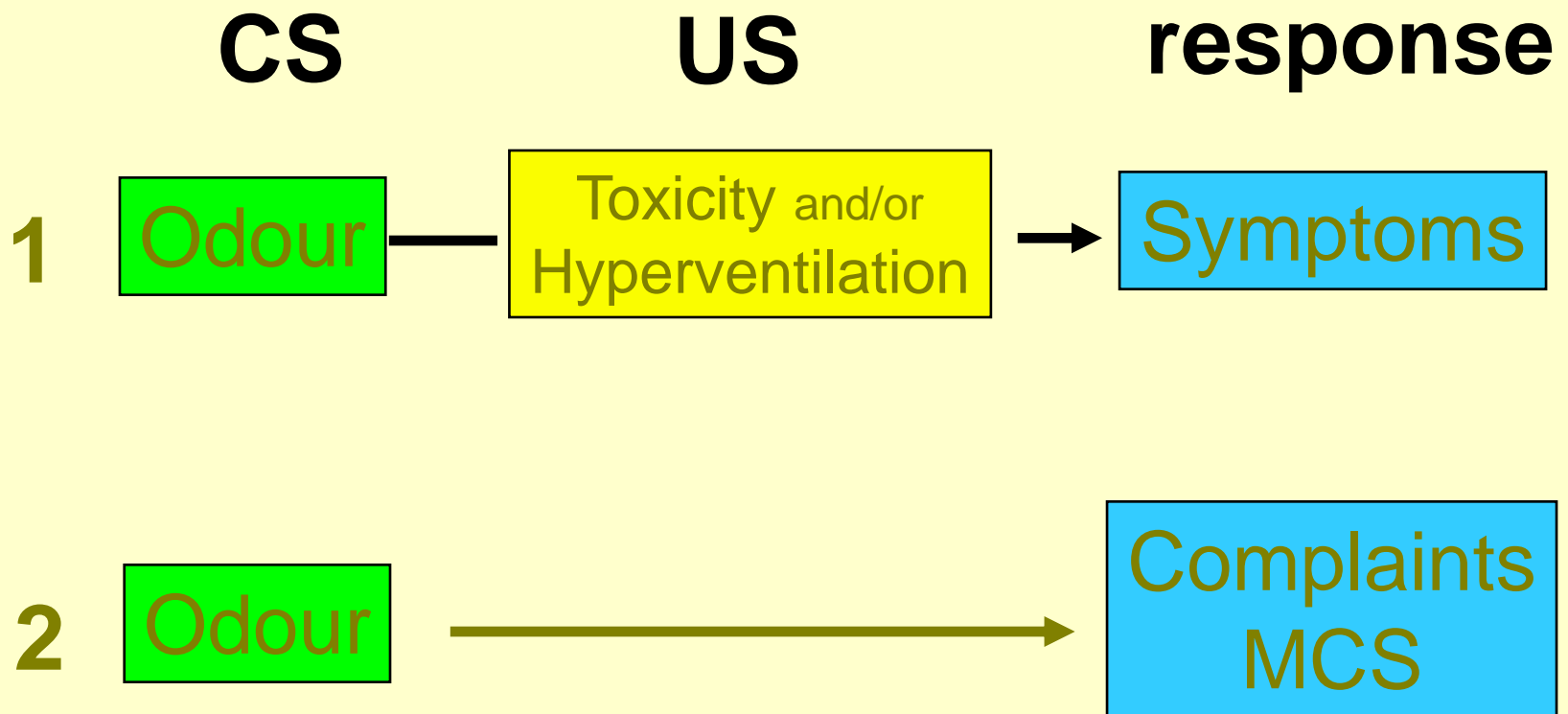
- “Multiple Chemical Sensitivity” (MCS)  
= “chemophobia”
  - acquired intolerance (**NOT allergy**) against low levels of diverse (odorous) chemicals:
    - “dyspnoea”, malaise + symptoms as in chronic fatigue syndrome (memory & concentration loss)
    - may be invalidating; social isolation
  - DD: RADS, HVs, VCD, depression, ...
  - Pavlovian conditioning? (behavioural therapy?)

# Classical conditioning model



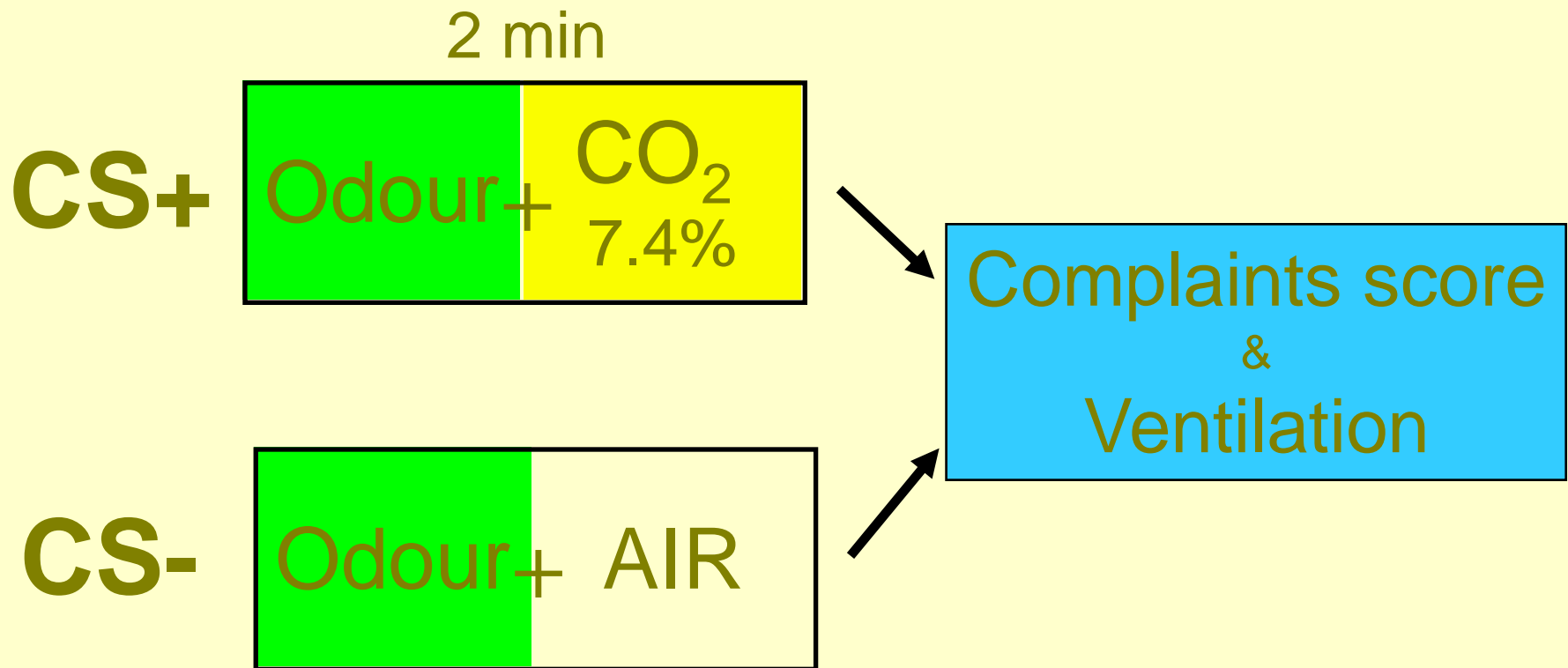
# Hypothesis: odour conditioning leads to MCS

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# Odour respiratory conditioning paradigm

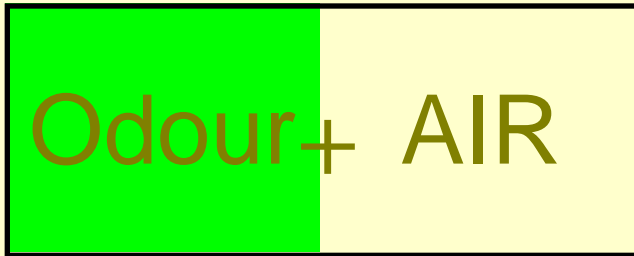
## 1. Acquisition phase



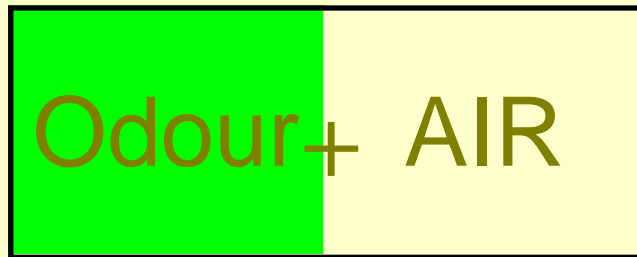
## 2. Test phase

2 min

**CS+**



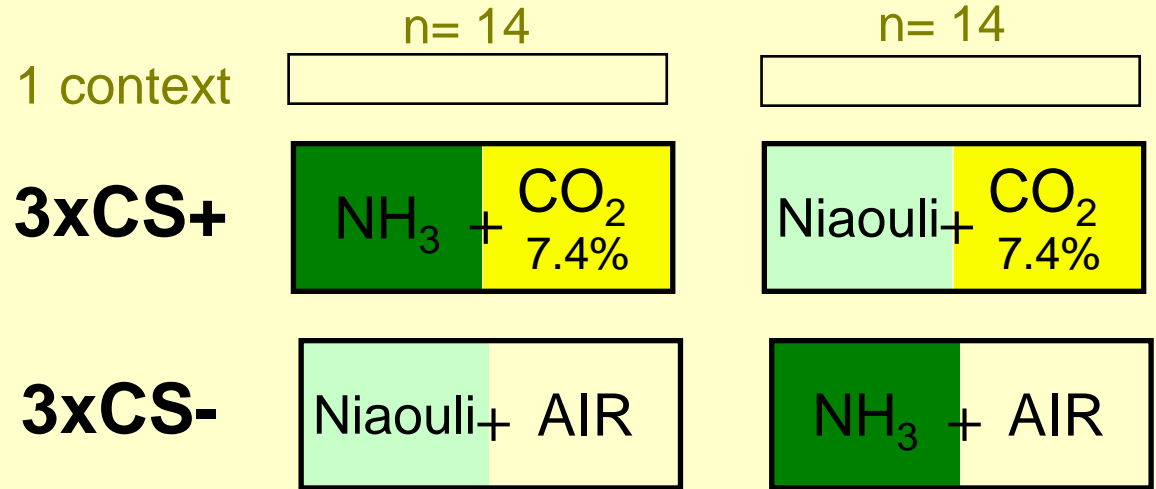
**CS-**



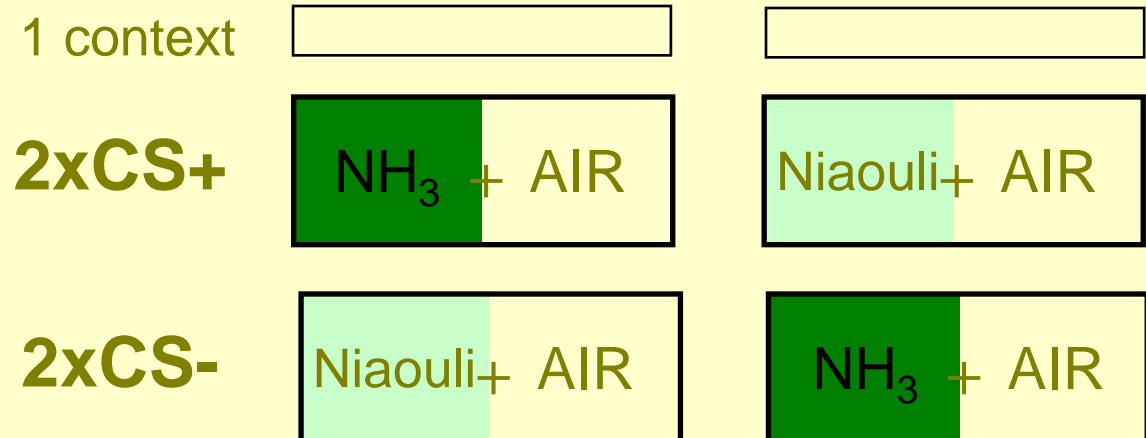
Complaints score  
&  
Ventilation

# Experimental protocol

## 1. Acquisition



## 2. Test



# Experimental studies

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- Van den Bergh O. *et al.* Respiratory learning and somatic complaints: a conditioning approach using CO<sub>2</sub>- enriched air inhalation. *Behaviour Research and Therapy*, 1995, 5, 517-27.
- Van den Bergh O. *et al.* Acquisition and extinction of somatic symptoms in response to odors. A pavlovian paradigm to investigate multiple chemical sensitivity. *Occupational and Environmental Medicine*, 1999, 56, 295-301.
- Devriese *et al.* Generalization of acquired somatic symptoms in response to odors: a Pavlovian perspective on Multiple Chemical Sensitivity. *Psychosomatic Medicine*, 2000, 62, 751-759

# Conclusions

---

- Complaints and ventilatory reactions (such as those commonly observed in MCS) can be caused by harmless, but **unpleasant** odours, having been paired previously with a respiratory CO<sub>2</sub> challenge in a classical conditioning paradigm
- **Pavlovian conditioning** is a plausible mechanism to explain the genesis of MCS

# Further studies

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Winters W, Devriese S, Van Diest I, Nemery B, Veulemans H, Eelen P, Van de Woestijne K, Van den Bergh O. Media warnings about environmental pollution facilitate the acquisition of symptoms in response to chemical substances. *Psychosom Med.* 2003, 65, 332-8

- conditioning worked only if received **prior message** about environmental pollution and mcs
- but conditioning was effective for BOTH foul and pleasant odors!

# Sick Building Syndrome

# Building-related illness

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1. Hypersensitivity pneumonitis (extrinsic allergic alveolitis) & humidifier fever
2. Building related asthma & allergic rhinitis
3. Infectious disease
4. Intoxications
5. Building-related dermatitis
6. Annoyance & irritational syndromes (sick-building syndrome)
7. Mass psychogenic/sociogenic illness

from Bardana *et al. Clin Rev Allergy*, 1988, 6, 61-89

# Sick building syndrome

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« *The sick building syndrome consists of a group of mucosal, skin, and general symptoms that are temporally related to working in particular buildings* »

excluding infectious disease or toxic reactions

Burge P.S. Sick Building Syndrome.  
*Occ Environ Med* 2004, 61, 185-190

# Sick building syndrome

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## Tight building syndrome

*« Illness in which worker complaints of ill health in a particular building are more common than might be reasonably expected »*

+ no other obvious explanation

# Sick building syndrome

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## Constellation of subjective & nonspecific symptoms

- Headache, fatigue, lethargy
- Eye irritation & watering
- Irritation of upper airways
- Nasal congestion, sneezing
- Dry throat, cough
- Chest tightness
- Nausea, dizziness
- Poor concentration
- Dry skin, pruritus

## Clearly work-related

- Worsening during day & workweek
- **Rapid** resolution when leaving building

# Sick building syndrome

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- Usually: large governmental or commercial office buildings, but also hospitals and schools
- Usually: mechanical ventilation and/or air conditioning, but also possible in naturally ventilated buildings

# Sick building syndrome

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- Absence of objective clinical or laboratory abnormalities
- Symptoms are *attributed* to bad indoor air quality:
  - « dry air »
  - « lack of fresh air »
  - « no control of temperature »
  - « fluorescent lighting »
  - ...

but no « abnormal » measurements,  
i.e. compliance with current standards of  
temperature, ventilation, lighting, ...

# Sick building syndrome

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- Solutions may be « easy »
  - Multidisciplinary approach
  - Improve general maintenance of building and ventilation system
  - « *Treat work environment as seriously as computers* »

Mass psychogenic illness  
Mass sociogenic illness  
(Mass hysteria)

# Mass sociogenic illness

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- Mass sociogenic/psychogenic illness  
*“constellation of symptoms suggestive of an organic illness, but without identifiable cause, which occurs among two or more persons who share beliefs related to those symptoms”*  
[ “mass hysteria” ]
- described in many settings (schools, offices, plants, communities)

# Mass sociogenic illness

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- Boss LP. Epidemic hysteria: a review of the published literature. *Epidemiologic Reviews*, 1997, 19, 233-242
- Philen RM et al. Mass sociogenic illness by proxy: parentally reported epidemic in an elementary school. *Lancet* 1989, ii, 1372-1376
- Jones TF *et al.* Mass psychogenic illness attributed to toxic exposure at a high school. *N Engl J Med* 2000, 342, 96-100
- + Wessely S. Responding to mass psychogenic illness (Editorial). *N Engl J Med* 2000, 342, 129-30

# Mass sociogenic illness

---

- Frequently reported in small communities (schools, workplaces, ...)
- Large outbreaks
  - Israeli-occupied West-Bank, 1983
    - n = 949 (747 schoolgirls)
  - Kosovo, 1990
    - n = 3000 (Albanians, mainly female teenagers)
  - Tbilisi, (Soviet) Georgia, 1989
    - Schoolchildren 40 d after violent repression of demonstration (“chemical warfare agents”)

# The Coca-Cola crisis in Belgium

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- Nemery B. *et al.* Dioxins, Coca-Cola, and mass sociogenic illness in Belgium (Letter). *Lancet*, 1999, 354, 77.
- Nemery B. *et al.* The Coca-Cola incident in Belgium, June 1999. *Food and Chemical Toxicology*, 2002, 40, 1657-1667

# Multiple Chemical Sensitivity (MCS)

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poorly understood & controversial syndrome

- fatigue, difficulty concentrating, anxiety, headache, nausea, dizziness, pounding heart, muscle tension, shortness of breath, ...
- in response to exposure to many chemically **unrelated** compounds (**odours**, solvents, “pollutants”, ...)
- **at doses well below accepted toxic levels**

# MCS

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- no toxicological or immunological basis
- no demonstrable organic disease
- but distressing and may be very disabling
  - panic reactions, hyperventilation, depression, ...
  - job loss, social isolation, ...
  - frustration, medical shopping (“clinical ecologists”)
- probably psychogenic origin (“chemophobia”)

mechanism ?

Pavlovian conditioning to odours ?

# Toxicology and functional syndromes

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## Multiple chemical sensitivity, chronic fatigue syndrome, fibromyalgia

- Consider/exclude other disease (incl. allergy, irritant-induced asthma, sleep disorders, ...)
- Exclude real poisoning
  - History
  - Clinical syndromes (incl. chronic toxic encephalopathy caused by heavy occupational exposure to solvents)
  - Exposures
- Evaluate source of specific attribution
  - CAVE “clinical ecologists” and other “specialists” (Internet)
- Limit investigations (immunology, toxicology)
- Do not (or limit) advice to avoid exposures
- Explain and give reassurance
- Cognitive behavioural therapy

# Genezen van MCS

Multiple Chemical Sensitivity - Meervoudige Chemische Overgevoeligheid

Enkele jaren na het verschijnen van het MCS boek "Als Chemische Stoffen en Geuren je Ziek maken. Een naslagwerk over de onbegrepen milieuziekte MCS" ben ik voor ca. 80% genezen van MCS (december 2010). Graag wil ik via deze webpagina mijn nieuwe ontdekkingen met u – de MCS patiënt, de arts, therapeut of andere geïnteresseerde – delen, als aanvulling op de reeds gedeelde kennis met u en in de hoop dat deze 'bewegwijzering' vele andere MCS patiënten zal bereiken en daarmee ook hun leven en situatie verlicht zal worden. Voor de goede orde: Ik benadruk dat ik geen enkel commercieel belang heb in de aangegeven genezingsmethode.

*Els Valkenburg*



Ik (Els Valkenburg) tijdens mijn eerste etentje (er volgden nog vele etentjes en uitjes daarna!)



**Hieronder een beschrijving van mijn ontdekkingen en daarmee de grandioze verandering in mijn leven:**

Mijn verbetering heeft twee aanleidingen, enerzijds het feit dat ik door de overgang flinke hormonale veranderingen heb ondergaan en anderzijds ben ik in diezelfde tijd een hersentraining gaan doen.

Dank voor uw aandacht

[ben.nemery@med.kuleuven.be](mailto:ben.nemery@med.kuleuven.be)