National Prevalence and Effects of Multiple Chemical Sensitivities

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ABSTRACT

OBJECTIVE To assess the prevalence of multiple chemical sensitivities (MCS), its co-occurrence with asthma and fragrance sensitivity, and effects from exposure to fragranced consumer products.

METHODS A nationally representative cross-sectional population-based sample of adult Americans (n=1,137) was surveyed in June 2016.

RESULTS Among the population, 12.8% report medically diagnosed MCS and 25.9% report chemical sensitivity. Of those with MCS, 86.2% experience health problems, such as migraine headaches, when exposed to fragranced consumer products; 71.0% are asthmatic; 70.3% cannot access places that use fragranced products such as air fresheners; and 60.7% lost workdays or a job in the past year due to fragranced products in the workplace.

CONCLUSIONS Prevalence of diagnosed MCS has increased over 300%, and self-reported chemical sensitivity over 200%, in the past decade. Reducing exposure to fragranced products could help reduce adverse health and societal effects.

Background

Multiple chemical sensitivities (MCS) is a medical condition characterized by adverse health effects from exposure to common chemicals and pollutants, from products such as pesticides, new carpet and paint, renovation materials, diesel exhaust, cleaning supplies, perfume, scented laundry products, and air fresheners.[1,2] MCS can cause a range of acute, chronic, multi-organ, and disabling health effects, such as headaches, dizziness, cognitive impairment, breathing difficulties, heart palpitations, nausea, mucous membrane irritation, and asthma attacks.[3] Individuals with MCS may not receive a diagnosis but nonetheless exhibit the condition of chemical sensitivity. Previous studies have found MCS often co-occurs with asthma,[4] as well as fragrance sensitivity,[5] characterized by adverse health effects from exposure to fragranced consumer products.[6]

While MCS is perhaps the most common term, the condition is also known by other terms, such as chemical intolerance or environmental illness (specific to chemical exposures).[3] MCS follows a two-step process of (i) initiation of the disease, often from exposure to petrochemical products, and then (ii) triggering of symptoms when exposed to problematic chemicals, often at low levels.[3,7] While significant efforts have been devoted to developing case definitions and diagnostic criteria,[3,8,9] a single internationally agreed-upon standard for prevalence studies is not yet established. Nonetheless, prior population-based studies of MCS, using specific and often different definitions and criteria, offer useful data on the extent and severity of the condition.

In the USA, two previous nationally representative studies, conducted in 2002-2003[4] and 2005-2006,[5] investigated the prevalence of MCS by using the key question developed by the California Department of Health Services (CDHS):[10] "Compared to other people, do you consider yourself allergic or unusually sensitive to everyday chemicals like those in household cleaning products, paints, perfumes, detergents, insect spray and things like that?" This criterion reflects self-reported chemical sensitivity. To ascertain a medical diagnosis of MCS, the survey asked, "Has a doctor or health care professional ever told you that you have multiple chemical sensitivities?" This criterion reflects medically diagnosed MCS. These two USA studies found (respectively) a prevalence of 11.1% and 11.6% self-reported chemical sensitivity and 2.5% and 3.9% medically diagnosed MCS.

At the state and regional level in the USA, using the CDHS criteria, a survey of 4,046 Californians in 1995[10] found a prevalence of 15.9% self-reported chemical sensitivity and 6.3% medically diagnosed MCS. A survey of 1,583 metropolitan Atlantans in 1999-2000,[1] also using the CDHS criteria, found a prevalence of 12.6% self-reported chemical sensitivity and 3.1% diagnosed MCS. A survey of 1,027 individuals in North Carolina in 1993,[11] using a question similar to CDHS, found a prevalence of 33% chemical sensitivity.

In Sweden, using the chemical sensitivity scale for sensory hyperreactivity (CSS-SHR),[12] an investigation of 1,387 adults in Skövde found a prevalence of 33% of self-reported general odour intolerance, or being bothered by strong or pungent odours, such as perfume, cleaning agents or flower scents.[13] Also in Sweden, a survey of 3,406 adult respondents from Västerbotten found 12.2% reported chemical intolerance to odorous

pungent chemicals, such as perfumes and cleaning agents, and 3.3% were physician-diagnosed with chemical intolerance.

In Australia, a population based-survey of 4,009 adults in South Australia in 2001-2002,[14] using a variation of the CDHS question, found a prevalence of 15.9% of self-reported chemical sensitivity and 1% medically diagnosed MCS. In Japan, a national survey of 7,245 adults,[15] using the Quick Environmental Exposure and Sensitivity Inventory (QEESI) questionnaire,[9] found a prevalence of 7.5% for chemical intolerance. In Korea, a survey of 379 adults, also using the QEESI, found a prevalence of 16.4% for chemical intolerance.[16]

While these studies provide useful context, we lack recent nationally representative data in the USA. A primary objective of this study is to provide a current estimate of the prevalence of MCS in the American population. Also, given previous studies indicating connections, a second objective is to investigate the co-occurrence of MCS with asthma and with fragrance sensitivity. Finally, because fragranced products are a common trigger, a third objective is to investigate the effects of exposure to fragranced products for individuals with MCS, which points to ways to reduce potential adverse effects.

Methods

To assess the prevalence and effects of MCS, an on-line survey was conducted with a random national cross-sectional sample of the adult US population, representative of age, gender, and region (n=1,137, 95% confidence level, 3% margin of error), drawn from a

large national panel (over 5,000,000 people) held by Survey Sampling International. The survey instrument was developed and tested over a two-year period before full implementation in June 2016. Response rate was 95%, and all responses were anonymous. (Details on survey methodology, questions, and data are provided in the files "Survey Methodology" and "Survey Data" as Supplemental Digital Content.)

To promote comparability, the survey replicated questions from previous large US national, state, and regional MCS prevalence studies.[1,4,5,10,11] In accordance, to ascertain medically diagnosed MCS, the survey asked, "Has a doctor or health care professional ever told you that you have multiple chemical sensitivities?" To ascertain self-reported chemical sensitivity, the survey asked, "Compared to other people, do you consider yourself allergic or unusually sensitive to everyday chemicals like those in household cleaning products, paints, perfumes, detergents, insect spray and things like that?"

To ascertain asthma, questions asked "Has a doctor or health care professional ever told you that you have asthma or an asthma-like condition?" and then further asked to specify whether asthma or an asthma-like condition. The term "asthmatic" will be used herein to encompass individuals with either asthma or an asthma-like condition or both.

To ascertain fragrance sensitivity, the survey investigated health effects associated with exposures to fragranced consumer products. A "fragranced consumer product," or "fragranced product" for brevity, is a chemically formulated product with the addition of a fragrance or scent.[6] An individual was considered to characterize fragrance sensitivity if

they experienced one or more types of health problems from one or more types of fragranced products and exposure contexts.

Fragranced product types were categorized as follows: air fresheners and deodorizers, personal care products, cleaning supplies, laundry products, household products, fragrance, and other. Health effects were categorized as follows: migraine headaches; asthma attacks; neurological problems; respiratory problems; skin problems; cognitive problems; mucosal symptoms; immune system problems; gastrointestinal problems; cardiovascular problems; musculoskeletal problems; and other. (Additional details on specific product types and health effects within each category, along with response data, are provided in the file "Survey Data" as Supplemental Digital Content.)

Specific exposure contexts were air fresheners or deodorizers used in public restrooms and other environments, scented laundry products coming from a dryer vent, being in a room after it was cleaned with scented cleaning products, being near someone wearing a fragranced product, entering a business with the scent of fragranced products, fragranced soap used in public restrooms, and ability to access environments that used fragranced products. The survey also investigated effects of fragrance exposure in the workplace, access to public places that used fragranced products, and preferences for fragrance-free environments and policies. Data on fragranced product exposures and effects were derived from a survey of the general population,[6] while the present study focuses specifically on effects on the sub-populations of individuals with MCS or chemical sensitivity.

Results

A national prevalence of 12.8% medically diagnosed MCS, 25.9% self-reported chemical sensitivity, and 27.5% either or both, was assessed by the survey. (See Table 1.) Compared with previous studies,[4,5] the prevalence of diagnosed MCS has increased over three times (2.5%, 3.9% to 12.8%) and self-reported chemical sensitivity has increased over two times (11.1%, 11.6% to 25.9%) in a little over ten years.

In addition, 71.0% of those with MCS are asthmatic: diagnosed with asthma (40.0%), an asthma-like condition (34.5%), or both. Also, 59.2% with chemical sensitivity are asthmatic: diagnosed with asthma (35.0%), an asthma-like condition (26.2%), or both. (See Table 1.) Compared with previous studies,[4,5] the co-occurrence of asthma with diagnosed MCS (42.3%, 39.0% versus 40.0%) and with chemical sensitivity (34.2%, 34.9% versus 35.0%) is relatively similar.

Fragranced consumer products were found to trigger a range of adverse health and societal effects. When exposed to fragranced consumer products, 86.2% of those with MCS experience one or more types of health problems, including respiratory difficulties (50.3%), migraine headaches (46.9%), mucosal symptoms (46.9%), skin problems (37.9%), and asthma attacks (31.7%). Similarly, 81.2% of those with chemical sensitivity report one or more types of health problems when exposed to fragranced products (see Tables 1 and 2).

Specific exposures triggering health problems include air fresheners and deodorizers (67.6%), scented laundry products coming from a dryer vent (57.9%), being in a room recently cleaned with scented products (67.6%), being near someone wearing a fragranced product (65.5%), and in general fragranced consumer products (73.1%) (see Table 3, and the file "Survey Data" as Supplemental Digital Content).

For 76.0% of people with MCS, the severity of these health problems was potentially disabling according to the criterion of the Americans with Disabilities Act Amendments Act of 2008 (ADAAA), asked by the question: "Do any of these health problems substantially limit one or more major life activities, such as seeing, hearing, eating, sleeping, walking, standing, lifting, bending, speaking, breathing, learning, reading, concentrating, thinking, communicating, or working, for you personally?"[17] (See Table 4.)

Fragranced products also restrict access in society: 58.6% of individuals with MCS are unable to use public restrooms that have an air freshener, deodorizer, or scented product; 55.2% are unable to wash their hands in a public place if the soap is fragranced; 63.4% enter a business but then want to leave as quickly as possible due to a fragranced product; and 70.3% have been prevented from going someplace because of the presence of a fragranced product that would make them sick. (See Table 4.)

Significantly, 60.7% of those with MCS lost workdays or a job in the past year due to illness from fragranced product exposure in the workplace. Further, 71% of those with

MCS would support a fragrance-free policy in the workplace, and 82.1% would prefer that health care facilities and professionals were fragrance-free. (See Table 4.)

Demographic proportions of diagnosed MCS are 57.9% male and 42.1% female, compared with the general population of 46.2% male and 53.8% female. Previous national prevalence studies in the US found instead a slight female bias. Thus, diagnosed MCS has a male bias (+11.7%). Relative to gender and age, the highest bias (percentage MCS greater than general population) is male 25-34 (+12.7%). (See Table 5.)

Discussion

Results of this study provide evidence that multiple chemical sensitivities is widespread and increasing in the US population: an estimated 25.6 million adults are diagnosed with MCS, and an estimated 51.8 million adults report chemical sensitivity.[18] Using the same criteria to assess MCS and chemical sensitivity as prior US national prevalence studies, this represents an increase of 300% in diagnosed MCS and 200% in self-reported chemical sensitivity in a little more than ten years.

Among individuals diagnosed with MCS, 71.0% report being diagnosed also with asthma or an asthma-like condition. Thus, individuals with MCS are proportionally more likely to be asthmatic than individuals without MCS (prevalence odds ratio 9.6; 95% confidence interval 6.5–14.2).

In addition, among individuals with MCS, 86.2% report adverse health effects from exposure to fragranced consumer products. Thus, individuals with MCS are proportionally more likely to be fragrance sensitive than individuals without MCS (prevalence odds ratio 16.8; 95% confidence interval 10.3–27.5).

As a consequence, individuals with MCS are prevented from accessing restrooms, businesses, workplaces, and public places due to risk of adverse health effects—some potentially disabling—from fragranced consumer products. Notably, exposure to fragranced consumer products is associated with lost workdays or a job, in the past year, for 11.0% of the adult population with MCS or chemical sensitivity, representing an estimated 22 million Americans. While researchers continue to investigate which chemicals or mixtures of chemicals in fragranced consumer products could be associated with adverse effects,[19] a practical step in the meantime would be to reduce exposure to the products. For instance, 71.0% of those with MCS would support fragrance-free policies in the workplace, and 82.1% would prefer fragrance-free health care facilities and professionals, as would a majority of the US general population.[6]

Limitations of the study include the following: (a) data were based on self-reports, although a standard and accepted method for epidemiological research, and consistent with prior prevalence studies of MCS; (b) only adults (ages 18-65) were surveyed; (c) all possible fragranced products and health effects were not included, although the low percentages for responses in the "other" category indicates the survey captured the primary products and effects; and (d) MCS and chemical sensitivity lack standard diagnostic criteria, although the

survey replicated questions from prior large-scale USA prevalence studies to promote comparability.

Conclusions

The prevalence of multiple chemical sensitivities has increased across the American population, and it frequently co-occurs with asthma and fragrance sensitivity. Moreover, fragranced consumer products, such as air fresheners and scented cleaning products, trigger significant adverse health and societal effects among individuals with MCS. Reducing exposure to fragranced products, such as through fragrance-free policies, would be an important practical step to reduce the adverse effects.

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Table 1: Prevalence and Co-Occurrence of MCS and Chemical Sensitivity with Asthma and Fragrance Sensitivity

	Gen Pop	**MCS Diag**	**ChemSens**	**MCS/ChemSens**
Total (N)	1137	145	294	313
(% relative to General Population)	100.0%	12.8%	25.9%	27.5%
	N % of column total	N % of column total	N % of column total	N % of column total
MCS Diagnosed	145	145	126	145
	12.8%	100.0%	42.9%	46.3%
Chemically Sensitive	294	126	294	294
	25.9%	86.9%	100.0%	93.9%
MCS Diagnosed or Chemically Sensitive (or both)	313	145	294	313
	27.5%	100.0%	100.0%	100.0%
Asthma Diagnosed	173	58	103	105
	15.2%	40.0%	35.0%	33.5%
Asthma-like Condition Diagnosed	142	50	77	80
	12.5%	34.5%	26.2%	25.6%
Asthmatic (Asthma or Asthma-like condition or both)	305	103	174	179
	26.8%	71.0%	59.2%	57.2%
Fragrance Sensitive	394	125	238	247
	34.7%	86.2%	81.0%	78.9%

Gen Pop=general population (including sub-populations of MCS and ChemSens)
MCS Diag=medically diagnosed with MCS
ChemSens=self-reported chemical sensitivity
MCS/ChemSens= medically diagnosed with MCS, or self-reported chemical sensitivity, or both

Table 2: Health problems (frequency and type) reported from exposure to fragranced consumer products

	Gen Pop	**MCS Diag**	**ChemSens**	**MCS/ChemSens**
Total (N)	1137	145	294	313
(% relative to General Population)	100.0%	12.8%	25.9%	27.5%
	N % of column total	N % of column total	N % of column total	N % of column total
Total Fragrance Sensitive (N) (reporting one or more health problems)	394	125	238	247
(% relative to Sub-population)	34.7%	86.2%	81.0%	78.9%
Type of health problem:				
* *Migraine headaches*	179	68	124	128
	15.7%	46.9%	42.2%	40.9%
* *Asthma attacks*	91	46	75	75
	8.0%	31.7%	25.5%	24.0%
* *Neurological problems* (e.g., dizziness, seizures,	82	38	62	63
head pain, fainting, loss of coordination)	7.2%	26.2%	21.1%	20.1%
* *Respiratory problems* (e.g., difficulty breathing,	211	73	147	148
coughing, shortness of breath)	18.6%	50.3%	50.0%	47.3%
* *Skin problems* (e.g., rashes, hives, red skin,	121	55	84	88
tingling skin, dermatitis)	10.6%	37.9%	28.6%	28.1%
* *Cognitive problems* (e.g., difficulties thinking,	66	35	56	57
concentrating, or remembering)	5.8%	24.1%	19.0%	18.2%
* *Mucosal symptoms* (e.g., watery or red eyes, nasal	184	68	120	124
congestion, sneezing)	16.2%	46.9%	40.8%	39.6%
* *Immune system problems* (e.g., swollen lymph	45	31	39	39
glands, fever, fatigue)	4.0%	21.4%	13.3%	12.5%
* *Gastrointestinal problems* (e.g., nausea, bloating,	63	32	53	53
cramping, diarrhea)	5.5%	22.1%	18.0%	16.9%
* *Cardiovascular problems* (e.g., fast or irregular	50	28	37	38
heartbeat, jitteriness, chest discomfort)	4.4%	19.3%	12.6%	12.1%
* *Musculoskeletal problems* (e.g., muscle or joint	43	28	35	36
pain, cramps, weakness)	3.8%	19.3%	11.9%	11.5%
* *Other*	19	2	6	6
	1.7%	1.4%	2.0%	1.9%

Table 3: Health problems (frequency and type) reported from exposure to fragranced consumer products

	Gen Pop	**MCS Diag**	**ChemSens**	**MCS/ChemSens**
	N % of column total	N % of column total	N % of column total	N % of column total
Total	1137	145	294	313
	100.0%	100.0%	100.0%	100.0%
Fragrance Sensitive	394	125	238	247
	34.7%	86.2%	81.0%	78.9%
Health problems from exposure to:				
Air fresheners or deodorizers	232	98	162	168
	20.4%	67.6%	55.1%	53.7%
Scented laundry products from a dryer vent	142	84	107	112
	12.5%	57.9%	36.4%	35.8%
Room cleaned with scented products	224	98	166	171
	19.7%	67.6%	56.5%	54.6%
Someone wearing a fragranced product	268	95	178	183
	23.6%	65.5%	60.5%	58.5%
Any type of fragranced consumer product	253	106	192	196
	22.3%	73.1%	65.3%	62.6%

Table 4: Societal effects of fragranced consumer products for individuals with MCS

	Gen Pop	**MCS Diag**	**ChemSens**	**MCS/ChemSens**
	N % of column total	N % of column total	N % of column total	N % of column total
Total	1137	145	294	313
	100.0%	100.0%	100.0%	100.0%
Fragrance Sensitive	394	125	238	247
	34.7%	86.2%	81.0%	78.9%
Disabling health effects from fragranced consumer products	195	95	160	164
	49.5%	76.0%	67.2%	66.4%
Unable to use restrooms in public place because of air freshener, deodorizer, or scented product	199	85	132	138
	17.5%	58.6%	44.9%	44.1%
Unable to wash hands because of fragranced soap	160	80	118	122
	14.1%	55.2%	40.1%	39.0%
Want to leave a business quickly because of fragranced product	229	92	160	164
	20.1%	63.4%	54.4%	52.4%
Prevented from going someplace because of fragranced product	258	102	168	179
	22.7%	70.3%	57.1%	57.2%
Lost workdays or job in past year due to fragranced product exposure in workplace	172	88	119	125
	15.1%	60.7%	40.5%	39.9%
Supportive of fragrance-free policy in the workplace	604	103	212	221
	53.1%	71.0%	72.1%	70.6%
Prefer fragrance-free health care facilities and professionals	623	119	236	248
	54.8%	82.1%	80.3%	79.2%

Table 5: Demographic information

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
	N % of column total	N % of column total	N % of column total	N % of column total
Total	1137	145	294	313
	100.0%	100.0%	100.0%	100.0%
Male/Female				
All Males	525	84	133	145
	46.2%	57.9%	45.2%	46.3%
All Females	612	61	161	168
	53.8%	42.1%	54.8%	53.7%
Gender vs Age				
Male 18-24	47	7	10	12
	4.1%	4.8%	3.4%	3.8%
Male 25-34	130	35	42	47
	11.4%	24.1%	14.3%	15.0%
Male 35-44	136	30	44	48
	12.0%	20.7%	15.0%	15.3%
Male 45-54	108	4	20	20
	9.5%	2.8%	6.8%	6.4%
Male 55-65	104	8	17	18
	9.1%	5.5%	5.8%	5.8%
Female 18-24	78	8	19	21
	6.9%	5.5%	6.5%	6.7%
Female 25-34	135	16	34	35
	11.9%	11.0%	11.6%	11.2%
Female 35-44	155	16	45	47
	13.6%	11.0%	15.3%	15.0%
Female 45-54	144	13	41	42
	12.7%	9.0%	13.9%	13.4%
Female 55-65	100	8	22	23
	8.8%	5.5%	7.5%	7.3%

Survey Methodology

Following Eysenbach G, 2004, Improving the Quality of Web Surveys: The Checklist for Reporting Results of Internet E-Surveys (CHERRIES), Journal of Medical Internet Research, Jul-Sep; 6(3): e34.

Checklist for Reporting Results of Internet E-Surveys (CHERRIES)		
Item Category	***Checklist Item***	***Explanation***
Design		
	Describe survey design	Target population: national random sample of adults (ages 18-65) in USA, representative of age, gender, and region (n=1,137, confidence limit=95%, margin of error=3%). The survey drew upon participants from a large web-based panel (over 5,000,000 participants) held by Survey Sampling International (SSI). Participant recruitment followed a randomized process (Dynamix). All responses were anonymous. Survey completion time was approximately ten minutes.
IRB (Institutional Review Board) approval and informed consent process		
	IRB approval	Ethics approval was obtained by the University of Melbourne, School of Engineering Human Ethics Advisory Group, application 1646894, on May 9, 2016.
	Informed consent	Participants had already provided informed consent as part of the SSI web-based panel. For this survey, participants were given the following introduction: aims of the study; principal researcher name, affiliation, and contact information; human ethics approval; length of survey (less than 15 minutes to complete); assurance that participation is completely voluntary and that all data provided are confidential; assurance that participants can withdraw at any time; outputs of research (findings will be provided through journal articles and website, free of charge); university human ethics contact information; and a specific question to indicate consent: "If you would like to participate in this project, please click the next button to proceed ('Go To Survey')."
	Data protection	Selected survey software and servers were used to ensure data protection. No personal information was linked to the survey results. The dataset (without any identifying information) is kept on password protected computers.

Development and pre-testing		
	Development and testing	The survey instrument was a 35-item questionnaire, developed and tested over a two-year period, including cognitive testing with 10 individuals and piloting with over 100 individuals, before full implementation in June 2016. This article reports results from the sub-populations of MCS and chemical sensitivity. Steinemann (2016) reports results from the general population.
Recruitment process and description of the sample having access to the questionnaire		The survey invitation is an open invitation, rather than a direct invite, to the pool of panelists available at the time. The pool is filtered to achieve a representative sample through a set of initial questions for basic demographic characteristics.
	Open survey versus closed survey	Closed survey (only SSI participants), general population, random sample nationally representative of demographics.
	Contact mode	The survey provider, SSI, provided an open invitation to potential participants. The survey targeted the general population rather than a specific cohort.
	Advertising the survey	An open invitation was issued to randomly selected members of the web-based panel. The survey was not advertised.
Survey administration		
	Web/E-mail	The survey was web-based, with multiple choice and open format answers. All responses were anonymous, and collected through the online survey platform and stored on local password protected servers.
	Context	SSI is a survey research company and online panel provider.
	Mandatory/voluntary	Voluntary. Prospective participants were randomly invited to the survey.
	Incentives	Respondents were provided incentives for their participation by the panel provider, SSI, with points that can be redeemed for money or reward programs.
	Time/Date	Data were collected within one week in June 2016.
	Randomization of items or questionnaires	To prevent biases in response, five sets of questions were randomized for their multiple-choice items.
	Adaptive questioning	Eight questions were conditionally displayed based on responses to other items.
	Number of Items	The survey contained 35 questions. Each page contained one question with multiple choice and open format response categories.
	Number of screens (pages)	Overall, 36 to 44 pages were presented (including the introductory page), depending on responses to conditional items.
	Completeness check	All questions were required to be completed. All questions provided non-response options such as "don't know/not sure" and "decline to answer." Only completed surveys were included for analysis.
	Review step	Respondents were allowed one attempt per question, once they click "next" to review the next question; they are not allowed to go back to the previous questions or answers.

Response rates		Survey response rate: 95%. Number of drop outs: 46; Number of screen outs: 18; Number of completes: 1,137; Panel size, over 5,000,000. Panel response rate at time of survey implementation: 9.32%.
	Unique site visitor	Each respondent goes through stringent verification of identity upon signing up on SSI panel (including name, contact details, and IP). Once opt-in process is completed, each respondent is tagged with unique panel ID.
	View rate (Ratio of unique survey visitors/unique site visitors)	not applicable
	Participation rate (Ratio of unique visitors who agreed to participate/unique first survey page visitors)	SSI respondents are invited to survey through general population random selection. Unique clicks or visitors to the first page of the survey can be those who complete survey, drop out, or screen out.
	Completion rate (Ratio of users who finished the survey/users who agreed to participate)	USA 95% (1,201 initial, 46 drop out, 18 screen out, 1,137 complete).
Preventing multiple entries from the same individual		
	Cookies used	not used
	IP check	SSI programming software and sampling tool, Dynamix, controls the traffic and ensures unique entries. Using unique Panel ID and IP, each respondent can attempt the survey only once.
	Log file analysis	not used
	Registration	This is a closed survey for SSI respondents only. Survey invite is mailed specifically to the e-mail address used upon joining survey and verified.
Analysis		
	Handling of incomplete questionnaires	Only completed questionnaires were included in the final dataset for analysis.
	Questionnaires submitted with an atypical timestamp	Minimum survey completion time was 5 minutes; average was 10 minutes. A small number of respondents were omitted for completing the items too quickly.
	Statistical correction	All demographic subgroups obtained statistically valid numbers to ensure a national representativeness.

Table 1

What is your gender?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Male	525	84	133	145
	46.20%	57.90%	45.20%	46.30%
Female	612	61	161	168
	53.80%	42.10%	54.80%	53.70%
Other	-	-	-	-
	-	-	-	-

Table 2

What is your age?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
18-24 (21)	125	15	29	33
	11.00%	10.30%	9.90%	10.50%
25-34 (29.5)	265	51	76	82
	23.30%	35.20%	25.90%	26.20%
35-44 (39.5)	291	46	89	95
	25.60%	31.70%	30.30%	30.40%
45-54 (49.5)	252	17	61	62
	22.20%	11.70%	20.70%	19.80%
55-65 (60)	204	16	39	41
	17.90%	11.00%	13.30%	13.10%
65 (65)	-	-	-	-

Table 3

USA Region

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Northeast	207	24	50	53
	18.20%	16.60%	17.00%	16.90%
Midwest	246	26	57	59
	21.60%	17.90%	19.40%	18.80%
South	422	51	107	115
	37.10%	35.20%	36.40%	36.70%
West	262	44	80	86
	23.00%	30.30%	27.20%	27.50%
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 4

QA. Do you experience any health problems when exposed to air fresheners or deodorizers?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	232	98	162	168
	20.40%	67.60%	55.10%	53.70%
No	791	36	88	98
	69.60%	24.80%	29.90%	31.30%
Don't know/not sure	109	11	43	46
	9.60%	7.60%	14.60%	14.70%
Decline to answer	5	-	1	1
	0.40%	-	0.30%	0.30%
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 5

Which of the following health problems do you experience?

Base: Respondents who experienced below health problems when exposed to air fresheners or deodorizers

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	232	98	162	168
	100.00%	100.00%	100.00%	100.00%
Migraine headaches	82	36	65	65
	35.30%	36.70%	40.10%	38.70%
Asthma attacks	53	27	44	44
	22.80%	27.60%	27.20%	26.20%
Neurological problems (e.g., dizziness, seizures,	36	20	29	29
head pain, fainting, loss of coordination)	15.50%	20.40%	17.90%	17.30%
Respiratory problems (e.g., difficulty breathing,	108	46	82	83
coughing, shortness of breath)	46.60%	46.90%	50.60%	49.40%
Skin problems (e.g., rashes, hives, red skin,	65	33	49	52
tingling skin, dermatitis)	28.00%	33.70%	30.20%	31.00%
Cognitive problems (e.g., difficulties thinking,	31	16	26	26
concentrating, or remembering)	13.40%	16.30%	16.00%	15.50%
nasal	86	37	63	66
congestion, sneezing)	37.10%	37.80%	38.90%	39.30%
Immune system problems (e.g., swollen lymph	21	13	17	17
glands, fever, fatigue)	9.10%	13.30%	10.50%	10.10%
bloating,	31	18	26	26
cramping, diarrhea)	13.40%	18.40%	16.00%	15.50%
Cardiovascular problems (e.g., fast or irregular	30	18	22	22
heartbeat, jitteriness, chest discomfort)	12.90%	18.40%	13.60%	13.10%
Musculoskeletal problems (e.g., muscle or joint	27	18	22	22
pain, cramps, weakness)	11.60%	18.40%	13.60%	13.10%
Other	8	2	3	3
	3.40%	2.00%	1.90%	1.80%
SUM	578	284	448	455
	249.10%	289.80%	276.50%	270.80%

Table 6

QB. Do you experience any health problems from the scent of laundry products coming from a dryer vent?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	142	84	107	112
	12.50%	57.90%	36.40%	35.80%
No	906	52	143	157
	79.70%	35.90%	48.60%	50.20%
Don't know/not sure	88	9	44	44
	7.70%	6.20%	15.00%	14.10%
Decline to answer	1	-	-	-
	0.10%	-	-	-
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 7

Which of the following health problems do you experience?

Base: Respondents who experienced below health problems from the scent of laundry products coming from a dryer vent

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	142	84	107	112
	100.00%	100.00%	100.00%	100.00%
Migraine headaches	37	23	28	29
	26.10%	27.40%	26.20%	25.90%
Asthma attacks	28	21	25	25
	19.70%	25.00%	23.40%	22.30%
Neurological problems (e.g., dizziness, seizures,	24	19	21	22
head pain, fainting, loss of coordination)	16.90%	22.60%	19.60%	19.60%
Respiratory problems (e.g., difficulty breathing,	46	31	39	40
coughing, shortness of breath)	32.40%	36.90%	36.40%	35.70%
Skin problems (e.g., rashes, hives, red skin,	41	22	26	26
tingling skin, dermatitis)	28.90%	26.20%	24.30%	23.20%
Cognitive problems (e.g., difficulties thinking,	15	10	13	13
concentrating, or remembering)	10.60%	11.90%	12.10%	11.60%
nasal	48	29	42	43
congestion, sneezing)	33.80%	34.50%	39.30%	38.40%
Immune system problems (e.g., swollen lymph	19	14	17	17
glands, fever, fatigue)	13.40%	16.70%	15.90%	15.20%
bloating,	29	18	26	26
cramping, diarrhea)	20.40%	21.40%	24.30%	23.20%
Cardiovascular problems (e.g., fast or irregular	15	11	13	13
heartbeat, jitteriness, chest discomfort)	10.60%	13.10%	12.10%	11.60%
Musculoskeletal problems (e.g., muscle or joint	23	19	21	22
pain, cramps, weakness)	16.20%	22.60%	19.60%	19.60%
Other	4	1	2	2
	2.80%	1.20%	1.90%	1.80%
SUM	329	218	273	278
	231.70%	259.50%	255.10%	248.20%

Table 8

QC. Do you experience any health problems from being in a room after it has been cleaned with scented products?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	224	98	166	171
	19.70%	67.60%	56.50%	54.60%
No	839	42	105	118
	73.80%	29.00%	35.70%	37.70%
Don't know/not sure	73	5	23	24
	6.40%	3.40%	7.80%	7.70%
Decline to answer	1	-	-	-
	0.10%	-	-	-
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 9

Which of the following health problems do you experience?

Base: Respondents who experienced below health problems from being in a room after it has been cleaned with scented products

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	224	98	166	171
	100.00%	100.00%	100.00%	100.00%
Migraine headaches	75	33	59	60
	33.50%	33.70%	35.50%	35.10%
Asthma attacks	46	23	38	38
	20.50%	23.50%	22.90%	22.20%
Neurological problems (e.g., dizziness, seizures,	47	23	39	39
head pain, fainting, loss of coordination)	21.00%	23.50%	23.50%	22.80%
Respiratory problems (e.g., difficulty breathing,	109	40	81	82
coughing, shortness of breath)	48.70%	40.80%	48.80%	48.00%
Skin problems (e.g., rashes, hives, red skin,	45	27	33	35
tingling skin, dermatitis)	20.10%	27.60%	19.90%	20.50%
Cognitive problems (e.g., difficulties thinking,	31	20	28	28
concentrating, or remembering)	13.80%	20.40%	16.90%	16.40%
nasal	83	33	60	63
congestion, sneezing)	37.10%	33.70%	36.10%	36.80%
Immune system problems (e.g., swollen lymph	23	17	20	20
glands, fever, fatigue)	10.30%	17.30%	12.00%	11.70%
bloating,	32	16	28	28
cramping, diarrhea)	14.30%	16.30%	16.90%	16.40%
Cardiovascular problems (e.g., fast or irregular	26	17	22	23
heartbeat, jitteriness, chest discomfort)	11.60%	17.30%	13.30%	13.50%
Musculoskeletal problems (e.g., muscle or joint	23	16	19	19
pain, cramps, weakness)	10.30%	16.30%	11.40%	11.10%
Other	4	1	2	2
	1.80%	1.00%	1.20%	1.20%
SUM	544	266	429	437
	242.90%	271.40%	258.40%	255.60%

Table 10

QD. Do you experience any health problems from being near someone who is wearing a fragranced product?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	268	95	178	183
	23.60%	65.50%	60.50%	58.50%
No	799	44	92	104
	70.30%	30.30%	31.30%	33.20%
Don't know/not sure	68	6	24	26
	6.00%	4.10%	8.20%	8.30%
Decline to answer	2	-	-	-
	0.20%	-	-	-
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 11

Which of the following health problems do you experience?

Base: Respondents who experienced below health problems from being near someone who is wearing a fragranced product

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	268	95	178	183
	100.00%	100.00%	100.00%	100.00%
Migraine headaches	96	38	69	70
	35.80%	40.00%	38.80%	38.30%
Asthma attacks	44	23	36	36
	16.40%	24.20%	20.20%	19.70%
Neurological problems (e.g., dizziness, seizures,	41	19	34	34
head pain, fainting, loss of coordination)	15.30%	20.00%	19.10%	18.60%
Respiratory problems (e.g., difficulty breathing,	118	43	83	84
coughing, shortness of breath)	44.00%	45.30%	46.60%	45.90%
Skin problems (e.g., rashes, hives, red skin,	39	24	31	33
tingling skin, dermatitis)	14.60%	25.30%	17.40%	18.00%
Cognitive problems (e.g., difficulties thinking,	30	17	27	28
concentrating, or remembering)	11.20%	17.90%	15.20%	15.30%
nasal	98	34	60	63
congestion, sneezing)	36.60%	35.80%	33.70%	34.40%
Immune system problems (e.g., swollen lymph	19	16	19	19
glands, fever, fatigue)	7.10%	16.80%	10.70%	10.40%
bloating,	31	17	29	29
cramping, diarrhea)	11.60%	17.90%	16.30%	15.80%
Cardiovascular problems (e.g., fast or irregular	20	14	18	18
heartbeat, jitteriness, chest discomfort)	7.50%	14.70%	10.10%	9.80%
Musculoskeletal problems (e.g., muscle or joint	17	13	16	16
pain, cramps, weakness)	6.30%	13.70%	9.00%	8.70%
Other	7	1	3	3
	2.60%	1.10%	1.70%	1.60%
SUM	560	259	425	433
	209.00%	272.60%	238.80%	236.60%

Table 12

QE. In general, do you experience any health problems from exposure to any type of fragranced product?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	253	106	192	196
	22.30%	73.10%	65.30%	62.60%
No	796	30	77	88
	70.00%	20.70%	26.20%	28.10%
Don't know/not sure	87	9	25	29
	7.70%	6.20%	8.50%	9.30%
Decline to answer	1	-	-	-
	0.10%	-	-	-
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 13

Which of the following health problems do you experience?

Base: Respondents who experienced below health problems from exposure to any type of fragranced product

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	253	106	192	196
	100.00%	100.00%	100.00%	100.00%
Migraine headaches	98	38	76	78
	38.70%	35.80%	39.60%	39.80%
Asthma attacks	55	30	48	48
	21.70%	28.30%	25.00%	24.50%
Neurological problems (e.g., dizziness, seizures,	42	23	38	39
head pain, fainting, loss of coordination)	16.60%	21.70%	19.80%	19.90%
Respiratory problems (e.g., difficulty breathing,	119	45	94	95
coughing, shortness of breath)	47.00%	42.50%	49.00%	48.50%
Skin problems (e.g., rashes, hives, red skin,	58	32	49	50
tingling skin, dermatitis)	22.90%	30.20%	25.50%	25.50%
Cognitive problems (e.g., difficulties thinking,	31	23	29	29
concentrating, or remembering)	12.30%	21.70%	15.10%	14.80%
nasal	102	41	76	78
congestion, sneezing)	40.30%	38.70%	39.60%	39.80%
Immune system problems (e.g., swollen lymph	24	21	24	24
glands, fever, fatigue)	9.50%	19.80%	12.50%	12.20%
bloating,	33	18	30	30
cramping, diarrhea)	13.00%	17.00%	15.60%	15.30%
Cardiovascular problems (e.g., fast or irregular	18	12	16	16
heartbeat, jitteriness, chest discomfort)	7.10%	11.30%	8.30%	8.20%
Musculoskeletal problems (e.g., muscle or joint	20	15	18	18
pain, cramps, weakness)	7.90%	14.20%	9.40%	9.20%
Other	3	1	2	2
	1.20%	0.90%	1.00%	1.00%
SUM	603	299	500	507
	238.30%	282.10%	260.40%	258.70%

Table 14

Do any of these health problems substantially limit one or more major life activities, such as seeing, hearing, eating, sleeping, walking, standing, lifting, bending, speaking, breathing, learning, reading, concentrating, thinking, communicating, or working, for you personally? (ADA)

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	394	125	238	247
	100.00%	100.00%	100.00%	100.00%
Yes	195	95	160	164
	49.50%	76.00%	67.20%	66.40%
No	175	27	69	72
	44.40%	21.60%	29.00%	29.10%
Don't know/not sure	22	2	9	10
	5.60%	1.60%	3.80%	4.00%
Decline to answer	2	1	-	1
	0.50%	0.80%	-	0.40%
SUM	394	125	238	247
	100.00%	100.00%	100.00%	100.00%

Table 15

Compared to other people, do you consider yourself allergic or unusually sensitive to everyday chemicals like those in household cleaning products, paints, perfumes, detergents, insect spray and things like that?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	294	126	294	294
	25.90%	86.90%	100.00%	93.90%
No	773	17	-	17
	68.00%	11.70%	-	5.40%
Don't know/not sure	68	2	-	2
	6.00%	1.40%	-	0.60%
Decline to answer	2	-	-	-
	0.20%	-	-	-
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 16

Has a doctor or health care professional ever told you that you have multiple chemical sensitivities?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	145	145	126	145
	12.80%	100.00%	42.90%	46.30%
No	950	-	151	151
	83.60%	-	51.40%	48.20%
Don't know/not sure	40	-	17	17
	3.50%	-	5.80%	5.40%
Decline to answer	2	-	-	-
	0.20%	-	-	-
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 17

Has a doctor or health care professional ever told you that you have asthma or an asthma-like condition?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes - asthma	173	58	103	105
	15.20%	40.00%	35.00%	33.50%
Yes - asthma-like condition	142	50	77	80
	12.50%	34.50%	26.20%	25.60%
No	811	39	114	126
	71.30%	26.90%	38.80%	40.30%
Don't know/not sure	19	3	6	8
	1.70%	2.10%	2.00%	2.60%
Decline to answer	2	-	-	-
	0.20%	-	-	-
SUM	1147	150	300	319
	100.90%	103.40%	102.00%	101.90%

Table 18

People Who Answer “Yes” to "Asthma" or "Asthma-Like Condition"

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	305	103	174	179
	26.80%	71.00%	59.20%	57.20%

Table 19

People Who Answer "Yes" To One Or More Of These Questions: QA/QB/QC/QD/QE (fragrance sensitive group).

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	394	125	238	247
	34.70%	86.20%	81.00%	78.90%

Table 20

Which of the following health problems do you experience?

Base: Yes to QA/QB/QC/QD/QE (fragrance sensitive group)

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Migraine headaches	179	68	124	128
	15.70%	46.90%	42.20%	40.90%
Asthma attacks	91	46	75	75
	8.00%	31.70%	25.50%	24.00%
Neurological problems (e.g., dizziness, seizures,	82	38	62	63
head pain, fainting, loss of coordination)	7.20%	26.20%	21.10%	20.10%
Respiratory problems (e.g., difficulty breathing,	211	73	147	148
coughing, shortness of breath)	18.60%	50.30%	50.00%	47.30%
Skin problems (e.g., rashes, hives, red skin,	121	55	84	88
tingling skin, dermatitis)	10.60%	37.90%	28.60%	28.10%
Cognitive problems (e.g., difficulties thinking,	66	35	56	57
concentrating, or remembering)	5.80%	24.10%	19.00%	18.20%
nasal	184	68	120	124
congestion, sneezing)	16.20%	46.90%	40.80%	39.60%
Immune system problems (e.g., swollen lymph	45	31	39	39
glands, fever, fatigue)	4.00%	21.40%	13.30%	12.50%
bloating,	63	32	53	53
cramping, diarrhea)	5.50%	22.10%	18.00%	16.90%
Cardiovascular problems (e.g., fast or irregular	50	28	37	38
heartbeat, jitteriness, chest discomfort)	4.40%	19.30%	12.60%	12.10%
Musculoskeletal problems (e.g., muscle or joint	43	28	35	36
pain, cramps, weakness)	3.80%	19.30%	11.90%	11.50%
Other	19	2	6	6
	1.70%	1.40%	2.00%	1.90%

Table 21

Would you be supportive of a fragrance-free policy in the workplace?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	604	103	212	221
	53.10%	71.00%	72.10%	70.60%
No	224	25	35	40
	19.70%	17.20%	11.90%	12.80%
Neutral/not sure	304	16	47	51
	26.70%	11.00%	16.00%	16.30%
Decline to answer	5	1	-	1
	0.40%	0.70%	-	0.30%
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 22

Would you prefer that health care facilities and health care professionals be fragrance-free?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	623	119	236	248
	54.80%	82.10%	80.30%	79.20%
No	255	15	33	37
	22.40%	10.30%	11.20%	11.80%
Neutral/not sure	254	11	25	28
	22.30%	7.60%	8.50%	8.90%
Decline to answer	5	-	-	-
	0.40%	-	-	-
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 23

Have you ever been prevented from going to some place because you would be exposed to a fragrance product that would make you sick?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	258	102	168	179
	22.70%	70.30%	57.10%	57.20%
No	819	36	106	113
	72.00%	24.80%	36.10%	36.10%
Don't know/not sure	58	6	20	20
	5.10%	4.10%	6.80%	6.40%
Decline to answer	2	1	-	1
	0.20%	0.70%	-	0.30%
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 24

Has any exposure to fragranced products in your work environment caused you to become sick, lose work days, or lose a job?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	172	88	119	125
	15.10%	60.70%	40.50%	39.90%
No	910	53	159	170
	80.00%	36.60%	54.10%	54.30%
Don't know/not sure	54	4	16	18
	4.70%	2.80%	5.40%	5.80%
Decline to answer	1	-	-	-
	0.10%	-	-	-
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 25

Have you ever been unable or reluctant to use the toilets in a public place, because of the presence of an air freshener, deodorizer, or scented product?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	199	85	132	138
	17.50%	58.60%	44.90%	44.10%
No	897	55	146	159
	78.90%	37.90%	49.70%	50.80%
Neutral/not sure	40	5	16	16
	3.50%	3.40%	5.40%	5.10%
Decline to answer	1	-	-	-
	0.10%	-	-	-
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 26

If you enter a business, and you smell air fresheners or some fragranced product, do you want to leave as quickly as possible?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	229	92	160	164
	20.10%	63.40%	54.40%	52.40%
No	787	38	91	103
	69.20%	26.20%	31.00%	32.90%
Neutral/not sure	120	15	43	46
	10.60%	10.30%	14.60%	14.70%
Decline to answer	1	-	-	-
	0.10%	-	-	-
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 27

Have you ever been unable or reluctant to wash your hands with soap in a public place, because you know or suspect that the soap is fragranced?

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Yes	160	80	118	122
	14.10%	55.20%	40.10%	39.00%
No	924	53	159	170
	81.30%	36.60%	54.10%	54.30%
Neutral/not sure	50	12	17	21
	4.40%	8.30%	5.80%	6.70%
Decline to answer	3	-	-	-
	0.30%	-	-	-
SUM	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%

Table 28

Demographic information

	Gen Pop	MCS Diag	ChemSens	ChemSens/MCS
Total	1137	145	294	313
	100.00%	100.00%	100.00%	100.00%
Male/Female				
All Males	525	84	133	145
	46.20%	57.90%	45.20%	46.30%
All Females	612	61	161	168
	53.80%	42.10%	54.80%	53.70%
Gender vs Age				
Male 18-24	47	7	10	12
	4.10%	4.80%	3.40%	3.80%
Male 25-34	130	35	42	47
	11.40%	24.10%	14.30%	15.00%
Male 35-44	136	30	44	48
	12.00%	20.70%	15.00%	15.30%
Male 45-54	108	4	20	20
	9.50%	2.80%	6.80%	6.40%
Male 55-65	104	8	17	18
	9.10%	5.50%	5.80%	5.80%
Female 18-24	78	8	19	21
	6.90%	5.50%	6.50%	6.70%
Female 25-34	135	16	34	35
	11.90%	11.00%	11.60%	11.20%
Female 35-44	155	16	45	47
	13.60%	11.00%	15.30%	15.00%
Female 45-54	144	13	41	42
	12.70%	9.00%	13.90%	13.40%
Female 55-65	100	8	22	23
	8.80%	5.50%	7.50%	7.30%