

# REPORT TO AGRIQUALITY LIMITED

HEALTH MONITORING AS PART OF  
ASIAN GYPSY MOTH PROJECT

## THE STUDY OF PRESENTATIONS OF HOUSEHOLDER CONCERNS TO THE AGM HEALTH SERVICE

### APPENDICES

June 2005

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# APPENDIX A

## SPRAY EXPOSURE AND DRIFT

**OPINION BY AGM HEALTH SERVICE MEDICAL DIRECTOR**

The "general public" zone was determined by the medical director based on information available to her as medical advisor since 1996 to the Forestry Research Institute, AgriQuality and Ministry of Agriculture and Forestry. This opinion has been systematically reconsidered when further publications have been available. No major revision of the advice has taken place during the PAM operation to date.

The advice as to the application of the exposure zone to individuals is not a "rule" but a matter of professional judgement based on current scientific information. The PAM Health Service does not depart from this approach.

The details of relevant information have been documented in personal background medical information held by the medical director. Some of this related to the formulation is confidential to the medical director. Other reported information is held by the Medical Director as copies for personal study purposes. Some information belongs to other agencies but has been made available for personal medical scientific use.

The systematic aspects of the exposure zone advice to staff and the implications for the use of the advice in PSPs are part of the documentation process in the reporting under the current PAM monitoring contract.

For general purposes, for general public health advice, the Medical Director advised AGM Health Service staff of the following:

- a. Spray delivery equipment was quite precise enabling most product to be deposited within the designated spray boundary.
- b. Spray applications only took place when wind conditions suited deposition in the intended zone.
- c. In practice about 90% of spray deposition was within 200m to 250m of the designated spray boundary and settled quickly within about half an hour. The "two hours after" time period recommended by the Health Risk Assessment was conservative and precautionary for most people.
- d. Exposure for those at risk was greatest within the designated zone (zone included in official map boundaries published by AgriQuality) and decreased rapidly with distance outside the designated spray zone. Relevant exposure became minimal for most outside 250 m from the designated zone. Exposure was greatest during spraying and had reduced rapidly after half an hour.
- e. Direct exposure to fresh spray at amounts within the spray zone was the potential issue for most people at risk from irritancy or allergy, or who needed to take precautions. Most were no longer at risk beyond 250 m.

- f. Any person with a significant risk must have had their individual avoidance advice validated by the medical director, in case general exposure zone advice was not appropriate for their individual spray avoidance measures
- g. Any correspondence with specialist medical practitioners about householder's possible risk and relevant exposure was verified by the medical director and usually issued under her personal signature.

Credentialing of the medical practitioner who is responsible to advise staff and other medical practitioners as to the exposure zone issues is covered in the Health Service procedures.

#### **OPINION BY AGM HEALTH SERVICE**

Richardson (2002) estimated *Btk* drift from aerial spraying in New Zealand as the distance to which 95% of the spray deposited, which was modelled to be 264m in a crosswind of 12km/hr and 160m in a crosswind of 3.6km/hr. Aerial spraying in West Auckland and Hamilton was carried out in wind speeds of up to 18km/hr or 12km/hr for spot spraying, allowing the potential for actual drift to be greater than these estimates. Downwind of the spray zone higher concentrations of *Btk* may be experienced than within the actual spray zone (Teschke et al, 2000).

Barry et al. (1989) and Teschke et al. (2000) documented the occurrence of *Btk* at distances of 3.15km and 1km respectively outside the spray zone, the maximum distances at which measurements were made for these studies. However, measured concentrations were small. Barry et al. (1989) recorded concentrations of 0.08-3.13% (the lower estimate from more consistent sampling equipment) of that recorded within the spray zone. *Btk* deposition was seen to decrease sharply with distance, values of 5% of that of within the spray zone occurring at 250-450m outside the spray zone (Barry et al., 1989). *Btk* concentrations were observed to be approximately constant at distances greater than 2km, indicating that droplets, smaller than those that deposited in the spray zone had reached these distances. The spray zone studied in Barry et al. (1989) was located in the Wasatch Mountain Range of Utah. Topography within the spray and drift zones was dissimilar to Auckland and Hamilton, and may have facilitated a greater degree of spray drift. Meteorological conditions measured during the aerial spraying in Utah indicate wind speeds of 3.6km/hr. In the Utah study paired stations showed significant variation indicating the dependence of *Btk* concentration on micrometeorological conditions.

Teschke et al. (2000) gives estimates of settling times for spray droplets based on their aerodynamic diameter. Droplets with aerodynamic diameters of less than 75 microns (with settling times estimated to be of the order of hours to weeks) may not settle because normal air movement is faster than settling velocities, giving the potential for wide distribution of these fine droplets. *Btk* has been measured in air for up to 17 days following an application (Swadeber, 1994) however increased dilution, with distance from the spray zone or with time, quickly reduces concentrations to environmentally insignificant levels. Although droplets of less than 75 microns still contain the full range of Foray 48B ingredients droplets are not visible to the naked eye and concentrations are such that no associated odour should be noticeable. However, very fine spray droplets (under 5 microns) are able to be more easily inhaled deep within the respiratory system than the larger droplets.

Dispersion of *Btk* following an aerial application may be large however concentrations of *Btk* at large distances from the spray zone are unlikely to be environmentally or medically significant. Small spray droplets are most susceptible to drift and the production of these droplets is increased by high delivery speed i.e. plane speed, low relative humidity causing evaporation during settling, or droplet production at the nozzle not being optimum. Locally higher concentrations of *Btk* outside the spray zone are possible through human mechanisms such as the movement of people and vehicles exposed to the spray (Elliott et al, 1988). The MAF drift estimate of 250m is perhaps insufficient given the possible effect of meteorological variation on the modelling results of Richardson (2002) although this modelling, unlike that carried out in North American studies (Barry et al, 1993), accounts for New Zealand aerial spray design. The studies of Barry et al. (1993), Teschke et al. (2000) and Richardson (2002) all indicate that concentrations of Foray 48B experienced at distances greater than 500m are likely to be low and therefore significant only to those with unusual susceptibility to the spray.

## References

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2. Elliott, L. J., Sokolo, R., Heumann, M. & Elefant, S. L., 1988. An exposure characterisation of a large scale application of a biological insecticide, *Bacillus thuringiensis*. *Applied Industrial Hygiene*. 3(4) p 119-122
3. Richardson, B. 2002. *Estimation of BTK Drift using Spraysafe Manager 2*. New Zealand Forest Research Institute Limited.
4. Swadeber, C., 1994, Insecticide Fact Sheet – *Bacillus Thuringiensis* (B.t.). *Journal of Pesticide Reform* 14 (3) p. 13-20

5. Teschke, K., Chow, Y., Bartlett, K., van Netten, C., Leung, V., Ross, A., 2000. *Airbourne Exposures to Bacillus thuringiensis var. kurstaki during Gypsy Moth Eradication. Final Report.* Wellington: Capital Health Region.

Originally prepared 17 November 2003

# APPENDIX B

## PSP JUSTIFICATION AND SEVERITY

## PSP JUSTIFICATION AND SEVERITY

There was often an interim daily assignment to a category made by one supervised person with final verification and choice of categories in all cases by the credentialed medical practitioner. The credentialing requirement was for consultant specialist status in Public Health medicine, since the purpose of the classification was public health evaluation of spray avoidance measures.

The “justification” was the only criteria on which a person received a PSP. The householder may have had other health concerns, but these were not relevant to the PSP.

Severity is a relative measure of likely severity of the underlying condition in relation to exposure. It does not directly measure the severity of reactions (if any), as individuals have usually not had a reaction to the spray.

The justification “food allergy” included householders with a clinically diagnosed food allergy. This was confirmed on the bases of clinical medical assessment, RAST testing, specialist reports (immunologist or allergies) or GP statement. It was not assigned on reported self-diagnosis by the householder, or by diagnoses of anyone not registered as a NZ medical practitioner.

Where a householder was diagnosed with a food allergy with the risk of anaphylaxis to a food component of Foray 48B, they were assigned to the “highest severity” category. Where the food allergy was moderate in nature, such as eczema or diarrhoea, with no previous history of anaphylaxis, or in other medical conditions such as chemical sensitivity, the allergy severity was classified “significant” and/or “precautionary”.

“Non-food allergy” was assigned by the same criteria as “allergy”, i.e. confirmed diagnosis. A non-food allergy to a known substance in the spray, where a householder had a history of anaphylaxis was assigned the “highest” severity category. Non-food allergy to a substance in the spray without a history of anaphylaxis was assigned the “significant” severity category.

Where individuals had a past history of bronchospasm to particular foods, a sub-category “Asthma from food” was assigned, and the severity assigned was “Highest”

The asthma category was assigned when confirmed either by the individual’s GP, the AGM Health Service GPs or a specialist assessment.

When assessing “Asthma” severity, clinical symptoms (dyspnoea, cough, wheezing), frequency of exacerbations, spirometry and medication use were taken into account. Where the individual had a severe persistent form of the disease, characterised by continuous symptoms, frequent exacerbations and increased medication use, the “significant” severity category was assigned. Where an individual had a history of respiratory failure necessitating mechanical ventilation, they were assigned the “Highest” severity category of asthma. In moderate asthma (daily reliever use and

low to medium inhaled corticosteroid use) the “other medical” severity category was assigned.

When Eczema was associated with Asthma in generally atopic individuals they could be assigned to the justification category “Asthma and Eczema”.

The category “Lower respiratory not asthma” was assigned to pre-existing bronchiectasis, cystic fibrosis, pneumonia, emphysema and congenital lung disorders. For most individuals the severity assigned was “Precautionary”. They were only assigned the “significant” category where medical history indicated respiratory failure and/or other severe complications of the underlying disease.

The category “Upper respiratory” was assigned to pre-existing conditions such as chronic sinusitis, tonsillitis and rhinitis. Severity category for these was generally “Other medical” where individuals only required “over the counter” (OTC) medication. In situations where ENT assessment and intervention had been required, the severity category assigned was “significant”.

The “Irritant eyes/nose/skin” justification was assigned to symptoms including sore/puffy eyes, sneezing, irritating cough, sore throat, nausea, headaches and transient rash. Most of these were categorised as “other medical” severity where individuals self-managed with OTC medication. Occasionally the “significant” or “precautionary” severity category was assigned.

The justification “skin condition” included skin lesions encountered in atopic dermatitis, contact dermatitis, urticaria and parasitic infections, and skin disorders such as psoriasis and ichthyosis. Individuals who had previous or current referral/s to a specialist dermatologist, and had chronic symptoms, frequent exacerbations and topical and/or oral steroid use were assigned to the “significant” severity category. Only skin conditions requiring hospitalisation were assigned to the “Highest” severity category.

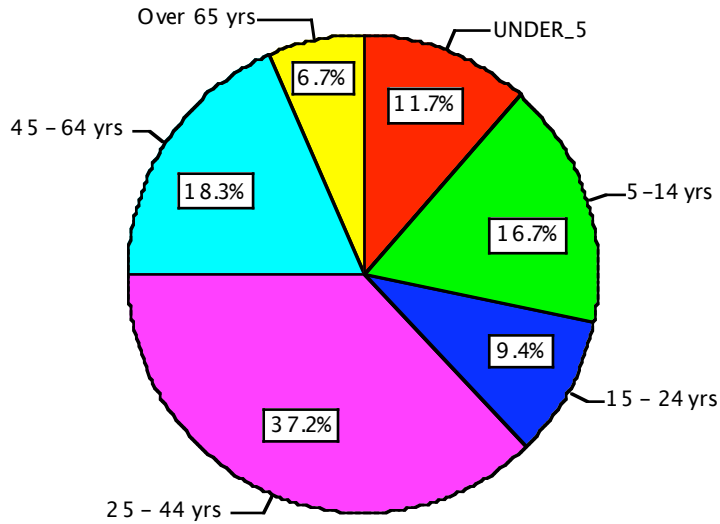
The “Medical SLE immune” justification included leukaemia, SLE, rheumatoid arthritis, HIV and cancer. These were generally assigned to the “Precautionary” severity category.

The justification “CFS/Chemical sensitivity was one of the few accepted self-reported diagnoses, and was always assigned to the “Precautionary” severity category.

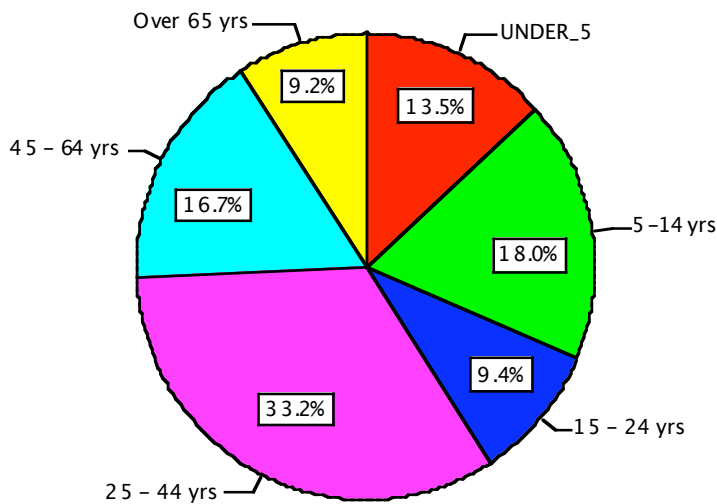
The justification “Situational stress” and “Pregnancy-baby” were assigned after exclusion of other medical justifications, and with appropriate reasons for providing a PSP. Most of these justifications were assigned the “Psycho-social” severity category. Only occasionally was the “significant” severity assigned (eg anxiety disorder related to aircraft operations)

**APPENDIX C  
DEMOGRAPHIC CHARACTERISTICS OF THE  
POPULATION AFFECTED BY AGM AERIAL  
OPERATIONS AND OF AGM HEALTH  
SERVICE HOUSEHOLDERS**

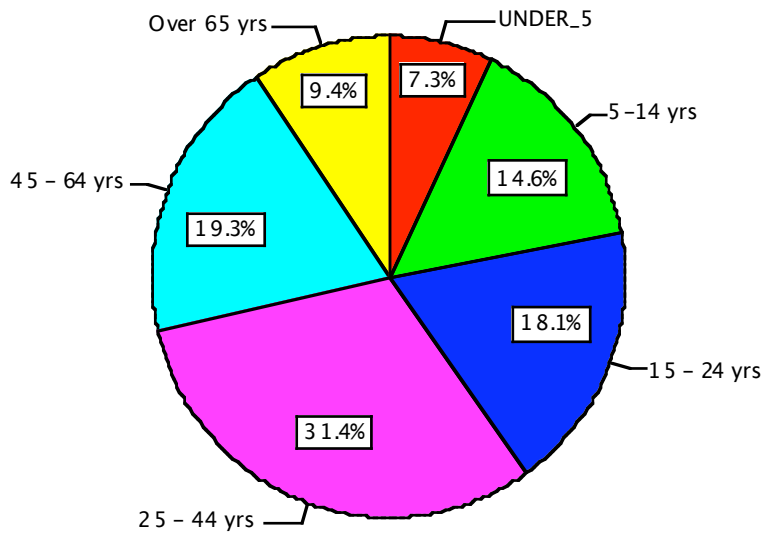
**Figure 1** Age distribution among AGM Health Service householders.



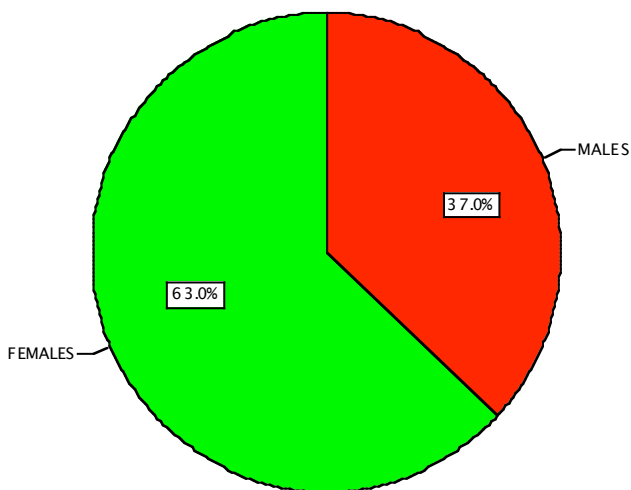
**Figure 2** Age distribution among AGM Health Service householders EXPOSED to spray.



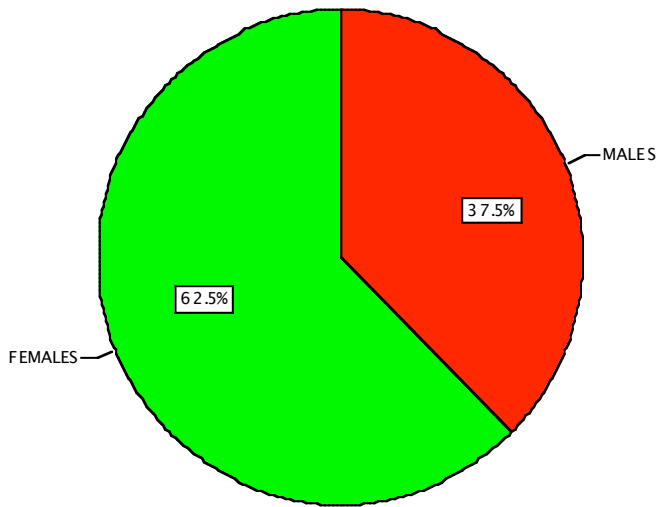
**Figure 3** Age distribution (Census 2001) among AGM Health Service  
householders living within AGM eradication areas.



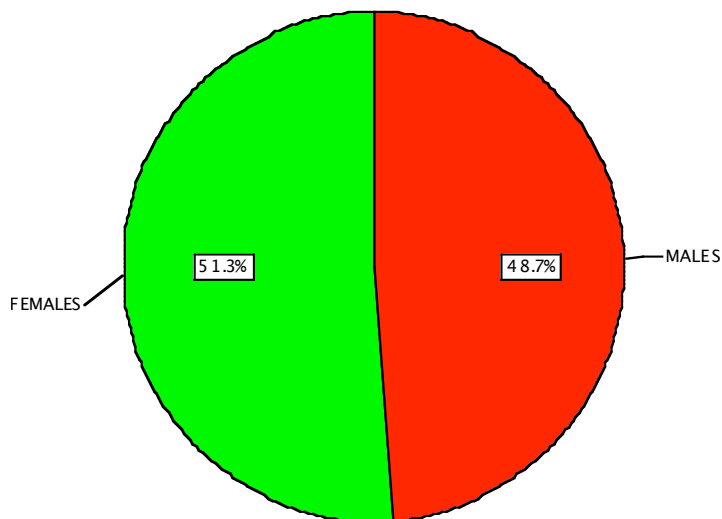
**Figure 4** Gender distribution among AGM Health Service  
householders.



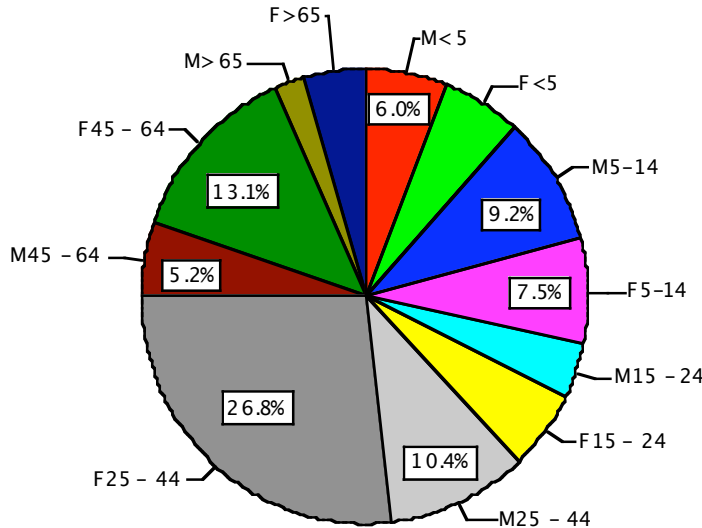
**Figure 5** Gender distribution among AGM Health Service householders EXPOSED to spray.



**Figure 6** Gender distribution (Census 2001) among AGM Health Service householders living within AGM eradication areas.



**Figure 7** Age & Gender distribution among AGM Health Service householders.



**Figure 8** Age & Gender distribution among AGM Health Service householders EXPOSED to spray.

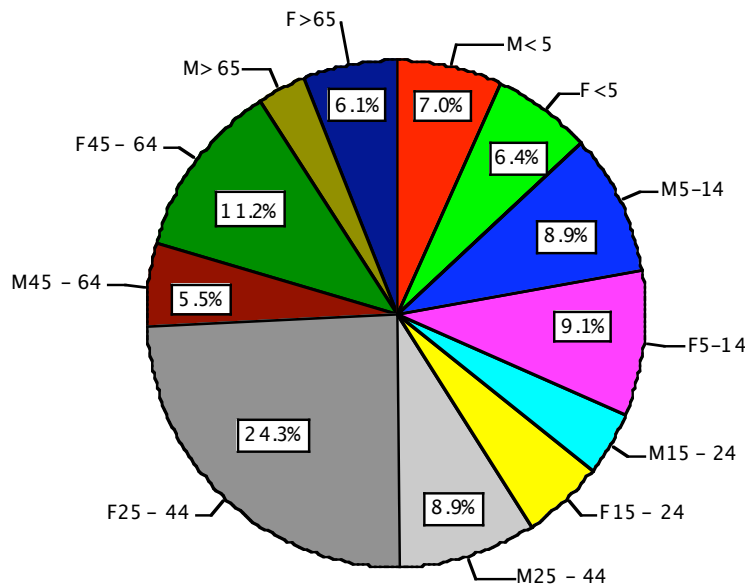
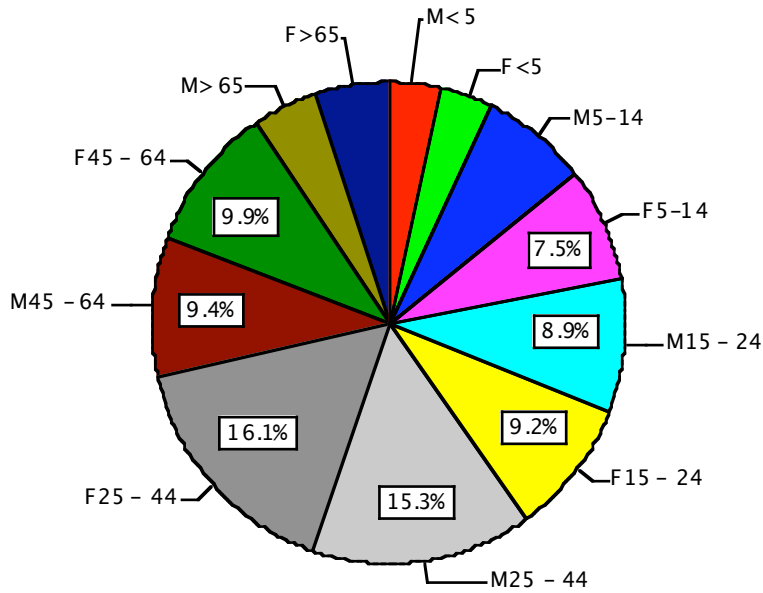


Figure 9

Age & Gender distribution (Census 2001) among AGM Health Service householders living within AGM eradication areas.



**APPENDIX D**  
**FREQUENCY OF SYMPTOMS FOR**  
**HOUSEHOLDERS AND ENCOUNTERS**

Table 1 Frequency of symptoms for exposed, non-exposed and all householders

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed Householders (855)	Frequency of ICPC Code per Non-Exposed Householders (681)	Frequency of ICPC Code per Total (Exposed + Non-Exp) Householders (1,536)
<b>Total A</b>	General and unspecified	<b>397</b>	<b>314</b>	<b>711</b>
A01	Pain generalised/ unspecified	5	4	9
A03	Fever	10	6	16
A04	Weakness/tiredness general	59	47	106
A05	Feeling ill	26	27	53
A06	Fainting/syncope	6	3	9
A08	Swelling (excl oedema K07)	8	13	21
A09	Sweating problems (hyperhidrosis)	1	1	2
A12	Allergy/allergic reaction NOS	241	201	442
A13	Concern/fear about treatment	1	2	3
A21	Risk factor for malignancy	0	1	1
A26	Fear of cancer, NOS	0	1	1
A27	Fear of other disease NOS	3	2	5
A29	General symptom/complaint, other	21	14	35
A72	Chickenpox.	3	0	3
A75	Infectious mononucleosis	0	2	2
A76	Other viral diseases with exanthem	0	1	1
A77	Other viral disease, NOS.	6	4	10
A78	Infectious diseases other, NOS	1	1	2
A79	Malignancy NOS	1	0	1
A86	Toxic effects other substances.	47	50	97
A90	Congenital anomaly NOS/multiple	5	3	8
A92	Food allergy	149	118	267
A93	Premature newborn	4	0	4
A97	No disease	2	0	2
A99	Other generalised diseases/multiple syndromes.	1	0	1
<b>Total B</b>	<b>Blood, blood forming organs and immune mechanism</b>	<b>23</b>	<b>15</b>	<b>38</b>
B02	Lymph gland(s) enlarged/painful	2	3	5

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed Householders (855)	Frequency of ICPC Code per Non-Exposed Householders (681)	Frequency of ICPC Code per Total (Exposed + Non-Exp) Householders (1,536)
B29	Symptoms/complications blood and immune mechanism	5	0	5
B72	Hodgkin's disease/lymphomas	2	1	3
B73	Leukaemia	0	2	2
B80	Iron deficiency anaemia	1	0	1
B81	Anaemia other/unspecified	7	0	7
B99	Blood/lymph/spleen disease, other including autoimmune disease of blood, red cell abnormality	10	9	19
<b>Total D</b>	<b>Digestive</b>	<b>196</b>	<b>150</b>	<b>346</b>
D01	Abdominal pain/cramps, general	14	12	26
D02	Abdominal pain, epigastric	10	5	15
D06	Abdominal pain, localised, other	6	3	9
D08	Flatulence/gas/belching	0	2	2
D09	Nausea	80	52	132
D10	Vomiting	40	21	61
D11	Diarrhoea	31	28	59
D12	Constipation	3	2	5
D18	Change in faeces/bowel movements	5	0	5
D20	Symptoms./complaint mouth, tongue or lips	56	46	102
D27	Fear of digestive disease, other	1	0	1
D72	Viral hepatitis	5	0	5
D77	Malignant neoplasm digestive, other	1	0	1
D83	Mouth/tongue/lip disease including aphthous ulcer, cheilosis, glossitis, salivary calculus	1	1	2
D84	Oesophagus disease	11	18	29
D88	Appendicitis	0	2	2
D90	Hiatus hernia	4	2	6
D93	Irritable bowel syndrome	1	5	6

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed Householders (855)	Frequency of ICPC Code per Non-Exposed Householders (681)	Frequency of ICPC Code per Total (Exposed + Non-Exp) Householders (1,536)
D97	Liver disease NOS including cirrhosis, portal hypertension	4	6	10
D99	Disease digestive system, other including food intolerance	15	20	35
<b>Total F□</b>	<b>Eye</b>	<b>169</b>	<b>130</b>	<b>299</b>
F01	Eye pain excluding abnormal sensations in eye	13	12	25
F02	Red eye including inflamed eye	26	24	50
F03	Eye discharge including discharge, watery eye	40	30	70
F05	Visual disturbance, other including blurred vision, eye strain, temporary blindness, weak eyes	6	5	11
F13	Eye sensations abnormal including burning eye, dry eye, itchy eye	118	79	197
F15	Eye appearance abnormal including swollen eyes	19	18	37
F16	Symptoms of eyelids	2	3	5
F70	Conjunctivitis, infectious	6	3	9
F71	Conjunctivitis, allergic	4	4	8
F72	Blepharitis/stye/chalazion	0	1	1
F94	Blindness, all types.	0	2	2
F99	Eye/adnexa disease, other including colour blindness, pterygium, night blindness	6	2	8
<b>Total H□</b>	<b>Ear</b>	<b>27</b>	<b>9</b>	<b>36</b>
H01	Ear pain/earache	12	3	15
H02	Hearing/complaints (excl, deafnessH84)	3	2	5
H03	Ringing/buzzing/tinnitus	3	0	3
H28	Limited function/disability ear including deafness one ear, temporary deafness	2	3	5
H71	Acute otitis media/myringitis	3	1	4

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed Householders (855)	Frequency of ICPC Code per Non-Exposed Householders (681)	Frequency of ICPC Code per Total (Exposed + Non-Exp) Householders (1,536)
H74	Chronic otitis media, other infections of ear.	1	0	1
H84	Presbycusis	1	0	1
H86	Deafness including partial or complete deafness in both ears	5	0	5
I182	Vertiginous syndrome/labyrinthitis/ vestib ulitis (excl vertigo N17)	2	0	2
<b>Total K□</b>	<b>Circulatory</b>	<b>95</b>	<b>34</b>	<b>129</b>
K04	Palpitations/awareness of heart, including tachycardia	7	6	13
K07	Swollen ankles/oedema including fluid retention, swollen feet	1	0	1
K24	Fear of heart disease	3	0	3
K29	Cardiovascular symptom/complaint, other including low blood pressure, weak heart	14	5	19
K71	Rheumatic fever/heart disease	3	0	3
K73	Congenital anomalies heart/circ. system	3	2	5
K74	Ischaemic heart disease with angina	8	1	9
K76	Other & chronic ischaemic heart disease	11	2	13
K77	Heart failure	5	3	8
K82	Pulmonary heart disease including primary pulmonary hypertension	2	0	2
K84	Heart Disease, cardiomyopathy	2	0	2
K86	Hypertension, uncomplicated	47	19	66
K87	Hypertension, complicated	0	1	1
K90	Stroke/cerebrovascular accident	5	1	6
<b>Total L□</b>	<b>Musculoskeletal (Locomotion)</b>	<b>69</b>	<b>51</b>	<b>120</b>

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed Householders (855)	Frequency of ICPC Code per Non-Exposed Householders (681)	Frequency of ICPC Code per Total (Exposed + Non-Exp) Householders (1,536)
L01	Neck symptom/complaint	6	3	9
L02	Back symptom/complaint	11	6	17
L04	Chest symptom/complaint including chest pain attributed to musculoskeletal system	24	23	47
L18	Muscle pain	7	6	13
L20	Joint symptom/complaint NOS including muscle stiffness, muscle strain, atrophy	7	7	14
L29	Other symptoms/complaints musculoskeletal system	4	2	6
L88	Rheumatoid arthritis excluding psoriatic arthropathy S91	2	2	4
L91	Osteoarthritis, other including arthritis NOS, Heberden's nodes, osteoarthritis, traumatic arthropathy	17	7	24
L99	Musculoskeletal disease, other	5	4	9
<b>Total N□</b>	<b>Neurological</b>	<b>188</b>	<b>139</b>	<b>327</b>
N01	Headache	143	109	252
N02	Tension headache	1	0	1
N05	Tingling fingers/feet/toes	4	2	6
N07	Convulsions / Seizures	4	1	5
N08	Abnormal involuntary movements including dystonia, jerking, shaking, spasm, tremor, twitching	2	3	5
N17	Vertigo/dizziness (excl. I182)	34	18	52
N86	Multiple sclerosis	3	1	4
N88	Epilepsy, all types	1	5	6
N89	Migraine	20	10	30
N91	Facial paralysis (Bell's palsy)	1	0	1
N93	Carpal tunnel syndrome	2	0	2
N99	Neurological disease, other including cerebral palsy, motor neurone disease	3	8	11

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed Householders (855)	Frequency of ICPC Code per Non-Exposed Householders (681)	Frequency of ICPC Code per Total (Exposed + Non-Exp) Householders (1,536)
<b>Total P□</b>	<b>Psychological</b>	<b>100</b>	<b>80</b>	<b>180</b>
P01	Feeling anxious/nervous/tense	38	32	70
P02	Acute stress reaction	5	6	11
P03	Feeling depressed	8	5	13
P04	Feeling/behaving irritable/angry	29	25	54
P06	Sleep disturbance	6	8	14
P20	Memory disturbance	7	3	10
P29	Psychological symptom/complaint, other including delusions, multiple psychological symptoms/complaints or strange behaviour, suspiciousness	3	5	8
P74	Anxiety disorder/anxiety state	8	4	12
P99	Psychological disorders, other including autism, neurosis NOS, mental illness unspecified	21	13	34
<b>Total R□</b>	<b>Respiratory</b>	<b>612</b>	<b>439</b>	<b>1051</b>
R01	Pain, respiratory system excluding sore throat R21	13	14	27
R02	Shortness of breath, dyspnoea excluding hyperventilation R98	24	14	38
R03	Wheezing	43	27	70
R04	Breathing problems, other including abnormal breathing	36	21	57
R05	Cough	93	69	162
R06	Nose bleed/epistaxis	25	16	41
R07	Sneezing/nasal congestion	25	18	43
R08	Nose symptom/complaint, other including pain in nose, post-nasal drip	72	53	125

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed Householders (855)	Frequency of ICPC Code per Non-Exposed Householders (681)	Frequency of ICPC Code per Total (Exposed + Non-Exp) Householders (1,536)
R09	Sinus symptom/ complaint, other	29	33	62
R21	Throat symptom/ complaint	153	85	238
R23	Voice symptom/ complaint including hoarseness, absence of voice	11	11	22
R25	Sputum/ phlegm abnormal	11	12	23
R29	Respiratory symptom/ complaint, other excluding breathing problems R02, R03, R04, cough R05, nose or sinus symptoms R06, R07, R08, R09, R21	14	12	26
R71	Whooping cough	1	2	3
R74	Upper respiratory infection, acute	15	2	17
R75	Sinusitis acute/ chronic	20	12	32
R76	Tonsillitis acute	5	0	5
R77	Laryngitis/ tracheitis, acute including croup	2	4	6
R78	Acute bronchitis/ bronchiolitis excluding chronic bronchitis R79, allergic bronchitis R96	24	5	29
R79	Chronic bronchitis	3	2	5
R80	Influenza	5	6	11
R81	Pneumonia including bronchopneumonia, Legionnaire's disease, influenzal pneumonia	13	11	24
R82	Pleurisy/ pleural effusion	2	1	3
R84	Malignant neoplasm bronchus, lung	0	1	1
R85	Neoplasm malignant respiratory other (larynx)	0	1	1
R89	Congenital anomalies of respiratory system	1	3	4
R91	Chronic bronchitis/ bronchiectasis	4	6	10

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed Householders (855)	Frequency of ICPC Code per Non-Exposed Householders (681)	Frequency of ICPC Code per Total (Exposed + Non-Exp) Householders (1,536)
R95	Chronic obstructive pulmonary disease	27	8	35
R96	Asthma	351	248	599
R97	Allergic rhinitis	177	128	305
R98	Hyperventilation syndrome	1	1	2
R99	Respiratory disease, other including bronchiectasis or pneumoconiosis	16	11	27
<b>Total S□</b>	<b>Skin</b>	<b>276</b>	<b>203</b>	<b>479</b>
S01	Pain, tenderness of skin including burning sensation, painful lesion or rash, soreness	17	11	28
S02	Pruritus including skin irritation	39	34	73
S04	Localised swelling/papules/lump/mass/skin/subcutaneous tissue	8	14	22
S05	Generalized multiple swelling/papules/lump/skin/subcutaneous tissue	3	3	6
S06	Rash localised	64	50	114
S07	Rash generalised	5	6	11
S08	Skin colour change including flushing	7	3	10
S10	Boil/carbuncle/cellulitis localized	1	0	1
S11	Other localized infection	1	0	1
S17	Abrasion/scratch/blister	0	1	1
S21	Symptoms/complaints of skin texture	8	9	17
S23	Hair Loss	1	0	1
S70	Herpes zoster including shingles	0	1	1
S71	Herpes simplex excluding genital infections X90, Y72	0	1	1
S76	Skin infection, other including cellulitis, erysipelas, pyoderma	2	2	4

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed Householders (855)	Frequency of ICPC Code per Non-Exposed Householders (681)	Frequency of ICPC Code per Total (Exposed + Non-Exp) Householders (1,536)
S77	Malignant neoplasm of skin	1	0	1
S87	Dermatitis, atopic eczema	179	120	299
S88	Dermatitis, contact/allergic	4	3	7
S91	Psoriasis	7	2	9
S98	Urticaria	13	9	22
S99	Skin disease, other	2	3	5
<b>Total T</b>	<b>Endocrine, metabolic and nutritional</b>	<b>64</b>	<b>27</b>	<b>91</b>
T01	Excessive thirst	2	1	3
T03	Loss of appetite	6	2	8
T15	Thyroid lump, excl. nodule T81	1	2	3
T27	Fear of endocrine/metabolic disease, other	0	1	1
T28	Limited function/disability endocrine/metabolic	10	5	15
T80	Congenital abnormality endocrine/metabolic	1	0	1
T89	Diabetes, insulin dependent	13	6	19
T90	Diabetes, non-insulin dependent	13	7	20
T93	Lipid disorder including hyperlipidaemia, abnormalities of lipoprotein levels, raised levels of cholesterol and triglycerides	10	1	11
T99	Endocrine/metabolic/nutrition al disease, other including lactose intolerance	18	5	23
<b>Total U</b>	<b>Urological</b>	<b>15</b>	<b>5</b>	<b>20</b>
U02	Urinary frequency/urgency	2	0	2
U08	Urinary retention	1	0	1
U13	Bladder symptom/complaint, other including bad odour of urine, dark urine	1	0	1
U14	Kidney symptom/complaint including renal colic, kidney trouble	6	3	9

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed Householders (855)	Frequency of ICPC Code per Non-Exposed Householders (681)	Frequency of ICPC Code per Total (Exposed + Non-Exp) Householders (1,536)
U29	Urinary symptom/ complaint, other excluding irritable bladder, bladder pain U13, kidney problems U14	2	1	3
U75	Malignant neoplasm kidney	2	0	2
U99	Urinary disease, other including obstruction bladder neck, renal failure	3	1	4
<b>Total W□</b>	<b>Pregnancy, child-bearing, family planning</b>	<b>44</b>	<b>30</b>	<b>74</b>
W05	Pregnancy nausea/ vomiting	2	0	2
W27	Fear of complications of pregnancy	31	20	51
W78	Pregnancy - is pregnant with no specific concerns	17	9	26
W82	Abortion, spontaneous	4	2	6
W85	Gestational diabetes excluding pre-existing diabetes T89 or T90	2	0	2
<b>Total X□</b>	<b>Female genital</b>	<b>10</b>	<b>5</b>	<b>15</b>
X21	Breast symptom/ complaint, other	5	1	6
X75	Neoplasm malignant cervix	0	1	1
X76	Neoplasm malignant breast female	1	1	2
X99	Genital disease, other	5	3	8
<b>Total Y□</b>	<b>Male genital</b>	<b>1</b>	<b>2</b>	<b>3</b>
Y06	Prostrate symptom/ complaint	1	1	2
Y77	Malignant neoplasm prostate	0	1	1
<b>Total Z□</b>	<b>Social problems</b>	<b>204</b>	<b>185</b>	<b>389</b>
Z01	Poverty/ financial problem affecting daily living	1	0	1
Z02	Problems food & water	5	8	13
Z03	Housing/ neighbourhood problem	3	6	9

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed Householders (855)	Frequency of ICPC Code per Non-Exposed Householders (681)	Frequency of ICPC Code per Total (Exposed + Non-Exp) Householders (1,536)
Z05	Work problem - spray affects work environment	6	8	14
Z06	Unemployment problem - spray prevents normal work attendance	9	14	23
Z10	Health care system problem including payment costs for scripts, etc.	6	13	19
Z11	Problems with being ill	0	2	2
Z14	Partner illness problem - concern for partner of person phoning in	25	9	34
Z18	Illness problem with child - disruption due to spray affecting child	107	90	197
Z21	Problems with behaviour parent/other family member	7	2	9
Z22	Problems with parent/other family member being ill	35	20	55
Z27	Fear of a social problem - worrying about pets	9	11	20
Z29	Social problems NOS including environmental problems, malingering, pollution	15	19	34

Table 2 Frequency of symptoms for encounters by exposed, non-exposed and all householders

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed HH Encounters (1,681)	Frequency of ICPC Code per Non-Exposed HH Encounters (1,191)	Frequency of ICPC Code per Total (Exposed + Non-Exp) HH Encounters (2,872)
<b>Total A</b>	General and unspecified	<b>621</b>	<b>495</b>	<b>1116</b>
A01	Pain generalised/ unspecified	6	5	11
A03	Fever	13	8	21
A04	Weakness/ tiredness general	87	67	154
A05	Feeling ill	27	28	55
A06	Fainting/ syncope	7	3	10
A08	Swelling (excl oedema K07)	8	17	25
A09	Sweating problems (hyperhidrosis)	1	1	2
A12	Allergy/ allergic reaction NOS	300	264	564
A13	Concern/ fear about treatment	1	2	3
A21	Risk factor for malignancy	0	1	1
A26	Fear of cancer, NOS	0	1	1
A27	Fear of other disease NOS	3	2	5
A29	General symptom/ complaint, other	22	15	37
A72	Chickenpox.	10	0	10
A75	Infectious mononucleosis	0	2	2
A76	Other viral diseases with exanthem	0	1	1
A77	Other viral disease, NOS.	7	5	12
A78	Infectious diseases other, NOS	2	1	3
A79	Malignancy NOS	0	1	1
A86	Toxic effects other substances.	64	65	129
A90	Congenital anomaly NOS/multiple	6	3	9
A92	Food allergy	207	169	376
A93	Premature newborn	6	0	6
A97	No disease	2	0	2
A99	Other generalised diseases/ multiple syndromes.	1	0	1
<b>Total B</b>	<b>Blood, blood forming organs and immune mechanism</b>	<b>33</b>	<b>16</b>	<b>49</b>

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed HH Encounters (1,681)	Frequency of ICPC Code per Non- Exposed HH Encounters (1,191)	Frequency of ICPC Code per Total (Exposed + Non-Exp) HH Encounters (2,872)
B02	Lymph gland(s) enlarged/painful	2	3	5
B29	Symptoms/complications blood and immune mechanism	5	0	5
B72	Hodgkin's disease/lymphomas	3	1	4
B73	Leukaemia	0	2	2
B80	Iron deficiency anaemia	1	0	1
B81	Anaemia other/unspecified	12	0	12
B99	Blood/lymph/spleen disease, other including autoimmune disease of blood, red cell abnormality	11	10	21
<b>Total D</b>	<b>Digestive</b>	<b>270</b>	<b>208</b>	<b>478</b>
D01	Abdominal pain/cramps, general	15	16	31
D02	Abdominal pain, epigastric	10	6	16
D06	Abdominal pain, localised, other	7	3	10
D08	Flatulence/gas/belching	0	5	5
D09	Nausea	97	69	166
D10	Vomiting	53	27	80
D11	Diarrhoea	37	40	77
D12	Constipation	4	2	6
D18	Change in faeces/bowel movements	6	0	6
D20	Symptoms./complaint mouth, tongue or lips	74	60	134
D27	Fear of digestive disease, other	1	0	1
D72	Viral hepatitis	5	0	5
D77	Malignant neoplasm digestive, other	1	0	1
D83	Mouth/tongue/lip disease including aphthous ulcer, cheilosis, glossitis, salivary calculus	1	1	2
D84	Oesophagus disease	13	21	34
D88	Appendicitis	0	2	2

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed HH Encounters (1,681)	Frequency of ICPC Code per Non- Exposed HH Encounters (1,191)	Frequency of ICPC Code per Total (Exposed + Non-Exp) HH Encounters (2,872)
D90	Hiatus hernia	6	2	8
D93	Irritable bowel syndrome	2	7	9
D97	Liver disease NOS including cirrhosis, portal hypertension	4	7	11
D99	Disease digestive system, other including food intolerance	17	22	39
<b>Total F□</b>	<b>Eye</b>	<b>240</b>	<b>182</b>	<b>422</b>
F01	Eye pain excluding abnormal sensations in eye	13	13	26
F02	Red eye including inflamed eye	31	26	57
F03	Eye discharge including discharge, watery eye	46	34	80
F05	Visual disturbance, other including blurred vision, eye strain, temporary blindness, weak eyes	6	8	14
F13	Eye sensations abnormal including burning eye, dry eye, itchy eye	150	102	252
F15	Eye appearance abnormal including swollen eyes	26	21	47
F16	Symptoms of eyelids	2	3	5
F70	Conjunctivitis, infectious	7	3	10
F71	Conjunctivitis, allergic	4	4	8
F72	Blepharitis/stye/chalazion	0	1	1
F94	Blindness, all types.	0	2	2
F99	Eye/adnexa disease, other including colour blindness, pterygium, night blindness	6	2	8
<b>Total H□</b>	<b>Ear</b>	<b>36</b>	<b>10</b>	<b>46</b>
H01	Ear pain/earache	16	4	20
H02	Hearing/complaints (excl, deafnessH84)	4	2	6
H03	Ringing/buzzing/tinnitus	3	0	3
H28	Limited function/disability ear including deafness one ear, temporary deafness	2	3	5

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed HH Encounters (1,681)	Frequency of ICPC Code per Non- Exposed HH Encounters (1,191)	Frequency of ICPC Code per Total (Exposed + Non-Exp) HH Encounters (2,872)
H71	Acute otitis media/myringitis	3	1	4
H74	Chronic otitis media, other infections of ear.	1	0	1
H84	Presbycusis	1	0	1
H86	Deafness including partial or complete deafness in both ears	6	0	6
I182	Vertiginous syndrome/labyrinthitis/ vestib ulitis (excl vertigo N17)	2	0	2
<b>Total K□</b>	<b>Circulatory</b>	<b>124</b>	<b>45</b>	<b>169</b>
K04	Palpitations/awareness of heart, including tachycardia	8	7	15
K07	Swollen ankles/oedema including fluid retention, swollen feet	1	0	1
K24	Fear of heart disease	4	0	4
K29	Cardiovascular symptom/complaint, other including low blood pressure, weak heart	17	5	22
K71	Rheumatic fever/heart disease	3	0	3
K73	Congenital anomalies heart/circ. system	3	4	7
K74	Ischaemic heart disease with angina	10	1	11
K76	Other & chronic ischaemic heart disease	13	3	16
K77	Heart failure	6	3	9
K82	Pulmonary heart disease including primary pulmonary hypertension	3	0	3
K84	Heart Disease, cardiomyopathy	2	0	2
K86	Hypertension, uncomplicated	59	23	82
K87	Hypertension, complicated	0	1	1
K90	Stroke/cerebrovascular accident	5	1	6
<b>Total L□</b>	<b>Musculoskeletal (Locomotion)</b>	<b>95</b>	<b>59</b>	<b>154</b>

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed HH Encounters (1,681)	Frequency of ICPC Code per Non- Exposed HH Encounters (1,191)	Frequency of ICPC Code per Total (Exposed + Non-Exp) HH Encounters (2,872)
L01	Neck symptom/complaint	7	3	10
L02	Back symptom/complaint	16	7	23
L04	Chest symptom/complaint including chest pain attributed to musculoskeletal system	27	24	51
L18	Muscle pain	11	7	18
L20	Joint symptom/complaint NOS including muscle stiffness, muscle strain, atrophy	8	8	16
L29	Other symptoms/complaints musculoskeletal system	4	2	6
L88	Rheumatoid arthritis excluding psoriatic arthropathy S91	3	2	5
L91	Osteoarthritis, other including arthritis NOS, Heberden's nodes, osteoarthritis, traumatic arthropathy	20	7	27
L99	Musculoskeletal disease, other	7	6	13
<b>Total N□</b>	<b>Neurological</b>	<b>272</b>	<b>200</b>	<b>472</b>
N01	Headache	204	160	364
N02	Tension headache	1	0	1
N05	Tingling fingers/feet/toes	4	2	6
N07	Convulsions / Seizures	4	1	5
N08	Abnormal involuntary movements including dystonia, jerking, shaking, spasm, tremor, twitching	3	3	6
N17	Vertigo/dizziness (excl. I182)	40	21	61
N86	Multiple sclerosis	6	2	8
N88	Epilepsy, all types	1	5	6
N89	Migraine	25	13	38
N91	Facial paralysis (Bell's palsy)	3	0	3
N93	Carpal tunnel syndrome	2	0	2
N99	Neurological disease, other including cerebral palsy, motor neurone disease	4	10	14

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed HH Encounters (1,681)	Frequency of ICPC Code per Non- Exposed HH Encounters (1,191)	Frequency of ICPC Code per Total (Exposed + Non-Exp) HH Encounters (2,872)
<b>Total P□</b>	<b>Psychological</b>	<b>148</b>	<b>101</b>	<b>249</b>
P01	Feeling anxious/nervous/tense	45	39	84
P02	Acute stress reaction	5	6	11
P03	Feeling depressed	9	5	14
P04	Feeling/behaving irritable/angry	37	26	63
P06	Sleep disturbance	7	9	16
P20	Memory disturbance	7	4	11
P29	Psychological symptom/complaint, other including delusions, multiple psychological symptoms/complaints or strange behaviour, suspiciousness	3	5	8
P74	Anxiety disorder/anxiety state	10	4	14
P99	Psychological disorders, other including autism, neurosis NOS, mental illness unspecified	32	13	45
<b>Total R□</b>	<b>Respiratory</b>	<b>1030</b>	<b>707</b>	<b>1737</b>
R01	Pain, respiratory system excluding sore throat R21	17	14	31
R02	Shortness of breath, dyspnoea excluding hyperventilation R98	35	16	51
R03	Wheezing	57	37	94
R04	Breathing problems, other including abnormal breathing	48	24	72
R05	Cough	117	91	208
R06	Nose bleed/epistaxis	35	20	55
R07	Sneezing/nasal congestion	33	22	55
R08	Nose symptom/complaint, other including pain in nose, post-nasal drip	89	70	159

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed HH Encounters (1,681)	Frequency of ICPC Code per Non-Exposed HH Encounters (1,191)	Frequency of ICPC Code per Total (Exposed + Non-Exp) HH Encounters (2,872)
R09	Sinus symptom/ complaint, other	34	48	82
R21	Throat symptom/ complaint	184	126	310
R23	Voice symptom/ complaint including hoarseness, absence of voice	16	12	28
R25	Sputum/ phlegm abnormal	13	14	27
R29	Respiratory symptom/ complaint, other excluding breathing problems R02, R03, R04, cough R05, nose or sinus symptoms R06, R07, R08, R09, R21	15	13	28
R71	Whooping cough	2	2	4
R74	Upper respiratory infection, acute	16	2	18
R75	Sinusitis acute/ chronic	22	17	39
R76	Tonsillitis acute	5	0	5
R77	Laryngitis/ tracheitis, acute including croup	2	5	7
R78	Acute bronchitis/ bronchiolitis excluding chronic bronchitis R79, allergic bronchitis R96	28	6	34
R79	Chronic bronchitis	3	2	5
R80	Influenza	6	6	12
R81	Pneumonia including bronchopneumonia, Legionnaire's disease, influenzal pneumonia	20	14	34
R82	Pleurisy/ pleural effusion	2	1	3
R84	Malignant neoplasm bronchus, lung	0	1	1
R85	Neoplasm malignant respiratory other (larynx)	0	2	2
R89	Congenital anomalies of respiratory system	1	3	4
R91	Chronic bronchitis/ bronchiectasis	4	10	14

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed HH Encounters (1,681)	Frequency of ICPC Code per Non- Exposed HH Encounters (1,191)	Frequency of ICPC Code per Total (Exposed + Non-Exp) HH Encounters (2,872)
R95	Chronic obstructive pulmonary disease	43	9	52
R96	Asthma	535	366	901
R97	Allergic rhinitis	220	158	378
R98	Hyperventilation syndrome	1	1	2
R99	Respiratory disease, other including bronchiectasis or pneumoconiosis	18	13	31
<b>Total S□</b>	<b>Skin</b>	<b>424</b>	<b>292</b>	<b>716</b>
S01	Pain, tenderness of skin including burning sensation, painful lesion or rash, soreness	18	11	29
S02	Pruritus including skin irritation	49	41	90
S04	Localised swelling/papules/lump/mass/skin/subcutaneous tissue	9	14	23
S05	Generalized multiple swelling/papules/lump/skin/subcutaneous tissue	3	3	6
S06	Rash localised	86	64	150
S07	Rash generalised	5	6	11
S08	Skin colour change including flushing	7	4	11
S10	Boil/carbuncle/cellulitis localized	1	0	1
S11	Other localized infection	1	0	1
S17	Abrasion/scratch/blister	0	1	1
S21	Symptoms/complaints of skin texture	9	10	19
S23	Hair Loss	1	0	1
S70	Herpes zoster including shingles	0	1	1
S71	Herpes simplex excluding genital infections X90, Y72	0	1	1
S76	Skin infection, other including cellulitis, erysipelas, pyoderma	2	2	4

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed HH Encounters (1,681)	Frequency of ICPC Code per Non- Exposed HH Encounters (1,191)	Frequency of ICPC Code per Total (Exposed + Non-Exp) HH Encounters (2,872)
S77	Malignant neoplasm of skin	2	0	2
S87	Dermatitis, atopic eczema	254	160	414
S88	Dermatitis, contact/allergic	5	3	8
S91	Psoriasis	11	4	15
S98	Urticaria	20	11	31
S99	Skin disease, other	2	3	5
<b>Total T</b>	<b>Endocrine, metabolic and nutritional</b>	<b>75</b>	<b>41</b>	<b>116</b>
T01	Excessive thirst	2	1	3
T03	Loss of appetite	6	2	8
T15	Thyroid lump, excl. nodule T81	1	3	4
T27	Fear of endocrine/metabolic disease, other	0	1	1
T28	Limited function/disability endocrine/metabolic	12	6	18
T80	Congenital abnormality endocrine/metabolic	1	0	1
T89	Diabetes, insulin dependent	16	9	25
T90	Diabetes, non-insulin dependent	17	7	24
T93	Lipid disorder including hyperlipidaemia, abnormalities of lipoprotein levels, raised levels of cholesterol and triglycerides	10	1	11
T99	Endocrine/metabolic/nutrition al disease, other including lactose intolerance	18	11	29
<b>Total U</b>	<b>Urological</b>	<b>22</b>	<b>5</b>	<b>27</b>
U02	Urinary frequency/urgency	4	0	4
U08	Urinary retention	1	0	1
U13	Bladder symptom/complaint, other including bad odour of urine, dark urine	1	0	1
U14	Kidney symptom/complaint including renal colic, kidney trouble	8	3	11

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed HH Encounters (1,681)	Frequency of ICPC Code per Non- Exposed HH Encounters (1,191)	Frequency of ICPC Code per Total (Exposed + Non-Exp) HH Encounters (2,872)
U29	Urinary symptom/complaint, other excluding irritable bladder, bladder pain U13, kidney problems U14	2	1	3
U75	Malignant neoplasm kidney	2	0	2
U99	Urinary disease, other including obstruction bladder neck, renal failure	5	1	6
<b>Total W□</b>	<b>Pregnancy, child-bearing, family planning</b>	<b>71</b>	<b>38</b>	<b>109</b>
W05	Pregnancy nausea/vomiting	2	0	2
W27	Fear of complications of pregnancy	38	26	64
W78	Pregnancy - is pregnant with no specific concerns	25	11	36
W82	Abortion, spontaneous	5	2	7
W85	Gestational diabetes excluding pre-existing diabetes T89 or T90	3	0	3
<b>Total X□</b>	<b>Female genital</b>	<b>14</b>	<b>8</b>	<b>22</b>
X21	Breast symptom/complaint, other	5	2	7
X75	Neoplasm malignant cervix	0	1	1
X76	Neoplasm malignant breast female	1	1	2
X99	Genital disease, other	8	4	12
<b>Total Y□</b>	<b>Male genital</b>	<b>1</b>	<b>3</b>	<b>4</b>
Y06	Prostrate symptom/complaint	1	1	2
Y77	Malignant neoplasm prostate	0	2	2
<b>Total Z□</b>	<b>Social problems</b>	<b>249</b>	<b>217</b>	<b>466</b>
Z01	Poverty/financial problem affecting daily living	1	0	1
Z02	Problems food & water	5	8	13
Z03	Housing/neighbourhood problem	3	6	9

ICPC	ICPC Code description	Frequency of ICPC Code per Exposed HH Encounters (1,681)	Frequency of ICPC Code per Non- Exposed HH Encounters (1,191)	Frequency of ICPC Code per Total (Exposed + Non-Exp) HH Encounters (2,872)
Z05	Work problem - spray affects work environment	6	8	14
Z06	Unemployment problem - spray prevents normal work attendance	10	18	28
Z10	Health care system problem including payment costs for scripts, etc.	7	13	20
Z11	Problems with being ill	0	2	2
Z14	Partner illness problem - concern for partner of person phoning in	27	10	37
Z18	Illness problem with child - disruption due to spray affecting child	133	106	239
Z21	Problems with behaviour parent/other family member	7	2	9
Z22	Problems with parent/other family member being ill	35	21	56
Z27	Fear of a social problem - worrying about pets	10	11	21
Z29	Social problems NOS including environmental problems, malingering, pollution	16	19	35

## APPENDIX E

### AGE GENDER RATES BY ORGAN SYSTEM

**Table 1** Age group "Under 5" EXPOSED rates per 100,000 by Organ System

Organ System	Males	Females	Total (Males + Females) under 5 yrs EXPOSED	Rates per 100,000 inhabitants with 95% confidence interval	
A - General	25	24	49	2,850	2,063 to 3,637
B - Blood	0	1	1	58	-56 to 172
D - Digestive	10	8	18	1,047	566 to 1,528
F - Eye	11	4	15	873	433 to 1,313
H - Ear	2	2	4	233	5 to 461
K - Circulatory	3	1	4	233	5 to 461
L - Musculoskeletal	4	2	6	349	70 to 628
N - Neurological	4	8	12	698	304 to 1,092
P - Psychological	3	1	4	233	5 to 461
R - Respiratory	47	32	79	4,596	3,606 to 5,586
S - Skin	24	19	43	2,501	1,763 to 3,239
T - Endocrine	0	2	2	116	-45 to 277
U - Urinary	2	0	2	116	-45 to 277
W - Pregnancy	0	0	0	0	0 to 0
X - Female genital	0	0	0	0	0 to 0
Y - Male genital	0	0	0	0	0 to 0
Z - Social problems	17	13	30	1,745	1,126 to 2,364
<b>Total</b>	<b>60</b>	<b>55</b>	<b>115</b>	<b>6,690</b>	<b>5,509 to 7,871</b>

**Table 2 Gender among those "Under 5" EXPOSED rates per 100,000 by Organ System**

Organ System	Males	Females	Rates per 100,000 inhabitants for Males with 95% confidence interval		Rates per 100,000 inhabitants for Females with 95% confidence interval	
<b>A - General</b>	25	24	2,983	1831 to 4135	2,724	1,649 to 3,799
<b>B - Blood</b>	0	1	0	0 to 0	114	-109 to 337
<b>D - Digestive</b>	10	8	1,193	458 to 1,928	908	282 to 1,534
<b>F - Eye</b>	11	4	1,313	542 to 2,084	454	10 to 898
<b>H - Ear</b>	2	2	239	-92 to 570	227	-87 to 541
<b>K - Circulatory</b>	3	1	358	-46 to 762	114	-109 to 337
<b>L - Musculoskeletal</b>	4	2	477	10 to 944	227	-87 to 541
<b>N - Neurological</b>	4	8	477	10 to 944	908	282 to 1,534
<b>P - Psychological</b>	3	1	358	-46 to 762	114	-109 to 337
<b>R - Respiratory</b>	47	32	5,609	4,051 to 7,167	3,632	2,397 to 4,867
<b>S - Skin</b>	24	19	2,864	1,735 to 3,993	2,157	1,198 to 3,116
<b>T - Endocrine</b>	0	2	0	0 to 0	227	-87 to 541
<b>U - Urinary</b>	2	0	239	-92 to 570	0	0 to 0
<b>W - Pregnancy</b>	0	0	0	0 to 0	0	0 to 0
<b>X - Female genital</b>	0	0	0	0 to 0	0	0 to 0
<b>Y - Male genital</b>	0	0	0	0 to 0	0	0 to 0
<b>Z - Social problems</b>	17	13	2,029	1,074 to 2,984	1,476	680 to 2,272

**Table 3** Age group " 5 – 14 " years EXPOSED rates per 100,000 by Organ System

Organ System	Males	Females	Total (Males + Females) 5 - 14 yrs EXPOSED	Rates per 100,000 inhabitants with 95%confidence interval	
A - General	29	34	63	1,834	1,385 to 2,283
B - Blood	1	2	3	87	-12 to 186
D - Digestive	11	7	18	524	283 to 765
F - Eye	12	5	17	495	260 to 730
H - Ear	3	1	4	116	2 to 230
K - Circulatory	2	1	3	87	-12 to 186
L - Musculoskeletal	4	2	6	175	35 to 315
N - Neurological	9	10	19	553	305 to 801
P - Psychological	6	2	8	233	72 to 394
R - Respiratory	57	60	117	3,406	2,799 to 4,013
S - Skin	31	45	76	2,213	1,721 to 2,705
T - Endocrine	1	1	2	58	-23 to 139
U - Urinary	0	5	5	146	18 to 274
W - Pregnancy	0	0	0	0	0 to 0
X – Female genital	0	1	1	29	-28 to 86
Y – Male genital	0	0	0	0	0 to 0
Z – Social problems	9	14	23	670	397 to 943
<b>Total</b>	<b>76</b>	<b>78</b>	<b>154</b>	<b>4,483</b>	<b>3,791 to 5,175</b>

**Table 4 Gender among those " 5 – 14 " years EXPOSED rates per 100,000 by Organ System**

Organ System	Males	Females	Rates per 100,000 inhabitants for Males with 95% confidence interval		Rates per 100,000 inhabitants for Females with 95% confidence interval	
			Rate	Interval	Rate	Interval
<b>A - General</b>	29	34	1,735	1,109 to 2,361	1927	1,285 to 2,569
<b>B - Blood</b>	1	2	60	-57 to 177	113	-44 to 270
<b>D - Digestive</b>	11	7	658	270 to 1,046	397	104 to 690
<b>F - Eye</b>	12	5	718	313 to 1,123	283	35 to 531
<b>H - Ear</b>	3	1	180	-23 to 383	57	-54 to 168
<b>K - Circulatory</b>	2	1	120	-46 to 286	57	-54 to 168
<b>L - Musculoskeletal</b>	4	2	239	5 to 473	113	-44 to 270
<b>N - Neurological</b>	9	10	539	188 to 890	567	217 to 917
<b>P - Psychological</b>	6	2	359	72 to 646	113	-44 to 270
<b>R - Respiratory</b>	57	60	3,411	2,541 to 4,281	3401	2,555 to 4,247
<b>S - Skin</b>	31	45	1,855	1,208 to 2,502	2551	1,815 to 3,287
<b>T - Endocrine</b>	1	1	60	-57 to 177	57	-54 to 168
<b>U - Urinary</b>	0	5	0	0 to 0	283	35 to 531
<b>W - Pregnancy</b>	0	0	0	0 to 0	0	0 to 0
<b>X – Female genital</b>	0	1	0	0 to 0	57	-54 to 168
<b>Y – Male genital</b>	0	0	0	0 to 0	0	0 to 0
<b>Z – Social problems</b>	9	14	539	188, 890	794	380 to 1,208

**Table 5** Age group "15 – 24 " years EXPOSED rates per 100,000 by Organ System

Organ System	Males	Females	Total (Males + Females) 15 - 24 yrs EXPOSED	Rates per 100,000 inhabitants with 95% confidence interval	
A - General	17	23	40	939	649 to 1,229
B - Blood	1	1	2	47	-18 to 112
D - Digestive	12	15	27	634	396 to 872
F - Eye	7	12	19	446	246 to 646
H - Ear	0	3	3	70	-9 to 149
K - Circulatory	0	1	1	23	-23 to 69
L - Musculoskeletal	0	2	2	47	-18 to 112
N - Neurological	10	18	28	657	414 to 900
P - Psychological	3	3	6	141	28 to 254
R - Respiratory	30	34	64	1,502	1,137 to 1,867
S - Skin	8	13	21	493	283 to 703
T - Endocrine	0	2	2	47	-18 to 112
U - Urinary	0	0	0	0	0 to 0
W - Pregnancy	0	5	5	117	14 to 220
X – Female genital	0	1	1	23	-23 to 69
Y – Male genital	0	0	0	0	0 to 0
Z – Social problems	7	5	12	282	123 to 441
<b>Total</b>	<b>35</b>	<b>45</b>	<b>80</b>	<b>1,878</b>	<b>1,470 to 2,286</b>

**Table 6 Gender for those "15 – 24 " years EXPOSED rates per 100,000 by Organ System**

Organ System	Males	Females	Rates per 100,000 inhabitants for Males with 95% confidence interval		Rates per 100,000 inhabitants for Females with 95% confidence interval	
<b>A - General</b>	17	23	813	428 to 1,198	1060	629 to 1,491
<b>B - Blood</b>	1	1	48	-46 to 142	46	-44 to 136
<b>D - Digestive</b>	12	15	574	250 to 898	692	343 to 1,041
<b>F - Eye</b>	7	12	335	87 to 583	553	241 to 865
<b>H - Ear</b>	0	3	0	0 to 0	138	-18 to 294
<b>K - Circulatory</b>	0	1	0	0 to 0	46	-44 to 136
<b>L - Musculoskeletal</b>	0	2	0	0 to 0	92	-36 to 220
<b>N - Neurological</b>	10	18	478	182 to 774	830	448 to 1,212
<b>P - Psychological</b>	3	3	143	-19 to 305	138	-18 to 294
<b>R - Respiratory</b>	30	34	1,435	925 to 1,945	1568	1,045 to 2,091
<b>S - Skin</b>	8	13	383	118 to 648	599	274 to 924
<b>T - Endocrine</b>	0	2	0	0 to 0	92	-36 to 220
<b>U - Urinary</b>	0	0	0	0 to 0	0	0 to 0
<b>W - Pregnancy</b>	0	5	0	0 to 0	231	29 to 433
<b>X – Female genital</b>	0	1	0	0 to 0	46	-44 to 136
<b>Y – Male genital</b>	0	0	0	0 to 0	0	0 to 0
<b>Z – Social problems</b>	7	5	335	87 to 583	231	29 to 433

**Table 7** Age group "25 – 44 " years EXPOSED rates per 100,000 by Organ System

Organ System	Males	Females	Total (Males + Females) 25 - 44 yrs EXPOSED	Rates per 100,000 inhabitants with 95% confidence interval	
A - General	29	106	135	1,820	1,516 to 2,124
B - Blood	4	4	8	108	33 to 183
D - Digestive	13	56	69	930	712 to 1,148
F - Eye	14	44	58	782	582 to 982
H - Ear	3	3	6	81	16 to 146
K - Circulatory	8	10	18	243	131 to 355
L - Musculoskeletal	7	12	19	256	141 to 371
N - Neurological	13	59	72	971	748 to 1,194
P - Psychological	11	35	46	620	441 to 799
R - Respiratory	49	143	192	2,589	2,228 to 2,950
S - Skin	20	75	95	1,281	1,025 to 1,537
T - Endocrine	2	12	14	189	90 to 288
U - Urinary	0	3	3	40	-6 to 86
W - Pregnancy	0	31	31	418	271 to 565
X – Female genital	0	2	2	27	-10 to 64
Y – Male genital	0	0	0	0	0 to 0
Z – Social problems	24	67	91	1,227	976 to 1,478
<b>Total</b>	<b>76</b>	<b>208</b>	<b>284</b>	<b>3,830</b>	<b>3,393 to 4,267</b>

**Table 8 Gender of those "25 – 44 " years EXPOSED rates per 100,000 by Organ System**

Organ System	Males	Females	Rates per 100,000 inhabitants for Males with 95% confidence interval		Rates per 100,000 inhabitants for Females with 95% confidence interval	
			Rate	Interval	Rate	Interval
<b>A - General</b>	29	106	801	511 to 1,091	2,792	2,268 to 3,316
<b>B - Blood</b>	4	4	110	2 to 218	105	2 to 208
<b>D - Digestive</b>	13	56	359	164 to 554	1,475	1,092 to 1,858
<b>F - Eye</b>	14	44	387	185 to 589	1,159	819 to 1,499
<b>H - Ear</b>	3	3	83	-11 to 177	79	-10 to 168
<b>K - Circulatory</b>	8	10	221	68 to 374	263	100 to 426
<b>L - Musculoskeletal</b>	7	12	193	50 to 336	316	137 to 495
<b>N - Neurological</b>	13	59	359	164 to 554	1,554	1,161 to 1,947
<b>P - Psychological</b>	11	35	304	125 to 483	922	618 to 1,226
<b>R - Respiratory</b>	49	143	1,354	978 to 1,730	3,767	3,161 to 4,373
<b>S - Skin</b>	20	75	552	311 to 79	1,976	1,533 to 2,419
<b>T - Endocrine</b>	2	12	55	-21 to 131	316	137 to 495
<b>U - Urinary</b>	0	3	0	0 to 0	79	-10 to 168
<b>W - Pregnancy</b>	0	31	0	0 to 0	817	531 to 1,103
<b>X – Female genital</b>	0	2	0	0 to 0	53	-20 to 126
<b>Y – Male genital</b>	0	0	0	0 to 0	0	0 to 0
<b>Z – Social problems</b>	24	67	663	399 to 927	1,765	1,346 to 2,184

**Table 9** Age group "45 – 64 " years EXPOSED rates per 100,000 by Organ System

Organ System	Males	Females	Total (Males + Females) 45 - 64 yrs EXPOSED	Rates per 100,000 inhabitants with 95% confidence interval	
A - General	18	52	70	1,538	1,180 to 1,896
B - Blood	1	6	7	154	40 to 268
D - Digestive	9	32	41	901	626 to 1,176
F - Eye	20	23	43	945	664 to 1,226
H - Ear	2	5	7	154	40 to 268
K - Circulatory	9	19	28	615	388 to 842
L - Musculoskeletal	8	12	20	439	247 to 631
N - Neurological	14	31	45	989	701 to 1,277
P - Psychological	9	11	20	439	247 to 631
R - Respiratory	30	71	101	2,219	1,791 to 2,647
S - Skin	7	25	32	703	460 to 946
T - Endocrine	6	14	20	439	247 to 631
U - Urinary	0	1	1	22	-21 to 65
W - Pregnancy	0	2	2	44	-17 to 105
X – Female genital	0	3	3	66	-9 to 141
Y – Male genital	0	0	0	0	0 to 0
Z – Social problems	14	21	35	769	515 to 1,023
<b>Total</b>	<b>47</b>	<b>96</b>	<b>143</b>	<b>3142</b>	<b>2,635 to 3,649</b>

**Table 10 Gender of those "45 – 64 " years EXPOSED rates per 100,000 by Organ System**

Organ System	Males	Females	Rates per 100,000 inhabitants for Males with 95% confidence interval		Rates per 100,000 inhabitants for Females with 95% confidence interval	
<b>A - General</b>	18	52	813	439 to 1187	2,224	1,626 to 2,822
<b>B - Blood</b>	1	6	45	-43 to 133	257	52 to 462
<b>D - Digestive</b>	9	32	407	142 to 133	1,369	898 to 1,840
<b>F - Eye</b>	20	23	904	510 to 1298	984	584 to 1,384
<b>H - Ear</b>	2	5	90	-35 to 215	214	27 to 401
<b>K - Circulatory</b>	9	19	407	142 to 672	813	449 to 1,177
<b>L - Musculoskeletal</b>	8	12	362	112 to 612	513	223 to 803
<b>N - Neurological</b>	14	31	633	303 to 963	1,326	862 to 1,790
<b>P - Psychological</b>	9	11	407	142 to 672	470	193 to 747
<b>R - Respiratory</b>	30	71	1356	874 to 1838	3,037	2,341 to 3,733
<b>S - Skin</b>	7	25	316	82 to 550	1,069	652 to 1,486
<b>T - Endocrine</b>	6	14	271	54 to 488	599	286 to 912
<b>U - Urinary</b>	0	1	0	0 to 0	43	-41 to 127
<b>W - Pregnancy</b>	0	2	0	0 to 0	86	-33 to 205
<b>X – Female genital</b>	0	3	0	0 to 0	128	-17 to 273
<b>Y – Male genital</b>	0	0	0	0 to 0	0	0 to 0
<b>Z – Social problems</b>	14	21	633	303 to 963	898	516 to 1,280

**Table 11** Age group "Over 65" years EXPOSED rates per 100,000 by Organ System

Organ System	Males	Females	Total (Males + Females) over 65 yrs EXPOSED	Rates per 100,000 inhabitants with 95% confidence interval	
A - General	8	32	40	1,804	1,250 to 2,358
B - Blood	1	1	2	90	-35 to 215
D - Digestive	7	16	23	1,037	615 to 1,459
F - Eye	6	11	17	767	404 to 1,130
H - Ear	0	3	3	135	-18 to 288
K - Circulatory	15	26	41	1,849	1,288 to 2,410
L - Musculoskeletal	4	12	16	722	370 to 1,074
N - Neurological	5	7	12	541	236 to 846
P - Psychological	5	11	16	722	370 to 1,074
R - Respiratory	19	40	59	2,661	1,991 to 3,331
S - Skin	3	6	9	406	141 to 671
T - Endocrine	9	15	24	1,083	652 to 1,514
U - Urinary	2	2	4	180	4 to 356
W - Pregnancy	0	3	3	135	-18 to 288
X - Female genital	0	3	3	135	-18 to 288
Y - Male genital	1	0	1	45	-43 to 133
Z - Social problems	6	7	13	586	268 to 904
<b>Total</b>	<b>27</b>	<b>52</b>	<b>79</b>	<b>3,563</b>	<b>2,791 to 4,335</b>

**Table 12 Gender of those "Over 65 " years EXPOSED rates per 100,000 by Organ System**

Organ System	Males	Females	Rates per 100,000 inhabitants for Males with 95% confidence interval		Rates per 100,000 inhabitants for Females with 95% confidence interval	
			Rate	Interval	Rate	Interval
<b>A - General</b>	8	32	755	234 to 1,276	2,766	1,821 to 3,711
<b>B - Blood</b>	1	1	94	-90 to 278	86	-83 to 255
<b>D - Digestive</b>	7	16	660	173 to 1,147	1,383	710 to 2,056
<b>F - Eye</b>	6	11	566	114 to 1,018	951	392 to 1,510
<b>H - Ear</b>	0	3	0	0 to 0	259	-34 to 552
<b>K - Circulatory</b>	15	26	1,415	704 to 2,126	2,247	1,393 to 3,101
<b>L - Musculoskeletal</b>	4	12	377	8 to 746	1,037	453 to 1,621
<b>N - Neurological</b>	5	7	472	59 to 885	605	158 to 1,052
<b>P - Psychological</b>	5	11	472	59 to 885	951	392 to 1,510
<b>R - Respiratory</b>	19	40	1,792	993 to 2,591	3,457	2,404 to 4,510
<b>S - Skin</b>	3	6	283	-37, 603	519	105 to 933
<b>T - Endocrine</b>	9	15	849	297 to 1,401	1,296	644 to 1,948
<b>U - Urinary</b>	2	2	189	-72 to 450	173	-66 to 412
<b>W - Pregnancy</b>	0	3	0	0 to 0	259	-34 to 552
<b>X - Female genital</b>	0	3	0	0 to 0	259	-34 to 552
<b>Y - Male genital</b>	1	0	94	-90 to 278	0	0 to 0
<b>Z - Social problems</b>	6	7	566	114 to 1,018	605	158 to 1,052

**APPENDIX F**

**MEDICAL DIAGNOSIS GENDER  
DISTRIBUTION**

**Table 1** Gender distribution for those under 5 years with and without a medical diagnosis

Organ System	Females with medical diagnosis	Females without medical diagnosis	Males with medical diagnosis	Males without medical diagnosis
A - General	28	11	30	10
B - Blood	2	0	0	1
D - Digestive	10	4	11	4
F - Eye	3	6	10	7
H - Ear	4	0	1	1
K - Circulatory	2	0	1	3
L - Musculoskeletal	2	0	4	2
N - Neurological	5	4	2	2
P - Psychological	3	1	4	0
R - Respiratory	27	26	41	27
S - Skin	18	17	32	7
T - Endocrine	2	0	2	0
U - Urinary	0	0	1	1
W - Pregnancy	0	0	0	0
X - Female genital	0	0	0	0
Y - Male genital	0	0	0	0
Z - Social problems	18	9	16	10
<b>Total number</b>	<b>43</b>	<b>45</b>	<b>49</b>	<b>43</b>

**Table 2** Gender distribution for those between 5 – 14 years with and without a medical diagnosis

Organ System	Females with medical diagnosis	Females without medical diagnosis	Males with medical diagnosis	Males without medical diagnosis
A - General	34	24	26	28
B - Blood	3	0	1	1
D - Digestive	4	8	8	12
F - Eye	4	5	9	9
H - Ear	0	1	3	1
K - Circulatory	0	1	3	0
L - Musculoskeletal	2	2	4	5
N - Neurological	5	11	12	10
P - Psychological	4	0	7	7
R - Respiratory	39	49	49	64
S - Skin	31	31	26	23
T - Endocrine	0	1	1	2
U - Urinary	4	2	0	0
W - Pregnancy	0	0	0	0
X – Female genital	0	1	0	0
Y – Male genital	0	0	0	0
Z – Social problems	10	9	11	16
<b>Total number</b>	<b>46</b>	<b>69</b>	<b>53</b>	<b>89</b>

**Table 3** Gender distribution for those between 15 – 24 years with and without a medical diagnosis

Organ System	Females with medical diagnosis	Females without medical diagnosis	Males with medical diagnosis	Males without medical diagnosis
A - General	28	22	12	18
B - Blood	3	1	0	2
D - Digestive	15	10	4	12
F - Eye	6	14	2	7
H - Ear	2	1	0	0
K - Circulatory	2	0	0	0
L - Musculoskeletal	3	2	0	1
N - Neurological	13	12	4	9
P - Psychological	8	3	2	2
R - Respiratory	31	27	17	32
S - Skin	19	10	8	7
T - Endocrine	2	1	1	0
U - Urinary	0	0	1	0
W - Pregnancy	1	8	0	0
X – Female genital	1	0	0	0
Y – Male genital	0	0	0	0
Z – Social problems	6	2	6	3
<b>Total number</b>	<b>39</b>	<b>45</b>	<b>18</b>	<b>42</b>

**Table 4** Gender distribution for those between 25 – 44 years with and without a medical diagnosis

Organ System	Females with medical diagnosis	Females without medical diagnosis	Males with medical diagnosis	Males without medical diagnosis
A - General	114	79	27	23
B - Blood	4	3	5	0
D - Digestive	53	39	15	13
F - Eye	44	35	9	21
H - Ear	3	1	3	1
K - Circulatory	8	5	3	7
L - Musculoskeletal	16	6	4	7
N - Neurological	61	39	13	17
P - Psychological	42	19	10	11
R - Respiratory	126	133	37	57
S - Skin	81	50	23	20
T - Endocrine	11	6	2	1
U - Urinary	4	0	0	1
W - Pregnancy	20	36	0	0
X – Female genital	2	2	0	0
Y – Male genital	0	0	0	1
Z – Social problems	50	83	15	41
<b>Total number</b>	<b>143</b>	<b>269</b>	<b>46</b>	<b>113</b>

**Table 5** Gender distribution for those between 45 – 64 years with and without a medical diagnosis

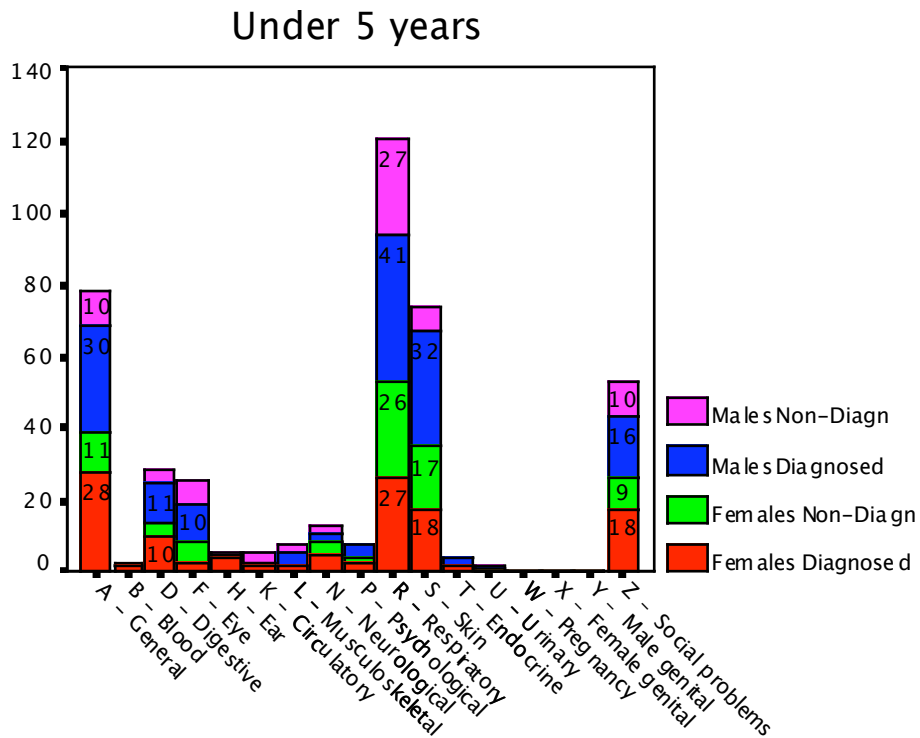
Organ System	Females with medical diagnosis	Females without medical diagnosis	Males with medical diagnosis	Males without medical diagnosis
A - General	59	52	14	19
B - Blood	7	2	1	0
D - Digestive	44	31	5	15
F - Eye	34	18	12	17
H - Ear	4	5	1	1
K - Circulatory	16	11	9	7
L - Musculoskeletal	17	14	6	5
N - Neurological	42	30	6	14
P - Psychological	16	6	10	6
R - Respiratory	64	80	18	29
S - Skin	35	17	4	7
T - Endocrine	14	12	5	2
U - Urinary	1	1	0	0
W - Pregnancy	0	2	0	0
X – Female genital	5	1	0	0
Y – Male genital	0	0	1	0
Z – Social problems	23	25	5	16
<b>Total number</b>	<b>76</b>	<b>125</b>	<b>22</b>	<b>58</b>

**Table 6** Gender distribution for those over 65 years with and without a medical diagnosis

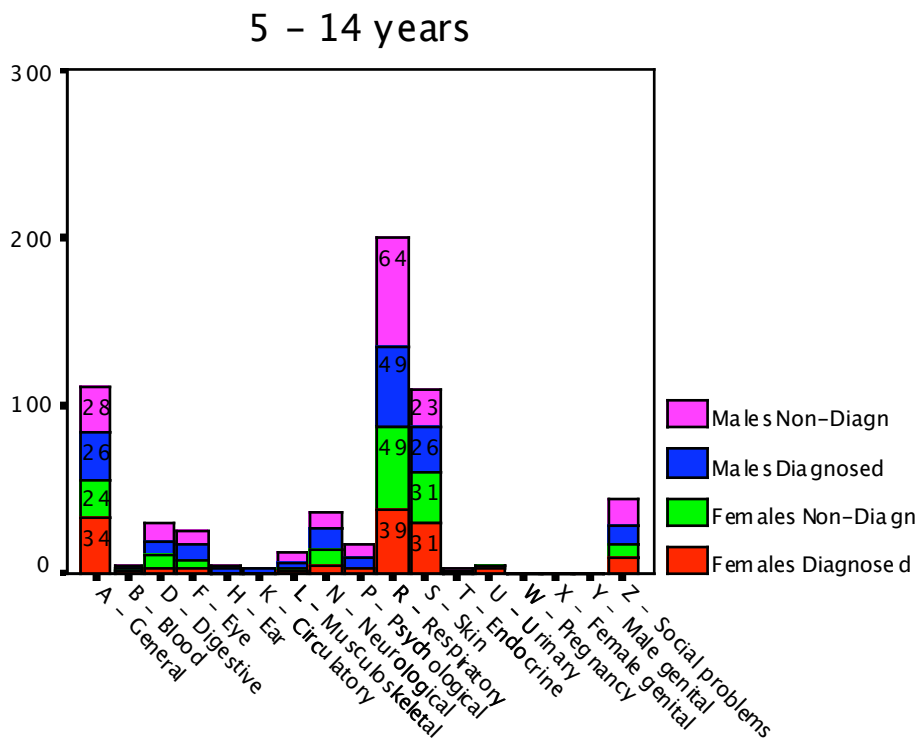
Organ System	Females with medical diagnosis	Females without medical diagnosis	Males with medical diagnosis	Males without medical diagnosis
A - General	15	24	8	6
B - Blood	0	1	1	0
D - Digestive	8	12	6	3
F - Eye	7	10	6	4
H - Ear	0	3	0	0
K - Circulatory	16	16	9	10
L - Musculoskeletal	6	7	3	2
N - Neurological	4	6	5	1
P - Psychological	8	5	3	3
R - Respiratory	18	33	15	12
S - Skin	5	3	4	1
T - Endocrine	9	8	3	6
U - Urinary	1	1	1	1
W - Pregnancy	0	0	0	0
X – Female genital	0	3	0	0
Y – Male genital	0	0	1	0
Z – Social problems	4	4	3	4
<b>Total number</b>	<b>22</b>	<b>46</b>	<b>16</b>	<b>19</b>

Figure 7 shows that of 43 females under 5 yrs with a medical diagnosis, 28 reported at least once, symptoms from the A - General organ system category, and of 45 without a medical diagnosis, 11 reported at least once a symptom from the A category. Also, of 49 males under 5 years with a medical diagnosis, 8 reported at least once an A - category symptom, whereas of 43 males under 5 years without a medical diagnosis, 10 reported at least once a symptom from the A - General organ system.

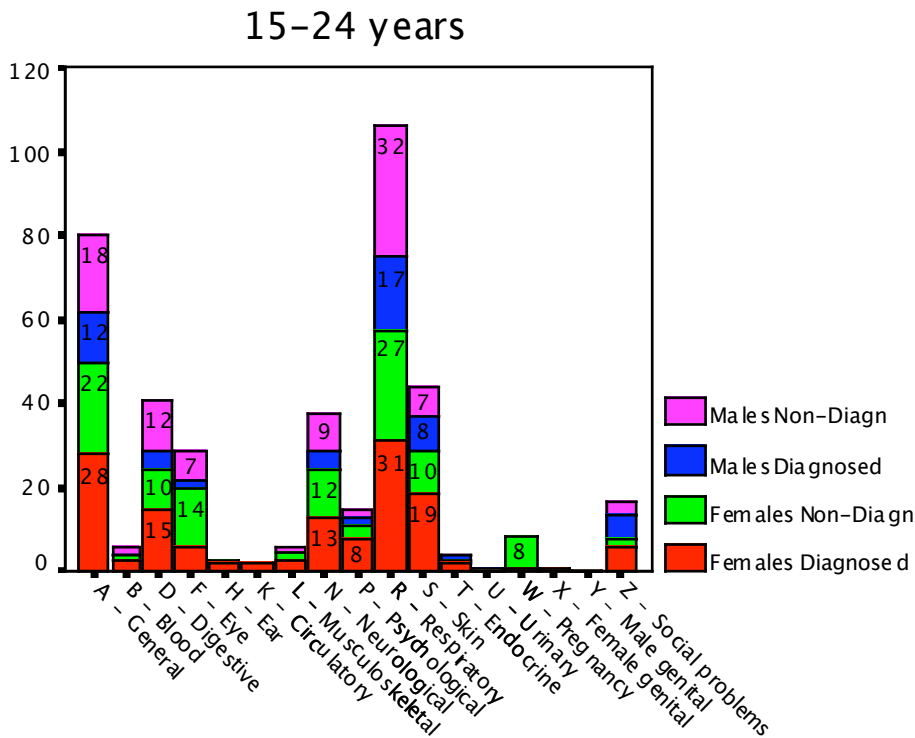
**Figure 7** Gender distribution for those under 5 years with and without a medical diagnosis



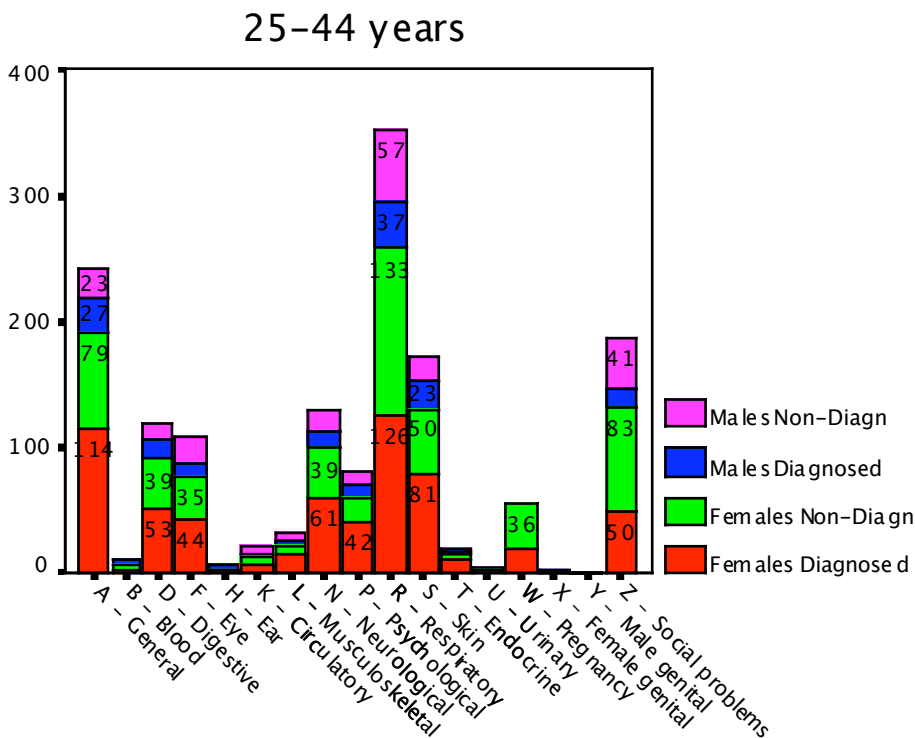
**Figure 8** Gender distribution for those between 5 – 14 years with and without a medical diagnosis



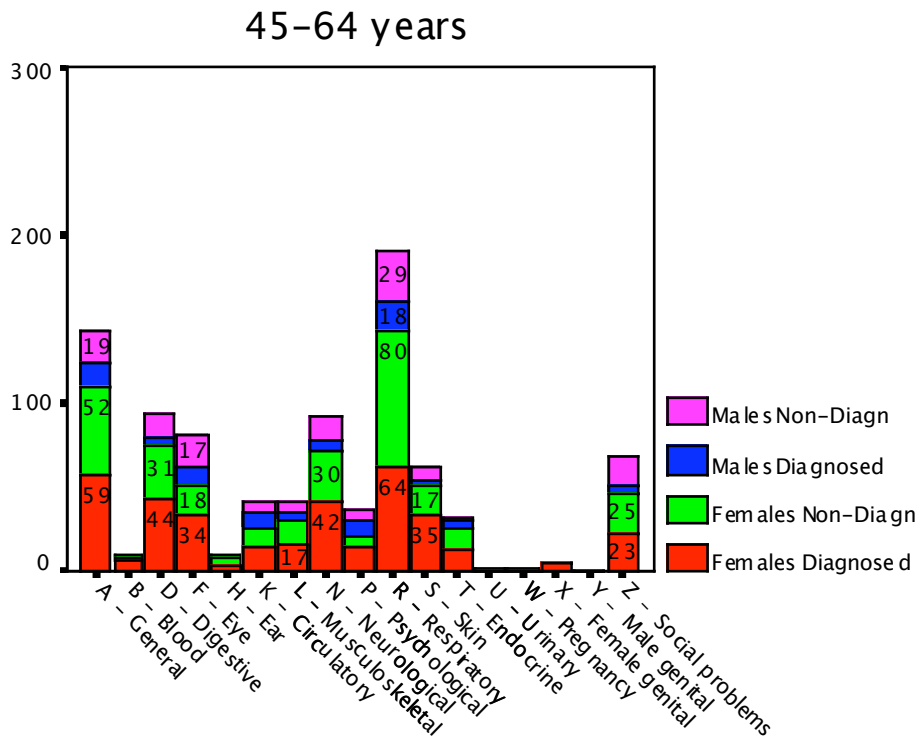
**Figure 9 Gender distribution for those between 15 – 24 years with and without a medical diagnosis**



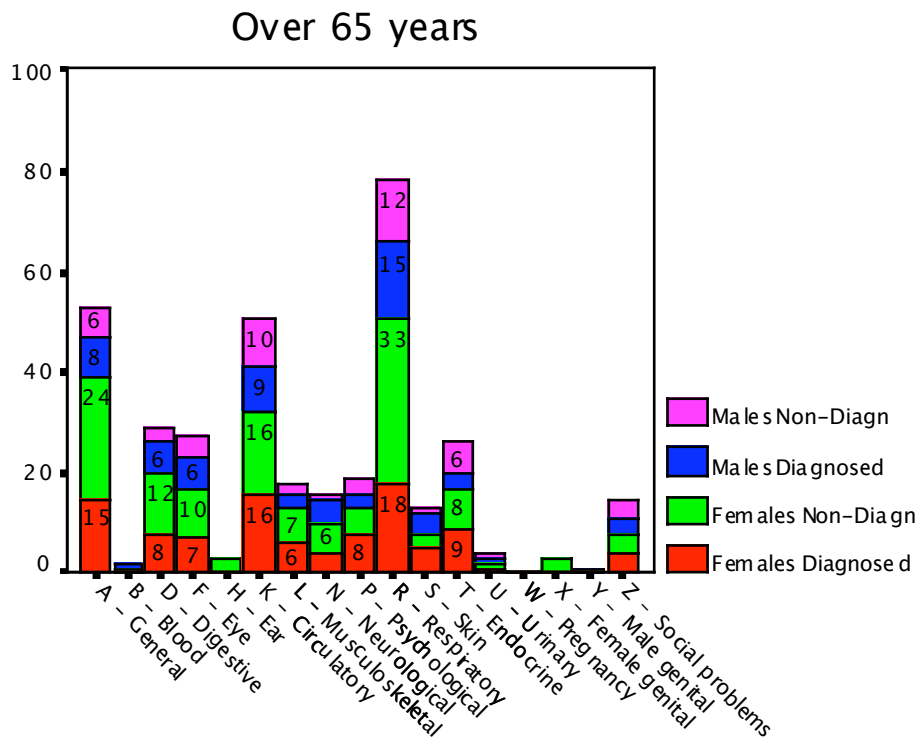
**Figure 10 Gender distribution for those between 25 - 44 years with and without a medical diagnosis**



**Figure 11** Gender distribution for those between 45 – 64 years with and without a medical diagnosis



**Figure 12** Gender distribution for those over 65 years with and without a medical diagnosis



# APPENDIX G

## RELOCATORS AND NON RELOCATORS

Table 1. Frequency of ICPC codes among relocators and non-relocators at the householder level

ICPC	ICPC Code description	Frequency of ICPC Code among 192 Relocators	Frequency of ICPC Code among 122 Non-Relocators
<b>Total A</b>	General and unspecified	<b>144</b>	<b>73</b>
A01	Pain generalised / unspecified	2	1
A03	Fever	7	3
A04	Weakness / tiredness general	27	14
A05	Feeling ill	13	6
A06	Fainting / syncope	3	0
A08	Swelling (excl oedema K07)	3	4
A09	Sweating problems (hyperhidrosis)	0	1
A12	Allergy / allergic reaction NOS	91	57
A13	Concern / fear about treatment	2	1
A21	Risk factor for malignancy	0	0
A26	Fear of cancer, NOS	0	0
A27	Fear of other disease NOS	1	1
A29	General symptom / complaint, other	9	6
A72	Chickenpox.	3	0
A75	Infectious mononucleosis	1	1
A76	Other viral diseases with exanthem	0	0
A77	Other viral disease, NOS.	4	2
A78	Infectious diseases other, NOS	0	1
A79	Malignancy NOS	1	0
A86	Toxic effects other substances.	33	11
A90	Congenital anomaly NOS / multiple	2	1
A92	Food allergy	72	34
A93	Premature newborn	2	0
A97	No disease	2	0
A99	Other generalised diseases / multiple syndromes.	1	0
<b>Total B</b>	<b>Blood, blood forming organs and immune mechanism</b>	<b>11</b>	<b>8</b>
B02	Lymph gland(s) enlarged / painful	2	0
B29	Symptoms / complications blood and immune mechanism	2	2
B72	Hodgkin's disease / lymphomas	1	2
B73	Leukaemia	0	0
B80	Iron deficiency anaemia	1	0
B81	Anaemia other / unspecified	1	1

ICPC	ICPC Code description	Frequency of ICPC Code among 192 Relocators	Frequency of ICPC Code among 122 Non- Relocators
B99	Blood/lymph/spleen disease, other including autoimmune disease of blood, red cell abnormality	5	4
<b>Total D</b>	<b>Digestive</b>	<b>65</b>	<b>51</b>
D01	Abdominal pain/cramps, general	7	7
D02	Abdominal pain, epigastric	3	1
D06	Abdominal pain, localised, other	2	0
D08	Flatulence/gas/belching	2	0
D09	Nausea	23	19
D10	Vomiting	14	5
D11	Diarrhoea	7	10
D12	Constipation	1	0
D18	Change in faeces/bowel movements	3	0
D20	Symptoms./complaint mouth, tongue or lips	23	23
D27	Fear of digestive disease, other	0	1
D72	Viral hepatitis	0	0
D77	Malignant neoplasm digestive, other	0	0
D83	Mouth/tongue/lip disease including aphthous ulcer, cheilosis, glossitis, salivary calculus	0	1
D84	Oesophagus disease	8	4
D88	Appendicitis	1	0
D90	Hiatus hernia	3	2
D93	Irritable bowel syndrome	1	2
D97	Liver disease NOS including cirrhosis, portal hypertension	2	0
D99	Disease digestive system, other including food intolerance	8	7
<b>Total F</b>	<b>Eye</b>	<b>55</b>	<b>36</b>
F01	Eye pain excluding abnormal sensations in eye	7	2
F02	Red eye including inflamed eye	10	5
F03	Eye discharge including discharge, watery eye	19	9
F05	Visual disturbance, other including blurred vision, eye strain, temporary blindness, weak eyes	1	3
F13	Eye sensations abnormal including burning eye, dry eye, itchy eye	37	27

ICPC	ICPC Code description	Frequency of ICPC Code among 192 Relocators	Frequency of ICPC Code among 122 Non- Relocators
F15	Eye appearance abnormal including swollen eyes	10	5
F16	Symptoms of eyelids	0	2
F70	Conjunctivitis, infectious	2	1
F71	Conjunctivitis, allergic	3	1
F72	Blepharitis/ stye/ chalazion	0	0
F94	Blindness, all types.	0	0
F99	Eye/adnexa disease, other including colour blindness, pterygium, night blindness	2	1
<b>Total H□</b>	<b>Ear</b>	<b>2</b>	<b>6</b>
H01	Ear pain/earache	1	3
H02	Hearing/complaints (excl, deafnessH84)	0	0
H03	Ringing/buzzing/tinnitus	1	1
H28	Limited function/disability ear including deafness one ear, temporary deafness	0	1
H71	Acute otitis media/myringitis	0	0
H74	Chronic otitis media, other infections of ear.	0	0
H84	Presbycusis	0	1
H86	Deafness including partial or complete deafness in both ears	0	1
I182	Vertiginous syndrome/labyrinthitis/ vestibulitis (excl vertigo N17)	1	0
<b>Total K□</b>	<b>Circulatory</b>	<b>31</b>	<b>14</b>
K04	Palpitations/awareness of heart, including tachycardia	6	2
K07	Swollen ankles/oedema including fluid retention, swollen feet	0	1
K24	Fear of heart disease	1	0
K29	Cardiovascular symptom/complaint, other including low blood pressure, weak heart	3	5
K71	Rheumatic fever/heart disease	0	0
K73	Congenital anomalies heart/circ. system	2	1
K74	Ischaemic heart disease with angina	2	1
K76	Other & chronic ischaemic heart disease	2	1
K77	Heart failure	2	0
K82	Pulmonary heart disease including primary pulmonary hypertension	1	0
K84	Heart Disease, cardiomyopathy	0	0

ICPC	ICPC Code description	Frequency of ICPC Code among 192 Relocators	Frequency of ICPC Code among 122 Non- Relocators
K86	Hypertension, uncomplicated	16	6
K87	Hypertension, complicated	1	0
K90	Stroke/cerebrovascular accident	4	0
<b>Total L</b>	<b>Musculoskeletal (Locomotion)</b>	<b>26</b>	<b>19</b>
L01	Neck symptom/complaint	0	1
L02	Back symptom/complaint	4	2
L04	Chest symptom/complaint including chest pain attributed to musculoskeletal system	7	7
L18	Muscle pain	2	2
L20	Joint symptom/complaint NOS including muscle stiffness, muscle strain, atrophy	5	3
L29	Other symptoms/complaints musculoskeletal system	2	1
L88	Rheumatoid arthritis excluding psoriatic arthropathy S91	2	0
L91	Osteoarthritis, other including arthritis NOS, Heberden's nodes, osteoarthritis, traumatic arthropathy	7	4
L99	Musculoskeletal disease, other	2	3
<b>Total N</b>	<b>Neurological</b>	<b>61</b>	<b>44</b>
N01	Headache	47	36
N02	Tension headache	0	1
N05	Tingling fingers/feet/toes	2	0
N07	Convulsions / Seizures	0	0
N08	Abnormal involuntary movements including dystonia, jerking, shaking, spasm, tremor, twitching	1	0
N17	Vertigo/dizziness (excl. I182)	11	4
N86	Multiple sclerosis	3	0
N88	Epilepsy, all types	0	0
N89	Migraine	8	5
N91	Facial paralysis (Bell's palsy)	0	1
N93	Carpal tunnel syndrome	1	1
N99	Neurological disease, other including cerebral palsy, motor neurone disease	2	4
<b>Total P</b>	<b>Psychological</b>	<b>63</b>	<b>20</b>
P01	Feeling anxious/nervous/tense	34	5
P02	Acute stress reaction	6	1

ICPC	ICPC Code description	Frequency of ICPC Code among 192 Relocators	Frequency of ICPC Code among 122 Non- Relocators
P03	Feeling depressed	5	3
P04	Feeling/behaving irritable/angry	24	9
P06	Sleep disturbance	5	0
P20	Memory disturbance	5	1
P29	Psychological symptom/complaint, other including delusions, multiple psychological symptoms/complaints or strange behaviour, suspiciousness	3	0
P74	Anxiety disorder/anxiety state	5	2
P99	Psychological disorders, other including autism, neurosis NOS, mental illness unspecified	10	2
<b>Total R</b>	<b>Respiratory</b>	<b>172</b>	<b>103</b>
R01	Pain, respiratory system excluding sore throat R21	11	4
R02	Shortness of breath, dyspnoea excluding hyperventilation R98	13	6
R03	Wheezing	25	14
R04	Breathing problems, other including abnormal breathing	14	9
R05	Cough	34	19
R06	Nose bleed/epistaxis	9	3
R07	Sneezing/nasal congestion	10	6
R08	Nose symptom/complaint, other including pain in nose, post-nasal drip	22	15
R09	Sinus symptom/complaint, other	8	9
R21	Throat symptom/complaint	45	25
R23	Voice symptom/complaint including hoarseness, absence of voice	4	3
R25	Sputum/phlegm abnormal	7	2
R29	Respiratory symptom/complaint, other excluding breathing problems R02, R03, R04, cough R05, nose or sinus symptoms R06, R07, R08, R09, R21	9	0
R71	Whooping cough	0	0
R74	Upper respiratory infection, acute	3	6
R75	Sinusitis acute/chronic	6	6
R76	Tonsillitis acute	1	1
R77	Laryngitis/tracheitis, acute including croup	0	2

ICPC	ICPC Code description	Frequency of ICPC Code among 192 Relocators	Frequency of ICPC Code among 122 Non- Relocators
R78	Acute bronchitis/bronchiolitis excluding chronic bronchitis R79, allergic bronchitis R96	10	6
R79	Chronic bronchitis	0	1
R80	Influenza	2	1
R81	Pneumonia including bronchopneumonia, Legionnaire's disease, influenzal pneumonia	5	7
R82	Pleurisy/pleural effusion	0	2
R84	Malignant neoplasm bronchus, lung	0	0
R85	Neoplasm malignant respiratory other (larynx)	0	0
R89	Congenital anomalies of respiratory system	1	0
R91	Chronic bronchitis/bronchiectasis	2	1
R95	Chronic obstructive pulmonary disease	7	7
R96	Asthma	113	64
R97	Allergic rhinitis	75	38
R98	Hyperventilation syndrome	0	0
R99	Respiratory disease, other including bronchiectasis or pneumoconiosis	11	5
<b>Total S</b>	<b>Skin</b>	<b>101</b>	<b>59</b>
S01	Pain, tenderness of skin including burning sensation, painful lesion or rash, soreness	6	7
S02	Pruritus including skin irritation	14	14
S04	Localized swelling/papules/lump/mass/skin/subcutaneous tissue	4	5
S05	Generalized multiple swelling/papules/lump/skin/ subcutaneous tissue	1	0
S06	Rash localised	24	15
S07	Rash generalised	0	2
S08	Skin colour change including flushing	3	0
S10	Boil/carbuncle/cellulitis localized	0	0
S11	Other localized infection	0	1
S17	Abrasion/scratch/blister	0	1
S21	Symptoms/complaints of skin texture	2	4
S23	Hair Loss	0	0
S70	Herpes zoster including shingles	0	1
S71	Herpes simplex excluding genital infections X90, Y72	0	1

ICPC	ICPC Code description	Frequency of ICPC Code among 192 Relocators	Frequency of ICPC Code among 122 Non- Relocators
S76	Skin infection, other including cellulitis, erysipelas, pyoderma	1	0
S77	Malignant neoplasm of skin	0	0
S87	Dermatitis, atopic eczema	77	31
S88	Dermatitis, contact/allergic	1	0
S91	Psoriasis	1	3
S98	Urticaria	4	4
S99	Skin disease, other	2	1
<b>Total T</b>	<b>Endocrine, metabolic and nutritional</b>	<b>18</b>	<b>9</b>
T01	Excessive thirst	0	0
T03	Loss of appetite	1	0
T15	Thyroid lump, excl. nodule T81	0	0
T27	Fear of endocrine/metabolic disease, other	0	0
T28	Limited function/disability endocrine/metabolic	3	2
T80	Congenital abnormality endocrine/metabolic	0	1
T89	Diabetes, insulin dependent	2	3
T90	Diabetes, non-insulin dependent	6	2
T93	Lipid disorder including hyperlipidaemia, abnormalities of lipoprotein levels, raised levels of cholesterol and triglycerides	3	1
T99	Endocrine/metabolic/nutritional disease, other including lactose intolerance	6	1
<b>Total U</b>	<b>Urological</b>	<b>1</b>	<b>6</b>
U02	Urinary frequency/urgency	1	0
U08	Urinary retention	0	0
U13	Bladder symptom/complaint, other including bad odour of urine, dark urine	0	1
U14	Kidney symptom/complaint including renal colic, kidney trouble	0	2
U29	Urinary symptom/complaint, other excluding irritable bladder, bladder pain U13, kidney problems U14	0	1
U75	Malignant neoplasm kidney	0	0
U99	Urinary disease, other including obstruction bladder neck, renal failure	0	2
<b>Total W</b>	<b>Pregnancy, child-bearing, family planning</b>	<b>11</b>	<b>10</b>

ICPC	ICPC Code description	Frequency of ICPC Code among 192 Relocators	Frequency of ICPC Code among 122 Non- Relocators
W05	Pregnancy nausea/vomiting	1	0
W27	Fear of complications of pregnancy	8	8
W78	Pregnancy - is pregnant with no specific concerns	9	3
W82	Abortion, spontaneous	1	2
W85	Gestational diabetes excluding pre-existing diabetes T89 or T90	1	0
<b>Total X</b>	<b>Female genital</b>	<b>5</b>	<b>3</b>
X21	Breast symptom/complaint, other	3	0
X75	Neoplasm malignant cervix	0	0
X76	Neoplasm malignant breast female	1	1
X99	Genital disease, other	3	2
<b>Total Y</b>	<b>Male genital</b>	<b>0</b>	<b>2</b>
Y06	Prostrate symptom/complaint	0	1
Y77	Malignant neoplasm prostate	0	1
<b>Total Z</b>	<b>Social problems</b>	<b>75</b>	<b>22</b>
Z01	Poverty/financial problem affecting daily living	1	0
Z02	Problems food & water	1	0
Z03	Housing/neighbourhood problem	1	0
Z05	Work problem - spray affects work environment	2	1
Z06	Unemployment problem - spray prevents normal work attendance	6	3
Z10	Health care system problem including payment costs for scripts, etc.	6	1
Z11	Problems with being ill	0	0
Z14	Partner illness problem - concern for partner of person phoning in	8	2
Z18	Illness problem with child - disruption due to spray affecting child	46	11
Z21	Problems with behaviour parent/other family member	2	3
Z22	Problems with parent/other family member being ill	13	6
Z27	Fear of a social problem - worrying about pets	3	1
Z29	Social problems NOS including environmental problems, malingering, pollution	0	0

**Table 2** Age and gender breakdown for householders exposed to spray and their type of support

Age group & Gender	Exposed to spray	Relocators	Non-relocators
Under 5 - Males	22	18	4
Under 5 - Females	14	10	4
5 - 14 - Males	11	7	4
5 - 14 - Females	13	10	3
15 - 24 Males	5	4	1
15 - 24 Females	10	4	6
25 - 44 Males	12	7	5
25 - 44 Females	66	48	18
45 - 64 Males	8	6	2
45 - 64 Females	31	16	15
Over 65 - Males	6	4	2
Over 65 - Females	16	9	7
<b>Total</b>	<b>214</b>	<b>143</b>	<b>71</b>

**Table 3** Age and gender breakdown for householders non- exposed to spray and their type of support

Age group & Gender	Non - exposed to spray	Relocators	Non-relocators
Under 5 - Males	6	2	4
Under 5 - Females	7	6	1
5 - 14 - Males	5	1	4
5 - 14 - Females	7	4	3
15 - 24 Males	1	0	1
15 - 24 Females	11	6	5
25 - 44 Males	9	4	5
25 - 44 Females	28	13	15
45 - 64 Males	3	1	2
45 - 64 Females	20	10	10
Over 65 - Males	2	1	1
Over 65 - Females	1	1	0
<b>Total</b>	<b>100</b>	<b>49</b>	<b>51</b>

# APPENDIX H

## PREVALENCE OF RELEVANT CONDITIONS

## Prevalence of relevant conditions

Householders registered with the AGM Health Service received varying medical diagnoses or were classified according to self-reported symptoms. ICPC codes were unavailable for certain diseases.

The following table represents disease prevalence in the community, and a calculation of disease prevalence in the AGM eradication area.

A Medline search was performed to identify medical literature relevant to New Zealand disease prevalence. Where disease-specific information was not available for New Zealand, international sources have been included.

**Table 1 Characteristics and prevalence of some diseases reported by the householders with presentations to the AGM Health Service**

Disease	ICPC code	Main characteristics of the disorder	Possible number of cases in the AGM area	Prevalence (%) of that particular disease in the community (NZ and / or overseas)
Asthma	R 96	Dry coughing, expiratory wheezing, shortness of breath, chest tightness, dyspnoea, PEF daily variation greater than 20%	392 in 5-14 years group; 1,413 in 20-44 yrs group 3,493 overall	1.6- 36.8% In NZ: various figures <sup>1</sup>
Asthma from food	R 96	Wheezing, chest tightness, shortness of breath, prolonged coughing, a decrease in lung function of at least 15% within an hour of exposure to food allergens	27 children in 5-14 yrs gr; 14 adults in 20-44 years group; 1% for overall 35	6 – 8% of asthmatic children; 1% of asthmatic adults <sup>2</sup>
Food allergy	A 92	Gastrointestinal, skin and respiratory manifestations	472 including those with coeliac disease	Around 2% of the USA population <sup>3</sup>
Gluten - sensitive enteropathy	D 99	Failure to thrive, diarrhoea, irritability, vomiting, anorexia, foul stools, wasted muscles	17 cases (for a prevalence of 70/ 100,000)	0.33%(UK); 1% Sweden; 0.03-0.07% in NZ <sup>4</sup>
Cystic fibrosis	T 99	Cough, recurrent pulmonary infiltrates, failure to thrive, meconium ileus, late onset of puberty	7 cases (for a prevalence of 0.03%)	0.001-0.03%, varies widely with ethnicity (Behrman, 2004)
Fibrosing alveolitis and other ILD	R 99	Tachypnoea, hemosiderosis, bronchitis/bronchiolitis, pneumonitis, idiopathic fibrosis	Not known	Difficult to estimate <sup>5</sup>

Disease	ICPC code	Main characteristics of the disorder	Possible number of cases in the AGM area	Prevalence (%) of that particular disease in the community (NZ and / or overseas)
Fibrosing alveolitis and other ILD	R 99	Tachypnoea, hemosiderosis, bronchitis/bronchiolitis, pneumonitis, idiopathic fibrosis	Not known	Difficult to estimate <sup>5</sup>
Chronic fatigue syndrome	A 04	Fatigue, numerous somatic complaints, myalgia, low-grade fever, headache, sore throat, etc	2 cases and up to 71	10 - 300/100,000 USA <sup>6</sup>
Leukaemia	B 73	Non-specific, fatigue, anorexia, weight loss, fever, bone pains, etc.	1 new case (4.13/100,000 per year)	<i>Incidence varies</i> <sup>7</sup>
Lymphomas	B 72	Lymphadenopathy, fever, night sweats, weight loss, etc.	0.2 new cases/year (1/100,000)	<i>Incidence varies</i> <sup>8</sup>
Von Willebrand disease	B 99	The most common hereditary bleeding disorder, excessive bruising, epistaxis, menorrhagia, etc	24 cases (1/1,000)	1/800 to 1/1,000 individuals (Harrison, 2001)
SLE & other immune disorders	L 99	Musculoskeletal, cutaneous, renal, nervous system, gastrointestinal and ocular manifestations	8 cases (for a prevalence of 32 per 100,000)	15 – 50 per 100,000 (USA) (Harrison, 2001)
Multiple sclerosis	N86	Weakness of the limbs, sensory loss, paresthesias, ataxia, optic neuritis, diplopia, vertigo, bladder dysfunction, cognitive dysfunction, depression, fatigue, heat sensitivity	4 cases ( for a prevalence of 15 per 100,000)	Increase with increasing dist. from the equator; From 2 to 15 and max 250 /100,000 (Orkney islands) (Harrison, 2001)
Facial paralysis (Bell's palsy)	N91	Facial paralysis (mouth droops, effaced skin folds, unfurrowed forehead, eyelids will not close), pain behind the ear, lost of taste sensations uni-laterally, hyperacusis	5 cases (for a incidence rate of 23 per 100,000)	23 per 100,000 annually; or about 1 in 60 or 70 persons in a lifetime (Harrison, 2001)
Guillain-Barre and/or Miller Fisher syndrome	N 99	Weakness, hypotonia, areflexia, chronic relapsing or unremitting poliradiculoneuropathy	Approximately an incidence of 0.2 new cases/year	<i>Incidence</i> 3,500 per year (USA) Harrison, 2001

Disease	ICPC code	Main characteristics of the disorder	Possible number of cases in the AGM area	Prevalence (%) of that particular disease in the community (NZ and / or overseas)
Multiple congenital anomalies (MCA)	A 90	e.g. Mandibulofacial dysostosis, Hearing loss, cleft palate (Treacher Collins syndrome); Oculoauriculovertebral syndrome (Goldenhar syndrome); other congenital anomalies	Approximately 29 cases	12.4 per 10,000 births <sup>9</sup> (International Centre of Birth Defects, 2003)
Down's Syndrome	A 90	Facial dysmorphism, mental and growth retardation, hypotonia, etc	34 cases (for 1 in 700 births)	1 in 600-800 births; 12.29 / 10,000 in 2001 in NZ
Urticaria and angioedema and lymphocytic vasculitis	S 98	Pruritus, erythema, hives, hypotension, swellings, symptoms related to associated conditions (e.g. Hashimoto thyroiditis, SLE, adverse drug reactions, etc.)	Up to 4,720 people might experience one episode of urticaria over lifetime	Up to 20% of the world population during life (Behrman, 2004)
Psoriasis	S 91	Erythematous papules that coalesce to form plaques with sharply demarcated irregular borders (elbows, knees, scalp);	354 cases One of the most common dermatologic diseases	1-2% of the world population (Harrison, 2001)
Atopic dermatitis	S 87	Pruritus, scratching, eczematous lesions, exacerbations and remissions, family history of atopy	3,304 estimation for 14% prevalence of atopy	Prevalence increasing worldwide <sup>10</sup> 13-15% in New Zealand

1 Asthma prevalence data was collected by the International Study of Asthma and Allergies in Childhood (ISAAC) for two age groups (6 – 7 and 13 – 14 year old children) using simple core written questionnaires. The study was completed in 156 collaborating centres (6 centres from New Zealand) in 56 countries. A total of 721,601 children participated. In the 13 – 14 year age group 155 centres from 56 countries participated; and 99 of these centres completed a video questionnaire. For the 6 – 7 year age group there were 91 collaborating centres in 38 countries.

The ISAAC study reported a 20-fold variation in asthma prevalence in children (range 1.6-36.8%) and a positive correlation between asthma, allergic rhinoconjunctivitis and atopic eczema (Beasley, 1998).

New Zealand has one of the highest asthma prevalences in the world, between 11.7% (self-reported night wheeze in the 13-14 year old) and 30.3 % (self-reported exercise wheeze for

the 13-14 year age group). For the Auckland area, prevalence is 11.3% (night wheeze) and 28.4% (exercise wheeze).

The European Community Respiratory Health Survey (ECRHS) gathered data on adult asthma prevalence. This study included 12,000 adults aged 20-44 years across four New Zealand centres (Holt, 2002). The authors reported a national prevalence of self-reported wheezing of 25.7%. However, this figure may be an over-estimation of community asthma prevalence, because occasional wheezing is not necessarily due to asthma. When a clear clinical diagnosis is made based on criteria such as breathlessness on waking, an asthma attack in the preceding 12 months, or current asthma medication use, asthma prevalence is estimated as 15.5% (Holt, 2002).

The ISAAC study evaluated the extent of asthma morbidity using self-reported symptoms of severe asthma (nocturnal awakening, severe attacks affecting speech. The prevalence of wheezing disturbing sleep was 3.2% in the 13-14 year-olds and 3.5% in the 6-7 years-olds, and the prevalence of asthma attacks limiting speech was 8% and 5.1%, respectively. In the ECRHS programme, 10.2% of 20-44 year olds reported waking with breathlessness in the previous 12 months (Holt, 2002).

The asthma prevalence in the AGM eradication area for 5-14 year olds was estimated by applying the Auckland (closest centre to Hamilton in the ISAAC study) data for self-reported asthma in 13-14 year olds. The total number of children 5-14 years old in the AGM area is 3,435. Therefore, the number of children expected to experience wheezing is 560 (16.3%), and those with severe wheezing to be 392 (11.4%).

When the Auckland data for asthma symptoms (wheezing, and wheezing + breathlessness) in 20-44 year olds was applied to the AGM area, the expected numbers would be 2,396 (25.1%) for wheezing, and 1,413 (14.8%) for wheezing + breathlessness.

If asthma symptom prevalence is applied to all residents in the AGM area (n = 23,598), it is estimated that potentially 3,492 asthmatics live in the area.

<sup>2</sup> The role food and diet plays in allergic asthma has been the subject of long-standing debate. Up to 8% of asthmatic subjects have a coexistent food allergy (Roberts G., 2003).

Coexistent food allergy has also been implicated as a risk factor in severe asthma. In a placebo-controlled, double-blind study of asthmatic children and young adults, 320 subjects underwent oral food challenges. Fifteen percent developed upper respiratory tract symptoms, and 7% experienced a decrease of > 20% in FEV1 (forced expiratory volume in 1 sec) (Roberts G, 2002).

One case-controlled study found that 53% of patients requiring intubation for severe asthma had a coexistent food allergy, compared to 10% of all asthmatic patients seen at the same hospital. The researchers concluded that food allergy is a significant risk factor for life-threatening asthma (Roberts G, 2003).

Another study reported that 6-8% of asthmatic children experience food-induced wheezing. In sensitised subjects, the ingestion of small amounts of food caused asthma worsening and airway hyper-reactivity in the absence of marked bronchospasm. Proteins in vapours emitted from food cooking can induce asthmatic reactions and anaphylaxis. The researchers estimated that about 1% of adult asthma might involve reactions to inhalational exposure to food, especially in the workplace (Sampson, 2004).

<sup>3</sup>Food allergies, like other atopic disorders, have increased over the past 3 decades, particularly in "Westernized" countries, and now affect an estimated 2% of the U.S. population (Behrman, 2004).

Up to 6% of infants and young children experience food allergic reactions in the first 3 years of life. Studies from a number of countries indicate that about 2.5% of infants develop cow's milk allergy, 1.5% develop egg allergy, and 0.6% develop peanut allergy in the first few years of life. Most infants and young children "outgrow" milk and egg allergy, with approximately 50% outgrowing their allergy within 2-3 years. In contrast, about 80% of those with peanut, nut, or seafood allergy will retain their allergy for life (Behrman, 2004).

The clinical symptoms of food allergy may include organ system manifestations. Gastrointestinal manifestations, (irritability, vomiting, diarrhoea, poor weight gain in the context of enterocolitis, proctocolitis and protein-induced enteropathy), Skin manifestations (atopic dermatitis, acute and/or chronic urticaria and angioedema), Respiratory manifestations (allergic rhinoconjunctivitis, nasal congestion and pruritus, sneezing, rhinorrhea, wheezing). Only 5-10% of asthmatic patients have food-induced respiratory symptoms. Food allergic reactions are the most common cause of anaphylaxis seen in hospital emergency departments. In addition to the rapid onset of cutaneous, respiratory, and gastrointestinal symptoms, patients may develop cardiovascular symptoms including hypotension, vascular collapse, and cardiac dysrhythmias (Behrman, 2004).

More recent surveys have reported that 3.5% to 4% of the US population may have IgE - mediated food allergy. These values include the prevalence data of gluten sensitive enteropathy, but not include food intolerances (non-allergic food hypersensitivities). The prevalence of fish allergy in the USA is 0.1% in young children and 0.4% in adults, and the prevalence of shellfish allergy is 0.1% in young children and 2% in adults (Sampson, 2004).

<sup>4</sup>Prevalence data for gluten sensitive enteropathy in New Zealand and overseas varies. One New Zealand study reported an increased incidence of coeliac disease in the Canterbury region from 1970 to 1999. The overall incidence of newly recognized coeliac disease was 2.2 per 100,000 per year and cumulative incidence of childhood disease was 0.40/1,000 births (Cook, 2004).

Another New Zealand study reported the prevalence of coeliac disease to be 1.2% in the adult population of Christchurch, considerably higher than previously determined by case acquisition studies which suggested a prevalence of 0.04-0.07% (Cook, 2000).

<sup>5</sup> It is difficult to estimate the prevalence of fibrosing alveolitis, (or other interstitial lung diseases [ILD] e.g. extrinsic allergic alveolitis, hypersensitivity pneumonitis) because of its rare occurrence and varied range of disease. Because the damage occurs during the process of lung growth and differentiation, the pathophysiology is more complex in children. In ILD, the initial injury causes damage to the alveolar epithelium and capillary endothelium. An exaggerated immune response then recruits oxidants and proteases, resulting in further damage to the lung interstitium and parenchymal units (Behrman, 2004).

<sup>6</sup> Chronic fatigue syndrome (CFS) is not a new disease, nor is it a previously unrecognised illness that has only recently been identified.

No pathogen has been identified, despite differential diagnosis including numerous infectious and non-infectious diseases. It is of mixed causation, and comprises varied

subjective somatic, psychological and physiological signs rather than a single disease entity with defined physiological and pathological abnormalities.

CFS is encountered in all patient populations, but its prevalence varies significantly. The lowest estimated prevalence in the United States is 4-10 cases/100,000 adults 18 yr of age and older (Behrman, 2004).

CFS prevalence estimates vary between studies due to differences in case definition criteria and study methodology. Community-based studies in the USA have found 100-300 individuals per 100,000 population meet Center for Disease Control and Prevention (CDC) criteria for case definition (Harrison, 2001).

CDC criteria defines CFS by the presence of the following two criteria:

*"1) Have severe chronic fatigue of six months or longer duration with other known medical conditions excluded by clinical diagnosis; and 2) concurrently have four or more of the following symptoms: substantial impairment in short-term memory or concentration; sore throat; tender lymph nodes; muscle pain; multi-joint pain without swelling or redness; headaches of a new type, pattern or severity; unrefreshing sleep; and post-exertional malaise lasting more than 24 hours. The symptoms must have persisted or recurred during six or more consecutive months of illness and must not have predated the fatigue." (CDC, 2004)*

CFS has a significant negative impact on work, school, exercise tolerance, activities of daily living and relationships.

Fatigue symptoms generally manifest as lethargy, profound tiredness, weakness, exertion intolerance, general malaise, and considerable daytime sleeping. Nocturnal sleeping is usually unchanged and does not differ from that of unaffected individuals. Myalgias and low-grade fever characteristically accompany fatigue in 50-95% of cases. Headaches and sore throat are common. Many other symptoms can be associated with CFS including chest palpitations, visual blurring, nausea, dizziness, arthralgia, paresthesia, dry eyes and mouth, diarrhoea, cough, night sweats, tender lymphadenopathy, and rash, and have been reported in 30-60% of cases. Cognitive impairment is common and includes confusion, difficulty in concentrating, impaired thinking, and forgetfulness. Adult patients often judge these as among the most debilitating symptoms (Behrman, 2004).

An Icelandic study, conducted on a random population of 4,000 people assessed CFS prevalence using a 95-item questionnaire, assessed prevalence to be between 0 and 4.9%. The most established criteria yielded a prevalence of 1.4% (Lindal, 2001). Another study evaluated the prevalence of CFS-like cases in the working population of the Netherlands (Huibers MJH, 2004). The authors used data from the prospective Maastricht Cohort Study on Fatigue at Work. Of 26,978 employees from 45 companies invited to participate, only 45% (12,161) provided their informed consent and completed the postal self-report questionnaire at baseline. The study was based on follow-up data obtained 3 years and 8 months after baseline measurement and included 5,499 employees who completed all CFS related questions. One hundred and ninety-nine employees met the CSF research criteria (3.6%)

<sup>7</sup> Leukaemias are the most common malignant neoplasms in children, with an annual incidence of 4.1 new cases per 100,000 children younger than 15 years of age in USA (Behrman, 2004). The incidence in adults is approximately 2.3 per 100,000 people per year (for acute myeloid leukaemia) and 1.3 per 100,000 people per year (for chronic myeloid leukaemia), and is higher in men than in women (Harrison, 2001).

An epidemiological study of childhood cancer in New Zealand identified 409 children aged 0 to 14 years with newly diagnosed malignant neoplasms between 1990 and 1993. The original diagnostic microscopic material was reviewed in 398 cases and the results used to assess the accuracy and completeness of childhood cancer registration in New Zealand (Becroft et al, 1999). There were 144 diagnoses of leukaemia (lymphoid, acute non-lymphocytic, chronic myeloid, other specified and unspecified) and 37 cases of lymphomas/other reticuloendothelial (Hodgkin's disease, non-Hodgkin's lymphoma, Burkitt's lymphoma, miscellaneous lymphoreticular neoplasms, unspecified lymphomas) in the age group 0-14 years from 1990-1993. The incidence rate for leukaemia and lymphoma was calculated for the 0-14 year age group using census data (2001), as leukaemia - 4.13/100,000 per year and lymphomas - 1/100,000 per year in the 0-14 age group.

<sup>8</sup> The incidence of Hodgkin's lymphoma in USA is fairly stable with approximately 8,000 new cases diagnosed each year (2.7/100,000 per year). It is not known why non-Hodgkin's lymphoma has increased in frequency in USA at the rate of 4% per year since 1950. (Harrison, 2001). In New Zealand for the age group 0-14 years, the incidence is 1/100,000 per year (Becroft, 1999).

<sup>9</sup> The overall rate of multiple congenital anomalies (two or more unrelated defects of unknown aetiology) was estimated at 12.4 per 10,000 births, by the International Centre on Birth Defects, Annual Report 2003, with variations across the programme. In New Zealand, the Birth Defects Monitoring Programme began in 1975 and became a full member of the ICBDMs in 1979. The Programme covers all live births (approximately 56,000 per year) delivered or treated in a New Zealand publicly funded hospital. In 2001 in New Zealand the birth prevalence rates for Down syndrome was 12.29 per 10,000 births.

<sup>10</sup> A Western Australian study reported that for the period 1969 – 1996, the incidence rate of mucopolysaccharidoses was between 1 in 58,000 live births (San Filippo syndrome) and 1 in 640,000 (Morquio syndrome type A); The overall incidence for all types of mucopolysaccharidoses was approximately 1 in 29,000 live births (Nelson J, 2003). These diseases are associated with a severe prognosis and death in the early or late childhood.

<sup>11</sup>The prevalence of atopic dermatitis is increasing worldwide with a point prevalence in Norwegian school children as high as 23%. (Harrison, 2001)

Atopic dermatitis is the cutaneous expression of the atopic state, characterised by a family history of asthma, hay fever, or dermatitis in up to 70% of patients. (Harrison, 2001)

The prevalence of atopy in New Zealand is among the highest in the world. The International Study of Asthma and Allergies in Childhood (ISAAC) Phase One was conducted in six New Zealand centres, and included 37,592 participants. The burden of asthma, allergic rhinoconjunctivitis and atopic eczema was evaluated among two age groups 6-7 years and 13-14 years. The prevalence of rhinoconjunctivitis was 10% and 19%, for these two age groups and the prevalence of atopic eczema was 15% and 13% respectively (Asher et al, 2001).

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