

# **REPORT TO AGRIQUALITY LIMITED**

## **A COMPARISON OF PRESENTATIONS OF HOUSEHOLDER CONCERNS TO THE PAINTED APPLE MOTH (PAM) AND ASIAN GYPSY MOTH (AGM) HEALTH SERVICES**

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## Introduction

### Purpose

The purpose of this study is to compare the types of health-related concerns reported by individuals exposed to aerial spraying (Foray 48B, a *Btk* based formulation) in Painted Apple Moth and Asian Gypsy Moth spray areas. Although the eradication programmes were not comparable in terms of duration and size of the spray areas, it is important to identify, by examining and evaluating the pattern of frequencies of experiencing symptoms, whether the householder's response to the spray differed in any way. The number of people resident within meshblocks contained in the direct spray area or 250m surrounding areas is taken as the "exposed population" in this study. Individuals presenting to the Health Service are assigned "exposure" status for study rates based on residential exposure status. However preventive plans were based on individual exposure criteria. Eg work or school location and daily travel. Hence, a specific individual might be clinically regarded as potentially exposed, whilst assigned a "non-exposed" residential status for calculating population-based rates.

### Objectives

To provide a comparison of demographic analyses between the PAM and the AGM studies.

To provide a comparison of encounters and householder ICPC classifications between the PAM and the AGM studies.

To compare the results of analyses of householders' rates of:

- health outcome frequency by age and gender
- defined syndromes of interest
- medically assessed versus not medically assessed, further categorised by age and gender

To compare analyses of types of support as rates per 100,000 population by age group, gender, justification and severity between the PAM and the AGM studies.

To compare PSP use by exposure between the PAM and the AGM studies.

To compare spray avoidance, symptoms and defined syndromes between the PAM and the AGM studies.

To compare the results relating frequencies of presentation of ICPC codes and organ systems to exposure, both for encounters and householders, between the PAM and the AGM studies.

To prepare interpretations and discuss comparisons between the PAM and the AGM studies.

## Methods

Data required for this comparison study was taken from two previous detailed reports titled "A study of presentations of householder concerns to the Painted Apple Moth (PAM) Health Service" and "A study of presentations of householder concerns to the Asian Gypsy Moth (AGM) Health Service".

### Population based rates

The present report compares the data between householders presenting to the PAM and AGM Health Services. Throughout, population based rates use estimated total ordinarily resident population living in the sprayed areas. Any population rate was calculated using only the residentially exposed presenting householders in the numerator. Rate ratios of age and gender based rates of householders presenting to the AGM and PAM Health Services were calculated by dividing the rates of AGM by the rates of PAM.

### Key categories

Comparisons were achieved by consistently grouping householders presenting to either Health Service, using demographic criteria or other categorisation systems developed within the health service. Comparisons are stratified by the key categories. All householders presenting to the health services were assigned key categorisations for example:

- a) Residentially exposed
- b) Person with medical diagnosis - at least once appraised in person by medical team
- c) Person in receipt of a Personal Support Plan (PSP).
  - Relocator (at least once) or non-relocator in such a plan
  - Medical justification and severity classifications for reasons for a PSP

### Confidence intervals

The extent of the differences between the PAM and AGM programmes was assessed through use of 95% confidence intervals. Statistically significant differences were identified by checking for any overlap between these confidence intervals. A 95% confidence interval is the range of numerical values in which someone can be confident (to a computed probability of 95%) that the population values being estimated will be found. Confidence intervals indicate the strength of evidence, where they are wide they indicate less precise estimates of effect and vice versa. The formula used for confidence intervals for the population proportion is:

sample proportion  $\pm$  z standard errors or  $p \pm z \text{ se } (p)$  where  $z = 1.96$  for 95% confidence interval. The confidence intervals of PAM were compared to the corresponding confidence intervals of AGM. If the intervals did not overlap, then the true proportion of PAM was different from that of AGM with 95% confidence.

### Comparison of health symptoms/queries among all presenters

Initial analyses compare all presenters to the health service regardless of spray area residency. These do not use population rates.

In order to identify whether the spray did affect the distribution of symptoms presented by householders, the percentage presentation by organ systems and associated 95% confidence intervals for all householders (and their encounters),

exposed householders presenting to the PAM and AGM Health Services were compared. 95% confidence intervals were calculated to assess the statistical significance of the differences between the two programmes. In these analyses, the denominator represents the number of householders who met certain criteria (eg exposed to spray, with or without a medical diagnosis, with or without a PSP, etc.) The numerator represents the frequency of symptoms experienced from an organ system by those householders. It was expected that there would be no statistically significant differences between the PAM and AGM studies.

### **Comparison of health symptoms/queries of exposed presenters**

The denominators (number of people living in the PAM and AGM spray areas) were very different, given the scale of the programmes. Hence frequencies for presentations are not directly comparable. Population based rates and associated rate ratios (AGM versus PAM), were calculated since these are comparable.

Differences between percentages of presentations by exposure to spraying, and by the type of practical support plan were also evaluated by comparing their 95% confidence intervals.

The rates of relocators and non-relocators by various characteristics (gender, age group, medical justification and severity) were also compared between those presenting to PAM and AGM, as were the confidence intervals for both programmes.

The rates of clinical syndromes, and atopic symptoms experienced for householders exposed to spray were calculated together with 95% confidence intervals.

The ratios were also calculated to estimate the magnitude of the differences between the PAM and AGM programmes.

#### **NOTE: Methods**

1. ICPC-2 (WONCA) was used to code symptoms and other health concerns presented by individuals. This groups symptoms into organ systems.
2. Clinical syndromes were defined using combinations of ICPC codes, after the type of commonly encountered "syndromes" was agreed among the most experienced medical practitioners with the PAM Health Service.
3. Atopic symptoms were defined using combinations of ICPC codes, and denote past history not only current symptoms.
4. Assignment of Practical Support Plans (PSPs) and measures for relocation are detailed in the other reports.
5. Definition of "with medical diagnosis" refers to the individual either personally attending a Health Service doctor or provision of detailed relevant medical records to the Health Service. It does not denote established medical disease.
6. A "householder" is a person with an individual Health Service record. An "encounter" is any occasion when a health symptom/concern record was made for that householder.
7. For those with a PSP, "medical justification" was assigned by a Public Health Medicine (PHM) specialist to assist public health evaluation of relocation measures. It related to the overriding relevant reason, not a list of medical problems.
8. For those with a PSP, "severity" was assigned by a PHM specialist (with reference to risk) to assist public health evaluation of relocation measures. It related to potential for a reaction, since most plans were pre-emptive and precautionary.

## Results

### I. Rates of presentation

#### Comparison of size and scope of programme

The programmes differed geographically. The AGM programme took place in only one area, whereas the PAM programme was over multiple areas, making up a much larger noncontiguous zone, and one that varied over time. A drift zone of 250m around the eradication area was taken into consideration for both programmes. The actual target area plus 250m is referred to in this report as "the spray area." A rough estimate of the ratio of total number of hectares sprayed in both programmes showed a PAM direct spray area around 12 times larger than the AGM area.

The AGM spray programme was completed in 8 weeks (one spray per week), while PAM went on intermittently for more than 2 years (40 sprays and 7 spot sprays).

In calculating rates per 100,000 inhabitants, the denominator represented the number of people living in the direct PAM and AGM eradication areas plus 250m. Residence within the defined zone was the definition of exposure for the purposes of the study

In other calculations the denominator represented certain age/gender criteria (e.g. total number of children under 5 years living in the eradication area plus 250m, or total number of females and males under 5 years, etc).

The pattern of population density of the spray area in AGM was similar to that of PAM. It consisted of both highly populated and sparsely populated meshblocks. The total number of people living in the AGM area was 23,598 and the population residing in the PAM area was 193,188; approximately 8 times more. It was expected that the number of resident householders presenting to the PAM Health Service to be about 8 times higher than that of AGM, but the actual number of householders presenting to the PAM Health Service was only 3.5 times higher than that of AGM (855 householders exposed to the AGM Health Service versus 3,004 exposed householders presenting to the PAM Health Service).

The following tables provide age based, gender based and both age and gender based frequencies for householders presenting to the PAM and AGM Health Services, together with 95% confidence intervals and ratios.

**Table 1. Summary figures for PAM and AGM Health Services**

<b>PAM Health Service</b>	<b>Relocators</b>	<b>Non-Relocators</b>	<b>All PSP</b>	<b>No PSP</b>	<b>All</b>
<b>Exposed</b>	310	262	572	2432	<b>3004</b>
<b>Not exposed</b>	38	79	117	737	<b>854</b>
<b>All</b>	<b>348</b>	<b>341</b>	<b>689</b>	<b>3199</b>	<b>3888</b>
<b>AGM HealthService</b>	<b>Relocators</b>	<b>Non-Relocators</b>	<b>All PSP</b>	<b>No PSP</b>	<b>All</b>
<b>Exposed</b>	143	71	214	641	<b>855</b>
<b>Not exposed</b>	49	51	100	581	<b>681</b>
<b>All</b>	<b>192</b>	<b>122</b>	<b>314</b>	<b>1222</b>	<b>1536</b>

**Table 2. Number of people living in the spray area categorized by age & gender**

<b>Age &amp; gender of residents in the PAM &amp; AGM spray areas.</b>	<b>Number of residents in the PAM spray area</b>	<b>Number of residents in the AGM spray area</b>	<b>Ratios of PAM and AGM for number of residents in the area</b>
<b>Males</b>	93,819	11,454	8.2
<b>Females</b>	99,426	12,069	8.2
<b>Under 5 yrs</b>	15,873	1,719	9.2
<b>5 - 14 yrs</b>	29,373	3,435	8.6
<b>15 - 24 yrs</b>	27,594	4,260	6.5
<b>25 - 44 yrs</b>	65,160	7,416	8.8
<b>45 - 64 yrs</b>	36,741	4,551	8.1
<b>Over 65 yrs</b>	18,447	2,217	8.3
<b>Total</b>	<b>193,188</b>	<b>23,598</b>	<b>8.2</b>

The number of residents living in the PAM spray area is approximately 8 times higher than the AGM area for total, males, females and for all age groups except for those under 5 years (9.2 times), and for those in the 15-24 years age group (6.5 times).

#### **Comparison of rates of presentation**

When rates of presentation to the PAM and AGM Health Services were compared according to age and gender, the differences were so great that there was no overlap between the 95% confidence intervals

**Table 3. Age based rates for presentation to the PAM and AGM Health Services**

Age group categories	PAM - Rates for those EXPOSED to spray per 100,000	95% Confidence intervals	AGM - Rates for those EXPOSED to spray per 100,000	95% Confidence intervals	Rate ratio (AGM/PAM)
<b>Under 5</b>	1,909	1,696 to 2,122	6,690	5,509 to 7,871	3.5
<b>5 - 14</b>	1,576	1,434 to 1,718	4,483	3,791 to 5,175	2.8
<b>15 - 24</b>	616	524 to 708	1,878	1,470 to 2,286	3.0
<b>25 - 44</b>	1,808	1,706 to 1,910	3,830	3,393 to 4,267	2.1
<b>45 - 64</b>	1,726	1,593 to 1,859	3,142	2,635 to 3,649	1.8
<b>Over 65</b>	1,388	1,219 to 1,557	3,563	2,791 to 4,33	2.6
<b>Total</b>	<b>1,555</b>	<b>1,500 to 1,610</b>	<b>3,623</b>	<b>3,385 to 3,861</b>	<b>2.3</b>

The rates for householders exposed to spray presenting to the AGM Health Service were significantly higher than those for the PAM Health Service for all age groups. Rates for those under 5 years and of those 15-24 years presenting to the AGM Health Service were at least 3 times higher than those for the PAM Health Service.

**Table 4. Gender based rates for presentation to the PAM and AGM Health Services**

Gender	PAM - Rates for those EXPOSED to spray per 100,000	95% Confidence intervals	AGM - Rates for those EXPOSED to spray per 100,000	95% Confidence intervals	Rate ratio (AGM/PAM)
<b>Males</b>	1,085	1,019 to 1,151	2,803	2,501 to 3,105	2.6
<b>Females</b>	1,997	1,910 to 2,084	4,425	4,058 to 4,792	2.2
<b>Total</b>	<b>1,555</b>	<b>1,500 to 1,610</b>	<b>3,635</b>	<b>3,396 to 3,874</b>	<b>2.3</b>

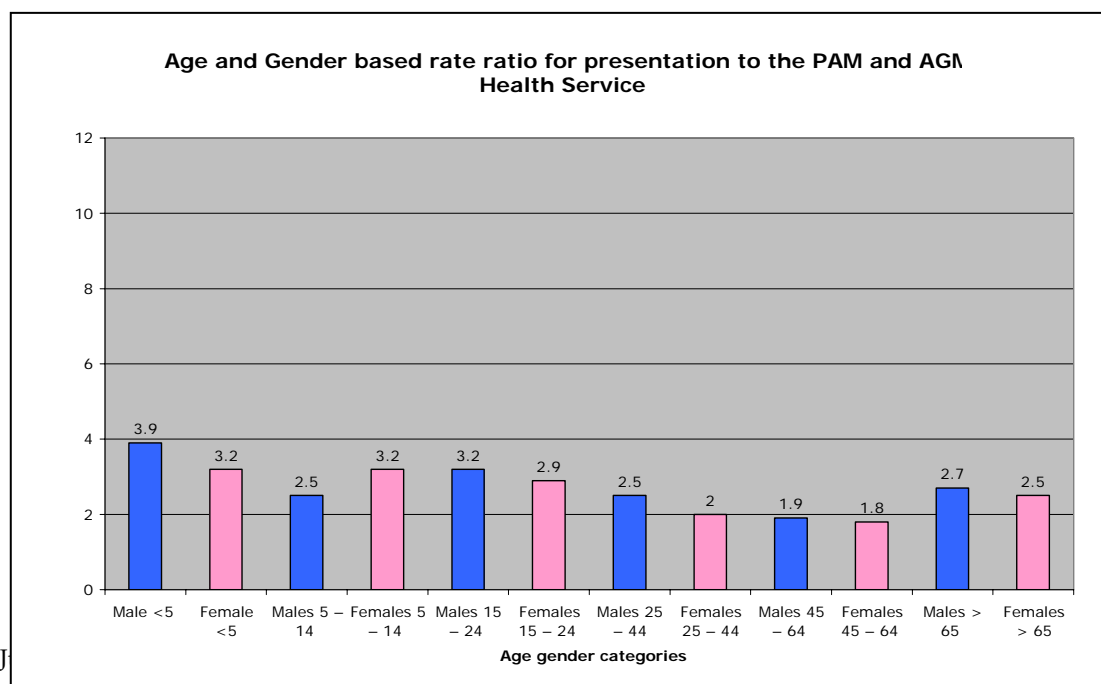
Both males and females in AGM presented at significantly higher rates than PAM males and females at a ratio of 2.6 and 2.2 respectively.

**Table 5. Age and gender based rates for presentation to the PAM & AGM Health Services**

Age group categories/ Gender	PAM - Rates per 100,000	95% Confidence interval	AGM - Rates per 100,000	95% Confidence interval	Rate ratio (AGM/PAM)
Males < 5	1,841	1,541 to 2,141	7,160	5,414 to 8,906	3.9
Females < 5	1,973	1,671 to 2,275	6,243	4,645 to 7,841	3.2
Males 5 - 14	1,785	1,568 to 2,002	4,548	3,549 to 5,547	2.5
Females 5 - 14	1,378	1,192 to 1,564	4,422	3,463 to 5,381	3.2
Males 15 -24	520	398 to 642	1,674	1,124 to 2,224	3.2
Females 15 -24	707	569 to 845	2,075	1,475 to 2,675	2.9
Males 25 - 44	851	750 to 952	2,099	1,632 to 2,566	2.5
Females 25 - 44	2,716	2,542 to 2,890	5,479	4,755 to 6,203	2.0
Males 45 - 64	1,102	949 to 1,255	2,124	1,523 to 2,725	1.9
Females 45 - 64	2,317	2,102 to 2,532	4,106	3,302 to 4,910	1.8
Males > 65	960	756 to 1,164	2,547	1,599 to 3,495	2.7
Females > 65	1,773	1,510 to 2,036	4,494	3,300 to 5,688	2.5

Age and gender based rates were significantly different between both services, with number of males under 5 years exposed to spray presenting to AGM Health Service 3.9 times higher compared with similar age & gender group presenting to PAM Health Service. Also, females from the under 5 and 5-14 years as well as males from the 15-24 years, had 3.2 times higher presentation rates to the AGM programme versus PAM (see Table 5 and Figure 1).

**Figure 1. Age and Gender based rate ratios for presentation to the PAM and AGM Health Services**



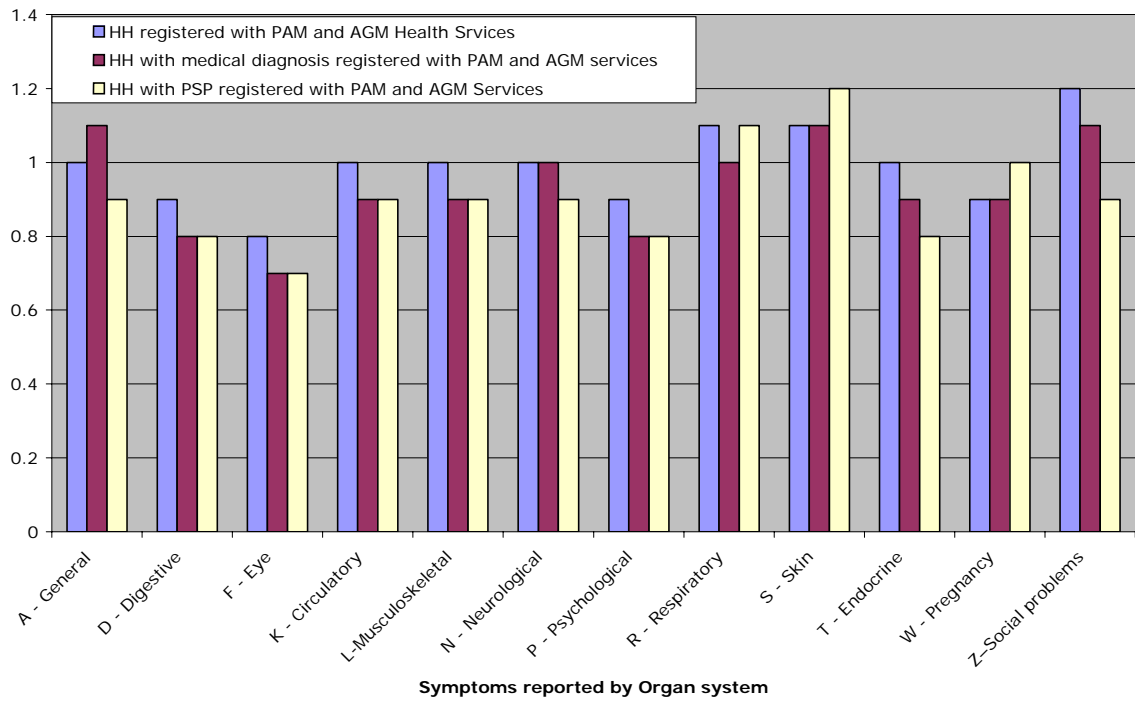
**Table 6. Rate ratios of presentation of symptoms (AGM/PAM) for total householders, householders with medical diagnosis, and householders with Practical support plan.**

Symptoms reported/Organ system	Rate ratios of presentation (AGM/PAM) for total householders presenting to PAM and AGM Health Services	Rate ratios of presentation (AGM/PAM) for householders with medical diagnosis presenting to PAM and AGM Health Services	Rate ratios of presentation (AGM/PAM) for householders with (PSP) presenting to PAM and AGM Health Services
<b>A - General</b>	1	1.1	0.9
<b>D - Digestive</b>	0.9	0.8	0.8
<b>F - Eye</b>	0.8	0.7	0.7
<b>K - Circulatory</b>	1	0.9	0.9
<b>L-Musculoskeletal</b>	1	0.9	0.9
<b>N - Neurological</b>	1	1	0.9
<b>P - Psychological</b>	0.9	0.8	0.8
<b>R - Respiratory</b>	1.1	1	1.1
<b>S - Skin</b>	1.1	1.1	1.2
<b>T - Endocrine</b>	1	0.9	0.8
<b>W - Pregnancy</b>	0.9	0.9	1
<b>Z-Social problems</b>	1.2	1.1	0.9

A rate ratio of less than one means that the rate of AGM householders presented with a particular symptom is less than that of PAM householders. To illustrate, the proportion of AGM householders with symptoms of the eye, is less than that for PAM.

Organ systems including blood, ear, urinary, female genital and male genital are not included in the table above. This is because of the minor frequency of presentations for these organ systems, and calculating ratio for these would have less stability.

**Figure 2. Rate ratios of presentation by organ system for all householders, householders with medical diagnosis only, and householders with PSP only presenting to PAM and AGM Health Services**



## II. Health outcome by organ system: Householders

**Table 7. Percentages of presentation by organ system and confidence intervals for total householders presenting to the PAM and AGM Health Services**

Symptoms reported/Organ system	PAM householders with a concern (%)	95% Confidence Interval	AGM householders with a concern (%)	95% Confidence Interval	Rate ratio (AGM/PAM)
A - General	46.6	45.01 to 48.15	46.3	43.80 to 48.78	1.0
B - Blood	3.9	3.27 to 4.49	2.5	1.69 to 3.25	0.6
D - Digestive	24.7	23.36 to 26.08	22.5	20.44 to 24.62	0.9
F - Eye	23.5	22.20 to 24.86	19.5	17.49 to 21.45	0.8
H - Ear	3.1	2.52 to 3.60	2.3	1.58 to 3.10	0.8
K - Circulatory	8.7	7.80 to 9.58	8.4	7.01 to 9.79	1.0
L- Musculoskeletal	7.7	6.90 to 8.58	7.8	6.47 to 9.15	1.0
N - Neurological	22.3	21.02 to 23.64	21.3	19.24 to 23.34	1.0
P - Psychological	13.6	12.55 to 14.71	11.7	10.11 to 13.33	0.9
R - Respiratory	64.5	62.95 to 65.95	68.4	66.10 to 70.74	1.1
S - Skin	29.4	27.94 to 30.80	31.2	28.86 to 33.50	1.1
T - Endocrine	5.9	5.18 to 6.66	5.9	4.74 to 7.10	1.0
U - Urinary	1.5	1.11 to 1.87	1.3	0.73 to 1.87	0.9
W - Pregnancy	5.5	4.74 to 6.16	4.8	3.75 to 5.89	0.9
X - Female genital	1.5	1.09 to 1.85	1	0.49 to 1.47	0.7
Y - Male genital	0.2	0.07 to 0.35	0.2	-0.02 to 0.42	1.0
Z-Social problems	21	19.68 to 22.24	25.3	23.16 to 27.50	1.2

Table 7 shows that there were statistically significant differences between the total number of householders presenting to the AGM and PAM Health Services who experienced symptoms for several organ systems (Blood, Eye, Respiratory, and Social problems). Those presenting to the AGM Health Service reported more symptoms from the Respiratory and Social organ system whereas those from the PAM Health Service reported more symptoms from the Eye and Blood organ system.

Health outcomes experienced much more frequently from the above mentioned organ systems by AGM householders were: asthma, allergic rhinitis, throat and nose complaints, cough (from the Respiratory organ system), illness problem with child/disruption due to spray affecting child (the leading frequency from the Social organ system), problems with parent/other family member being ill, partner illness problem and social problems not otherwise specified including environmental problems, malingering, pollution (from the Social organ system). Symptoms experienced more often by the PAM householders were: abnormal eyes sensations (burning, dry, itchy eyes - the leading frequency), eye discharge (including watery eyes), painful, red and swollen eyes (from the Eye organ system) and enlarged/painful lymph glands, blood/lymph/spleen diseases (from the Blood, blood forming organs and immune mechanism organ system).

### III. Health outcome by organ system: Encounters

**Table 8. Percentages of presentation by organ system and confidence intervals for total encounters of householders presenting to the PAM and AGM Health Services**

Symptoms reported/Organ system	PAM Encounters with a concern (%)	95% Confidence Intervals Lower CI to Upper CI PAM	AGM Encounters with a concern (%)	95% Confidence Intervals Lower CI to Upper CI AGM	Rate ratio (AGM/PAM)
A - General	33.3	32.32 to 34.22	38.9	37.08 to 40.64	1.2
B - Blood	2	1.74 to 2.30	1.7	1.24 to 2.18	0.8
D - Digestive	16.1	15.39 to 16.87	16.6	15.28 to 18.00	1.0
F - Eye	15.7	14.92 to 16.38	14.7	13.40 to 15.98	0.9
H - Ear	1.6	1.33 to 1.83	1.6	1.14 to 2.06	1.0
K - Circulatory	4.7	4.30 to 5.16	5.9	5.02 to 6.74	1.2
L- Musculoskeletal	4.5	4.06 to 4.88	5.4	4.54 to 6.18	1.2
N - Neurological	14.3	13.55 to 14.95	16.4	15.07 to 17.79	1.2
P - Psychological	10.6	9.99 to 11.23	8.7	7.64 to 9.70	0.8
R - Respiratory	5.3	51.99 to 53.99	60.5	58.69 to 62.27	1.1
S - Skin	21.4	20.61 to 22.25	24.9	23.35 to 26.51	1.2
T - Endocrine	3.3	2.97 to 3.69	4.	3.32 to 4.76	1.2
U - Urinary	0.7	0.53 to 0.87	0.9	0.59 to 1.29	1.3
W - Pregnancy	3.2	2.83 to 3.53	3.8	3.10 to 4.50	1.2
X - Female genital	0.7	0.55 to 0.89	0.8	0.45 to 1.09	1.1
Y - Male genital	0.1	0.04 to 0.16	0.1	0.00 to 0.28	1.4
Z -Social problems	14.5	13.77 to 15.19	16.2	14.88 to 17.58	1.1

When the total number of householders and their encounters were taken into consideration, the findings showed a statistically significant difference between PAM and AGM for symptoms reported from the General, Skin, Neurological and Respiratory (more frequently reported by AGM householders than by PAM householders) and from the Psychological organ system (more often reported by PAM than by AGM householders). More commonly reported symptoms from these organ system were: allergy/ allergic reaction, food allergy, weakness/ tiredness, toxic effects other substances (from the General organ system), atopic dermatitis, localized

rash, pruritus including skin irritation (from Skin organ system), headache (the leading frequency), vertigo/dizziness and migraine (from the Neurological organ system), asthma, allergic rhinitis, throat symptom complaints, cough (from the Respiratory organ system). Recurrently reported symptoms from the Psychological organ system by PAM householders and their encounters were: feeling/ behaving irritable/angry and feeling/ behaving anxious/ nervous/tense.

**Table 9. Percentages of presentation by organ system and confidence intervals for householders exposed to spray presenting to the PAM and AGM Health Services**

Symptoms reported/Organ system	PAM exposed householders with a concern (%)	95% Confidence Interval	AGM exposed householders with a concern (%)	95% Confidence Interval	Rate ratio (AGM/PAM)
A - General	47.1	45.29 to 48.85	46.4	43.09 to 49.77	1.0
B - Blood	3.7	3.05 to 4.41	2.7	1.61 to 3.77	0.7
D - Digestive	25.3	23.72 to 26.82	22.9	20.10 to 25.74	0.9
F - Eye	24.2	22.70 to 25.76	19.8	17.10 to 22.44	0.8
H - Ear	3.2	2.53 to 3.79	3.2	1.99 to 4.33	1.0
K - Circulatory	8.9	7.90 to 9.94	11.1	9.00 to 13.22	1.2
L- Musculoskeletal	7.9	6.95 to 8.89	8.1	6.24 to 9.90	1.0
N - Neurological	22.7	21.24 to 24.24	22	19.21 to 24.77	1.0
P - Psychological	13.7	12.49 to 14.95	11.7	9.55 to 13.85	0.9
R - Respiratory	65.7	64.01 to 67.41	71.6	68.56 to 74.60	1.1
S - Skin	30.6	28.98 to 32.28	32.3	29.15 to 35.41	1.1
T - Endocrine	6.2	5.37 to 7.09	7.5	5.73 to 9.25	1.2
U - Urinary	1.6	1.15 to 2.05	1.8	0.87 to 2.63	1.1
W - Pregnancy	5.6	4.74 to 6.38	5.2	3.67 to 6.63	0.9
X - Female genital	1.4	1.01 to 1.85	1.2	0.45 to 1.89	0.8
Y - Male genital	0.2	0.06 to 0.40	0.1	-0.11 to 0.35	0.5
Z-Social problems	21.1	19.65 to 22.57	23.9	21.00 to 26.72	1.1

Among householders exposed to spray presenting to the PAM Health Service, those with symptoms from the Eye organ system (abnormal sensation in eye and eye discharge) showed a statistically significant higher level of eye symptoms compared with those presenting to AGM Health Service exposed to spray who reported

symptoms from the same organ system. AGM exposed householders reported a small but statistically significant higher level of symptoms from the Respiratory organ system (asthma - the leading frequency, allergic rhinitis, throat complaints) than PAM exposed householders.

**Table 10. Percentages of presentation by organ system and confidence intervals for encounters by exposed householders presenting to the PAM & AGM Health Services**

Symptoms reported/Organ system	PAM exposed householders with a concern (%)	95% Confidence Interval	AGM exposed householders with a concern (%)	95% Confidence Intervals	Rate ratio (AGM/PAM)
A - General	33.1	32.01 to 34.11	36.9	34.63 to 39.25	1.1
B - Blood	1.8	1.54 to 2.14	2	1.30 to 2.62	1.1
D - Digestive	15.8	15.00 to 16.62	16.1	14.30 to 17.82	1.0
F - Eye	15.3	14.48 to 16.08	14.3	12.61 to 15.95	0.9
H - Ear	1.6	1.31 to 1.87	2.1	1.45 to 2.83	1.3
K - Circulatory	4.7	4.18 to 5.12	7.4	6.13 to 8.63	1.6
L-Musculoskeletal	4.3	3.87 to 4.77	5.7	4.55 to 6.75	1.3
N - Neurological	14.1	13.30 to 14.84	16.2	14.42 to 17.94	1.1
P - Psychological	10.5	9.82 to 11.18	8.8	7.45 to 10.15	0.8
R - Respiratory	53.4	52.24 to 54.46	61.3	58.94 to 63.60	1.1
S - Skin	21.6	20.70 to 22.52	25.2	23.14 to 27.30	1.2
T - Endocrine	3.4	3.01 to 3.81	4.5	3.47 to 5.45	1.3
U - Urinary	0.7	0.53 to 0.91	1.3	0.77 to 1.85	1.8
W - Pregnancy	3.1	2.70 to 3.46	4.2	3.26 to 5.18	1.4
X - Female genital	0.7	0.52 to 0.90	0.8	0.40 to 1.26	1.2
Y - Male genital	0.1	0.04 to 0.20	0.1	-0.06 to 0.18	0.5
Z-Social problems	14.4	13.61 to 15.17	14.8	13.11 to 16.51	1.0

Analysis by encounters of exposed householders showed that AGM householders reported a statistically significant higher level of symptoms from the Circulatory (uncomplicated hypertension, cardiovascular symptom/complaint, palpitations), Skin, General and Respiratory organ systems than PAM householders.

#### IV. Health outcome by medical diagnosis

Medical diagnosis was available for a higher percentage of householders presenting to AGM Health Service than for PAM householders for the following age groups: under 5, 5-14, 15-24, and males 25-44. For the other age groups, females 25-44, 45-64 and over 65, medical diagnosis was available more frequently for PAM householders than for AGM householders.

**Table 11. Age and gender breakdown as percentages for those with and without medical diagnosis presenting to the PAM & AGM Health Services**

Age groups - Gender	% PAM - Males & Females with a Medical Diagnosis (1,363)	% AGM - Males & Females with a Medical Diagnosis (573)	% PAM - Males & Females without a Medical Diagnosis (2,525)	% AGM - Males & Females without a Medical Diagnosis (963)
Under 5 - Males	6.4	8.6	3.7	4.5
Under 5 - Females	5.4	7.5	4.5	4.7
5 - 14 - Males	9	9.3	6.8	9.2
5 - 14 - Females	6.7	8	6.7	7.2
15 - 24 Males	2.3	3.1	2.3	4.4
15 - 24 Females	3.3	6.8	3.4	4.7
25 - 44 Males	7.1	8.	11.1	11.7
25 - 44 Females	26	25	34	27.9
45 - 64 Males	6.4	3.8	7.4	6
45 - 64 Females	18.8	13.3	12.9	13
Over 65 - Males	3.2	2.8	2.3	2
Over 65 - Females	5.7	3.8	5	4.8
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>

Females between 25 to 44 years old comprised the largest proportion of householders with medical diagnosis for both PAM and AGM. However, having medical diagnosis does not confirm an actual health problem, as this category was often determined via self-reporting to the Health Service GP.

Designation of “medical diagnosis” reflects the process of receiving personal medical consultation. Those without this designation will have only self-reported their experiences to a nurse over the phone.

**Table 12. Percentages of different age gender groups presenting to the PAM & AGM Health Services who received medical diagnosis**

Age groups - Gender	%PAM - Males & Females with a Medical Diagnosis	95% Confidence Interval	%AGM - Males & Females with a Medical Diagnosis	95% Confidence Interval
Under 5 - Males	48.1	40.8 to 55.4	53.26	43.1 to 63.5
Under 5 - Females	39	32.1 to 46	48.86	38.4 to 59.3
5 - 14 - Males	41.5	35.9 to 47.1	37.32	29.4 to 45.3
5 - 14 - Females	35.1	29.3 to 41	40.00	31.1 to 49
15 - 24 Males	35.2	25.3 to 45.2	30.00	18.4 to 41.6
15 - 24 Females	34.4	26.2 to 42.5	46.43	35.8 to 57.1
25 - 44 Males	25.7	21.3 to 30.1	28.93	21.9 to 36
25 - 44 Females	29.2	26.7 to 31.8	34.71	30.1 to 39.3
45 - 64 Males	31.8	26.2 to 37.3	27.50	17.7 to 37.3
45 - 64 Females	44.1	40to 48.1	37.81	31.1 to 44.5
Over 65 - Males	42.2	32.6 to 51.7	45.71	29.2 to 62.2
Over 65 - Females	38.1	31.4 to 44.8	32.35	21.23% to 43.47%
All ages male	35.5	32.9 to 38.1	35.92	31.97% to 39.87%
All ages female	34.8	33 to 36.7	38.12	35.06% to 41.18%

Figures from PAM report Table 5 and 13

For both the PAM and AGM Health Services, males under 5 years had the highest proportion with a medical diagnosis. Males aged 24-44 in both PAM and AGM, and males 45-64 in AGM had the lowest proportion with a medical diagnosis.

Disregarding age, higher proportions of females presenting to AGM Health Services had a medical diagnosis than those presenting to PAM Health Services. With 95% confidence, there were no significant differences between the percentages of PAM and AGM householders with medical diagnosis of different age and gender groups.

Percentages of householders experiencing symptoms from each organ system for those with medical diagnosis who presented to the PAM and AGM Health Services are shown in Table 13.

**Table 13. Percentages of presentation by organ system and confidence intervals for householders with a medical diagnosis presenting to the PAM & AGM Health Services**

Symptoms reported/Organ system	PAM Hhs with a medical diagnosis and a concern (%)	95% Confidence Interval	AGM Hhs with a medical diagnosis and a concern (%)	95% Confidence Interval	Rate ratio (AGM/PAM)
A - General	65.6	63.07 to 68.11	68.9	65.15 to 72.73	1.1
B - Blood	7	5.68 to 8.40	4.7	2.98 to 6.44	0.7
D - Digestive	38.8	36.22 to 41.40	31.9	28.12 to 35.76	0.8
F - Eye	34.9	32.39 to 37.45	25.5	21.91 to 29.05	0.7
H - Ear	5.2	4.03 to 6.39	3.7	2.12 to 5.20	0.7
K - Circulatory	13.3	11.48 to 15.08	12	9.38 to 14.70	0.9
L-Musculoskeletal	13.7	11.83 to 15.47	11.7	9.06 to 14.32	0.9
N - Neurological	31.2	28.72 to 33.64	30	26.27 to 33.77	1.0
P - Psychological	24.9	22.58 to 27.16	20.4	17.12 to 23.72	0.8
R - Respiratory	81.2	79.15 to 83.29	84	81.13 to 87.11	1.0
S - Skin	44	41.38 to 46.66	49.9	45.82 to 54.00	1.1
T - Endocrine	9.8	8.25 to 11.41	9.1	6.73 to 11.43	0.9
U - Urinary	3.1	2.16 to 4.00	2.3	1.05 to 3.49	0.7
W - Pregnancy	4.6	3.51 to 5.73	4.4	2.69 to 6.03	0.9
X - Female genital	2.9	2.03 to 3.83	1.4	0.44 to 2.36	0.5
Y - Male genital	0.3	0.00 to 0.58	0.4	-0.13 to 0.83	1.2
Z-Social problems	26.5	24.15 to 28.83	29.1	25.42 to 32.86	1.1

Overall there were no statistically significant differences in symptoms reported from most organ systems, by AGM and PAM householders with a medical diagnosis. However, PAM householders reported significantly more symptoms from the Digestive (nausea, diarrhoea, vomiting, symptoms/complaints mouth, tongue, lips) and Eye (burning, dry, itchy, watery eyes) organ system.

**Table 14. Percentages of presentation by organ system and confidence intervals for householders without a medical diagnosis presenting to the PAM & AGM Health Services**

Symptoms reported/Organ system	PAM Hhs without a medical diagnosis (%)	95% Confidence Interval	AGM Hhs without a medical diagnosis (%)	95% Confidence Interval	Rate ratio (AGM/PAM)
A - General	36.3	34.44 to 38.20	32.8	29.84 to 35.78	0.9
B - Blood	2.2	1.61 to 2.75	1.1	0.47 to 1.81	0.5
D - Digestive	17.1	15.64 to 18.58	16.9	14.56 to 19.30	1.0
F - Eye	17.4	15.91 to 18.87	15.9	13.58 to 18.20	0.9
H - Ear	1.9	1.37 to 2.43	1.6	0.78 to 2.34	0.8
K - Circulatory	6.2	5.28 to 7.16	6.2	4.70 to 7.76	1.0
L- Musculoskeletal	4.6	3.74 to 5.36	5.5	4.06 to 6.94	1.2
N - Neurological	17.5	16.06 to 19.02	16.1	13.78 to 18.42	0.9
P - Psychological	7.6	6.53 to 8.59	6.5	4.98 to 8.10	0.9
R - Respiratory	55.4	53.47 to 57.35	59.1	55.98 to 62.20	1.1
S - Skin	21.5	19.87 to 23.07	20	17.51 to 22.57	0.9
T - Endocrine	3.8	3.05 to 4.55	4.1	2.80 to 5.30	1.1
U - Urinary	0.6	0.32 to 0.94	0.7	0.19 to 1.27	1.2
W - Pregnancy	5.9	4.98 to 6.82	5.1	3.70 to 6.48	0.9
X - Female genital	0.7	0.35 to 0.99	0.7	0.19 to 1.27	1.1
Y - Male genital	0.2	0.00 to 0.32	0.1	-0.10 to 0.30	0.6
Z - Social problems	18	16.48 to 19.48	23.1	20.39 to 25.71	1.3

AGM householders without a medical diagnosis reported a statistically significant higher level of symptoms from the Social organ system (illness problem with child/disruption due to spray affecting child) than PAM householders without a medical diagnosis.

## V. Health outcome by type of Practical Support Plan

Of the 3,888 householders presenting to the PAM Health Service, approximately 18% (689) had a Practical Support Plan (PSP). Of the 1,536 householders presenting to the AGM Health Service, nearly 20% (314) had a PSP.

Table 15 summarizes percentages of reporting symptoms by organ system for householders with a PSP presenting to both Health Services.

**Table 15. Percentages of presentation by organ system and confidence intervals for householders with a PSP presenting to the PAM & AGM Health Services**

Symptoms reported/Organ system	PAM Hhs with a PSP (689) (%)	95% Confidence Interval	AGM Hhs with a PSP (314) (%)	95% Confidence Interval	Rate ratio (AGM/PAM)
A - General	74.3	71.05 to 77.57	69.1	64.00 to 74.22	0.9
B - Blood	8.6	6.47 to 10.65	6.1	3.41 to 8.69	0.7
D - Digestive	45.3	41.56 to 49.00	36.9	31.60 to 42.28	0.8
F - Eye	40.1	36.40 to 43.72	28	23.96 to 34.00	0.7
H - Ear	5.5	3.81 to 7.23	2.6	0.81 to 4.29	0.5
K - Circulatory	16.3	13.50 to 19.02	14.3	10.45 to 18.21	0.9
L- Musculoskeletal	16	13.23 to 18.71	14.3	10.45 to 18.21	0.9
N - Neurological	36.7	33.12 to 40.32	33.4	28.22 to 38.66	0.9
P - Psychological	34.5	30.99 to 38.09	26.4	21.55 to 31.31	0.8
R - Respiratory	81.6	78.67 to 84.47	87.6	83.93 to 91.23	1.1
R - Respiratory Asthma	45.9	42.14 to 49.58	56.4	50.88 to 61.86	1.2
S - Skin	44.1	40.41 to 47.83	51	45.43 to 56.49	1.2
T - Endocrine	10.3	8.03 to 12.57	8.6	5.50 to 11.70	0.8
U - Urinary	2.8	1.54 to 3.98	2.2	0.60 to 3.86	0.8
W - Pregnancy	6.34	4.56 to 8.22	6.7	3.93 to 9.45	1.0
X - Female genital	3.6	2.23 to 5.03	2.6	0.81 to 4.29	0.7
Y - Male genital	0.3	-0.11 to 0.69	0.6	-0.24 to 1.52	2.2
Z-Social problems	36.3	32.69 to 39.87	30.9	25.78 to 36.00	0.9

Approximately 82% (3,199) of PAM householders and almost 80% (1,222) of AGM householders were not in a receipt of a PSP. AGM householders without a PSP reported a statistically significant higher level of asthma symptoms and of symptoms from the Social organ system and a statistically significant lower level of symptoms from the Blood organ system than PAM householders without a PSP.

It is important to know whether some statistically significant differences occurred between characteristics of householders with a PSP presenting to both services and if so, the extent of these disparities. For example, 74.3% of all PAM householders with a PSP presented with at least one concern from General organ system

Percentages of householders with a PSP reporting symptoms from various organ systems were similar for both programmes with only two exceptions. AGM householders with a PSP reported a statistically significant lower level of symptoms from the Eye organ system, and a small but statistically significant higher level of asthma symptoms than PAM householders with a PSP.

**Table 16. Percentages of presentation by organ system and confidence intervals for householders aged under 5 years with a PSP presenting to the PAM & AGM Health Services**

Symptoms reported/Organ system	PAM Hhs under 5 years with a concern (%)	95% Confidence Interval	AGM Hhs under 5 years with a concern (%)	95% Confidence Interval	Rate ratio (AGM/PAM)
A - General	9.8	6.75 to 12.82	15.0	9.78 to 20.22	1.5
B - Blood	0.2	-0.26 to 0.80	0.6	-0.53 to 1.64	2.1
D - Digestive	3.3	1.45 to 5.08	5.6	2.21 to 8.90	1.7
F - Eye	2.2	0.68 to 3.66	5.0	1.82 to 8.18	2.3
H - Ear	1.1	0.03 to 2.15	0.0	0.00 to 0.00	0.0
K - Circulatory	0.3	-0.26 to 0.80	0.6	-0.53 to 1.64	2.1
L - Musculoskeletal	0.3	-0.26 to 0.80	1.7	-0.20 to 3.54	6.2
N - Neurological	0.3	-0.26 to 0.80	3.3	0.71 to 5.96	12.3
P - Psychological	2.2	0.68 to 3.66	2.2	0.07 to 4.38	1.0
R - Respiratory	11.4	8.16 to 14.66	22.2	16.15 to 28.30	1.9
R- Respiratory Asthma	7.3	4.67 to 9.99	14.4	9.31 to 19.57	2.0
S - Skin	10.1	6.98 to 13.13	15.6	10.26 to 20.85	1.5
T - Endocrine	1.4	0.18 to 2.54	1.1	-0.42 to 2.64	0.8
U - Urinary	0.0	0.00 to 0.00	0.6	-0.53 to 1.64	

Comparison of presentations to  
PAM & AGM Health Services

W - Pregnancy	0.00	0.00 to 0.00	0.0	0.00 to 0.00	
X - Female genital	0.0	0.00 to 0.00	0.0	0.00 to 0.00	
Y - Male genital	0.0	0.00 to 0.00	0.0	0.00 to 0.00	
Z - Social problems	2.5	0.87 to 4.02	9.4	5.17 to 13.72	3.9

The total number of children under 5 years presenting to the PAM and AGM Health Services was 368 and 180 respectively. When the symptom reports for those under 5 years with a PSP were compared there were only two statistically significant differences between the AGM and PAM programmes. The percentages of symptom reports from the Respiratory (other than asthma) and Social organ system by children under 5 years presenting to the AGM Health Service was 1.9 times and 3.9 times higher respectively than for PAM.

**Table 17. Percentages of presentation by organ system and confidence intervals for householders without a PSP presenting to the PAM & AGM Health Service**

Symptoms reported/Organ system	PAM Hhs with a PSP (3,199) with a concern (%)	95% Confidence Interval	AGM Hhs with a PSP (1,222) with a concern (%)	95% Confidence Interval	Rate ratio AGM/PAM
A - General	40.6	38.91 to 42.31	40.4	37.68 to 43.18	1.0
B - Blood	2.9	2.30 to 3.46	1.6	0.86 to 2.24	0.5
D - Digestive	20.3	18.90 to 21.68	18.8	16.63 to 21.01	0.9
F - Eye	20	18.58 to 21.36	17	14.91 to 19.13	0.9
H - Ear	2.5	1.99 to 3.07	2.3	1.45 to 3.13	0.9
K - Circulatory	7.1	6.17 to 7.95	6.9	5.45 to 8.29	1.0
L - Musculoskeletal	6	5.15 to 6.79	6.1	4.79 to 7.49	1.0
N - Neurological	19.2	17.85 to 20.59	18.2	16.01 to 20.33	0.9
P - Psychological	9.1	8.13 to 10.13	7.9	6.42 to 9.46	0.9
R - Respiratory	60.8	59.08 to 62.46	63.5	60.80 to 66.20	1.0
R - Respiratory Asthma	25.6	24.09 to 27.11	34.5	31.86 to 37.20	1.3
S - Skin	26.2	24.68 to 27.72	26.1	23.64 to 28.56	1.0
T - Endocrine	5	4.22 to 5.72	5.2	3.99 to 6.49	1.1
U - Urinary	1.2	0.84 to 1.60	1.1	0.49 to 1.63	0.9
W - Pregnancy	5.3	4.48 to 6.02	4.3	3.20 to 5.48	0.8
X - Female genital	1.0	0.66 to 1.34	0.6	0.15 to 0.99	0.6
Y - Male genital	0.2	0.04 to 0.34	0.1	-0.08 to 0.24	0.4
Z - Social problems	17.7	16.34 to 18.98	23.9	21.51 to 26.29	1.4

**Table 18. Characteristics of householders presenting to the PAM & AGM Health Services in receipt of a PSP**

<b>Characteristics of PAM and AGM householders with a PSP</b>	<b>PAM Hhs in receipt of a PSP (%)</b>	<b>95% Confidence Interval</b>	<b>AGM Hhs in receipt of a PSP (%)</b>	<b>95% Confidence Interval</b>	<b>Rate ratio (AGM/PAM)</b>
Males	15	13.04 to 16.90	15.9	12.84 to 18.85	1.06
Females	19.1	17.61 to 20.65	23.1	20.49 to 25.80	1.21
<b>All</b>	<b>17.7</b>	<b>16.52 to 18.92</b>	<b>20.4</b>	<b>18.42 to 22.46</b>	<b>1.15</b>
Under 5 yrs	13.6	10.09 to 17.09	27.2	20.72to 33.72	2.00
5 - 14 yrs	12.8	10.05to 15.63	14	9.76 to 18.25	1.09
15 - 24 yrs	15.1	10.33to 19.81	18.8	12.37to 25.13	1.24
25 - 44 yrs	9.8	8.35to 11.28	20.1	16.85 to 23.43	2.058
45 - 64 yrs	24.8	21.90to 27.69	22.7	17.22 to 26.91	0.89
Over 65 yrs	22	17.38 to 26.70	24.3	16.00 to 32.55	0.93
<b>All</b>	<b>17.7</b>	<b>16.52 to 18.92</b>	<b>20.4</b>	<b>18.42 to 22.46</b>	<b>1.15</b>
<b>Medical Justification</b>					
Asthma	4.1	3.44 to 4.68	4.1	3.11 to 5.09	1.0
Asthma & Eczema	0.7	0.45 to 0.99	2.4	1.64 to 3.18	3.3
Lower respiratory not asthma	0.9	0.58 to 1.16	1.3	0.73 to 1.87	1.5
Upper respiratory	0.4	0.19 to 0.59	0.3	0.04 to 0.62	0.8
Irritant eyes, nose, skin	4.6	3.92 to 5.24	4	2.99 to 4.95	0.9
*Food allergy	1.1	0.76 to 1.41	1.7	1.05 to 2.34	1.5
Non food allergy	0.3	0.11 to 0.45	0.1	-0.05 to 0.31	0.5
Skin condition	0.9	0.58 to 1.16	1.3	0.73 to 1.87	1.5
Medical SLE	0.8	0.52 to 1.08	1	0.53 to 1.55	1.3
CFS/chemical sensitivity	1.8	1.38 to 2.22	1.7	1.05 to 2.33	0.9
Situational stress	1.8	1.34 to 2.16	1.4	0.79 to 1.95	0.8

Comparison of presentations to  
PAM & AGM Health Services

Pregnancy - baby	0.5	0.29 to 0.73	1.1	0.59 to 1.63	2.2
<b>Total</b>	17.7	16.52 to 18.92	20.4	18.42 to 22.46	
<b>Medical Severity</b>					
Highest	1.3	0.94 to 1.64	1.7	1.05 to 2.33	1.3
Significant	4.8	4.17 to 5.51	7.6	6.23 to 8.87	1.6
Other medical	5.4	4.69 to 6.11	4.9	3.80 to 5.96	0.9
Precautionary	3.9	3.33 to 4.55	3.9	2.94 to 4.88	1.0
Psycho-social	2.3	1.79 to 2.73	2.4	1.64 to 3.18	1.1
<b>Total</b>	17.7	16.52 to 18.92	20.4	18.42 to 22.46	

N.B. Data in this table is taken from Table 16 of Chapter 4.5.6 of PAM and AGM report

\*Food allergy includes Asthma from food

The percentage of males and females who had a PSP was similar for both programmes. The percentage of male householders who received a PSP for PAM was 15% and 15.9% for AGM.

The percentage of female householders in PAM who received a PSP was 19.1% and 23% in AGM.

Overall, 17.7% of all householders in PAM and 20.4% in AGM received a PSP

Of the six age group categories with a PSP percentages were comparable except for in the AGM householders under 5 years, which were twice that of PAM. For householders with a PSP, "asthma" and "irritant eyes, nose, skin" were the two most common medical justifications for both PAM and AGM Health Services. "Asthma & eczema" occurred 3.3 times more frequently among AGM householders and "significant" severity occurred 1.6 times more often (at a statistically significant higher level) amongst AGM householders. This is explained by the fact that "asthma & eczema" as a medical justification was almost always associated with a "significant" medical severity.

A comparison of the differences between the programmes for those under 5 years with a PSP is shown in Table 19.

**Table 19. Characteristics of householders aged under 5 years presenting to the PAM & AGM Health Services in receipt of a PSP**

Characteristics of PAM and AGM householders under 5 years with a PSP	PAM Hhs under 5 years (%)	95% Confidence Interval	AGM Hhs under 5 years (%)	95% Confidence Interval	Rate ratio AGM/PAM
Males	9.5	6.51 to 12.51	15.56	10.26 to 20.85	1.6
Females	4.1	2.06 to 6.10	11.67	6.98 to 16.36	2.9
<b>All</b>	<b>13.6</b>	<b>10.09 to 17.09</b>	<b>27.22</b>	<b>20.72 to 33.72</b>	<b>2.0</b>
Exposed to spray	11.4	8.16 to 14.66	20.00	14.16 to 25.84	1.8
Non-exposed to spray	2.2	0.68 to 3.66	7.22	3.44 to 11.00	3.3
Diagnosed	10.6	7.45 to 13.74	25.56	19.18 to 31.93	2.4
Non-diagnosed	3	1.25 to 4.73	1.67	-0.20 to 3.54	0.6
Relocators	7.1	4.45 to 9.68	20.00	14.16 to 25.84	2.8
Non-relocators	6.5	4.00 to 9.04	7.22	3.44 to 11.00	1.1
<b>All</b>	<b>13.6</b>	<b>10.09 to 17.09</b>	<b>27.22</b>	<b>20.72 to 33.72</b>	<b>2.0</b>
<b>Medical Justification</b>					
Asthma	3.8	1.85 to 5.76	4.4	1.43 to 7.46	1.2
Asthma & Eczema	1.6	0.34 to 2.92	6.7	3.02 to 10.31	4.1
Lower respiratory not asthma	0.8	-0.10 to 1.73	2.2	0.07 to 4.38	2.7
Upper respiratory	0.0	0.00 to 0.00	0.6	-0.53 to 1.64	
Irritant eyes, nose, skin	2.5	0.87 to 4.02	2.8	0.38 to 5.18	1.1
*Food allergy	2.5	0.87 to 4.02	6.2	2.68 to 9.72	2.5
Non food allergy	0.0	0.00 to 0.00	0.0	0.00 to 0.00	
Skin condition	2.2	0.68 to 3.66	2.8	0.38 to 5.18	1.3
Medical SLE	0.0	0.00 to 0.00	0.0	0.00 to 0.00	
CFS/chemical sensitivity	0.0	0.00 to 0.00	0.0	0.00 to 0.00	
Situational stress	0.3	-0.26 to 0.80	1.7	-0.20 to 3.54	6.2

Comparison of presentations to  
PAM & AGM Health Services

Pregnancy - baby	0.0	0.00 to 0.00	0.0	0.00 to 0.00	
<b>Total</b>	<b>13.6</b>	<b>10.09 to 17.09</b>	<b>27.2</b>	<b>20.72 to 33.72</b>	
<b>Medical Severity</b>					
Highest	1.9	0.51 to 3.30	3.3	0.71 to 5.96	1.8
Significant	6	3.56 to 8.40	14.4	9.31 to 19.58	2.4
Other medical	3.5	1.65 to 5.42	5.0	1.82 to 8.18	1.4
Precautionary	1.9	0.51 to 3.30	2.2	0.07 to 4.38	1.2
Psycho-social	0.3	-0.26 to 0.80	2.2	0.07 to 4.38	8.2
<b>Total</b>	<b>13.6</b>	<b>10.09 to 17.09</b>	<b>27.2</b>	<b>20.72 to 33.72</b>	

\*Food allergy includes Asthma from food

The total number of children under 5 years presenting to the PAM and AGM Health Services was 368 and 180, respectively. When comparing the characteristics of these young child householders with a PSP, as percentages, there were statistically significant differences between the numbers of those under 5 years receiving a PSP during the AGM programme (two times higher than those of PAM aged under 5 years with a PSP).

There were other statistically significant differences among PSP recipients between the percentage of those with a medical diagnosis (2.4 times higher for AGM than for PAM), for relocators (2.8 times higher for AGM than for PAM), "asthma & eczema" as medical justification (4.1 times higher for AGM than for PAM) and "significant" as medical severity (2.4 times higher for AGM than for PAM).

The dissimilarities between relocators and non-relocators in the PAM and AGM Health Services were evaluated; among presenters to the Health Services approximately 9% received relocator PSPs and nearly 9% non-relocator PSPs in the PAM programme and 12.5% relocator PSPs and approximately 8% non-relocator PSPs in the AGM programme. This is despite the higher proportion of PAM presenters with residential exposure. Householders in the later Hamilton aerial spray programme were more likely than in the PAM programme to leave their home as an avoidance measure for the spray.

**Table 20. Characteristics of householders in receipt of a relocater PSP, as a percent of all Hhs presenting to the PAM & AGM Health Services.**

Characteristics of PAM and AGM householders with a PSP	AGM Relocater PSPs among Hhs (%)	95% Confidence Interval	AGM Relocater PSPs among Hhs (%)	95% Confidence Interval	Rate ratio (AGM/PAM)
Males	2.3	1.86 to 2.82	3.6	2.65 to 4.51	1.5
Females	6.6	5.83 to 7.39	8.9	7.49 to 10.35	1.3
<b>All</b>	<b>9</b>	<b>8.05 to 9.85</b>	<b>12.5</b>	<b>10.85 to 14.15</b>	<b>1.4</b>
Under 5 yrs	0.7	0.41 to 0.93	2.4	1.58 to 3.10	3.5
5 - 14 yrs	0.9	0.56 to 1.14	1.4	0.84 to 2.02	1.7
15 - 24 yrs	0.4	0.21 to 0.61	0.9	0.44 to 1.38	2.2
25 - 44 yrs	3.4	2.83 to 3.97	4.70	3.63 to 5.75	1.4
45 - 64 yrs	2.9	2.40 to 3.46	2.2	1.42 to 2.88	0.7
Over 65 yrs	0.7	0.43 to 0.95	1	0.49 to 1.47	1.4
<b>All</b>	<b>9</b>	<b>8.05 to 9.85</b>	<b>12.5</b>	<b>10.85 to 14.15</b>	<b>1.4</b>
<b>Medical Justification</b>					
Asthma	2.2	1.77 to 2.71	2.7	1.86 to 3.48	1.2
Asthma & Eczema	0.4	0.19 to 0.59	1.4	0.84 to 2.02	3.7
Lower respiratory not asthma	0.5	0.25 to 0.67	0.8	0.34 to 1.22	1.7
Upper respiratory	0.1	0.00 to 0.20	0.1	-0.05 to 0.31	1.3
Irritant eyes, nose, skin	2.1	1.68 to 2.58	2	1.26 to 2.64	0.9
*Food allergy	0.75	0.48 to 1.02	1.4	0.79 to 1.95	1.9
Non food allergy	0.2	0.07 to 0.35	0.1	-0.06 to 0.20	0.3
Skin condition	0.4	0.17 to 0.55	0.8	0.34 to 1.22	2.2
Medical SLE	0.5	0.27 to 0.71	0.4	0.08 to 0.70	0.8
CFS/chemical sensitivity	1.0	0.71 to 1.35	1.3	0.73 to 1.87	1.3
Situational stress	0.6	0.39 to 0.89	1	0.53 to 1.55	1.6

Comparison of presentations to  
PAM & AGM Health Services

Pregnancy - baby	0.2	0.03 to 0.27	0.6	0.21 to 0.97	3.9
<b>Total</b>	<b>9</b>	<b>8.05 to 9.85</b>	<b>12.5</b>	<b>10.85 to 14.15</b>	
<b>Medical Severity</b>					
Highest	0.9	0.63 to 1.23	1.4	0.79 to 1.95	1.5
Significant	2.7	2.16 to 3.18	5	3.92 to 6.10	1.9
Other medical	2.6	2.05 to 3.05	2.3	1.53 to 3.03	0.9
Precautionary	2.1	1.61 to 2.51	2.3	1.53 to 3.03	1.1
Psycho-social	0.8	0.48 to 1.02	1.6	0.94 to 2.18	2.1
<b>Total</b>	<b>9</b>	<b>8.05 to 9.85</b>	<b>12.5</b>	<b>10.85 to 14.15</b>	

\*Food allergy includes Asthma from food

Despite the fact that there were no gender differences of those with a PSP (relocators plus non-relocators) in both programmes, there was a statistically significant higher percentage of females (and therefore a higher percentage of total number of householders) among relocators in AGM programme versus PAM. Among relocators, those under 5 years presenting to the AGM Health Service were considerably more represented (3.5 times higher) than those under 5 years presenting to PAM Health Service. There was also a significantly higher percentage of relocators with "asthma & eczema" as medical justification (3.7 times higher), and of "significant" medical severity (1.9 times higher) of relocators in the AGM programme than of those in the PAM programme.

**Table 21. Characteristics of householders in receipt of a non relocator PSP, as a percentage of all Hhs presenting to the PAM & AGM Health Services.**

Characteristics of PAM and AGM householders with a PSP	PAM Non Relocator PSPs among Hhs (%)	95% Confidence Interval	AGM Non Relocator PSPs among Hhs (%)	95% Confidence Interval	Rate ratio (AGM/PAM)
Males	2.7	2.22 to 3.24	2.3	1.53 to 3.03	0.8
Females	6	5.29 to 6.79	5.7	4.50 to 6.82	0.9
<b>All</b>	<b>8.8</b>	<b>7.88 to 9.66</b>	<b>7.9</b>	<b>6.59 to 9.29</b>	<b>0.9</b>
Under 5 yrs	0.6	0.37 to 0.87	0.9	0.39 to 1.31	1.4
5 - 14 yrs	1	0.67 to 1.29	0.9	0.44 to 1.38	0.9
15 - 24 yrs	0.4	0.23 to 0.65	0.9	0.39 to 1.31	1.9
25 - 44 yrs	3.2	2.64 to 3.74	2.8	1.97 to 3.63	0.9
45 - 64 yrs	2.5	2.03 to 3.01	1.9	1.21 to 2.57	0.8
Over 65 yrs	1.0	0.71 to 1.35	0.7	0.25 to 1.05	0.6

Comparison of presentations to  
PAM & AGM Health Services

<b>All</b>	<b>8.8</b>	<b>7.88 to 9.66</b>	<b>7.9</b>	<b>6.59 to 9.29</b>	<b>0.9</b>
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<b>Medical Justification</b>					
Asthma	1.8	1.41 to 2.25	1.4	0.84 to 2.02	0.8
Asthma & Eczema	0.3	0.15 to 0.51	1	0.49 to 1.47	3.0
Lower respiratory not asthma	0.4	0.21 to 0.61	0.5	0.16 to 0.88	1.3
Upper respiratory	0.3	0.11 to 0.45	0.2	-0.02 to 0.42	0.7
Irritant eyes, nose, skin	2.4	1.96 to 2.92	2	1.32 to 2.72	0.8
*Food allergy	0.3	0.15 to 0.51	0.3	0.04 to 0.61	1.0
Non food allergy	0.1	-0.01 to 0.17	0.1	-0.06 to 0.20	0.9
Skin condition	0.5	0.29 to 0.73	0.5	0.16 to 0.88	1.0
Medical SLE	0.3	0.14 to 0.48	0.1	0.25 to 1.05	2.1
CFS/chemical sensitivity	0.8	0.50 to 1.04	0.4	0.08 to 0.70	0.5
Situational stress	1.1	0.78 to 1.44	0.3	0.04 to 0.62	0.3
Pregnancy - baby	0.4	0.17 to 0.55	0.5	0.16 to 0.88	1.4
<b>Total</b>	<b>8.8</b>	<b>7.88 to 9.66</b>	<b>7.9</b>	<b>6.59 to 9.29</b>	
<b>Medical Severity</b>					
Highest	0.4	0.17 to 0.55	0.3	0.04 to 0.62	0.9
Significant	2.2	1.70 to 2.62	2.5	1.75 to 3.33	1.2
Other medical	2.9	2.33 to 3.37	2.6	1.80 to 3.40	0.9
Precautionary	1.9	1.45 to 2.31	1.6	1.00 to 2.26	0.9
Psycho-social	1.5	1.14 to 1.90	0.9	0.39 to 1.31	0.6
<b>Total</b>	<b>8.8</b>	<b>7.88 to 9.66</b>	<b>7.9</b>	<b>6.59 to 9.29</b>	

\*Food allergy includes Asthma from food

There was only one statistically significant difference between characteristics of non-relocators included in the PAM and AGM programmes. "Situational stress" as a medical justification was assigned to non-relocators in the PAM programme at a significantly higher percentage compared with non-relocators in the AGM programme.

**Table 22. Rates of exposed relocators presenting to the PAM & AGM Health Services**

Characteristics of householders with a PSP who relocated during spray	Rates of PAM - Exposed Relocators per 100,000	95% Confidence Interval	Rates of AGM - Exposed Relocators per 100,000	95% Confidence Interval	Rate ratio (AGM/PAM)
Males	87	68 to 106	402	286 to 518	4.6
Females	229	199 to 259	804	645 to 963	3.5
<b>All</b>	<b>160</b>	<b>142 to 178</b>	<b>608</b>	<b>509 to 707</b>	<b>3.8</b>
Under 5 yrs	158	96 to 220	1629	1,031 to 2,227	10.3
5 - 14 yrs	106	69 to 143	495	260 to 730	4.7
15 - 24 yrs	51	24 to 78	188	58 to 318	3.7
25 - 44 yrs	184	151 to 217	742	547 to 937	4.0
45 - 64 yrs	264	212 to 316	483	282 to 684	1.8
Over 65 yrs	125	74 to 176	586	268 to 904	4.7
<b>All</b>	<b>160</b>	<b>142 to 178</b>	<b>608</b>	<b>509 to 707</b>	<b>3.8</b>
<b>Medical Justification</b>					
Asthma	41	32 to 50	136	89 to 183	3.3
Asthma & Eczema	7	3 to 11	81	45 to 117	11.6
Lower respiratory not asthma	9	5 to 13	38	13 to 63	4.2
Upper respiratory	2	0 to 4	8	-3 to 19	4.0
Irritant eyes, nose, skin	35	27 to 43	102	61 to 143	2.9
*Food allergy	13	8 to 19	59	28 to 91	4.5
Non food allergy	4	1 to 7	4	-4 to 12	1.0
Skin condition	7	3 to 11	42	16 to 68	6.0
Medical SLE	10	6 to 14	13	-2 to 28	1.3
CFS/chemical sensitivity	18	12 to 24	47	19 to 75	2.6
Situational stress	12	7 to 17	47	19 to 75	3.9
Pregnancy - baby	3	1 to 5	30	8 to 52	10.0

Comparison of presentations to  
PAM & AGM Health Services

<b>Total</b>	<b>160</b>	<b>142 to 178</b>	<b>608</b>	<b>509 to 707</b>	
<b>Medical Severity</b>					
Highest	17	11 to 23	64	32 to 96	3.8
Significant	49	39 to 59	254	190 to 318	5.2
Other medical	43	34 to 52	127	82 to 172	3.0
Precautionary	37	28 to 46	89	51 to 127	2.4
Psycho-social	14	9 to 19	72	38 to 106	5.1
<b>Total</b>	<b>160</b>	<b>142 to 178</b>	<b>608</b>	<b>509 to 707</b>	

\*Food allergy includes Asthma from food

Overall, there were significantly higher rates of relocators for those presenting to the AGM Health Service. For exposed relocators in the 15-24 and 45-64 age groups, there were no statistically significant differences between programmes.

The rates for nearly all medical justification categories were higher for AGM compared to PAM. In the medical severity categories, there were significantly higher rates for AGM householders than for PAM householders in every category. Overall population-based rates of PSP uptake were much higher for AGM.

[Note that overall frequency of PSPs among presenters to the Services was similar. The high AGM comparative rate per 100,000 exposed population was for both presentation to the Health Service and for receipt of a PSP]

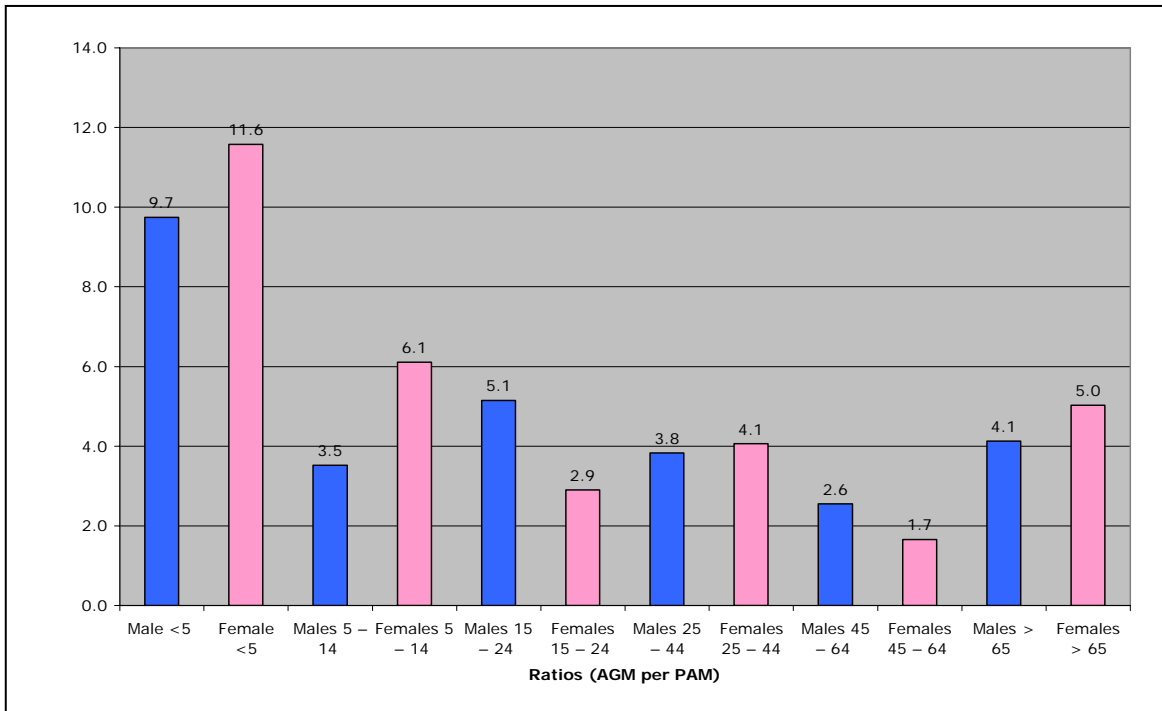
There was a high ratio of AGM versus PAM exposed relocators for those under 5 years (10.3 times higher) and for asthma & eczema (11.6 times higher) and pregnancy-baby (10 times higher) as medical justifications.

A further breakdown by gender for all six age groups together with rates (and 95% confidence intervals) of exposed relocators are presented in Table 23 and Figure 3.

**Table 23. Age and gender based rates of exposed relocators presenting to the PAM & AGM Health Service**

<b>Age &amp; gender of relocators</b>	<b>PAM exposed relocators per 100,000</b>	<b>95% Confidence Interval</b>	<b>AGM exposed relocators per 100,000</b>	<b>95% Confidence Interval</b>	<b>Rate ratio (AGM/PAM)</b>
<b>Under 5 - Males</b>	220	116 to 325	2,148	1,166 to 3,314	9.7
<b>Under 5 - Females</b>	98	30 to 166	1,135	436 to 1,571	11.6
<b>5 - 14 - Males</b>	119	62 to 176	419	109 to 528	3.5
<b>5 - 14 - Females</b>	93	44 to 141	567	217 to 783	6.1
<b>15 - 24 Males</b>	37	5 to 70	191	4 to 195	5.1
<b>15 - 24 Females</b>	64	22 to 105	184	4 to 188	2.9
<b>25 - 44 Males</b>	50	26 to 75	193	50 to 244	3.8
<b>25 - 44 Females</b>	311	251 to 371	1,264	909 to 2,174	4.1
<b>45 - 64 Males</b>	106	59 to 154	271	54 to 326	2.6
<b>45 - 64 Females</b>	414	322 to 505	684	350 to 1,035	1.7
<b>Over 65 - Males</b>	91	28 to 155	377	8 to 386	4.1
<b>Over 65 - Females</b>	155	76 to 233	778	272 to 1,050	5.0

**Figure 3. Ratios of exposed relocators presenting to PAM and AGM Health Services**



**Table 24. Rates and 95% confidence intervals of exposed relocators aged under 5 years presenting to the PAM & AGM Health Services**

Organ system	PAM Hhs under 5 years with a PSP per 100,000	95% Confidence Interval	AGM Hhs under 5 years with a PSP per 100,000	95% Confidence Interval	Rate ratio (AGM/PAM)
A - General	107	56 to 158	1,047	566 to 1,528	9.8
B - Blood	0	0 to 0	0	0 to 0	
D - Digestive	44	11 to 77	233	5 to 461	5.3
F - Eye	38	8 to 68	349	70 to 628	9.2
H - Ear	13	-5 to 30	0	0 to 0	0.0
K - Circulatory	0	0 to 0	58	-56 to 172	
L- Musculoskeletal	0	0 to 0	175	-23 to 372	
N - Neurological	0	0 to 0	233	5 to 461	
P - Psychological	31	4 to 59	58	-56 to 172	1.9
R - Respiratory	126	71 to 181	1,280	748 to 1,811	10.2
S - Skin	132	76 to 189	989	521 to 1,457	7.5
T - Endocrine	6	-6 to 19	58	-56 to 172	9.7
U - Urinary	0	0 to 0	0	0 to 0	
W - Pregnancy	0	0 to 0	0	0 to 0	
X - Female genital	0	0 to 0	0	0 to 0	
Y - Male genital	0	0 to 0	0	0 to 0	
Z-Social problems	44	11 to 77	466	144 to 787	10.6
<b>Total</b>	<b>157</b>	<b>96 to 219</b>	<b>1,629</b>	<b>1,031 to 2,227</b>	<b>10.4</b>

The denominator was represented by the total number of children under 5 years living in the PAM area (15,873) and in the AGM area (1,719). The number of exposed relocators under 5 years presenting to the PAM and AGM Health Services was 25 and 28 respectively. Table 24 shows rates of presentation by organ system for exposed relocators under 5 years presenting to the Health Services. There were statistically significantly higher rates of reported symptoms from the Social, Respiratory, General, Eye and Neurological organ systems in the AGM programme than in the APM programme.

**Table 25. Rates of non-relocators presenting to the PAM & AGM Health Services**

Characteristics of householders	PAM - Exposed Non-Relocators per 100,000	95% Confidence Interval	AGM - Exposed Non-Relocators per 100,000	95% Confidence Interval	Rate ratio (AGM/PAM)
Males	81	63 to 99	157	84 to 230	1.9
Females	187	160 to 214	439	321 to 557	2.3
<b>All</b>	<b>136</b>	<b>120 to 152</b>	<b>302</b>	<b>232 to 372</b>	<b>2.2</b>
Under 5 yrs	107	56 to 158	465	143 to 787	4.3
5 - 14 yrs	99	63 to 135	204	53 to 355	2.1
15 - 24 yrs	43	19 to 67	164	42 to 286	3.8
25 - 44 yrs	149	119 to 179	310	183 to 437	2.1
45 - 64 yrs	196	151 to 241	374	197 to 551	1.9
Over 65 yrs	190	127 to 253	406	141 to 671	2.1
<b>All</b>	<b>136</b>	<b>120 to 152</b>	<b>302</b>	<b>232 to 372</b>	<b>2.2</b>
<b>Medical Justification</b>					
Asthma	28	21 to 35	55	25 to 85	2.0
Asthma & Eczema	6	3 to 9	25	5 to 45	4.2
Lower respiratory not asthma	6	3 to 9	30	8 to 52	5.0
Upper respiratory	4	1 to 7	13	-2 to 28	3.3
Irritant eyes, nose, skin	39	30 to 48	64	32 to 96	1.6
*Food allergy	5	2 to 8	4	-4 to 12	0.8
Non food allergy	1	0 to 2	4	-4 to 12	4.0
Skin condition	8	4 to 12	30	8 to 52	3.8
Medical SLE	6	3 to 9	25	5 to 45	4.2

Comparison of presentations to  
PAM & AGM Health Services

CFS/chemical sensitivity	10	6 to 14	13	-2 to 28	1.3
Situational stress	18	12 to 24	21	3 to 39	1.2
Pregnancy - baby	6	3 to 9	17	0 to 34	2.8
<b>Total</b>	<b>136</b>	<b>120 to 152</b>	<b>302</b>	<b>232 to 372</b>	
<b>Medical Severity</b>					
Highest	5	2 to 8	4	-4 to 12	0.8
Significant	34	26 to 42	93	54 to 132	2.7
Other medical	46	36 to 56	93	54 to 132	2.0
Precautionary	27	20 to 34	72	38 to 106	2.7
Psycho-social	24	17 to 31	38	13 to 63	1.6
<b>Total</b>	<b>136</b>	<b>120 to 152</b>	<b>302</b>	<b>232 to 372</b>	

\*Food allergy includes Asthma from food

Rates of AGM non-relocators were not significantly different from those of PAM with a few exceptions. The total number of AGM non-relocators and those of AGM females only non-relocators, was more than two times higher compared with PAM non-relocators. The rate of AGM non-relocators in the 25-44 years age group was statistically significantly higher than those of PAM non-relocators in the same age group. Other statistically significant differences were between rates of medical severity, with significant and precautionary, both 2.7 times higher for AGM non-relocators than for PAM non-relocators.

## VI. Rates of presentation with a Clinical Syndrome

A comparison of rates of assignment to defined Clinical Syndromes <sup>#</sup>(and 95% confidence intervals) among householders presenting to PAM and AGM Health Services is presented in Table 26. In general there were no statistically significant differences between programmes in the rates of those with lower respiratory syndrome, headache symptom complexes and skin symptom complexes.

**Table 26. Rates of householders with a Clinical Syndrome presenting to the PAM and AGM Health Service**

Clinical syndromes	PAM - Hhs per 100,000	95% Confidence Interval	AGM- Hhs per 100,000	95% Confidence Interval	Rate ratio AGM/PAM
Lower respiratory syndrome	46	36 to 56	76	41 to 111	1.7
Upper respiratory syndrome	233	212 to 254	335	261 to 409	1.4
Eye symptom complexes	82	69 to 95	153	103 to 203	1.9
Headache symptom complexes	38	29 to 47	64	32 to 96	1.7
Skin symptom complexes	88	75 to 101	72	38 to 106	0.8

There were statistically significant differences in rates of householders with upper respiratory syndrome and eye symptom complexes, those presenting to AGM experienced a higher level of these clinical syndromes than those who presented to PAM Health Service.

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<sup>#</sup> Refer to explanations of criteria for meeting assignment to a Clinical Syndrome, contained in "A study of presentations of householder concerns to the Painted Apple Moth (PAM) Health Service" and "A study of presentations of householder concerns to the Asian Gypsy Moth (AGM) Health Service".

## VII. Rates of presentation with Atopic Symptoms

A comparison of rates of reported Atopic Symptoms<sup>#</sup> by householders exposed to spray demonstrated statistically significant differences between programmes, with rates of past or current history of food allergy, asthma, allergic rhinitis and atopic dermatitis for AGM householders much higher (2.8 to 3.9 times) than those of PAM.

**Table 27. Rates of Atopic Symptoms for exposed householders presenting to the PAM and AGM Health Services**

Rates of ICPC "atopic" codes	PAM - atopic codes per 100,000	95% Confidence Interval	AGM- atopic codes per 100,000	95% Confidence Interval	Rate ratio (AGM/PAM)
A92 -Food allergy	229	208 to 250	631	530 to 732	2.8
F71- Conjunctivitis, allergic	17	11 to 23	17	0 to 34	1.0
R96 - Asthma	485	454 to 516	1487	1,333 to 1,641	3.1
R97-Allergic rhinitis	210	190 to 230	750	640 to 860	3.6
S87-Dermatitis, atopic eczema	193	173 to 213	759	648 to 870	3.9
S88-Dermatitis, contact/allergic	30	22 to 38	17	0 to 34	0.6
S98-Urticaria	28	21 to 35	55	25 to 85	2.0

There were no statistically significant differences between allergic conjunctivitis, allergic dermatitis and urticaria.

The use of the code indicates that the atopic condition was either a current symptom, or a past history was discussed, or a general question was addressed related to effects on such a condition. Only residentially exposed householders who had a medical diagnosis (at least one occasion with a medical consultation about their concerns) were included in this analysis.

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<sup>#</sup> Refer to explanations of criteria for meeting assignment to a Atopic Symptom, contained in "A study of presentations of householder concerns to the Painted Apple Moth (PAM) Health Service" and "A study of presentations of householder concerns to the Asian Gypsy Moth (AGM) Health Service".

## Discussion

### Rates of presentation

There were statistically significant differences in the number of householders who presented to the PAM and AGM Health Services. Of the 193,188 residents living in the PAM spray areas, 3,888 presented with their health concerns to the Health Service (3,004 exposed to spray), and of the 23,598 inhabitants in the AGM spray area, 1,536 presented to the Health Service (855 exposed to spray). The number of AGM householders who presented to the AGM Health Service was 3.23 times higher than that of PAM householders who presented to the PAM Health Service and when only those residentially exposed to spray were taken into account this number is 2.33 times higher for AGM than for PAM.

The number of encounters of householders exposed to spray was 1.77 times higher for AGM encounters than for PAM encounters.

Differences in the number of people presenting to PAM and AGM Health Services led to statistically significant differences in rates of presentation by age and gender. For example, rates for those under 5 years (particularly males under 5) and of those aged 15-24 years presenting to AGM Health Service were at least 3 times higher than those for PAM. As described above, mothers contacting the AGM Health Service were keen to register all their family members, children in particular, which led to a considerable increase in the rates of presentation of children under 5 years to the AGM Health Service (3.5 times higher than rates for PAM) and in rates of presentation of children aged 5-14 years (2.8 times higher than rates for PAM).

Gender based rates for presentation had statistically significant differences in each programme as well as between programmes. In both PAM and AGM programmes rates of presentation for females aged 25-44 years, 45-64 years and over 65 years, were more than twice the rates than for males.

Gender, while referring to biological differences in health requirements, also refers to characteristics that are socially constructed and so vary culturally and in context of time (Vlasoff, 2002). For example, rates of presentation to PAM Health Service for females aged 25-44 were 3.19 times higher than rates for males in the same age group and the rates of presentation to AGM Health Service for females aged 25-44 were 2.61 times higher than the rates for males.

One potential contributor to the higher presentation rate of women to men to the PAM and AGM Health Services could be the role of women as caregivers within family groups. This result reflects those of previous studies in Canada where gender differences in accessing health services account for women being twice as likely to report to a regular family physician than men (Karzanjian, 2004). According to Molinari et al, women are more likely to be in nurturing roles, while men are more likely to be in autonomous, competitive roles. Because societal culture sees the roles of men and women differently, variations in health status between men and women are expected. Females accessed both Health Services in West Auckland and Hamilton, either for themselves or for those in their care, possibly because they were involved in nurturing roles even when employed (Molinari 1998). This supports a considerable body of research which focuses on gender differences accounting for use

of health services, in particular, during child bearing years in women (Haas, 1998; Mustard, 1998 Artazcoz, 2001).

In contrast, gender differences for males and females in all young age groups under 5, 5-14 and 15-24 years, show little or no difference in rates for presentation to either the PAM Health Service or the AGM Health Service.

Gender differences become more apparent in context of role responsibilities when measured against employment status as in comparative studies of health in Britain and Finland (Lahelma, 2001). Such differences have been established to extend from biological to psychological both cognitive and psychosocial (Artazcoz, 2001, Molinari, 1998.) Lack of social support increases vulnerability, particularly for those who are responsible for young children or for the aged. (Molinari, 1998).

On the other hand, there were statistically significant differences in age and gender based rates of presentation between programmes, rates of those presenting to the AGM Health Service were 1.8 to 3.9 times higher than those presenting to the PAM Health Service.

### **Patterns of health outcome**

The 40 most frequent ICPC codes among exposed householders, and their associated encounters, were similar between programmes but there were differences in order of frequency.

Asthma and allergy/allergic reactions were the two most frequently presented symptoms in both programmes, followed by throat symptom/complaint, headache, cough, food allergy, abnormal sensations in eye, allergic rhinitis in PAM. In the AGM programme asthma and allergy were followed by atopic dermatitis, allergic rhinitis, throat symptom/complaint, food allergy, headache and abnormal sensations in eyes.

ICPC codes were organized into 17 organ systems. There were statistically significant differences between PAM and AGM but with no discernible pattern. Among all presenters regardless of their residential exposure, those presenting to AGM Health Service reported more symptoms from the Respiratory and Social organ system. Those presenting to the PAM Health Service reported more symptoms from the Eye and Blood organ system.

At the encounter level there were statistically significant differences between AGM and PAM, with more encounters from the General, Skin, Neurological and Respiratory reported by householders presenting to AGM Health Service. When only residentially exposed householders were assessed, there were more encounters with the PAM Health Service concerning the Eye organ system, at a statistically significant higher level. For AGM exposed householders, there was a significantly higher level of encounters concerning the Respiratory organ system.

An analysis of rates of presentation by age, gender and organ system showed no discernible pattern. There were always statistically significant differences between PAM and AGM for various age groups reporting symptoms from various organ systems. For example, AGM males under 5 years exposed to spray reported a significantly higher rate of symptoms reported from Social, Eye, Respiratory, General and Skin. AGM females under 5 years exposed to spray reported a significantly higher rate of symptoms from the Social, Neurological, General and Respiratory organ system compared with the rates of those under 5 years presenting to PAM

Health Service. The rates of AGM males aged 25-44 years exposed to spray reported significantly higher rates of symptoms from Circulatory, Social, Skin, Respiratory, and General whereas rates of AGM females aged 25-44 years exposed to spray reported significantly higher rates of symptoms from Skin, General, Neurological, Psychological, Respiratory, Digestive, Pregnancy and Eye organ system compared with the rates of those aged 25-44 years presenting to PAM Health Service. The differences in rates of presentation by age, gender and by organ system are inexplicable under current epidemiological hypotheses.

An analysis of those householders with and without a medical diagnosis presenting to AGM and PAM Health Services, showed no statistically significant differences of reporting symptoms from most organ systems. However PAM householders reported significantly more symptoms from the Digestive and Eye organ systems compared with AGM householders. Among householders without a medical diagnosis, AGM householders reported a statistically significant higher rate of symptoms from the Social organ system than PAM householders.

### **Use of practical support (PSPs)**

The percentage of householders with a PSP reporting symptoms from various organ systems was similar for both programmes. AGM householders with a PSP reported statistically significant more asthma symptoms compared with PAM householders with a PSP, who reported more symptoms from the Eye organ system.

In the categories of medical justification and severity, "asthma & eczema" and "significant" occurred more frequently among AGM householders than PAM householders.

The biggest difference in reporting ratios between PAM and AGM householders with a PSP was in the under 5 years age group. While this group as a whole reported symptoms at 3.5 times the number of PAM householders under 5 years, the AGM rates of relocators for those aged under 5 years were extremely high (10.3 times higher than those for PAM). Symptom reporting rates in females under 5 years with a PSP were 11.6 times higher in the AGM programme compared to the PAM programme, and in males under 5 years were 9.7 times higher in the AGM programme.

The significant differences between programmes in symptom reporting are unlikely to be due to classification bias, as the same personnel were used to code both PAM and AGM data.

It is possible that observation bias could have been a partial factor. While the same nursing team recorded telephone self reports, different doctors were involved in face-to-face consultations. There were also important differences between the programmes in time-frames, relationships and operational issues.

Because of the duration of the PAM programme, and the way in which the programme grew, the level of interaction between PAM Health Service staff and householders was generally much greater, and there was more awareness of the householders' situation and background issues than with the AGM programme.

PAM householders may have gone through a series of steps before going on to motel relocation, and many were happy with other avoidance measures such as staying at

home with the windows and doors shut. In the AGM programme however, the majority of the PSPs were determined before the first spray, and were based on what health effects the householder perceived they might have.

There was also significant pressure of time in determining the PSPs for householders in the AGM programme; the release of medically verified information through MAF channels was delayed until Cabinet approval of funding for a medical service. The AGM Health Service could not be operational until this approval was granted. When it was granted, there was only three weeks until the first planned spray. For over two months prior to this, aerial spraying was anticipated as an option, the AGM Health service could not provide medical information to concerned residents, while spray opponents from Auckland were free to disseminate their own information on the spray and its effects on health. They held widely advertised public meetings warning of the "toxic effects" of the spray. There was a great deal of media coverage generated. This further fuelled Hamilton householder anxiety, especially where they may have felt their children with pre-existing conditions (e.g. asthma, eczema) were at risk. Some householders refused to accept anything less than motel accommodation, citing prior awareness of risk information from media or public meetings.

The concentration of Foray 48B formulation used in both the PAM and AGM programmes was identical. However, the application rates for each programme was different.

The PAM programme used rates of 5 litres per hectare, which was consistent throughout the programme. The AGM programme however, began the programme using 5 litres per hectare, but increased this to 7 litres per hectare as the caterpillars grew and the foliage became denser.

Suggestion that the higher symptom reports in the AGM programme were due to the greater application rate were not borne out by the symptom report analysis in the AGM report (Aeraqua Medical Services, 2005). Symptom reports decreased significantly as the programme progressed; from 237 people with symptoms on Day 1 Spray 1, to 18 people on Day 1 Spray 8. There was no increase in reported symptoms corresponding with spray 4 onwards (with its higher application rate) rather, there was a significant decrease. The number of symptom reports for day 1 spray 3 was 139, and for day1 spray 4 was 68. Total reported symptoms for spray 3 (days 1 - >7) was 306 for spray 3, and 163 for spray 4. Given that spray 4 was when the application rate increased, it cannot be claimed that the higher level of symptom reporting for AGM was due to higher application rates.

It has been suggested that symptom reporting may have decreased due to more people leaving the area to avoid the spray as the programme progressed. This is an unlikely explanation. The majority of householders who relocated did so from spray 1. Some relocated for only 2-3 sprays, decided that the upheaval to their lives was outweighing concerns about the effects of the spray, and stayed at home for the rest of the programme. These individuals were contacted for subsequent sprays by AGM Health Service staff to check their health status following each spray and no adverse events arose. For others who did not relocate, but were initially concerned about potentially harmful effects of the spray, it was uncommon for a later uptake of a relocation plan.

### **Clinical Syndromes and Atopic Symptoms**

Between programmes there were no statistically significant differences in rates of those with lower respiratory syndrome, headache symptom complexes and skin symptom complexes. There were statistically significant higher rates of householders with upper respiratory syndrome and eye symptom complexes, presenting to the AGM Health Service, than those presenting to the PAM Health Service.

Rates of food allergy, asthma, allergic rhinitis and atopic dermatitis were reported at a statistically significantly higher level for AGM householders than those for PAM.

Overall, the differences in symptom reporting between PAM and AGM householders appear to have no logical pattern and are difficult to interpret from an epidemiological point of view. As was the case with both projects, householders contacted the Health Services about a wider range of health symptoms, questions and experiences than were anticipated before the commencement of PAM, and even prior to the AGM programme. Interestingly, with the AGM programme, reported symptoms decreased as the programme progressed. There was no increase in reported symptoms corresponding with Spray 4 onwards in Hamilton, rather, there was a significant decrease. Symptoms from organ systems expected to relate to airborne irritancy (respiratory and skin), showed a lower occurrence than other unrelated symptoms in relation to exposure, medical diagnosis and uptake of a PSP for each programme. Generally the statistically significant differences between programmes were not reflective of a dose-response effect to an environmental agent impacting on skin, eyes, nose, throat or airways.

## Appendix

### Rates of presentation by age, gender and organ system

**Appendix Table 1. Age group “Under 5” EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	Rates per 100,000 PAM with 95%confidence interval		Rates per 100,000 AGM with 95%confidence interval		Ratio (AGM/PAM)
A - General	838	696 to 980	2,850	2,063 to 3,637	3.4
B - Blood	50	15 to 85	58	-56 to 172	1.2
D - Digestive	460	355 to 565	1,047	566 to 1,528	2.3
F - Eye	246	169 to 323	873	433 to 1,313	3.5
H - Ear	113	61 to 166	233	5 to 461	2.1
K - Circulatory	38	8 to 68	233	5 to 461	6.1
L - Musculoskeletal	19	-2 to 40	349	70 to 628	18.4
N - Neurological	139	81 to 196	698	304 to 1,092	5.0
P - Psychological	145	86 to 204	233	5 to 461	1.6
R - Respiratory	1,166	999 to 1,332	4,596	3,606 to 5,586	3.9
S - Skin	983	829 to 1,136	2,501	1,763 to 3,239	2.5
T - Endocrine	101	51 to 150	116	-45 to 277	1.1
U - Urinary	19	-2 to 40	116	-45 to 277	6.1
W - Pregnancy	0	0 to 0	0	0 to 0	
X - Female genital	0	0 to 0	0	0 to 0	
Y - Male genital	0	0 to 0	0	0 to 0	
Z - Social problems	145	86 to 204	1,745	1,126 to 2,364	12.0

Rates of AGM householders under 5 years exposed to spray were significantly higher for symptoms reported from the Musculoskeletal, Social, Neurological, Respiratory, Eye, General, Skin and Digestive organ system than rates of PAM householders under 5 years who reported symptoms from those organ systems. There were also statistically significant differences in rates of the total number of children under 5 years exposed to spray who presented to the Health Services, AGM rates of those under 5 years being 3.5 times higher than those for PAM.

**Appendix Table 2. Males “Under 5” EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	Rates per 100,000 PAM with 95%confidence interval		Rates per 100,000 AGM with 95%confidence interval		Ratio (AGM/PAM)
A - General	882	673 to 1,090	2,983	1,831 to 4,135	3.4
B - Blood	26	-10 to 62	0	0 to 0	0.0
D - Digestive	363	229 to 497	1,193	458 to 1,928	3.3
F - Eye	207	106 to 309	1,313	542 to 2,084	6.3
H - Ear	117	40 to 193	239	-92 to 570	2.0
K - Circulatory	65	8 to 122	358	-46 to 762	5.5
L - Musculoskeletal	39	-5 to 83	477	10 to 944	12.2
N - Neurological	117	40 to 193	477	10 to 944	4.1
P - Psychological	182	87 to 277	358	-46 to 762	2.0
R - Respiratory	1,232	986 to 1,478	5,609	4,051 to 7,167	4.6
S - Skin	972	753 to 1,191	2,864	1,735 to 3,993	2.9
T - Endocrine	91	24 to 158	0	0 to 0	0.0
U - Urinary	13	-12 to 38	239	-92 to 570	18.4
W - Pregnancy	0	0 to 0	0	0 to 0	
X - Female genital	0	0 to 0	0	0 to 0	
Y - Male genital	0	0 to 0	0	0 to 0	
Z - Social problems	169	77 to 260	2,029	1,074 to 2,984	12.0

Rates of AGM males under 5 years exposed to spray were significantly higher for symptoms reported from the Social, Eye, Respiratory, General and Skin organ system than rates of PAM males under 5 years who reported symptoms from those organ systems.

**Appendix Table 3. Females “Under 5” EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	Rates per 100,000 PAM with 95%confidence interval		Rates per 100,000 AGM with 95%confidence interval		Ratio (AGM/PAM)
A - General	797	604 to 989	2,724	1,649 to 3,799	3.4
B - Blood	74	15 to 132	114	-109 to 337	1.5
D - Digestive	551	391 to 712	908	282 to 1,534	1.6
F - Eye	282	167 to 397	454	10 to 898	1.6
H - Ear	110	38 to 182	227	-87 to 541	2.1
K - Circulatory	12	-12 to 36	114	-109 to 337	9.5
L Musculoskeletal	0	0 to 0	227	-87 to 541	
N Neurological	159	73 to 246	908	282 to 1534	5.7
P Psychological	110	38 to 182	114	-109 to 337	1.0
R - Respiratory	1,103	876 to 1,330	3,632	2,397 to 4,867	3.3
S - Skin	993	778 to 1,208	2,157	1,198 to 3,116	2.2
T - Endocrine	110	38 to 182	227	-87 to 541	2.1
U - Urinary	25	-9 to 58	0	0 to 0	0.0
W - Pregnancy	0	0 to 0	0	0 to 0	
X - Female genital	0	0 to 0	0	0 to 0	
Y - Male genital	0	0 to 0	0	0 to 0	
Z - Social problems	123	47 to 198	1,476	680 to 2,272	12.0

Rates of AGM females under 5 years exposed to spray were significantly higher for symptoms reported from the Social, Neurological, General and Respiratory organ system than rates of PAM females under 5 years who reported symptoms from those organ systems.

**Appendix Table 4. Age group “5 – 14” years EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	Rates per 100,000 PAM with 95%confidence interval		Rates per 100,000 AGM with 95%confidence interval		Ratio (AGM/PAM)
A - General	735	638 to 833	1,834	1,385 to 2,283	2.5
B - Blood	27	8 to 46	87	-12 to 186	3.2
D - Digestive	385	314 to 456	524	283 to 765	1.4
F - Eye	327	262 to 392	495	260 to 730	1.5
H - Ear	37	15 to 60	116	2 to 230	3.1
K - Circulatory	37	15 to 60	87	-12 to 186	2.4
L - Musculoskeletal	27	8 to 46	175	35 to 315	6.5
N - Neurological	310	246 to 373	553	305 to 801	1.8
P - Psychological	126	85 to 167	233	72 to 394	1.8
R - Respiratory	1,147	1,026 to 1,269	3,406	2,799 to 4,013	3.0
S - Skin	562	476 to 647	2,213	1,721 to 2,705	3.9
T - Endocrine	31	11 to 51	58	-23 to 139	1.9
U - Urinary	20	4 to 37	146	18 to 274	7.3
W - Pregnancy	0	0 to 0	0	0 to 0	
X - Female genital	0	0 to 0	29	-28 to 86	
Y - Male genital	3	-3 to 10	0	0 to 0	0.0
Z - Social problems	129	88 to 170	670	397 to 943	5.2

Rates of AGM householders in the 5-14 years age group exposed to spray were significantly higher for symptoms reported from the Social, Skin, Respiratory and General organ system than rates of PAM householders 5-14 years who reported symptoms from those organ systems. Additionally there were statistically significant differences in rates of total number of children 5-14 years exposed to spray presenting to the Health Services, AGM rates for those 5-14 years being 2.8 times higher than those for PAM.

**Appendix Table 5. Males “ 5 – 14 ” years EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	Rates per 100,000 PAM with 95%confidence interval		Rates per 100,000 AGM with 95%confidence interval		Ratio (AGM/PAM)
A - General	868	716 to 1,020	1,735	1,109 to 2,361	2.0
B - Blood	42	8 to 76	60	-57 to 177	1.4
D - Digestive	434	326 to 542	658	270 to 1,046	1.5
F - Eye	364	265 to 463	718	313 to 1,123	2.0
H - Ear	28	1 to 55	180	-23 to 383	6.4
K - Circulatory	56	17 to 95	120	-46 to 286	2.1
L - Musculoskeletal	35	4 to 66	239	5 to 473	6.8
N - Neurological	350	253 to 447	539	188 to 890	1.5
P - Psychological	147	84 to 210	359	72 to 646	2.4
R - Respiratory	1,386	1,195 to 1,578	3,411	2,541 to 4,281	2.5
S - Skin	644	513 to 775	1,855	1,208 to 2,502	2.9
T - Endocrine	35	4 to 66	60	-57 to 177	1.7
U - Urinary	14	-5 to 33	0	0 to 0	0.0
W - Pregnancy	0	0 to 0	0	0 to 0	
X - Female genital	0	0 to 0	0	0 to 0	
Y - Male genital	7	-7 to 21	0	0 to 0	0.0
Z - Social problems	126	68 to 184	539	188 to 890	4.3

AGM rates of males 5-14 years reporting symptoms from the Social, Skin, Respiratory and General organ systems were significantly higher than those of PAM males 5-14 years reporting symptoms from the same organ systems.

**Appendix Table 6. Females “5 – 14” years EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	Rates per 100,000 PAM with 95% confidence interval		Rates per 100,000 AGM with 95% confidence interval		Ratio (AGM /PAM)
A - General	610	485 to 734	1927	1,285 to 2,569	3.2
B - Blood	13	-5 to 32	113	-44 to 270	8.7
D - Digestive	338	245 to 431	397	104 to 690	1.2
F - Eye	292	206 to 378	283	35 to 531	1.0
H - Ear	46	12 to 81	57	-54 to 168	1.2
K - Circulatory	20	-3 to 42	57	-54 to 168	2.9
L - Musculoskeletal	20	-3 to 42	113	-44 to 270	5.7
N - Neurological	272	189 to 355	567	217 to 917	2.1
P - Psychological	106	54 to 158	113	-44 to 270	1.1
R - Respiratory	921	769 to 1,073	3,401	2,555 to 4,247	3.7
S - Skin	484	373 to 594	2,551	1,815 to 3,287	5.3
T - Endocrine	27	1 to 52	57	-54 to 168	2.1
U - Urinary	27	1 to 52	283	35 to 531	10.5
W - Pregnancy	0	0 to 0	0	0 to 0	
X - Female genital	0	0 to 0	57	-54 to 168	
Y - Male genital	0	0 to 0	0	0 to 0	
Z - Social problems	133	74 to 191	794	380 to 1,208	6.0

AGM rates of females 5-14 years reporting symptoms from the Social, Skin, Respiratory and General organ systems were significantly higher than those of PAM females 5-14 years reporting symptoms from the same organ systems.

**Appendix Table 7. Age group “15 – 24” years EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	Rates per 100,000 PAM with 95%confidence interval		Rates per 100,000 AGM with 95%confidence interval		Ratio (AGM/PAM)
A - General	315	249 to 381	939	649 to 1,229	3.0
B - Blood	36	14 to 59	47	-18 to 112	1.3
D - Digestive	156	109 to 202	634	396 to 872	4.1
F - Eye	174	125 to 223	446	246 to 646	2.6
H - Ear	11	-1 to 23	70	-9 to 149	6.4
K - Circulatory	11	-1 to 23	23	-23 to 69	2.1
L - Musculoskeletal	43	19 to 68	47	-18 to 112	1.1
N - Neurological	178	128 to 227	657	414 to 900	3.7
P - Psychological	58	30 to 86	141	28 to 254	2.4
R - Respiratory	406	331 to 481	1,502	1,137 to 1,867	3.7
S - Skin	185	134 to 236	493	283 to 703	2.7
T - Endocrine	22	4 to 39	47	-18 to 112	2.1
U - Urinary	7	-3 to 17	0	0 to 0	0.0
W - Pregnancy	36	14 to 59	117	14 to 220	3.3
X - Female genital	4	-3 to 11	23	-23 to 69	5.8
Y - Male genital	0	0 to 0	0	0 to 0	
Z - Social problems	62	32 to 91	282	123 to 441	4.5

Rates of AGM adolescents in the 15-24 years age group exposed to spray were significantly higher for symptoms reported from the Social, Digestive, Respiratory, Neurological, General, Skin and Eye organ system than rates of PAM householders aged 15-24 years who reported symptoms from those organ systems. Additionally there were statistically significant differences in rates of total number of adolescents 15-24 years exposed to spray presenting to the Health Services, AGM rates were 3 times higher than those for PAM.

**Appendix Table 8. Males “15 – 24” years EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	Rates per 100,000 PAM with 95%confidence interval		Rates per 100,000 AGM with 95%confidence interval		Ratio (AGM/PAM)
A - General	260	174 to 346	813	428 to 1,198	3.1
B - Blood	7	-7 to 22	48	-46 to 142	6.9
D - Digestive	112	55 to 168	574	250 to 898	5.1
F - Eye	164	95 to 232	335	87 to 583	2.0
H - Ear	15	-6 to 35	0	0 to 0	0.0
K - Circulatory	15	-6 to 35	0	0 to 0	0.0
L - Musculoskeletal	30	1 to 59	0	0 to 0	0.0
N - Neurological	141	78 to 205	478	182 to 774	3.4
P - Psychological	37	5 to 70	143	-19 to 305	3.9
R - Respiratory	349	250 to 449	1,435	925 to 1,945	4.1
S - Skin	171	101 to 241	383	118 to 648	2.2
T - Endocrine	22	-3 to 48	0	0 to 0	0.0
U - Urinary	0	0 to 0	0	0 to 0	
W - Pregnancy	0	0 to 0	0	0 to 0	
X - Female genital	0	0 to 0	0	0 to 0	
Y - Male genital	0	0 to 0	0	0 to 0	
Z - Social problems	52	13 to 91	335	87 to 583	6.4

AGM rates of males aged 15-24 years reporting symptoms from the Digestive, Respiratory and General organ systems were significantly higher than those of PAM males 15-24 years reporting symptoms from the same organ systems.

Appendix Table 9. Females “15 – 24” years EXPOSED rates per 100,000 inhabitants by Organ System

Organ System	Rates per 100,000 PAM with 95%confidence interval		Rates per 100,000 AGM with 95%confidence interval		Ratio (AGM/PAM)
A - General	368	268 to 467	1,060	629 to 1,491	2.9
B - Blood	64	22 to 105	46	-44 to 136	0.7
D - Digestive	198	125 to 271	692	343 to 1,041	3.5
F - Eye	184	113 to 254	553	241 to 865	3.0
H - Ear	7	-7 to 21	138	-18 to 294	19.7
K - Circulatory	7	-7 to 21	46	-44 to 136	6.6
L - Musculoskeletal	57	17 to 96	92	-36 to 220	1.6
N - Neurological	212	136 to 288	830	448 to 1,212	3.9
P - Psychological	78	32 to 124	138	-18 to 294	1.8
R - Respiratory	460	348 to 571	1,568	1,045 to 2,091	3.4
S - Skin	198	125 to 271	599	274 to 924	3.0
T - Endocrine	21	-3 to 45	92	-36 to 220	4.4
U - Urinary	14	-5 to 34	0	0 to 0	0.0
W - Pregnancy	71	27 to 115	231	29 to 433	3.3
X - Female genital	7	-7 to 21	46	-44 to 136	6.6
Y - Male genital	0	0 to 0	0	0 to 0	
Z - Social problems	71	27 to 115	231	29 to 433	3.3

AGM rates of females aged 15-24 years reporting symptoms from the Neurological, Digestive, Respiratory, Skin and General organ systems were significantly higher than those of PAM females 15-24 years reporting symptoms from the same organ systems.

**Appendix Table 10. Age group “25 – 44” years EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	Rates per 100,000 PAM with 95%confidence interval		Rates per 100,000 AGM with 95%confidence interval		Ratio (AGM/PAM)
A - General	790	722 to 858	1,820	1,516 to 2,124	2.3
B - Blood	55	37 to 73	108	33 to 183	2.0
D - Digestive	417	368 to 466	930	712 to 1,148	2.2
F - Eye	430	380 to 480	782	582 to 982	1.8
H - Ear	52	34 to 70	81	16 to 146	1.6
K - Circulatory	81	59 to 103	243	131 to 355	3.0
L - Musculoskeletal	123	96 to 150	256	141 to 371	2.1
N - Neurological	436	385 to 487	971	748 to 1,194	2.2
P - Psychological	255	216 to 294	620	441 to 799	2.4
R - Respiratory	1,093	1,013 to 1,173	2,589	2,228 to 2,950	2.4
S - Skin	470	417 to 523	1,281	1,025 to 1,537	2.7
T - Endocrine	74	53 to 95	189	90 to 288	2.6
U - Urinary	20	9 to 31	40	-6 to 86	2.0
W - Pregnancy	209	174 to 244	418	271 to 565	2.0
X - Female genital	18	8 to 28	27	10 to 64	1.5
Y - Male genital	0	0 to 0	0	0 to 0	
Z - Social problems	539	483 to 595	1,227	976 to 1,478	2.3
<b>Total</b>	<b>1,808</b>	<b>1,706 to 1,910</b>	<b>3,830</b>	<b>3,393 to 4,267</b>	

Rates of AGM householders aged 25-44 years exposed to spray were significantly higher for symptoms reported from the Circulatory, Skin, Respiratory, Psychological, General, Social, Digestive, Neurological and Eye organ system than rates of PAM householders aged 25-44 years who reported symptoms from those organ systems. There were statistically significant differences in rates of total number of

householders aged 25-44 years exposed to spray presenting to the Health Services;  
AGM rates were 2.1 times higher than those for PAM.

**Appendix Table 11. Males “25 – 44” years EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	Rates per 100,000 PAM with 95%confidence interval		Rates per 100,000 AGM with 95%confidence interval		Ratio (AGM/PAM)
A - General	413	342 to 483	801	511 to 1,091	1.9
B - Blood	19	4 to 34	110	2 to 218	5.8
D - Digestive	183	136 to 230	359	164 to 554	2.0
F - Eye	211	161 to 262	387	185 to 589	1.8
H - Ear	19	4 to 34	83	-11 to 177	4.4
K - Circulatory	32	12 to 51	221	68 to 374	6.9
L - Musculoskeletal	54	28 to 79	193	50 to 336	3.6
N - Neurological	211	161 to 262	359	164 to 554	1.7
P - Psychological	110	74 to 147	304	125 to 483	2.8
R - Respiratory	529	450 to 609	1,354	978 to 1,730	2.6
S - Skin	189	141 to 237	552	311 to 79	2.9
T - Endocrine	38	16 to 59	55	-21 to 131	1.4
U - Urinary	6	-2 to 15	0	0 to 0	0.0
W - Pregnancy	0	0 to 0	0	0 to 0	
X -Female genital	0	0 to 0	0	0 to 0	
Y -Male genital	0	0 to 0	0	0 to 0	
Z - Social problems	173	128 to 219	663	399 to 927	3.8

AGM rates of males aged 25-44 years reporting symptoms from the Circulatory, Social, Skin, Respiratory and General organ systems were significantly higher than those of PAM males aged 25-44 years reporting symptoms from the same organ systems.

**Appendix Table 12. Females “25 – 44” years EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	PAM rates per 100,000 with 95%confidence interval		AGM rates per 100,000 with 95%confidence interval		Ratio (AGM/PAM)
	Rate	Interval	Rate	Interval	
A - General	1,149	1,035 to 1,263	2,792	2,268 to 3,316	2.4
B - Blood	90	58 to 122	105	2 to 208	1.2
D - Digestive	640	555 to 726	1,475	1,092 to 1,858	2.3
F - Eye	637	552 to 722	1,159	819 to 1,499	1.8
H - Ear	84	53 to 115	79	-10 to 168	0.9
K - Circulatory	129	90 to 167	263	100 to 426	2.0
L - Musculoskeletal	188	142 to 235	316	137 to 495	1.7
N - Neurological	649	563 to 735	1,554	1,161 to 1,947	2.4
P - Psychological	392	325 to 459	922	618 to 1,226	2.4
R - Respiratory	1,627	1,492 to 1,763	3,767	3,161 to 4,373	2.3
S - Skin	736	644 to 828	1,976	1,533 to 2,419	2.7
T - Endocrine	108	73 to 143	316	137 to 495	2.9
U - Urinary	33	13 to 52	79	-10 to 168	2.4
W - Pregnancy	407	339 to 475	817	531 to 1,103	2.0
X - Female genital	36	16 to 56	53	-20 to 126	1.5
Y - Male genital	0	0 to 0	0	0 to 0	
Z - Social problems	885	785 to 986	1,765	1,346 to 2,184	2.0

AGM rates of females aged 25-44 years reporting symptoms from the Skin, General, Neurological, Psychological, Respiratory, Digestive, Pregnancy and Eye organ systems were significantly higher than those of PAM females aged 25-44 years reporting symptoms from those organ systems.

**Appendix Table 13. Age group “45 – 64” years EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	PAM rates per 100,000 with 95%confidence interval		AGM rates per 100,000 with 95%confidence interval		Ratio (AGM/PAM)
A - General	1,181	1,023 to 1,339	1,538	1,180 to 1,896	1.3
B - Blood	142	87 to 197	154	40 to 268	1.1
D - Digestive	664	545 to 783	901	626 to 1,176	1.4
F - Eye	664	545 to 783	945	664 to 1,226	1.4
H - Ear	52	19 to 85	154	40 to 268	3.0
K - Circulatory	359	271 to 447	615	388 to 842	1.7
L - Musculoskeletal	313	231 to 395	439	247 to 631	1.4
N - Neurological	612	498 to 726	989	701 to 1,277	1.6
P - Psychological	422	327 to 517	439	247 to 631	1.0
R - Respiratory	1,429	1,255 to 1,603	2,219	1,791 to 2,647	1.6
S - Skin	645	528 to 762	703	460 to 946	1.1
T - Endocrine	215	147 to 283	439	247 to 631	2.0
U - Urinary	49	17 to 81	22	-21 to 65	0.4
W - Pregnancy	22	0 to 44	44	-17 to 105	2.0
X - Female genital	84	42 to 126	66	-9 to 141	0.8
Y - Male genital	8	-5 to 21	0	0 to 0	0.0
Z - Social problems	533	426 to 640	769	515 to 1,023	1.4

Rates of AGM householders aged 45-64 years exposed to spray were significantly higher for symptoms reported only from the Respiratory organ system than rates of PAM householders aged 45-64 years who reported symptoms from Respiratory organ system. There were statistically significant differences in rates of the total number of householders aged 45-64 years exposed to spray presenting to the Health Services; AGM rates were 1.8 times higher than those for PAM.

There were no statistically significant differences between rates of reporting symptoms from all other organ systems between AGM and PAM householders aged 45-64 years.

**Appendix Table 14. Males “ 45 – 64 ” years EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	PAM rates per 100,000 with 95%confidence interval		AGM rates per 100,000 with 95%confidence interval		Ratio (AGM/PAM)
A - General	487	385 to 589	813	439 to 1,187	1.7
B - Blood	28	3 to 52	45	-43 to 133	1.6
D - Digestive	263	188 to 338	407	142 to 133	1.5
F - Eye	296	217 to 376	904	510 to 1,298	3.1
H - Ear	22	0 to 44	90	-35 to 215	4.1
K - Circulatory	190	126 to 254	407	142 to 672	2.1
L - Musculoskeletal	129	76 to 181	362	112 to 612	2.8
N - Neurological	241	169 to 312	633	303 to 963	2.6
P - Psychological	173	112 to 234	407	142 to 672	2.4
R - Respiratory	727	603 to 852	1,356	874 to 1,838	1.9
S - Skin	302	222 to 382	316	82 to 550	1.0
T - Endocrine	89	46 to 133	271	54 to 488	3.0
U - Urinary	17	-2 to 36	0	0 to 0	0.0
W - Pregnancy	0	0 to 0	0	0 to 0	
X - Female genital	0	0 to 0	0	0 to 0	
Y - Male genital	17	-2 to 36	0	0 to 0	0.0
Z - Social problems	241	169 to 312	633	303 to 963	2.6

AGM rates of males aged 45-64 years reporting symptoms from the Eye and Respiratory organ systems were significantly higher than those of PAM males aged 45-64 years reporting symptoms from those organ systems.

**Appendix Table 15. Females “ 45 – 64 ” years EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	PAM rates per 100,000 with 95%confidence interval		AGM rates per 100,000 with 95%confidence interval		Ratio (AGMPAM )
A - General	1,840	1,648 to 2,031	2,224	1,626 to 2,822	1.2
B - Blood	249	178 to 320	257	52 to 462	1.0
D - Digestive	1,044	899 to 1,190	1,369	898 to 1,840	1.3
F - Eye	1,013	870 to 1,155	984	584 to 1,384	1.0
H - Ear	80	39 to 120	214	27 to 401	2.7
K - Circulatory	520	417 to 622	813	449 to 1,177	1.6
L - Musculoskeletal	488	388 to 587	513	223 to 803	1.1
N - Neurological	965	825 to 1,104	1,326	862 to 1,790	1.4
P - Psychological	657	542 to 773	470	193 to 747	0.7
R - Respiratory	2,094	1,890 to 2,299	3,037	2,341 to 3,733	1.5
S - Skin	970	830 to 1,110	1,069	652 to 1,486	1.1
T - Endocrine	334	252 to 416	599	286 to 912	1.8
U - Urinary	80	39 to 120	43	-41 to 127	0.5
W - Pregnancy	42	13 to 72	86	-33 to 205	2.0
X - Female genital	164	107 to 222	128	-17 to 273	0.8
Y - Male genital	0	0 to 0	0	0 to 0	
Z - Social problems	811	683 to 939	898	516 to 1,280	1.1

AGM rate of females aged 45-64 years reporting symptoms from the Respiratory organ system was significantly higher than that of PAM females aged 45-64 years. There were no statistically significant differences between rates of AGM and PAM householders who reported symptoms from the other organ systems.

**Appendix Table 16. Age group “Over 65” years EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	PAM rates per 100,000 with 95%confidence interval		AGM rates per 100,000 with 95%confidence interval		Ratio (AGM/PAM)
A - General	613	499 to 727	1,804	1,250 to 2,358	2.9
B - Blood	70	31 to 109	90	-35 to 315	1.3
D - Digestive	352	265 to 439	1,037	615 to 1,459	2.9
F - Eye	369	280 to 458	767	404 to 1,130	2.1
H - Ear	81	39 to 123	135	-18 to 288	1.7
K - Circulatory	461	362 to 560	1,849	1,288 to 2,410	4.0
L - Musculoskeletal	217	149 to 285	722	370 to 1,074	3.3
N - Neurological	320	237 to 403	541	236 to 846	1.7
P - Psychological	222	153 to 291	722	370 to 1,074	3.3
R - Respiratory	1,068	917 to 1,219	2,661	1,991 to 3,331	2.5
S - Skin	276	199 to 353	406	141 to 671	1.5
T - Endocrine	222	153 to 291	1,083	652 to 1,514	4.9
U - Urinary	49	17 to 81	180	4 to 356	3.7
W - Pregnancy	0	0 to 0	135	-18 to 288	
X - Female genital	16	-3 to 35	135	-18 to 288	8.4
Y - Male genital	16	-3 to 35	45	-43 to 133	2.8
Z - Social problems	222	153 to 291	586	268 to 904	2.6

Rates of AGM householders aged over 65 years exposed to spray were significantly higher for symptoms reported from the Endocrine, Circulatory, Musculoskeletal, Psychological, General, Digestive and Respiratory organ system than rates of PAM householders aged over 65 years who reported symptoms from those organ systems. There were statistically significant differences in rates of total number of householders aged over 65 years exposed to spray presenting to the Health Services, AGM rates were 2.6 times higher than those for PAM.

**Appendix Table 17. Males “Over 65” years EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	PAM rates per 100,000 with 95%confidence interval		AGM rates per 100,000 with 95%confidence interval		Ratio (AGM/PAM)
A - General	354	267 to 442	755	234 to 1,276	2.1
B - Blood	46	14 to 77	94	-90 to 278	2.0
D - Digestive	206	139 to 272	660	173 to 1,147	3.2
F - Eye	229	159 to 299	566	114 to 1,018	2.5
H - Ear	69	30 to 107	0	0 to 0	
K - Circulatory	297	217 to 377	1,415	704 to 2,126	4.8
L - Musculoskeletal	126	74 to 178	377	8 to 746	3.0
N - Neurological	217	149 to 285	472	59 to 885	2.2
P - Psychological	183	120 to 246	472	59 to 885	2.6
R - Respiratory	766	638 to 894	1,792	993 to 2,591	2.3
S - Skin	149	92 to 205	283	-37 to 603	1.9
T - Endocrine	183	120 to 246	849	297 to 1,401	4.6
U - Urinary	46	14 to 77	189	-72 to 450	4.1
W - Pregnancy	0	0 to 0	0	0 to 0	
X - Female genital	0	0 to 0	0	0 to 0	
Y - Male genital	34	7 to 61	94	-90 to 278	2.8
Z - Social problems	171	111 to 232	566	114 to 1,018	3.3

AGM rates of females aged over 65 years reporting symptoms from the Circulatory, Endocrine, Respiratory and Ear organ systems were significantly higher than those of PAM females aged over 65 years.

**Appendix Table 18. Females “Over 65” years EXPOSED rates per 100,000 inhabitants by Organ System**

Organ System	PAM rates per 100,000 with 95% confidence interval		AGM rates per 100,000 with 95% confidence interval		Ratio (AGM/PAM)	
	Rate	Lower	Upper	Lower		
A - General	845	715	976	2,766	1,821 to 3,711	3.3
B - Blood	93	49	136	86	-83 to 255	0.9
D - Digestive	485	385	584	1,383	710 to 2,056	2.9
F - Eye	495	395	595	951	392 to 1,510	1.9
H - Ear	93	49	136	259	-34 to 552	2.8
K - Circulatory	608	497	719	2,247	1,393 to 3,101	3.7
L - Musculoskeletal	299	221	377	1,037	453 to 1,621	3.5
N - Neurological	412	321	504	605	158 to 1,052	1.5
P - Psychological	258	185	330	951	392 to 1,510	3.7
R - Respiratory	1,340	1,176	1,504	3,457	2,404 to 4,510	2.6
S - Skin	392	303	481	519	105 to 933	1.3
T - Endocrine	258	185	330	1,296	644 to 1,948	5.0
U - Urinary	52	19	84	173	-66 to 412	3.3
W - Pregnancy	0	0	0	259	-34 to 552	
X - Female genital	31	6	56	259	-34 to 552	8.4
Y - Male genital	0	0	0	0	0 to 0	
Z - Social problems	268	194	342	605	158 to 1,052	2.3

AGM rates of females aged over 65 years reporting symptoms from the Endocrine, Psychological, Circulatory, Musculoskeletal, General, Digestive and Respiratory organ systems were significantly higher than those of PAM females aged over 65 years reporting symptoms from those organ systems.

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