BTK PESTICIDE SPRAYS

Adverse health impacts and effects of urban aerial spraying:

Cover up or abdication of responsibility?

Review of
New Zealand's Experience

May 2020 – updated March 2025

Hana Blackmore

Author: Hana Blackmore

ISBN 978-0-473-78382-2 print
ISBN 978-0-473-78383-9 pdf

See the People's Inquiry website for contact information
www.peoplesinquiry.co.nz

BTK PESTICIDE SPRAYS
Adverse Health Impacts and Effects of Urban Aerial Spraying:
Cover up or Abdication of Responsibility?

Review of New Zealand's experience

Hana Blackmore
March 2025

PREFACE

In 2008, I first set out to review and report on the adverse health impacts and effects of Btk-based pesticides after the end of extensive aerial spraying of urban populations in New Zealand. My reports were in response to requests from North America and Canada for information on the New Zealand experience and the Btk pesticide used for three eradication campaigns in New Zealand between 1996 and 2004.

At that time the findings of two independent investigations into the impacts of the aerial spraying had just been published in New Zealand. The reports, from the Parliamentary Ombudsman and a community-initiated People's Inquiry, had both concluded the pesticide used was not benign or harmless and the adverse health effects neither minor nor transient.

Both investigations had critically reviewed and evaluated a number of government-commissioned reports, papers, risk assessments and studies that arose from the New Zealand spraying programmes, as well as detailed community reports.

They had both underlined the need for further (long-term) health studies and to take a more precautionary approach to human exposure from this pesticide. My 2008 reports drew attention to these investigations.

Whilst aerial spraying of urban areas has not recurred in New Zealand, overseas they still continue. So, ten years later, in 2018, when reviewing our campaign reports in preparation for archiving all studies and information on our website for public access, I did a trawl of overseas campaigns to see what New Zealand information had been used or referenced in the intervening years.

It was disappointing. Very few of the numerous reports and studies that were carried out in New Zealand have made it into the consciousness of public health protection services or forestry/agriculture departments. What has been noted is patchy, and invariably, only those few studies that made it into peer reviewed literature.

Has there been a deliberate cover up of unpalatable results from the New Zealand programmes, or have authorities simply failed to detect the sort of grey literature that arose from them? Much of it is good, relevant research. But ownership or copyright often stays with the commissioning body not the authors, and may simply disappear from online reference libraries, even after a relatively short period.

My decision therefore to update and expand on my 2008 reports was, in large, because of this potential loss of valuable research and evidence. No spraying programme anywhere in the world appears to have been so well documented and I felt it was important to preserve and reference the findings and studies of the New Zealand investigations. Not least because of the continued and active use of Btk pesticides on urban populations and the apparent lack of any new studies or research since then. This resolve was followed shortly by an unexpected call from the Canadian recipient of one of my 2008 reports, for any updated information.

A proposed aerial spraying in a Canadian Province against the Asian Gypsy Moth commencing in a few short months lent some urgency to the completion of my update - (that I didn't make the cut before the spraying says a lot about the volume of relevant material I subsequently uncovered). But it gave me the opportunity to review what

information and advice was being provided to a community on an active and current spray programme.

What I found was disturbing. Information and advice being given to the Canadians was simply old. It was as if decades had been wiped from the records. Even the results of a scientific study done in Canada itself that had provided vital precautionary information on the movement and drift of aerially applied pesticide had seemingly vanished. The same simplistic information was being given that the Btk-based pesticide to be used had no detrimental effects on humans. There was no new research or studies referenced to back this up.

It was ironic that in accessing the YouTube video of a Canadian Chief Medical Health Officer promoting this current *no effect* advice, that the next item was a lost 2005 TV film about the then, current New Zealand aerial spraying campaign. This documentary featured a leading scientist of the New Zealand Wellington School of Medicine which had been engaged by the NZ Ministry of Health to assess the potential health impacts of aerial spraying Btk. He was reporting the efforts of the government to 'shoot the messengers' and cover up the legitimate scientific concern being raised by the authors on their findings about the potential risk to exposed populations of biological insecticides.

The ultimate message from this scientist was that public health should come first and economic considerations second and there shouldn't be a trade-off between the two. Therefore, the follow up discovery of a disturbing 2017 New Zealand report, was doubly jarring.

The joint report by the New Zealand Forest Owners Association (FOA), Scion and the Ministry for Primary Industries (MPI) was presenting findings from a delegation to British Columbia, Canada. This was undertaken because of FOA concerns that "… MPI has lost its social licence to apply [Btk] from ground or air in urban areas in New Zealand …" and considered this a serious potential risk to primary production.

The visit was to learn how Canadian authorities managed to gain and retain this 'social licence' to spray. That one of the main factors was a legislative amendment preventing any appeals to the spraying "based on human health concerns" was alarming.

In this situation it would seem timely that the facts about the adverse health impacts and effects of spraying human populations with Btk-based pesticides should be re-visited and detailed. Many consider the price for protecting corporate forestry interests in New Zealand all those years ago was paid by the community that had to endure the aerial spraying. The community took all the risks and received none of the benefits. It should not happen again.

Hana Blackmore

Postscript: Family circumstances and the Covid-19 pandemic presented unique challenges to completing this original review. With extensive lockdown and restrictions here in Auckland, New Zealand, other urgent commitments and keeping family safe and well, engaged most of my time and attention. Updating and extending the Review, now, in light of further information was necessary.

CONTENTS

BTK PESTICIDE SPRAYS
Adverse Health Impacts and Effects of Urban Aerial Spraying:
Cover up or Abdication of Responsibility?

Review of New Zealand's experience

INTRODUCTION

Between 1996 and 2004 three biosecurity aerial spraying programmes were conducted over heavily populated urban areas of New Zealand on a scale unprecedented worldwide. Although hundreds of thousands of people were exposed to the pesticide, in some cases over seventy times during nearly two and a half years of aerial spraying, the health consequences of these campaigns have received scant public attention. But two reports published in late 2007, of independent investigations into these programmes, have revealed the extent of the impacts and effects of the spraying.

The most significant finding of these two investigations, conducted by the New Zealand Parliamentary Ombudsman and a community-initiated People's Inquiry, was that the pesticide used was not benign or harmless. Thousands of people experienced adverse health effects, from severe skin and respiratory aggravations through to neurological and allergic conditions. In many documented and verified cases these were not minor or transient.

This finding led to strong recommendations. These included that not only should there be no further spraying until long term follow up studies were carried out on the exposed population, but that the human health data that was collected during these New Zealand programmes by a government contracted health service provider was unreliable and should not form part of the evidence base for any future health risk assessments of this pesticide.

This has implications for all communities subject to this and other pesticide sprays. Most risk assessments for spray programmes of this nature rely heavily on data collected from previous surveillance studies and monitoring programmes. Most of the adverse health effects reported in New Zealand were discounted by public health officials. Evidence of an institutional dogma that the 'spray is safe' resulted over the years in most adverse spray effects reported by the community being re-labelled as simply psychosomatic responses.

Critically, there is evidence there was a government-level abdication of responsibility for human health protection in favour of biosecurity interests. This led not only to attempts to influence, discredit and downplay unpalatable results of the spraying but overt actions to 'turn a blind eye'. Refusals to carry out studies, blocking of requests and funding for independent health and science research, and sound and valid recommendations ignored, rejected or regulated away are just some of the mechanisms evidenced. As people continue to experience these sorts of pesticide programmes, consideration of the New Zealand experience is vital for any subject community.

This review provides a narrative and commentary of these two investigations using the studies, reports and papers detailed in their findings, together with documents, records and other information held by the author, to illustrate the legitimacy of community-reported effects and the relevance and implications of New Zealand's experience.

BACKGROUND

The three biosecurity eradication campaigns against invasive moth pests that were conducted in New Zealand, all involved the aerial spraying of heavily populated urban areas of cities with a Bacillus thuringiensis var Kurstaki (Btk) pesticide in the commercial formula Foray 48B.

The first aerial spraying of this pesticide in New Zealand was the *Operation Evergreen* programme in east Auckland in 1996-97 against the White Spotted Tussock Moth. The proposed 3-5 night-time sprays over 4,000 hectares with a population of 80,000 turned into seven months of weekly daytime sprays, with approx 5,000 residents in a rapidly reduced 300 hectare zone receiving the vast majority of the 23 aerial sprays and dozens of ground sprays. Two years later in 1999 the Painted Apple Moth (PAM) was discovered in Waitakere, west Auckland. [1]

There followed two and a half unsuccessful years of ground spraying the PAM with chlorpyrifos and deltamethrin pesticides before aerial spraying with Btk began in January 2002 over an area of 500 hectares. Six to eight sprays were assessed as being needed to complete the eradication, but by May 2004 nearly two and a half years later 70 aerial operations had been conducted over an extended area of up to 12,000 hectares, exposing in excess of 200,000 people. Thirteen thousand, five hundred residents in the original infestation 'hot' zone were subjected to nearly all of these aerial sprays and the continuing ground operations with deltamethrin.

The third campaign took place over an eight week period in October and November of 2003, when 28,000 residents in a 1,253 hectare area of Hamilton City received a weekly spray after a lone male Asian Gypsy Moth (AGM) was trapped. (No further evidence of any AGM activity was ever discovered). [2]

The last two campaigns had a 'health service' [3] set up and funded by the government that provided a helpline, free medical assessment for residents and practical support plans for 'at risk' or spray affected people. These support plans included evacuating people during sprays for periods that ranged from several hours during spraying to long-term re-location from the area.

The two investigations reviewed here began in April 2003 with the first of the complaints laid with the Ombudsman. His report, published in December 2007 (Office of the Ombudsmen, 2007) was the result of his four year investigation into the complaints raised by members of the community in West Auckland and Hamilton City. The Ombudsman reinforced his independence by noting that he did not take into account any material from the People's Inquiry that was being conducted at the same time.

The Ombudsman's responsibilities and powers of investigation are fairly wide, and he notes that they are not confined to the strict details of the complaint laid with him. Indeed, as he records, it was necessary that his investigation covered all three New Zealand spraying programmes as they all had the aerial spraying of the Btk pesticide in common. His statutory access to Ministers and public servants – and their obligation to respond –

[1] A secondary infestation was found 4 months later in Mt Wellington 15km away, which took over 18 months to eradicate. See Blackmore H. February 2001. Timeline Comparison of Two Moth Eradication Programmes.
[2] Asian Gypsy Moth has been re-named as the Spongy Moth
[3] Run by independent consultants Aeraqua Medical Services

together with his ability to obtain even confidential government documents and reports not available to the public, has ensured that his findings and conclusions are highly reliable and authoritative.

The People's Inquiry was conducted by four independent Commissioners [4] engaged by the community to investigate the impacts and effects of the 2002-2004 aerial spraying against the PAM on the people in west Auckland. The community had set up and funded their own inquiry after failing to persuade the Government to review its controversial two and a half year spraying programme. The Commissioners' extensive eighteen month investigation began with five days of public hearings in March 2006 and culminated in the publication of their report in November 2007. (Goven et al, 2007)

The findings of these two independent investigations are significant. Not only do the authors concur on many of their conclusions and recommendations, but they have both critically reviewed and evaluated many of the same government studies and assessments in the process. Official reports and documents were examined and contrasted with the detailed evidence of the impacts and effects presented by the community.

In the case of the People's Inquiry this included detailed evidence from over 160 people of whom seventy gave public submissions on the effects of the spraying and were able to be questioned and examined by the Commissioners. Leading scientists and doctors with practical experience of the New Zealand eradication campaigns also gave evidence at the public hearings.

The relevance of New Zealand's experience lies not only in the fact that these effects arose from the so-called 'safest' pesticide in use, but on the very nature of the aerial spraying campaigns conducted. All the programmes have been on an unprecedented scale not experienced anywhere else in the world. The short and even overlapping time between these three eradications, coupled with the duration of the actual spraying has meant that impacts and effects became only too obvious over this timescale and could not so easily be dismissed or ignored, as happens overseas where spraying may take place only a few days every year.

This is not to belittle or discount the experience of these overseas communities, rather, the result of the New Zealand experience detailed in this review corroborates and confirms the validity of the effects people have been reporting for decades from Canada and America where this same pesticide formula is used in urban settings.

* * * * *

[4] Dr Joanna Goven, Prof Tom Kerns, Prof Romeo F Quijano, Dell Wihongi Te Rawara, Hokianga

BTK PESTICIDE SPRAYS – AN ADEQUATE ASSURANCE OF SAFETY? - New evidence from New Zealand

Btk-based pesticide sprays have been marketed for over forty years as benign and toxicologically safe for everyone and everything except the targeted caterpillars. Even though the earliest study of an exposed population (Green et al, 1990) – often quoted as 'proving' safety – advised caution and further evaluation for immunocompromised persons, subsequent studies have consistently trivialized or dismissed reported adverse health effects. But the very nature of the New Zealand spray programmes has exposed the weak foundation for claims of safety and non-effect. This is detailed here, and in subsequent chapters, in a number of new studies, reports and data that flowed from the NZ programmes.

The community in New Zealand have been documenting and reporting the impacts and adverse health effects of the NZ aerial spraying campaigns since 1996 and their records are still maintained. In early 2003, one year after the start of the PAM aerial spraying, two community-initiated reports (Blackmore, 2003; Watts, 2003) were published detailing the inadequacy of the PAM Health Risk Assessment (HRA) to accurately predict the effects of the spraying.

The Interim Report of the Community-based health and incident monitoring of the aerial spray programme (Blackmore, 2003), records community-reported effects of the first year of the PAM spraying, including for the first time, the social and economic impacts. [5] It compares the adverse health symptoms and effects recorded from the passive, unsolicited reports of over 300 residents with the expectations and predictions detailed in the PAM HRA (Kalemba et al 2002). A wealth of detail is recorded in the data and the narratives of the community reports. The conclusion is that the HRA not only failed to predict the level, extent and seriousness of the adverse effects being experienced, but that 'expectations' that the adverse health effects of the spray would be minor and insignificant, had led to the discounting and dismissal of most symptoms reported by the community to Aeraqua, the government appointed health service providers.

The Watts report Painted Apple Moth Eradication Programme – Health Risk and Effects (Watts, 2003) was commissioned by a community group in late 2002 on the advice of Sir Geoffrey Palmer, a leading public law specialist who had been engaged to advise what legal actions were available to stop the spraying (Palmer, 2002). The Watts paper addresses the adverse health effects apparently experienced by the two Auckland communities exposed to the aerially applied pesticide – the 1996-97 *Operation Evergreen* Tussock Moth spraying and the, then, current PAM campaign. The report draws on New Zealand HRAs, surveillance reports and studies, and uses the HRA of the PAM (Kalemba et al 2002) as the primary document to examine the government's assessment of the spray and its potential health effects compared with those reported by the community.

Dr Watts concludes that the PAM HRA was flawed for a number of reasons including inadequate characterization of exposure, the discounting of reported effects, and the influence of the underlying value system inherent in risk assessments. This resulted in an inadequate depiction of the real risks to which the current West Auckland community was being exposed.

[5] Environmental and animal impacts are also detailed as reported by the community.

Until the publication of these two reports the Government had not responded to community concern about the urban aerial spraying programmes. As the Ombudsman notes, up until that time "little attention seemed to have been paid to the possibility of human health impacts". But after the Government commissioned their own peer reviews (Phillips, 2003; Read, 2003) of both the Blackmore and Watts reports, all that changed.

By the end of March 2003 the Ministry of Health (MoH), on behalf of the eradicating agency Ministry of Agriculture and Forestry (MAF), had contracted the Wellington School of Medicine (WSM) to consult with the PAM community and "review the existing scientific knowledge relevant to [their] health concerns, symptoms and effects" [6] and recommend (but not carry out) what further studies may be needed. The Ombudsman concluded that, in his view, this was commissioned in the hope that it would satisfy the community.

> "Having reviewed the material that does exist I am left with a strong feeling that this arrangement was made in haste as a response to the Blackmore and Watts reports which had been prepared in Auckland, and in the expectation by the Ministry that the appointment of the University would close off further protests from opponents of the spray programme." [7]

Far from settling the matter, the Assessment of the Potential Health Impacts of the PAM Aerial Spraying Programme (Hales et al, 2004), was itself the subject of an extraordinary series of delays, criticisms, political interference and attempts to prevent its publication. Both the Ombudsman and Commissioners cover this story in some detail, and both express concern about the conduct of various government officials and Ministries.

In particular the Ombudsman was highly critical of all the delays in commissioning, reviewing and releasing the report. "Having regard to the urgency, and potential importance, of the findings of this report, there seems to have been a remarkable absence of urgency by those principally involved." [8] Although the WSM authors had not been asked to assess whether the spray was safe, they concluded that only further scientifically robust studies could answer that question, as "existing scientific knowledge did not give a satisfactory level of assurance".

As part of his investigation, the Ombudsman had asked the authors what weight could be attached to their Report in view of the criticisms it had raised. Dr Hales the lead author had replied:

> "Ideally, the report should be reviewed by epidemiologists with experience in bioaerosol effects on respiratory diseases. I have tried, unsuccessfully, to achieve that. We have raised several important health concerns relating to the use of biologically-based insecticides in New Zealand. These relate, in particular, to a lack of adequate assurance of safety from existing scientific knowledge. In non-technical terms, these issues are as follows:
>
> - Aerial spraying of Foray 48B produces fine particles of biological matter (bioaerosols) that may be inhaled.
> - The level of exposure via this route is not well known and has not been measured in New Zealand.
> - By analogy with exposure to bioaerosols in the workplace, insecticides based on bacteria or bacterial products could cause chronic health effects.
> - Studies of exposed workers and communities have not shown serious health effects, BUT [9] these studies have methodological weaknesses.

[6] The original MoH terms of reference (only looking into health "concerns") were not acceptable to the community and were changed by negotiation to "health concerns, symptoms and effects".
[7] Report of the Ombudsman, para 46
[8] Ibid, 16.42
[9] Emphasis in original

- Studies of workers and human cells in the laboratory have shown that the active ingredients of Foray 48B have measurable physiological effects, particularly on the immune system.
- The ERMA [10] approval of a closely related biological insecticide was based, in part, on incorrect assumptions.[11]

> "The reviewers have been critical, but they have not seriously challenged these key points. Note that the reviewers were also supportive of the recommended epidemiological studies. .... "It may be an overstatement [reference to the Hamilton spraying] that a causal link can be definitely established on the basis of interviews alone. However, the range of symptoms is consistent with those reported by the Auckland community and in the literature. The frequency of the reported effects seems alarmingly high. This lends some support to the argument for undertaking detailed studies of the exposed populations in Auckland and in Hamilton.
>
> "Note that we have not proved (or set out to prove) that the spray has caused or is causing serious health impacts. In public health terms, the most serious potential impact of the spray may well be a long-term effect on chronic diseases, especially respiratory diseases. We have raised questions about the level of assurance that can be derived from existing knowledge, and recommended scientifically robust methods of study that can answer the question of safety.
>
> "I would be very pleased to learn, from the result of careful follow-up of exposed populations, that the spray has no serious chronic health effects. Until we have that assurance, it is my personal view that it would be prudent to avoid aerial spraying biological insecticides over populated areas." [12]

The findings of the WSM Report were drawn from their literature review, community interviews and submissions, and a focus group study. Written submissions were invited from the public via local adverts, and two existing sets of data were added: anonymised 'raw' copies of reports collected for Blackmore 2003, and a tabulated summary by Auckland Public Health of submissions sent by residents to the Health Officer of the Waitakere City Council.

These submissions to the Health Officer arose after nine community organisations had jointly petitioned the Waitakere Council to take action under the Health Act to protect its citizens and stop the aerial spraying. Although the reports that formed the basis for Blackmore 2003 were published in a document [13] for Councillors as part of the petition, the Health Officer said he "required" his *own* submissions for him to investigate. (The data summary of these 235 submissions would be published later in the year as part of the AGM HRA) [14] Aeraqua – the government's health service provider – did not respond to requests to provide a third set from their data collection system, though MAF did provide some monthly Aeraqua summaries that gave the numbers of health effects reported. The WSM considered over 600 reports of health effects. For the focus group component, the WSM sub-contracted the Institute of Environmental Science and Research (ESR).

The ESR Painted Apple Moth Focus Group Study (Baker, 2004) was designed to complement the written submissions to the WSM by selecting people whose voices and view-point may not have been heard. Four formal group interviews were conducted with Maori, Pacific Island peoples and migrant groups. Whilst acknowledging the limitations of the study and the focus group method, Baker is still able to observe some important themes that provided her with a consistent picture. She concludes that the aerial spray programme "has had multiple impacts on the health, well being and everyday life of many … residents", with the most serious health impacts for those with existing respiratory and allergic conditions. The study's extensive quotes from group participants makes for a

[10] New Zealand's Environmental Risk Management Authority – (now the NZ EPA)
[11] Assumptions that short term irritant effects of Bt products are only seen in laboratory animals or workers exposed to relatively high doses – and do not occur in communities exposed to aerial spraying of Bt products. (Hales et al, 2004 p7)
[12] Report of the Ombudsman, 15.16
[13] PAM Health Effect Table - Spray-related Health & Incident Reports (Blackmore, 2002)
[14] Auckland Regional Public Health Service 2003.

valuable insight into their experiences of the spray programme. Baker makes three recommendations focusing on the ineffectiveness of information provided during the programme, resident concerns about the MAF health service and the limitations of her study to provide statistical data on the frequency and distribution of health effects.

A case study published later in 2004 in the EcoHealth Journal draws on the literature review component of the WSM Report and proposes an alternative approach by that lead author to health risk assessments. In his paper, Precautionary Health Risk Assessment: Case Study of Biological Insecticides (Hales, 2004a), Hales compares the different approaches and 'outcomes' between conventional and a proposed precautionary HRA. Using the PAM experience, his illustrative case study of biological insecticides shows that both acute inflammatory responses and more prolonged symptoms like asthma exacerbation and skin rashes reported by communities after exposure to sprays like Foray 48B are consistent with a number of studies of the adverse effects of bioaerosol exposure in workers. The study reports this finding is at odds with the negative results of past studies in the community of these biological sprays which dismissed the pattern of self-reported symptoms.

Hales considers the epidemiological studies of past urban sprays that he examined (e.g. Noble et al. 1992; Pearce et al. 2002; Aeraqua, 2001) have limitations such as potential or actual exposure of control groups, and "do not provide strong evidence in support of the long-term safety of *Bt* products in a community setting." Hales reiterates his opinion to the Ombudsman that it would be prudent to avoid aerial spraying populated areas with biological insecticides until the result of detailed follow-up of exposed populations is available.

Despite being an explicit part of their terms of reference only one of the eleven WSM recommended studies has been implemented. The ramifications of this 'failure' are explored later in this review, but after the MoH were finally forced to release the WSM Report, and aerial spraying had ceased, the MoH did commission a new study from the Institute of Environmental Science and Research (ESR) to examine hospital discharge rates for respiratory conditions in the PAM spray zone. For reasons never explained, its terms of reference did not cover the full time series recommended by the WSM. Even so, it did not provide reassurance for the government.

The Descriptive Study of hospital discharges for respiratory diseases in spray zone for Painted Apple Moth (Gallagher et al, 2005) compared acute hospital admissions for respiratory conditions before and during the period of the aerial spraying. The authors found statistically significant differences in hospitalisation rates both locally and compared to the national population. Although the authors observed that the underlying upward trend in the spray zone for *all* respiratory diseases had started the year before aerial spraying and therefore couldn't be attributed to the exposure, the asthma results were different. There were "several findings pointing to a real increase in the asthma discharges that could plausibly be associated with the spray programme."

These findings include statistically significant local trends in the increase of asthma admissions for residents inside the spray zone, compared to those just outside. National comparisons show that overall, the age-adjusted and sex-adjusted monthly discharge rates for asthma conditions increased significantly by 42% between the two time periods for the exposed population, but decreased 17% nationally. During the spray period there were statistically significant increases in the monthly asthma discharge rates in the spray zone, with those for exposed boys aged 0-4 doubling, and an 80% increase for girls between 5 and 14 years. Similar but less distinct increases were observed for boys aged 5-14 and girls

aged 0 to 4. The authors note that in fact the observed increased rate for all respiratory diseases in the spray zone from 2001 onwards was almost entirely accounted for by this under 15 years age group.

These troubling asthma results for children in the spray zone were further explored in a study presented at the University of Otago's Annual Colloquium of the Spatial Information Research Centre. The paper on the Clustering of childhood asthma hospital admissions in New Zealand (Hales et al, 2005), used a spatial scan statistic to analyse national asthma admissions during the same time period as the Gallagher study above.

The study confirmed that among several clusters identified in New Zealand there had indeed been a significant space-time cluster of acute childhood asthma admissions in West Auckland during the period of the aerial spray operations which could plausibly be associated with the spraying. Not only did the study confirm there had been an increase in children admitted to hospital for asthma during the time of the aerial spraying, but these cases clustered in a defined geographical area, which in this case was the boundary of the aerial spray zone. The authors conclude that "the hypothesis that chronic exposure to biological insecticides may lead to asthma exacerbations deserves further study".

One study had been conducted during the active spraying period of the PAM campaign, and was published shortly after the Blackmore and Watts reports in 2003. The study, Symptom complaints following aerial spraying with biological insecticide Foray 48B (Petrie et al, 2003) published in The New Zealand Medical Journal, reports the outcomes of a survey conducted at the commencement of the PAM spraying by the University of Auckland, Faculty of Medical and Health Sciences. This was the only prospective study for the PAM and was actually proposed – and presumably conducted – as a study assessing the "psychological status of the community before, during and after the spray programme."[15] This original aspect was published separately in 2005. [16]

The 2003 study investigated self-reported symptoms of 292 residents recruited in a door to door survey in the initial 500 hectare PAM spray zone. It compares the changes in their symptom complaints from ten weeks prior to the spraying commencing and ten weeks later – after three spray rounds had been completed. The study found symptom complaints increased significantly following the aerial spraying and concluded that "aerial spraying with Foray 48B is associated with some adverse health consequences in terms of significant increases in upper airway, gastrointestinal and neuropsychiatric symptoms, as well as a reduction in overall perception of health in the exposed population."

The Ombudsman notes that Petrie's findings were not inconsistent with those anticipated in the HRA and confirmed in detail in the Blackmore Report. He went on to comment:

> While acknowledging the limitations of their survey, the authors expressed the opinion that it is not unreasonable to expect that exposure to spray containing *Bt* might cause health effects. Commercial sprays such as Foray 48B contain spores of *Btk* as well as other ingredients, some of which appear to have been harmful to some people. One may question, therefore, the reliability of the oft-repeated assertions that Foray 48B is not harmful to humans. [17]

There was also no reassurance of non-effect in other papers and documents considered by the Ombudsman. Formal reports provided to him by the government show that by March 2004 (27 months after the PAM aerial spraying commenced) there were 3611 people still registered with the PAM Health Service. Of these, 694 had Practical Support Plans (PSP)

[15] See Blackmore 2003, pp25
[16] Petrie et al, 2005
[17] Report of the Ombudsman 13.45 – 13.46

to help them avoid the effects of the aerial spraying, and over 1000 had been assessed at least once by a PAM health service doctor.

Table 4 (reproduced below) shows the number of people still in the PAM spray area late in the campaign with PSPs whom the Government paid to evacuate each spray cycle to avoid the pesticide. The individual medical justifications for these people to receive this assistance included 250 people that had "severe to significant medical risks". [18]

Table 4 – Medical justification for practical Support Plans

		June 2003 – percentage – people (total 625)	**March 2004 – applying similar percentage – people (total 693)**
Highest severity	E.g. anaphylaxis to relevant foods, multiple severe food allergy in child, very severe asthma.	7% 44	7% 49
Significant medical	E.g. definite or unstable asthma, eczema or upper respiratory with significant severity.	29% 181	29% 201
Other medical	E.g. short-term irritant symptoms or mild respiratory, mild skin problems, headaches.	29% 181	29% 201
Precautionary because of a previous medical diagnosis	E.g. a lower respiratory, alveolitis, emphysema, bronchiectasis, lichen planus, immune disorders, rheumatoid arthritis, SLE, past/current history of Chronic Fatigue Syndrome, and major medical problems not known to be at specific risk of aggravation by spray exposure.	19% 119	19% 131
Mainly psychosocial justification	e.g. pregnancy or situational stress as justification. General concerns about spraying	16% 100	16% 111

Whilst some of these adverse effects listed in the table above might be considered as simply the consequence of the chronic exposure and unprecedented duration of the PAM programme, this cannot be said of outcomes recorded during the eight week aerial spraying against the Asian Gypsy Moth (AGM) in Hamilton, Waikato, during late 2003. The impact on those who were at acute risk from the spray was clearly illustrated by the report of an incident that is detailed at some length in the Ombudsman's Report.

The Principal of a high school in the Hamilton spray zone brought in Occupational Safety & Health (OSH) after a number of his staff had experienced severe health reactions to the first couple of sprays and he had been unable to get their concerns taken seriously by Aeraqua, the government's AGM Health Service providers. The report of the official investigation by OSH, Hamilton's Fraser High School – Final Report (OSH 2003)

[18] Ibid 14.14 – note: a number of people will have received PSPs to prevent exposure to the pesticide – see below

confirmed that over thirty staff had been adversely affected and that a significant number had serious reactions to the spray.

> "…A causal link between adverse health effects and occupational exposure to Foray 48B has been established in a number of staff members, a number of whom had rare food allergies. … The investigation serves as a timely reminder for all practicable steps to be implemented to ensure safety and health within workplaces affected by an environmental programme. The effectiveness of monitoring health is dependent upon all concerns being reported to and comprehensively canvassed by medical practitioners." (OSH 2003)

It is borne in mind that people at severe risk from the spray have probably not experienced an actual reaction to the pesticide as their conditions would have necessitated evacuation as a precautionary measure. But in the Hamilton high school case, as explored later in this review, an unfortunate sequence of events meant that vulnerable staff members had not been evacuated. Their subsequent involuntary exposure and severe reactions clearly demonstrate that precautionary evacuations result in significant numbers of health effects going unrecorded in the statistics - because they have not been 'experienced'.

A community group [19] did record and collate some self-reported health effects in Hamilton in a similar manner to that used by the PAM community. The Ombudsman details a list of reported ailments that he received from the group which showed the spray related incidents and health effects of 202 people. (Reproduced below) [20]

• Respiratory problems, of which breathing difficulties – sore painful or burning throats, congested nose, coughs, and asthma aggravations - were the most common.	233
• Neurological complaints, of which headaches were by far the most common.	139
• Skin irritations.	79
• Eye infections burning, itchy, and soreness were most frequent.	67
• Digestive problems, such as nausea and diarrhoea.	61
• Fatigue, and a variety of miscellaneous other symptoms.	46

The Ombudsman notes that these problems correlated closely with those reported from Auckland and with the cohort of cases at the Hamilton High School. He records similar occupational events at other schools during the Auckland campaigns, and details one survey conducted in West Auckland primary schools by the New Zealand Education Institute. (NZEI) [21]

The NZEI West Auckland Aerial Spraying Survey (NZEI, 2003) had found that of the 353 staff who replied to a questionnaire, 56% had recorded adverse effects from the spray, or had observed similar effects in the children. The Ombudsman notes that reactions included "breathing difficulties, or asthma related problems, eczema, and watery eyes. In some cases, the symptoms lasted days and, in some instances, even weeks, and recurred on subsequent spray days." [22] He also notes that two other schools in East Auckland during the *Operation Evergreen* programme also recorded "a number of staff and pupils [who] were affected by sore throats, respiratory illness and fatigue." [23]

Although the government's first NZ Health Risk Assessment, that of the *Operation Evergreen* Tussock Moth campaign (Jenner Consultants, 1996) had emphasised there would be no future health surveys or follow-up studies of the programme, the Ministry of

[19] *Waikato Against Toxic and Chemical Hazards (WATCH)*
[20] Report of the Ombudsman 13.78
[21] The NZEI is NZ's largest education union
[22] Ibid 13.18 – 13.20
[23] Ibid 4.10

Forestry did in fact commission its own surveys of *Operation Evergreen* residents before, during and after spraying.[24]

The post-spray survey results as detailed in the 1997 HRA (Auckland Healthcare,1997) show that overall, 8% of residents reported being affected by the Btk spray. This went up to 9.9% in the more frequently sprayed target areas. Not mentioned in this HRA is that this figure increased to 16% of residents being affected in the most intensive hot zone. [25]

> "When asked how these household members had been affected, respondents noted irritations of sore eyes, throat, sinuses, and headaches, breathing difficulties and fatigue. Together, these symptoms accounted for 91% of those conditions noted. There was a consistently higher proportion of target area households reporting for each of the health effects, except for 'other' and 'allergic to, or aggravation of allergies'".[26]

As noted earlier, there is evidence that precautionary self-evacuations occurred in east Auckland residents with severe and medically diagnosed allergies, plausibly reducing the numbers *reporting* these effects.

> "Many of us with previous history of respiratory problems, immune deficiency or chemical intolerance, who were able to, left town. As the sprays progressed, and more people suffered ill-effects, others followed. Our only consolation was that it was for the sake of the country, and would soon be over." [27]

Tussock Moth community records also show there were numbers of people who left the area permanently because of the spraying programme – notably a number of pregnant women and their families after concerns about reported miscarriages (six in one street for instance) and therefore outcomes were not recorded in the local statistics. This was of concern when rare conditions with a small number of cases were later reported. For example, congenital hypothyroid cases identified by the author in a 'cluster' investigation included one child conceived during spraying but born outside Auckland.[28] All case-control or cohort studies would – and did – 'miss' this case, which continues to be omitted from official statistics.

A post-spray government project that set up a register of exposed people in the main Tussock Moth spray zone estimated that 20% of eligible people would have moved out before the register was established. Census records before the spraying show that in fact 24% of individuals stayed at their address less than a year anyway, with a further 9% resident between 1 and 2 years.[29] This degree of attrition would ensure very few people on the Tussock Moth Register would still be resident at their registered address if a follow up or future study was undertaken.

One other report of occupational exposure in NZ has made it into the literature and is recorded by Blackmore (2003) and followed up by Hales et al (2004). The Douglas Manufacturing Staff Survey (2002) [30] was conducted by the Health and Safety Co-ordinator of a large pharmaceutical company in the PAM spray zone. Fifteen percent of the employees surveyed experienced health effects or had family that suffered health effects they attributed to the spray. Effects recorded (as a percentage) from the first survey of 101 employees:

---

[24] Allpro Consulting of Wellington 1-3
[25] Tussock Moth Spraying Programme Survey 111 Allpro Consulting of Wellington, July 11, 1997
[26] Auckland Healthcare, 1997 - 4.6 pp15-16
[27] Healthy Option magazine (20) – winter 1997
[28] The mother was actually one of the six women in one street who earlier miscarried.
[29] Aeraqua, Health Surveillance following Operation Ever Green. 2001 8.11
[30] Appendix in Blackmore, 2003

- 35% suffered eye problems (itchy, watery or sore eyes)
- 38% suffered lung and/or respiratory problems. (Difficulty breathing, asthma attack, respiratory irritation, nosebleeds, sinus pain and sneezing, pre-existing allergies had worsened).
- 7% suffered skin burning or irritation.
- 10% developed headache.
- 3% suffered swelling of the face and eyes.
- 7% had to obtain medical attention and treatment.

A second survey of 111 employees 12 days later reported similar results. The Commissioners document many similar reports from individuals who experienced "extensive disruption" of their work and workplaces, and a number of small businesses that were lost as a direct result of the PAM spray programme. The Commissioners note that "there has been neither acknowledgement of nor compensation for these impacts."

The significance of the incident at the Hamilton high school is that the investigation by OSH not only took place during the first sprays of the two-month campaign, but the establishment of a causal link had been made by an independent medical expert. As the Ombudsman records:

> The OSH report is of some significance because it represents the only example of which I am aware of the making of a contemporaneous official investigation by OSH or any comparable agency. It establishes a clear link between exposure to the spray and the types of ailments which were reported in both Eastern and West Auckland. At the School there were perhaps 17 or so members of the staff who, in different ways, were particularly susceptible to the spray. It is noteworthy that these people did not live in the spray zone but were obliged to go into it in order to attend their employment. In addition to the 17 or so staff significantly affected, there were approximately another 20 who suffered some form of unwanted effect. [31]

The interviews and examination of staff at the school were carried out by the Regional OSH Departmental Medical Practitioner. It was Dr Emrys's clinical opinion that the staff had been affected by components of the spray that had been identified to him. This opinion was accepted and confirmed by the head of the government's AGM Health Service (Aeraqua) as recorded in the OSH report. This 'confirmation' would become of some importance as examined later in this review.

Romeo Quijano, one of the Commissioners for the People's Inquiry is a Professor of Medical Toxicology and Pharmacology and an expert on pesticide effects. He was able to question people in a similar manner to Dr Emrys. His examination of the people who appeared before the People's Inquiry during the five days of public hearings covered not only their written submissions and direct testimony about their claims of adverse effects from the pesticide spraying, but also the physical, documentary and laboratory evidence presented. As the inquiry was conducted two years after the spraying had ended it also allowed an evaluation of any ongoing or chronic effects. Prof. Quijano reported that

> "… most of the signs and symptoms described by the testimonies were respiratory in nature, which is what is to be expected from the inhalation exposure to the aerially sprayed Foray 48B pesticide formulation. Of the respiratory complaints, the most common were asthmatic symptoms … The next most common adverse health effects were neurological (mainly headaches, memory loss and dizziness) and skin reactions (mainly skin rashes).[32]

"Again, these symptoms and signs, though non specific, are to be expected from exposure to the known ingredients of the Foray 48B pesticide formulation." Prof. Quijano's conclusion was unequivocal:

[31] Report of the Ombudsman 13.70
[32] See appendix 3 of the People's Inquiry Report for full table of reported health effects. www.peoplesinquiry.co.nz

> From the foregoing appraisal of available information and various types of evidence, it is clear beyond reasonable doubt that the aerial spraying of Foray 48B in Auckland, New Zealand has resulted in adverse health effects on the exposed population. The impact of the aerial spraying extends beyond signs and symptoms. As detailed in our main findings [of the Report] it has been devastating not only to the physical but also to the emotional, mental, economic and social wellbeing of the affected people.[33]

An important note about the ingredients of Foray 48B needs to be made here which should be borne in mind throughout this review. Foray 48B was the subject of intensive evaluation and comment by the Ombudsman throughout his report, and on his attempts to have the spray ingredients released to the public. In response to the second draft of his report the principal complainant had queried the wisdom of the government's confidentiality agreement with the manufacturer which prevented those affected by the spray from knowing the ingredients and being able to track the cause of their ailments. "They cannot avoid the ingredients to which they may have been sensitised and which occur in many common products". The Ombudsman did conclude that he considered that it was preferable that such arrangements "should not operate so as to preclude important health information being available to those who may need it" and recommended in his final report that in future the fullest information about the spray and its possible effects should be made available. [34]

Bearing this in mind, although commercially confidential with the full ingredients of Foray 48B only given to a few government health personnel, the list of ingredients was inadvertently disclosed to the PAM community. Under an Official Information Act (OIA) request, the STOP (SAS) group in Waitakere had received a redacted copy of the government's **"Toxicological assessment of Foray 48B: inert ingredients. 19 Aug 1996."** However, the references from which the information on each redacted ingredient was obtained were left in, including the quoted page of the Martindale Pharmacopoeia. [35] The invaluable help of Douglas Pharmaceuticals in West Auckland in confirming the ingredient list and their kind donation of the relevant Pharmacopoeia, enabled the PAM 'detectives' – Dr Meriel Watts and the author – to reliably identify each ingredient. The identification was confirmed by the fact that frequently the assessment was lifted verbatim from Martindale.

Of course, as they had to, the New Zealand government has to this day "neither confirmed nor denied" these ingredients.[36] But the official document supplied is attached for public scrutiny and assessment as Appendix 4 of the People's Inquiry Report. Dr Watts subsequently gave a brief summary of the adverse effects of all these ingredients in her submission to the People's Inquiry. [37]

So, unlike subsequent commissioned assessments [38] for both Hamilton and Waitakere Cities by toxicologist Peter Di Marco who could not reveal what the ingredients he was assessing actually were! - Prof. Quijano was able to publicly examine and report on the Foray 48B constituents as confirmed and detailed to him by Dr Watts.

---

[33] Report of the People's Inquiry *4.12* pp 65
[34] Report of the Ombudsman *48-51*
[35] Martindale, The Extra pharmacopoeia 31st edition
[36] See the TV interview of MAF responding to ingredient reveal - "Spray Day" – Dateline SBS – 2003
[37] See Submission 75 - https://peoplesinquiry.co.nz/inquiry-testimonies/
[38] Di Marco PN 2003 and Di Marco PN 2006. .

Of note is that Quijano's examination of the spray ingredients included a new ingredient not in the original toxicological assessment. This ingredient – BIT (1,2-benzisothiazolin-3-one) was confirmed as present in a new Foray 48B formula that was substituted and used from early 2003 in West Auckland and for the whole AGM programme.[39] As noted by Quijano, small amounts of BIT might be expected to cause sensitization or allergic reactions after exposure. "There are numerous reports about humans being sensitized due to handling products containing small amounts of 1,2-benzisothiazolin-3-one. In several published case reports 1,2-benzisothiazolin-3-one has induced allergic dermatitis. " [40]

These reports, studies, surveys and examinations of the health effects from the aerial spraying of the *Btk* pesticide Foray 48B in New Zealand clearly demonstrate the spray is neither benign nor harmless, nor were many of the effects just minor or transient. Both the Ombudsman and Commissioners recognise this finding is at serious odds with the government-commissioned reports and health risk assessments for the New Zealand programmes that all conclude the spray was safe and "harmless to people". What is not clear is why this belief persisted in the face of the cumulative adverse evidence over the years.

Examination of the consecutive New Zealand HRAs and surveillance reports gives some clarity and answers. But it also reveals a worrying degree of inadequacy and raises critical questions of institutional bias that impacted on the treatment of the community subject to the biosecurity programmes.

* * * * *

[39] Report of the Ombudsman *15.29-15.35*
[40] Report of the People's Inquiry *4.3.3.C* pp 60

"BTK HARMS ONLY CATERPILLARS"
New Zealand Health Risk Assessments and Surveillance Reports - Inadequate or Institutionally Biased?

The first government-commissioned health risk assessment (HRA) was for the 1996-97 *Operation Evergreen* Tussock Moth eradication campaign in East Auckland (Jenner Consultants, 1996). As the first such spraying undertaken in New Zealand, the HRA had no NZ epidemiology to call on and was light on any evidence of potential health effects for the population. The HRA's validity is questionable as it was based on 3-5 night time aerial sprays, not the two dozen daytime operations that eventuated. This number of sprays far exceeded all overseas operations and epidemiology on which the HRA was based. As an Auckland Public Health official later commented in 1997, this level of intensity might move the spraying outside the parameters of the literature. [41]

There was an Addendum published three weeks later (Jenner Consultants, 26 Sep1996) assessing the possible health impacts of using different aircraft for the spray delivery. Noise, visual effects, aviation fuel exhaust, time of day etc. But overall, there was no change to the expected health effects "because of the inherent safety of the spray". The 1996 HRA was updated one year later, after seven months of spraying had been completed, for a new proposed control programme – eradication presumed to have failed.

The 1997 HRA from the Public Health Protection Service (Auckland Healthcare, 1997) was for a maximum nine aerial sprays of a small 300 hectare 'hot zone' area. Although the HRA assessed additional risks from a synthetic pheromone that would be deployed in traps and a new and extensive six page section on the 'dangers' of the Tussock Moth itself, the public health position does not shift from its 1996 assessment. The HRA found "no evidence of a causal association between Foray 48B and [the effects reported by the population during the 1996 spraying]." It was instead suggested that "common psychological and social factors, not directly related to the exposure may be involved."

The third HRA, this time for the PAM, also from the Auckland Public Health Service (Kalemba et al, 2002) was for 6-8 targeted aerial sprays of 500 hectares of inaccessible and riparian areas around the established infestation. It is essentially an update of both the 1996 and 1997 Tussock Moth HRAs, as the proposed 1997 spraying against the Tussock Moth never went ahead. Pheromone trapping had returned zero catches, and the moth was declared eradicated in 1999. The terms of reference for the PAM HRA were to provide independent expert advice on whether the recommendations in the 1997 HRA remained valid.

The PAM HRA is a 'cut and paste' of the 1997 Tussock Moth control programme HRA. Whilst there is additional material from the government's retrospective surveillance (Aeraqua 2001), undertaken after the 1997 HRA, only passing reference is made to the hundreds of adverse health effects reported by the community - many only recorded post the 1997 HRA. The public health position is maintained and the characterization of the overall health risk from the spray is identical to the 1997 HRA. But like the original 1996 HRA, the reliability of an assessment whose spray operations would far exceed that assessed, is questionable.

[41] Report of the Ombudsman. Doc 4B. Veil of Fears – Is the Tussock Moth Spray making people sick?" North and South. July 1997

There was no formal HRA for the 2003 AGM operation in Hamilton City. Instead, Auckland Public Health Services provided a comprehensive summary of the above HRAs and surveillance reports (ARPHS 2003). The authors do not re-examine them, but simply report the conclusions of the HRAs as confirming there was no evidence to support any causal link or effect from the pesticide.

As documented in their investigations, both the Ombudsman and Commissioners fundamentally disagree with this conclusion. They raise concerns not only about what they see as the failure of these assessments to adequately predict the effects of the spray, but why action was not taken by Public Health or the Ministries involved to re-evaluate or halt the spraying programmes as evidence mounted of the adverse effects.

The Commissioners argue that it was the inability of MAF, and their contracted health service advisor and provider (Aeraqua Medical Services), to recognise and accept these effects when they arose, that compounded the predictive failure.

> The claim of safety suggests that MAF misunderstood the nature of the evidence on the effects of the spray. The absence of evidence is not evidence of absence (of effect), particularly in an under-researched area … MAF should have been alert to the possibility of unforeseen effects and should have had contingency plans in place to deal with them, both by assisting those affected and re-assessing the spray programme. The PAM Health Service, which seems to have based its work on the same misunderstanding of the evidence for safety, and thus to have worked largely to a pre-determined script describing what would be considered an effect of the spray, did not provide assistance for unforeseen effects. [42]

Even when unequivocal evidence did arise as documented by both the Ombudsman and Commissioners, the "predetermined script" was maintained and no acknowledgement was made of adverse effects being caused by the spray. The report on the HRA process by Dr Watts (Watts M. 2003) is discussed and quoted at length in both investigations and provides some explanation.

As Watts notes from her examination of the NZ HRAs and surveillance reports, "in this succession of reports involving some of the same authors, there is a discernible tendency to confirm previous findings, rather than to question them in the face of contradictory community reports." [43] Watts goes on to argue that:

> … If the value bias were to be in favour of public health, or even neutral, the [PAM] Health Risk Assessment would have looked more closely at the health effects reported from previous occasions, instead of dismissing them because they are unproven. There is no adequate explanation of the effects reported by the community during Operation Ever Green; they have been simply discounted because they do not fit with the method chosen to determine if there was any effect ... Similar effects have also been experienced in previous overseas aerial spray operations, and are again in West Auckland, but each time they are discounted. … Where one piece of literature dismisses community reports, so another one cites this report as support for the belief that there won't be any health effects of this nature. [44]

All risk assessments rely heavily on data collected during spray programmes. It must be considered that if these do not accurately record the adverse effects then all subsequent HRAs perpetuate this inadequate and unreliable data. As OSH commented above "the effectiveness of monitoring health is dependent upon all concerns being reported to and comprehensively canvassed by medical practitioners." So it is significant that as a result of their investigation the Commissioners recommend that the data collected by the

[42] Report of the People's Inquiry *1.5.1* pp 32
[43] Ibid *4.3.3* pp 58
[44] Report of the Ombudsman *13.38*

government's health service provider (Aeraqua) should not form part of the evidence base for any future HRAs of Foray 48B or similar products.[45]

This strong recommendation arose from the Commissioners' criticisms about whether Aeraqua provided a health service or a screening process. "The difference is significant, and testimony suggests that while the former was promised, the latter was delivered." As a result, the Commissioners consider the deficiencies in the health support service for the people affected by the PAM spraying may have been compromised by the same company being contracted to provide the monitoring service as well.

> "The primary basis for the monitoring report was the statistical data accumulated by the Aeraqua health support service. In other words, an overly restrictive screening process would have distorted the reporting of health impacts: if Aeraqua personnel did not accept the symptoms as spray-related, they did not show up in the data. We also heard from many, including a local [doctor] that most affected residents did not go to Aeraqua, either because they did not associate their symptoms with the spray or because they had heard of others' bad experiences." [46]

The Ombudsman confirms this plausible explanation for the failure to report adverse effects when he notes there had been debate in government papers he'd been given about the apparent falling away of reported ailments during the latter part of the AGM programme. "There may have been many reasons for the reduction in complaints, including dissatisfaction with the AGM Medical Service recorded in the OSH report, and, according to that report, acknowledged by Dr Kelly." [47]

Similarly, the Focus Group component (Baker, 2004) of the WSM Report noted that under-reporting of health effects was prevalent and that data from all the focus groups suggested that people were reluctant to use the MAF (Aeraqua) health service.

> Further questioning revealed that there are numbers of people in the community who are sick but are not seeking medical advice. All the people in the focus group suffered respiratory effects, but most did not go to their doctor and only some went to the pharmacy for medication. No one in the group knew the MAF helpline number, nor did they see any point in going to the MAF doctors who were felt to be a waste of time and there only "to tell you that you were not sick".[48]

Blackmore recorded similar concerns in her earlier interim report (Blackmore, 2003), and also noted there was evidence that the cost of a general practitioner doctor (GP) consultation was a deterrent for many of those wishing to report effects or obtain treatment from their own GP. Their only option was to see the MAF doctors for which there was no charge, but who could not treat or prescribe. [49]

> Not only is there no free treatment or prescription service for those affected by the spray, but many people report that they struggle to even get recognition they may have been affected by the spray. There are numerous reports of MAF doctors, GPs and even 0800 staff informing people their symptoms are not caused by the spray. … [M]any people also believed the MAF doctors were actually doing all they could to dismiss their symptoms, and those who persisted in trying to get support and assistance were being 'put through the hoops' to get anywhere …[50]

The Commissioners confirm that these difficulties extended to the independent medical consultants who were engaged by the PAM health service (Aeraqua) to provide specialist assessment. They note that affected people firstly struggled to obtain such referrals to specialists (essential in 'proving' the spray was responsible), but they also "heard

---

[45] Ibid *1.1* pp 20
[46] Ibid *1.1* pp19
[47] Dr Kelly is Head of the AGM (and PAM) Health Service and Director of Aeraqua
[48] PAM Focus Group Report *p13*
[49] Later in the programme some prescription charges were paid for by MAF/Aeraqua
[50] Blackmore (2003) pp 29-30

testimony from those who did obtain such referrals that specialists' recommendations were ignored or overturned by Aeraqua." [51]

The Ombudsman who examined one of these cases in detail in his investigation disputed the assertion by Aeraqua that although "[the patient] has had thorough and repetitive medical assessments, by medical specialists, [they] could not give any credence to her claims of spray related health effects". He records that he had been given medical reports and documents under a sworn Statutory Declaration that did "give credence to the existence of spray related health effects". [52]

The Ombudsman also refers to the concerns of another medical consultant, engaged for assessments by Aeraqua, about the dangers of people becoming sensitised to ingredients in the spray. [53] Dr Ameratunga, a leading Auckland allergy specialist, also warned about the unreliability of the patch testing then being 'promoted' by Aeraqua and the need for longer term studies in this relatively unknown area. His warnings appear to have gone unheeded. The fact that Dr Ameratunga was - bizarrely - included in a list of 'activist critics' of the spraying programme in a MAF communications strategy supplied in evidence to a Hamilton High Court in 2003, [54] might explain why.

The under-reporting of health effects both to government 'help-lines' and residents' own doctors appears to be a common theme and has been noted in overseas surveillance and monitoring programmes. The report by the Washington State Department of Health (Anon 2001) of that Btk spraying typifies this when it records that the majority of people did not seek health care for their symptoms. Indeed, the report goes on to make recommendations for better capture of these effects in future surveillance programmes.

In New Zealand, underreporting of adverse effects should have been anticipated and considered by Public Health and the PAM/AGM Health Service because they were run by the very same people who had documented this phenomenon during the first aerial spraying in 1996-97 for *Operation Evergreen*.

Official reports and media statements show that in February 1997, five months after aerial spraying began in *Operation Evergreen*, a summary report from Auckland Public Health of "possible Btk-associated health events" recorded only nine formal reports of illness through its passive reporting system – 3 reports from GPs and 6 from members of the public. This was the only system set in place, it was explained, because "the [1996] HRA suggested no specific condition for monitoring (due to lack of evidence on residential populations)." [55] But the publication of what was seen by the community as Public Health's grossly inaccurate summary triggered a huge response, and dozens of adverse health reports flooded in.

According to a second press release from Public Health in May 1997 of further analysis of reported health events, these reports appear to have taken Public Health by surprise. It included the urgent request that people report any "Btk related health effects" to their GP or 0800 number and included the comment that Public Health was "somewhat concerned to hear discussion of symptoms by residents in the media which may indicate a level of prevalence of illness not reflected in the formal reporting mechanisms."

---

[51] Report of the People's Inquiry *pp 1.1*
[52] Report of the Ombudsman *13.55*
[53] Ibid *13.15*
[54] Part of MAF affidavit opposing an interim injunction lodged by a Hamilton Group to stop the AGM spraying going ahead until a Judicial Review could be carried out.
[55] Auckland Healthcare, Press Release + Summary of reports of possible btk-associated health events. 25th Feb 1997

By the time the HRA was updated four months later in September 1997, Public Health say adverse health effects had been reported from 278 residents. So why were these reports not taken seriously by Public Health, particularly as the number of people reporting adverse effects had risen to 375 by the time of their PAM HRA in 2002? The Ombudsman considers that an *Operation Evergreen* surveillance report from MAF may have been the influential factor.

MAF's report of the 1996-97 spray programme Health Surveillance following Operation Evergreen (Aeraqua 2001) [56] suddenly appeared in May 2001 as MAF's plans to move to aerial spraying for the PAM were being made. As part of its retrospective surveillance Aeraqua says it had examined the hundreds of adverse health reports submitted by the East Auckland community. Whilst it notes that many of the 375 individuals self-reporting effects had not consulted a medical practitioner, it goes on to say that "… their concerns were part of a spectrum of symptoms commonly taken to a family doctor". It was concluded that the frequency of occurrence of many of the "health concerns" was no different from natural variation and "no adverse health patterns were found, once patterns were examined at a population level."

There is a conspicuous disconnect between this figure of only 375 individuals reporting effects and the Ministry's own 1997 post-spray survey results canvassed during the same period of between 8% and 10% of the exposed 80,000+ population recording they had been affected by the spray – extrapolating, that is 6,500 to 8,000 people. One of the strong messages the community took from these figures is the 'distortion' that arises when gross population numbers are used by Public Health to derive – or in this case, dismiss - the incidence of health impacts. The Ombudsman inadvertently illustrates one element of this in his "spray comparisons" table, reproduced below, of the numbers of people reporting sick from the three programmes.[57]

TABLE 1 – Spray comparisons

Programme	People reporting sick	Population in spray area (approx)	Percentage reporting sick (approx)	Frequency of spraying	Duration of spray programme (weeks)
OEG	375	86,000	0.4	9/30 wks	30
PAM	3500 (figs,vary)	193,000	1.6	40/104 wks	104
AGM	855	24,000	3.6	1/8wks	8

Putting to one side the Ministry's survey figures and only examining the 'reported' cases here, there is a vast difference between 375 *Operation Evergreen* (OEG) people reporting being affected out of a population of 86,000 - (0.4% - Ombudsman's figure) and 375 from a population of 5,640 [58] (6.6%). This may simply be because all 86,000 people were not sprayed for seven months; some only received between 4 to 7 sprays, whilst the 5,640 people resident in the intensive zone were subject to all 23 aerial sprays and up to 21 ground sprays. [59]

[56] Note: The Director of Aeraqua authored the 1996 HRA under previous name of Jenner Consultants
[57] Report of the Ombudsman *5.11*
[58] Aeraqua estimated resident population in the intensive 'hot zone'.
[59] It is noted that the number of sprays recorded in this table are not accurate – 23 sprays were experienced by some people in the OEG programme not 9, and 70 sprays in the PAM, not 40.

Indeed, this is precisely why the Ministry responded to the expressed concerns of residents about unknown future effects and the lack of any long term studies, and initiated a voluntary register [60] of *only* these 5,640 individuals who the Ministry said had the "greatest residential exposure to the spray" to "assist future scientific health studies". [61] A similar pattern in the PAM zone occurred where the population in the 'intensive' zone were disproportionally impacted because they received nearly all the sprays. Only the Hamilton operation saw the whole targeted population receive all the sprays.

Of equal concern to the community, was the use of gross population figures to 'water down' effects when considering small numbers of serious or rare conditions. This is illustrated by an incident in 1997 when two local nurse/midwives reported a 'cluster' of miscarriages and premature births in the Tussock Moth spray area. As detailed by the Plunket Area Manager, [62] "both nurses have seen babies born prematurely at times close together and in close proximity to each other." In all there were 8 mothers involved in a small area in the suburb of Orakei. Although both nurses defined 'premature' as "three to eight weeks early," the subsequent investigation by Auckland Healthcare was only of babies born under 32 weeks, thus eliminating all these Orakei clustered babies from the figures.

Additionally, Auckland Healthcare's figures were derived from the whole of the eastern suburbs. The Northern Health officer who prepared these statistics reported that any statistical anomaly in an area as small as [Orakei] would not show up in this information she supplied to Auckland Healthcare. "A population sample this size would mask any localised increase." [63]

Auckland Healthcare would go on to use these Northern Health statistics and a supposed cluster investigation to declare there had been no increase in premature births and miscarriages in the spray zone. Examination of this cluster reported in the 1997 HRA (Auckland Healthcare 1997) shows this conclusion is based on an incomplete investigation with information available for only 6 of 12 cases. [64] This unfinished "study" was subsequently cited in (Aeraqua 2001) as confirming there was no cluster. No data was supplied and no further information was reported on the remaining 6 cases. [65]

The same pattern of misleading data informing invalid conclusions was observed in another cluster investigation noted earlier which was originally initiated by the author into congenital hypothyroidism reported in the *Operation Evergreen* spray zone. An independent public health specialist conducted a formal cluster investigation for Auckland Public Health in 2001 of 26 people reporting new thyroid problems to the author following the 1996/97 spray. [66] He reported back to Public Health with his recommendations for more detailed analysis and follow up, particularly of the 4 cases of congenital hypothyroidism identified. None of the investigator's recommendations appear to have been implemented. Public Health tentatively concluded in 2002 there was no evidence of a congenital hypothyroid cluster. No report of the investigation has been published.

[60] See Aeraqua 2001 - pp50-57 for details
[61] As of late 2018, the register has not been accessed except by this author, and no follow up studies have been done. (The author is on the register).
[62] Plunket provides a nationwide free health service supporting the development and health and wellbeing of children from birth to five years old
[63] *Fears for Research* East & Bays Courier 29.8.97
[64] Auckland Healthcare 1997 Appendix Four
[65] Aeraqua 2001 pp15
[66] 36 cases were actually logged by the author but only 26 were able to participate.

But a study commissioned by MAF four years later into the PAM campaign - Population health impacts of airborne spraying in Auckland: A retrospective case-control study of birth defects and congenital hypothyroidism (White P, Borman B, 2006) - appeared to follow up on this but came to the same Tussock Moth 'no evidence' conclusion about the PAM spraying. It found that "… despite the associations identified, it is not possible from this analysis to attribute an increase in birth defect prevalence directly to aerial spraying … the same conclusion holds for congenital hypothyroidism where more cases occurred in the control areas compared to the spray areas, and in the spray areas during non-exposed (pre and post spraying) periods". But the study data and the subsequent conclusions are flawed.

One of the two control areas chosen for this research included a large area of the East Auckland *Operation Evergreen* spray zone where active aerial spraying was still taking place during the study's supposed unexposed pre-control period of the Birth Defect study. Although one author did comment [67] that had they been aware of the East Auckland spray, alternative comparison areas might have been chosen, it is disturbing that no-one from MAF, Ministry of Health or any of the peer reviewers picked up on this. [68]

It has to be considered that, as evidenced, the authors were not only oblivious of the fact that *Operation Evergreen* took place but also totally ignorant of the formal congenital hypothyroid cluster investigation by Auckland Public Health that took place only four years previously. Because it would be extraordinary that a study whose terms of reference - *Study and identify any changes in the prevalence of birth defects and newborn thyroid disorders in relation to spray activities* – would not at least reference the 1996/1997 aerial spraying which gave rise to the original investigation of "newborn thyroid disorders" they were now investigating literally next door in the PAM area. It is perhaps an indication the original thyroid investigation was never properly undertaken or reported, as examined later in this review.

Mention should be made here of the apparent failure of the New Zealand studies and surveillance reports - illustrated by this study above - to take into account the proximity of the *Operation Evergreen* and PAM campaigns, both geographically and temporally. Community records of both campaigns reveal the Auckland population is highly mobile and there was/is significant cross-over of people, working, studying or relocating in and out of the two spray areas. As identified previously this was of concern when case-control or cohort studies (and even cluster investigations) are looking at a small number of cases.

Just one example in the community records, is of a mother who lives in the west Auckland PAM area (still) but was working in the eastern suburbs during *Operation Evergreen* and was pregnant with twins. They were born prematurely during the spraying and one died. The 'case' would not show up in Auckland Healthcare's miscarriage/premature birth cluster investigation. This was because although the mother gave birth in the relevant city hospital that the figures were derived from, she did not have an address in the spray zone and was therefore allocated into the "non-exposed" cases. With such small numbers, all data is skewed and inaccurate when relying only on a residential address for 'exposure'.

So, were the birth defects study and the supposed cluster investigations just inadequate and poorly designed? Or a deliberate deflection or suppression of warning flags by Public Health by failing to properly undertake, or complete, the investigations - in other words failing to look? Did the same thing happen to the risk assessments and other retrospective surveillance studies that dismissed community reported symptoms and effects?

[67] Personal communication 2018
[68] One reviewer had in fact reviewed an Operation Evergreen paper only a few years earlier.

It is of note that what were described early on by Public Health in the *Operation Evergreen* spraying as "medical health events" or "health impacts" and "illnesses", translated into only casual *health concerns* when reported directly by residents. The consequence of downplaying these community-reported symptoms and effects is explored later in this review, but this language and the conclusions drawn that the health effects were not serious did not escape the notice of the Ombudsman.

The Ombudsman considered that not only did MAF feel able to "use these [Health Surveillance] conclusions for claiming safety for its future spray operations" but that they also influenced its approach to complaints that arose during the later operations. Indeed, the Ombudsman appears irritated by the final "oft repeated phrase" of the Aeraqua Surveillance report which he underlines a number of times in his Report. He comments that whilst the phrase "no adverse health patterns were found, once patterns were examined at a population level" had its value in the creation of health statistics it seemed to him that the repeated use of it in reports that went to Ministers "may have somewhat played down possible danger to individuals."

He does in fact go on to express concern about the apparent playing down of these self-reported health effects from the *Operation Evergreen* aerial spraying. He had noted that the 375 complainants had reported a variety of symptoms, all of which "fell within the parameters anticipated in the relevant HRA." The Ministry's criticism of this statement in his draft report to them is robustly defended by the Ombudsman.

> In its reply to my draft Report MAF points out this is consistent with the advice received by MAF, and with its messages to Ministers and the public. It is said that elsewhere in my Report my opinion has been premised on a contrary view. However, that is not so. The symptoms *per se* are not the issue. The issues are extent and severity, both of which may have been played down, and the consistency of which must surely rule-out any suggestion of coincidence, leading to the conclusion that such reactions are to be expected and are not to be written down. It seems to me that the coincidence and consistency of events can be said to move the balance of causation from "doubtful/possible" to "probable". [69]

It was also observed by the Ombudsman that although a number of staff and pupils of several east Auckland schools were affected by the *Operation Evergreen* spray no reports of these incidents were made [to Public Health] with the result that "these events did not enter the official statistics. There may or may not have been other such occurrences." [70]

Concern had in fact been raised on this very point by the east Auckland resident's group, STOP [71] when they began documenting adverse health effects for the community. They reported that a number of calls to the official *Operation Evergreen* Bugline had seemingly disappeared. Consistent reports appeared to show that complainants were telephoned by a contracted doctor who after listening to details of the family symptoms would tell the resident that "Btk harms only caterpillars". The STOP Co-ordinator suggested this dismissal of symptoms meant they did not enter the official statistics. [72]

Apparently confirming this view were several 'notable' conditions documented in the community records which although formally reported to Public Health failed to materialise in any of the subsequent surveillance reports or statistics. This included a corneal ulcer confirmed on emergency referral to a specialist ophthalmic consultant by the patient's optometrist, and two unrelated, but identical, hospitalisations in young people for severe

[69] Report of the Ombudsman *13.2*
[70] Although three schools in the inner spray zone had been invited to submit their school rolls to the voluntary register of exposed residents – there seemed to be no active follow-up and no rolls were included.
[71] STOP - Society Targeting Overuse of Pesticides NZ
[72] Healthy Options Magazine: Autumn 1997.

and unremitting headaches for which no medical explanation was found in spite of extensive blood tests, CT scans and lumbar punctures. In one case, the Consultant confirmed that symptoms were so troubling they thought the patient had a brain tumour. That these cases failed to be documented is of huge concern. These were all serious events so their absence from the statistics stands out, but how many less identifiable incidents and effects were omitted from the records as suggested above by the Ombudsman?

It is of note that the Hamilton OSH Report, for all its impact and import, has not been subsequently referenced, reviewed or even mentioned in *any* government papers or their commissioned reports and studies later provided to the Ombudsman. Indeed, the Ombudsman expresses concern at the lack of action on their recommendations.

> In response to my enquiry as to what action had been taken regarding the recommendation by OSH cited above I have been informed by the Ministry of Health that as it has no responsibility or accountability for occupational health and safety, apparently as a consequence of the Health and Safety in Employment Act 1992, it has taken no action on the recommendation. Consequently, it would appear that a potentially useful piece of evidence has been ignored. [73]

This lack of action on the part of the MoH will be addressed later in this Review, for it would have profound implications for any recognition of the effects experienced by the staff at the high school. But all these incidents above would appear to confirm the concerns expressed by the Commissioners about what they saw as "selective" data being used to deny adverse effects. They report that instead of the empirical studies recommended by a government appointed Health Advisory Group, the only publications arising from the PAM and AGM spray programmes were analyses by Aeraqua of the data collected by its own health service.

Aeraqua's claim that this data showed that "the spray programme did not result in any new-onset illnesses or any exacerbations of existing illness" was firmly rejected by the Commissioners. Validating Dr Watts' observations noted previously about conclusions being 'rebroadcast' this Aeraqua health monitoring report (Aeraqua, 2005) was rapidly quoted in a new 2006 risk assessment by a toxicologist in support of his assertion that Foray 48B could not cause *any* health effects. The Commissioners note:

> The DiMarco report (DiMarco 2006) assessing the health effects of aerially spraying Foray48B has used the Aeraqua report as the basis for some of its conclusions. The report states: "Health studies undertaken in New Zealand suggest that while the spraying programmes are associated with increased community concerns about their health, the evidence does not support a causative link between Foray48B and the reported health effects. (p 17)" [74]

The Commissioners consider that the persistence of belief in the safety of Foray 48B appeared to have become "an article of faith, difficult to dislodge by empirical evidence to the contrary." Instead, an alternative theory is presented by these two authors [DiMarco and Kelly (Aeraqua)] that the spray effects reported by the community to the government's health service provider were primarily psychological.

> The 2005 Aeraqua health monitoring report (Aeraqua 2005) supports the conclusions of the 2002 Health Risk Assessment (which in turn supported the previous work of Aeraqua and its earlier incarnation, Jenner Consultants) that the use of Foray48B was "generally safe for the public" and instead attributes reported health effects primarily to psychological factors. These factors include "attitudes and opinions", the stress stemming from the incorrect belief that they have been exposed to something harmful, and personality types high in "negative affectivity" (pp 123-124). Stress and anxiety are seen as particularly relevant (pp127-128) and are said to be likely to have been caused

[73] Report of the Ombudsman. *13.75*
[74] Report of the People's Inquiry – *2.1.2* pp38

> by "disinformation", or "extensive reporting by the media of the protest movement, promoting the view of detrimental effects of ground and aerial spraying in pest control." [75]

Of interest and relevance here is a study completed in 2005 for a Master's Thesis, Science Communication in an age of risk: a Case Study of Two Biosecurity Incursions (McEntee 2005) which rejects this view of media influence.

McEntee used interviews with key stakeholders and detailed content analysis of newspapers in the way media portrayed the *Operation Evergreen* and PAM campaigns. McEntee emphasised that her thesis "does not support any conclusion that media coverage in PAM resulted in increased fear in the community re health issues". [76] (Emphasis in the original).

The Aeraqua psychosomatic premise, which will be explored in greater detail later in this review, was soundly rejected by the Commissioners.

> "[N]o empirical evidence was offered to support the conclusion that the experienced health impacts in this case were a result of psychosomatic responses. Symptoms should not be dismissed as psychosomatic simply because their nature and pattern does not fit what the assessor expected based on past risk assessments, particularly where the level of exposure is unusual (e.g., long-term, repeated exposure of an urban population to Foray 48B)." [77]

This belief in the 'safety' of the Btk spray and the evidenced dismissal of any adverse health effects appears to be reinforced from some external factors, notably, the degree of spray exposure that the population experienced. The public health consequence of the failure to actually monitor this exposure in any of the New Zealand spray programmes is significant.

* * * * *

[75] Ibid – *2.1.2* pp38
[76] Author personal communication
[77] Report of the People's Inquiry pp 39

UNPRECEDENTED WORLDWIDE
Spray Exposure, Drift, Persistence and Monitoring - and the Public Health Consequences

It was the unusual exposures, not experienced anywhere else in the world, and neither anticipated nor assessed in the HRAs, which were flagged early on by Blackmore and Watts in their 2003 papers and echoed by both the government peer reviewers of these reports. The Ombudsman comments that Dr Phillips in his review (Phillips, 2003) of the Blackmore Report had noted the "problems of exposure assessment, the apparent absence of predictive modeling, and contingency planning for possible adverse effects. [Dr Phillips] said:

> 'Spraying frequency, coverage, intensity and duration has clearly expanded significantly beyond that initially anticipated. It has occurred over a far greater area, with a far larger population exposed. This has potential public health consequences. Exposure for some in high intensity spray zones may have been far higher than initially estimated. Unintentional overlap compounding exposure in some areas.' " [78]

The Ombudsman clearly concurs, detailing his concerns about the greatly expanded PAM spray zone. He notes that even though the Minister of Biosecurity had acknowledged that the programme was on a scale that was unprecedented worldwide "nowhere does there seem to be addressed the implications of a very much greater area being sprayed and in a more intensive manner." [79] He considers the 2002 Health Risk Assessment (HRA) for the PAM had become "an unreliable basis because of the changes which had been made to the spray programme … and [was] vastly different from what actually occurred." [80]

But as noted previously, the original 1996 HRA - which formed the evidence base for all the subsequent HRAs – also turned out to be unsound when it came to assessing the intensity of spraying that eventuated. Of note is that the Ombudsman revealed scientific and public health uncertainties and cautions expressed *before* any NZ spraying was undertaken, never translated into the HRAs.

The unearthing of meticulously recorded minutes of the Tussock Moth 1996 Government-convened Science Panel by the resident's group STOP, provided the Ombudsman with a wealth of relevant material which he covers in some detail. As the Ombudsman notes "the then Government, recognizing the importance of a broad range of independent scientific advice, established a group of scientists known as the Tussock Moth Science Panel, to report directly to Ministers … the wide-spread aerial spraying of a large urban population was recognised as a unique situation in New Zealand and the Panel paid particular heed to the issues thus raised." [81]

Issues around health effects relating to the degree of exposure to the spray were considered by the Panel and covered in some detail. These included:

- The question of residues of the spray. The need to consider the implications of repeated exposure for increased sensitivity [which] needed further attention.
- The issue of the persistence of *Btk* in the environment.
- The need for severe asthmatics to take care was also noted.

[78] Report of the Ombudsman *13.25*
[79] Ibid *10.9*
[80] Ibid *16.12-16.13*
[81] Ibid *3.11-3.16*

- Measurement was required of the amount of spray in the air that people would be exposed to, and how much would be in a house that had its doors and windows closed.

In fact, as the Ombudsman recorded, "it was regarded as important to establish the exact level of doses to which the residents of the spray zone would be exposed, and it could be of assistance to compare that dose level with that to which people were currently exposed as a result of private sprays and naturally occurring *Bt."* [82]

The outcome of these considerations was research initiated by the Science Panel. But as the Ombudsman would later observe, it would appear this preparatory work was either ignored or completely forgotten - and it is clear from the NZ experience that one of the problematic definitions was of 'exposure'. As the Ombudsman records from Watts:

> "The exposure assessment for the PAM operation is premised on exposure during a short period of time, during or after the spray application. Experience in West Auckland has been that some people may be exposed directly to the spray up to five times in one day - in addition to the residual spray in their homes and workplaces... Thus the exposure assessment in this report [2002 HRA] appears to significantly underestimate the actual exposure people are experiencing, and hence the conclusions it reaches cannot be supported." [Watts, 2003] p.15 [83]

Plainly the number of sprays applied and their cumulative effects should be factored into exposure determination, but in practice it seems they are rarely considered. Persistence of the spray - or more accurately in this case only the active ingredient, Btk - may be reviewed in HRAs and surveillance reports, but is dismissed as inconsequential. Firstly, because Btk is considered ubiquitous in the environment, and secondly, it is assumed that all the spray components will degrade or dissipate within a short period of time. But studies initiated by the Tussock Moth Science Panel provide convincing evidence that both these assumptions are incorrect.

Research undertaken for the Ministry of Forestry in 1996, (Broadwell et al, 1996), found that Btk-like isolates appeared infrequently in the wider Auckland soil prior to spraying against the Tussock Moth - being found at only 6 of 100 sites sampled. A subsequent study for MAF, (Gribben, 2002) found that whilst there had been no Btk found pre-spray in the Tussock Moth inner spray zone, after spraying it was now a major component. Samples taken from the same sites at 2 months, 2 years and 4 years post spray, shows there was only a minimal decrease in viable Btk spores during this time. Gribben advised MAF that the Btk would persist at high levels in the PAM spray zone for longer than the four years he sampled the Tussock Moth sites.

Research brought to the attention of the author shortly after Gribben in 2003 showed that Btk can persist in the soil for at least 7 years (88 months) and its toxin for over 2 years (28 months). (Vettori et al 2003a). The authors show in further research at the same site (Vettori et al 2003b), that after five years they had detected a genetic exchange between the spray-introduced Btk and indigenous bacteria. The authors comment that these results indicated that it was the very persistence of the Btk that favoured this gene transfer. This transfer occurred under normal field conditions of an annual spray with the same Btk commercial product (Foray 48B) used in all three NZ campaigns.

Similarly, spray drift should be considered in the cumulative exposure calculation. Apart from application overlap, all aerially applied sprays drift out of the target zone. The Ombudsman reports that NZ studies, supplied to him by the government, acknowledge that spray drift was "the biggest issue with application of Btk, especially from the air".

---

[82] Ibid *3.12,13*
[83] Ibid *13.34-13.35*

Studies quoted by the Ombudsman and Commissioners show that up to 60 percent of aerially applied pesticide can drift out of the spray zone, and foliage was still found to be toxic [to caterpillars] 3km from the application site. Even higher concentrations were found outside the spray zone than inside the zone on windy days.

During the PAM spraying a community group member meticulously recorded data from local weather stations which showed that spraying occurred on a regular basis in winds that exceeded the recommended limit for spraying. MAF's apparent need to complete the spray runs in spite of rising adverse weather conditions, appeared to take precedence over any concerns about drift and exposure for people outside the target zone.

In 2002, just as they moved to blanket spraying with three aircraft, MAF did in fact increase their 'permitted' wind velocity for operations from 12km to 18km per hour. (Original recommendation was for spraying in wind speeds under 7km/hr).[84] But as the community data showed, even this limit was exceeded and wind gusts in the 20s peaking up to 30km/hr were regularly recorded. In these circumstances extensive drift outside the target zone was not just possible but probable.

Despite this MAF (and Public Health) still defined drift only as the maximum distance spray *droplets* may still deposit on the ground in an area bordering the target zone. This definition does not take into account the drift of aerosol particles. The comprehensive Canadian study (Teschke et al, 2001 [85]) quoted in both investigations, indicated that fine aerosols, which are invisible to the naked eye, are produced during aerial spraying. Being much lighter they do not reach the ground immediately but can remain airborne enabling them to drift considerable distances on the wind and thermal air currents to impact some distance from the spray zone. These aerosols also penetrate deep into buildings, and this migration indoors takes place whatever the type of house or building.

The ability for aerosols to migrate indoors was confirmed in New Zealand conditions by a pre-Teschke study undertaken for the Ministry of Forestry during *Operation Evergreen.* The study (Thorogood et al, 1996) [86] measured the airborne concentrations of the Btk spores and the degree they penetrated and persisted inside and outside homes after spraying.

Measurable penetration of Btk spores was recorded in a sampling study of 8 houses during the first *Operation Evergreen* aerial spray. The study found there was considerable variation in the extent of penetration, unrelated to the age of the house or type of joinery. This was borne out in the Teschke study, which found no relationship in the 33 homes studied between indoor Btk concentrations and the type of house, conditions or environment. Simultaneous samples taken outside these 33 homes were able to accurately compare the indoor/outdoor concentrations and the movement of the Btk between.

The Teschke study shows that the pattern of differences between indoor and outdoor exposure was "unexpectedly complex". The highest concentrations of Btk, both inside and out, was at 2 to 3 hours after start of spraying, and tended to be lower during the spray. Whilst concentrations outside fell exponentially after this time, indoor measurements 5-6 hours after spraying were higher than outside. The study suggests that migration of Btk inside took place with the resumption of normal activities. The outdoor sampling in the

[84] PAM Health Steering Group meeting minutes 30 Oct 2001.
[85] This study was part of a series of studies conducted for the Capital Health Region. See "Airborne Exposures to *Bacillus thuringiensis* var.*kurstaki* During Gypsy Moth Eradication" (Teschke et al, May 2000) for the full Report.
[86] Referenced by Teschke

Thorogood study was from a separate site on an open reserve so comparisons are not reliable.

After correspondence with Teschke about her research, the community had alerted both public health and MAF to her findings and detailed them in a report [87] before aerial spraying began for the PAM. If note had been taken of Teschke's findings and recommendations then recognition that significant spray exposure could take place indoors could have alerted all schools to the problem and therefore to possible solutions as suggested by the community. In the Hamilton high school case it might have prevented, or at least ameliorated, the serious consequences experienced by some staff.

Teschke's research shows that the spray which penetrates buildings may be composed of the smallest aerosols that take much longer to settle out of the air. Their fine size also means they may be inhaled deep into the lungs. As the Ombudsman notes from Dr Watt's examination of the PAM HRA this exposure route appears to be disregarded by the health risk assessors. [88]

> It appears that dermal contact was assumed to be the primary route of exposure for residents outside, with inhalation as a possible alternative, but Dr Watts considers that expectation may have led to an underestimation of the exposure via inhalation (a view shared by the authors of the WSM Report [Hales et al, 2004]) …" [89]

The OSH case at the Hamilton high school provides convincing evidence that adverse effects experienced by staff were as a result of this *indirect* exposure inside the school buildings. The spray not only penetrated the school but its components were still at sufficient 'volume or concentration' to cause severe health reactions and adverse effects in the 18% of staff affected.

A return of symptoms was also reported by staff members on re-entering the school in the days after spraying had occurred.[90] As this was severe enough to prevent them continuing at work, a high degree of indoor spray persistence would have had to exist. This pattern of exacerbations, some severe and debilitating, was also reported by many PAM residents returning home following absence during spraying.[91] Why was this mechanism of exposure not recognised?

The evidence from the OSH Report clearly shows the Government's Health Service doctors (Aeraqua) failed to establish or recognise people were being exposed to the spray in their workplace, until after OSH had been brought in to investigate. It was only the fact that a significant number of staff members had allergies to a known trace component of the spent Btk broth [92] that the causal link was confirmed and accepted by the AGM Health Service.

> "… it was agreed by the doctors that it is indeed extraordinary to have such a large cohort associated with a fish allergy. All were known to MAF, but the system in place failed to report that they all worked in the same place." [93]

---

[87] Blackmore, November 2001
[88] Watts, 2003
[89] Report of the Ombudsman *13.35*
[90] See OSH and Waikato Times reports – July 2004
[91] Blackmore. 2003 pp 14-15
[92] Aerosols which stay suspended in the air include all components of the insecticide formulation. (Watts 2003 notes from Teschke et al 2001 study),
[93] OSH Report 5.14 p 9

The conclusion that the system failed to identify a common workplace clouds the issue. Although each individual was apparently known to the AGM Health Service as being at risk, they were not identified as being *exposed*. This was because the only criterion used by the Service for being registered as exposed was to have a residential address in the spray zone, and none of the staff did.

The same situation would apply to any worker in a spray zone [94] as it would to students attending school. It is of note that Selwyn College in the heavily sprayed 'hot zone' of *Operation Evergreen* had an 'open' enrolment policy. As a specialist college it took many of its pupils from outside the spray zone. (Although the student roll was supposed to be entered into the Tussock Moth Health Register as described in the application for ethics approval for this Register, this was not done. There appears no follow-up was undertaken to ensure this happened). [95]

The consequence is illustrated in another case identified in community records where a former pupil of Selwyn College developed thyroid cancer - (notified to the author too late to be included in the Public Health thyroid cluster investigation). He would not appear in *any* statistics or surveillance studies (or potential case-control or cohort studies) as he not only lived outside the spray zone but had gone overseas straight after college. His Australian doctors had expressed interest in obtaining information about the spray as they were baffled by this young man's cancer and "felt that it had to be an environmental 'insult' or initiator." [96]

Even if not identified in the HRAs, it is difficult to understand why exposure at work was not factored into the medical interviews or officially 'recognised' until this Hamilton high school incident, because as noted previously the *same* government consultants had been assessing, and apparently recording and reporting, the New Zealand health effects of this pesticide spray since 1996. It is not unreasonable to question why professionals appeared to be wedded to an exposure criterion that excluded, for example, not just teachers but, as noted above, thousands of children who only entered a spray zone to attend school.

Furthermore, as the OSH incident is probably the first recorded and 'officially' acknowledged case of indirect exposure causing adverse health effects, it is to be wondered why urgent action was not taken during the remaining month of spraying to actually measure not only the mechanism of spray penetration at this school but the inside persistence levels that were causing these adverse reactions. A legitimate and scientifically useful research opportunity, lost. Or deliberately ignored?

It is perhaps not so cynical to suggest that authorities really did not want to know. If you don't look, you can't find. And, as the Commissioners note elsewhere with regard to the PAM operation, there was no spray monitoring, assessment or measurement of exposure at any time before, during or after that programme either.

> We heard testimony that explicit requests to Auckland Public Health and MAF to carry out baseline health studies before the aerial spraying began, and exposure studies during the spray programme, were rejected on the grounds that "it would be difficult for us to justify spending substantial government funds in this area when we are being told by the health experts we have commissioned …that there [are no effects]."
>
> This is surprising, as all assessments of health risk as well as epidemiological studies of effects need accurate information regarding exposure. We have already seen that the Auckland Public Health

[94] The Douglas Manufacturing Staff Survey recorded that 42% of staff lived outside the spray zone and were therefore only exposed at work, but did not note how many of the 15% affected fell into this category.
[95] Ethics application – Nov 1997. Retrieved from National Archive 2018.
[96] Author personal communication

> risk assessment of 2002 was based on what turned out to be inaccurate assumptions regarding likely exposure. Given the volume of health complaints arising, it is difficult to understand why no attempt was made to measure actual human exposures during the two-and-a-half years of the spray programme [97]

The failure to carry out any actual spray monitoring or measurement of its distribution or persistence had wider implications. Without 'proof' of exposure thousands of reported health effects could be discounted.

That this occurred in New Zealand is evident from the unpublished government-commissioned reviews and assessments provided to the Ombudsman late in his investigation after spraying was over. [98] Throughout these internal Ministry of Health assessments, where reports and studies both in New Zealand and overseas have recorded health symptoms or effects from the Btk spray, they are dismissed by the New Zealand authors as unsound because they are lacking in exposure data.

- It is almost impossible to determine whether symptoms were the result of exposure to spray, since exposure not measured … (of Anon, 2001).
- There is a lack of data on individual exposure to spray – thus it is hard to find direct association between symptoms and exposure ... (of Anon, 1999).
- However, the study design with its focus on self-reports with no exposure data … precludes it from providing valid epidemiological evidence demonstrating a causal link … (of Petrie, 2003).
- This study provides no information about the actual exposure to the spray, which is important to establish a causal link … (of Gallagher 2005).
- Furthermore, [all the epidemiological studies] are significantly limited in their ability to provide aetiological evidence. They lack comprehensive individual level exposure data to Foray 48B …

It is impossible to get past this 'catch-22' situation. The New Zealand Government's 'health experts' said they did not believe there would be any adverse health effects from the spraying, so exposure did not need to be monitored or measured. Because exposure was not monitored or measured, people adversely affected could not 'prove' it was the spray causing their symptoms.

Even worse, as illustrated earlier by the Commissioners, without 'proof' of exposure the experienced health impacts reported by the community were instead re-labelled and attributed to psychosomatic responses – with the implication inherent in this label that any ill health effects are the fault of the person, not the external environmental factors. How this could have happened in the face of all the evidence is deeply concerning.

* * * * *

[97] Report of the People's Inquiry *2.1.1* pp 37
[98] Public Health Intelligence, 2005 and 2006; Frampton et al, 2007 – referenced in original

"IT'S ALL IN YOUR HEAD"
Health 'Concerns', 'Worries' and 'Fears'

> *As evening fell, Bill drove away from his home in Waitakere. Working methodically, he visited each of the PAM pheromone traps hung alongside the road that contained a caged live female moth. A couple of squirts from a can of fly spray then Bill moved on to the next trap in an expanding circle out from his home. Bill had discovered the only way to keep his family safe from the effects of the spray. No male moth catches in the monitoring traps – no aerial spray. He was risking not only a $100,000 fine and five years' imprisonment, but the whole biosecurity campaign*. [99]

How did it come to this where a perfectly ordinary citizen was resorting to such measures and risks? His answer – no-one was listening to him. A Waitakere community co-ordinator and a member of the government's Health Advisory Group and Community Liaison Group and original member of the Community Advisory Group provided testimony to the PAM Inquiry on the extent of stress and helplessness many people experienced:

> There was a health care service set up with Aeraqua that everyone had to go through if they wanted to get their care free of charge. This service was located in [Auckland city centre] and the system did not work well. There were many complaints from the community about the hoops they had to go through to get treatment, the rudeness of the personnel, and the apparent attitude that there was always some other cause for your illness, it wasn't the spray. Many people just gave up. Others persevered as they had no choice but over the period of the spraying it became an intolerable ordeal. …[100]

For the Commissioners, there was little doubt the persistent belief in the safety of Foray 48B had a significant bearing on the way the community was treated. As they highlight, "the majority of testimony, diverse in many other respects, had one major theme in common: the way in which members of the community were treated when they sought assistance in dealing with the effects of the spray." They record that even before the PAM spraying commenced the message from MAF "emphasised community concerns rather than actual health risks …

> MAF media releases implied that the health service was a response to community perceptions rather than an indication of the health effects of the spray: "Although most people are not at any risk from the spray, MAF responded to *community concerns* from people with respiratory or allergic conditions who *feel* vulnerable with a health monitoring and support programme… [S]ome people *may prefer* to be cautious if they are sensitive to sprays" (MAF media release 14.01.02, emphasis added)". [101]

Indeed, as the Ombudsman records, as late as July 2003, after eighteen months of the PAM aerial spraying and thousands of documented health effects, nothing had changed this view. The Ombudsman notes that the Ministry's Health Advisory Group agreed on Dr Kelly's [102] model for providing health services to the Hamilton community during the AGM spraying that would be "sensitive to the community it serves and that is proactive. This needed to be balanced with '<u>not sending a message</u> that conflicts with Btk being a harmless product.'" [103] (Ombudsman's emphasis)

---

[99] Confidential communication to the author. Not his real name or location
[100] Report of the People's Inquiry pp18-19
[101] Ibid. *1.1* pp 11 – note: emphasis added in the original
[102] Dr Kelly (formerly Jenner) is MAFs consultant and head of AGM (and PAM) Health Services and Director of Aeraqua
[103] Report of the Ombudsman 14.25

It would seem difficult, if not impossible, to warn the public about even known negative impacts of the spray ingredients if the authorities had to maintain this "harmless product" line, so it is perhaps ironic that barely two months later – once again – it was the Hamilton high school case that would disprove this message so dramatically. Interestingly, this incident at the school reveals a sequence of events indicating that in this case psychosomatic 'diagnoses' had arisen from the belief that the 'patients' had not been exposed to the spray.

As the OSH investigation shows, the examining medical personnel from the government's AGM Health Service failed to elicit information from staff presenting with spray-related symptoms that they were working in the spray zone. As none of the staff *lived* in the spray zone – the only criterion for registration – they were not considered exposed to the spray. Therefore, in the 'opinion' of the doctors, the symptoms and reactions staff were reporting had nothing to do with the spray. The subsequent treatment of staff by the medical personnel would appear to confirm this view. In fact, the attitude of the doctors and MAF was the catalyst for the complaint by the high school Principal to OSH. As the OSH investigator reports:

> [The Principal's] concern was that the diagnosis had often failed to acknowledge any link between the spray and the serious health complaints that staff were suffering from. It was perceived that medical consultations had trivialised or dismissed any notion that the spray was the culprit in situations where staff had presented with serious allergic reactions including skin sensitivities and respiratory problems. Specific information as to the extent of suffering indicated that some staff were very severely debilitated to the extent that they suffered extensive swelling and nausea in addition to skin and respiratory complaints. [104]

What the OSH Report does not record is that up until the spraying had commenced, the Principal had *very* publicly supported the spray programme and dismissed what he called the "scare tactics of the small group of rabid environmentalists." But as the Ombudsman records, he "vigorously recanted" his view that the spray would not affect anyone, or that if it did, MAF would treat people with compassion. [105]

The Ombudsman said that after witnessing the experience his staff went through "Mr Elliott [the Principal] emphasised, because of the attitude of certain MAF officials, that these people were suffering very real physical disorders and not some hysterical psychological reaction to the spray. He considered the MAF medical team had failed to act impartially, and had blatantly played down and trivialised patients' concerns." [106] As the Principal wrote in the local newspaper:

> A senior MAF official told me that he thought that our eight serious cases were an aberration: "It was like contagious paranoia where people feed off the psychology of the propaganda spread by the anti-spray brigade." It took a lot of my self-control not to reach across the table and yank his testicles out through his throat." [107]

This very public 'accounting' by the Principal was understandable in the circumstances. These were serious, even life-threatening, medically established effects from a spray component his staff were experiencing, and for a senior government official to hold this opinion is, still, chilling.

Ultimately, the school staff could be considered 'fortunate' in that they had effective and strong support from their employer, and their health effects were confirmed by

[104] OSH Report 2003, *5.6* pp7
[105] Waikato Times, October 2003
[106] Report of the Ombudsman, *13.68*
[107] Waikato Times 4.11.2003 *Spray Support Definitely Wrong.*

independent OSH doctors and 'accepted' by the government's AGM Health Service doctors. But for so many people in the community their experience was vastly different.

They were often isolated, vulnerable individuals, having to deal with unsympathetic medical personnel with no-one to support them in having their health effects recognised and treated. And as the Commissioners comprehensively detail, accounts about the way many people were treated by the medical personnel during the PAM spraying would appear to confirm the same attitude of dismissal that happened during the subsequent AGM operation - because the spray was a "harmless product".

> "This would go some way to explain the treatment reported to us by people who presented to the health service with symptoms. If the spray is safe, then the symptoms must be caused by something else. If the symptoms are caused by something else, then the presenting resident is trying to access 'benefits' they are not entitled to." [108]

The Blackmore Report [109] also confirms this attitude had been present from the very beginning of the PAM campaign with reports of MAF doctors doing all they could to dismiss symptoms as nothing to do with the spray. Worse, the psychological 'diagnosis' was already being used with reports of even seriously affected people having to be seen by a counsellor first if they wanted to be re-located.

> Of even more concern have been reports from several different sources that MAF doctors were sending people for psychiatric assessments – 'they are trying to say it's all in the mind'. One resident very distressed and frightened after receiving a call from a doctor wanted to know who had given their details to the hospital [mental health unit]? Was extremely worried that they would be 'taken away' if they complained any more. [110]

Ultimately, some health service provider reactions went far beyond simple dismissal of symptoms. As detailed by Commissioner Kerns, testimony of one seriously spray-affected witness included documents obtained under the Official Information Act that "suggested that MAF/Aeraqua did not believe she was ill or affected by the spraying, but was abusing the system for personal gain". [111]

Kerns reported what she saw as "a chronology of harassment, ridicule, disrespect and systematic invasions of her privacy far beyond what she considered relevant to the information that might be required about her health or eligibility to receive assistance." That this included bringing in private investigators, with the Aeraqua medical team actively assisting them by secretly photographing inside her rented property when visiting their 'patient' – a property she had been forced to rent outside the spray zone - shows the extraordinary lengths that were undertaken to deny spray-related effects.

At no time does it appear to have been questioned by the medical personnel that what they were doing was unethical?

Other testimony to the Inquiry would appear to confirm not only this case, but the same Hamilton High School reports of systematic denial of effects. The Commissioners observed that many of the community reports show that the medical personnel from the PAM Health Service did seem determined to either "attribute symptoms to any cause but the spray", or not to "consider the possibility that the spray may be aggravating a pre-existing condition such as asthma". This proved distressing for many.

---

[108] Report of the People's Inquiry *1.1 pp13*
[109] Blackmore, 2003
[110] Ibid *pp26*
[111] Report of the People's Inquiry – see footnote 38 *5.3.1 pp71-72*

> We heard repeatedly of people being told during these telephone conversations with Aeraqua nurses (that is, with no physical examination) that their symptoms, including skin rashes and blistered skin, nose ulcers, and respiratory difficulties, could not possibly be caused by the spray. Even more distressing for the callers, other explanations were offered for the symptoms, without any examination or evidence. Examples we heard included menopause (for symptoms of allergy), heredity (for nose ulcer), and hysteria or psychosomatic reaction (for a wide range of symptoms). These dismissals meant the caller could not access the promised services." [112]

The Commissioners also record that testimony indicated provision of services from the PAM Health Service worsened later in the spray programme. "People whose symptoms had previously been accepted as requiring practical support to avoid the spray, report being suddenly told, without further examination, that "there is nothing wrong with you, it's all in your head. … From a resident who suffered a severe skin reaction to the spray we heard:

> [T]owards the end of the campaign (the final few months), the medical staff were claiming I suffered from psychological symptoms and that I am no longer going to be evacuated. I still do not think that this hypothesis is valid since my symptoms started without me being aware that the spraying was taking place in my area. Also I do not have a phobia for low flying aeroplanes (as the medical staff suggested). From that point onwards the medical staff were so uncooperative that it seemed like they were deliberately making it difficult for me to be evacuated …" [113]

It was known by all the community networks at this point in the programme that the medical support service appeared to be in financial difficulties. As the Commissioners note - "support items promised, such as petrol vouchers or food vouchers, did not arrive. Callers to the Health Service report being told they could not obtain support because 'the money's run out'". [114]

So, it has to be asked - was the denial of this resident's health effects reported above (that had been officially diagnosed as spray related by one of MAF's own doctors) and threats of cancelling evacuations during spraying because it was now 'all in their head'- just an unethical mechanism to cut costs?

Or was it the endgame of the continual trivialisation and downplaying of health effects as epitomised by the casual description of presenting health effects by all Public Health and medical teams only as "concerns" and "worries" and not "symptoms" and "effects"?

This characterisation did not arise from the PAM programme; it emerged after the end of the aerial spraying for *Operation Evergreen* and carried over in all public health documents and HRAs from then onwards. The origin and evolvement of psychological attributions had a significant bearing on the way the PAM and AGM communities were subsequently portrayed and treated.

It is clear from the chronicling of the Tussock Moth campaign[115] how initially reported adverse effects when they were from a small number of people rapidly morphed into the psychological attribution when large numbers of the community began presenting with health effects. However, all the evidence shows *Operation Evergreen* is the one programme where a psychosomatic 'classification' should not have been contemplated let alone applied.

---

[112] Ibid *1.1 pp13*
[113] Ibid pp 18
[114] Ibid pp 18
[115] The author was living in the centre of the hot zone, and as a member of the resident's group STOP, coordinated, collated and submitted the community reported health impacts to Public Health.

Consider the fact this was a community experiencing a unique event. The first time an urban population in New Zealand would be subjected to an aerial spray. There were no preconceptions or history to go by – and as comprehensively detailed in the case study (McEntee 2005) about the way the Tussock Moth and PAM campaigns were reported by the press – there was no negative or 'opposing' voice in the media during the first phase of spraying to feed any suggestion of harm. Indeed, it was the opposite.

The campaign took place in an atmosphere of positivity and huge public support over the declared biosecurity threat. An extensive (award-winning) public relations campaign was undertaken by the government with transparent and comprehensive information available to everyone, and public meetings with accessible on the ground scientists and health personnel. They informed the public the moth had to be eradicated for the sake of all New Zealand and, most importantly, "the spray is safe".

There is little doubt that people had confidence and they did believe the authorities. Indicative of this is the public did not take any special precautions to avoid the spray. Media reports were replete with stories of people standing out in their gardens and on hillside vantage points to witness the spray plane in action. It was not until the public were informed that the moth had not been eradicated by the first nine aerial sprays (double what had been expected) and that a further intensive helicopter operation would be needed in a smaller targeted zone, that the growing community unease surfaced.

Community contact and reports show that people who had tolerated unexpected symptoms now became concerned at having to endure further exposure. For the first time people began to question whether it could be the spray causing their problems. Stories of unusual symptoms had already been circulating at school gates and between colleagues and friends. Reports of sudden and serious nose bleeding in both adults and children for example, and severe and unremitting headaches and migraines that did not respond to usual medication – (including - as noted earlier - two emergency hospitalisations) [116] - did not give confidence.

Community unease became outright disbelief and even anger after publication of a summary report from Public Health had noted "surprisingly small" numbers of community health reports - (nine) - all of which were dismissed for various reasons e.g. "lack of an appropriate temporal relationship, inconsistent symptom complexes etc." and therefore it was "not possible to establish any causative association".[117] *Everyone* knew someone who was experiencing effects, so how could it be such a small number? Community accounts began pouring in and appearing in the local newspapers, challenging and disputing this Public Health conclusion.

The Public Health report of these additional community health effects was summarised in two minor paragraphs of the 100-page September HRA (Auckland Healthcare, 1997) as an "analysis of spray-related health *concerns*" (Emphasis added). The 1997 HRA goes on to say they found it difficult to assess the significance of the 682 self-reported symptoms because of the "lack of baseline information on the numbers of these complaints before spraying" and that the people volunteering symptoms "are self-selected and may not [be representative] of the whole population possibly exposed."

The HRA goes on to suggest that many health hazards present as increased reporting of non-specific symptoms. "The pattern and number of such symptoms are remarkably constant from hazard to hazard suggesting that common psychological and social factors,

[116] No medical explanation found for either case and Public Health surveillance did not capture them nor did they enter OEG statistics.

[117] Auckland Healthcare, Press Release + Summary of reports of possible btk-associated health events. 25th Feb 1997

not directly related to the exposure may be involved". [118] But as the timeline outlined above shows, it is not plausible that these "self-selected reported effects" should be attributed to this phenomenon.

Firstly, this was no "hazard" like the HRA example used of the disastrous grounding of a tanker in the Shetland Isles – it was a very carefully planned operation with a "safe" spray. Secondly the people themselves did not report their symptoms from the spray until later in the programme. Nor did they report them during the initial spraying as Public Health itself acknowledges. The *Operation Evergreen* Health Surveillance Report (Aeraqua 2001) clearly confirms this in its illustrative chronology of "patterns of contacts over health *concerns*." [119] As comment was made elsewhere - these were good citizens. They did not want to make a fuss. [120]

But the reality is the vast majority of public reports were not even "volunteered" as suggested above – they came in at the invitation of Public Health itself who had issued the urgent request that people report "any Btk related health effects" because they were concerned that the level of illness reported in the press was not reflected in their formal reporting mechanisms. Any further suggestion that these were not "representative of the whole population possibly exposed" is clearly misleading. The Ministry survey detailed in this same 1997 HRA sampled across the entire exposed population of 80,000 and confirms the same pattern of reported effects across all the sprayed suburbs. [121]

So, having invited these reports of "Btk related health *effects,*" why, instead of accepting the reported symptoms as valid health effects, were they instead discounted as mere "concerns" and "fears" by Public Health? It wasn't until years later that the possible reason to dismiss these effects became clearer.

But, from 1997 onwards 'psychological risks' appeared and became embedded in the New Zealand Btk health risk assessments including the *psychological* risk of the [moths] themselves.[122] Six pages of the 1997 and 2002 HRAs are devoted to the moth[s] which were said to have "the potential for generating anger, stress and anxiety" if it destroyed amenity plants and people came into contact with it. Apart from creating a moment of comic relief and hilarity in the community this ludicrous statement was seen as the further trivialisation of what was considered valid health effects, as well as the downplaying of genuine concerns about possible long-term consequences of this unprecedented spray campaign.

In fact, as Dr Watts noted in her report on the health risk process, (Watts, 2003), an assessment of the 'effects of the moth' has no place in a health risk assessment of aerial spraying. She considered its inclusion was an indication of bias – "the authors appeared to be at pains to justify the eradication programme." [123]

It was not until six years later during the PAM campaign that the question of 'concerns' versus 'valid health effects' was unexpectedly brought into the spotlight at government level. It would also raise reactions from Public Health that provided potential motivation for the discounting of the *Operation Evergreen* results as well as revealing disturbing

[118] Auckland Healthcare, 1997. pp58-59
[119] Aeraqua 2001 – Figure 4 pp 12.
[120] Veil of Fears – is the Tussock Moth Spray making people sick? North and South July 1997
[121] Tussock Moth Spraying Programme Survey 111 Allpro Consulting of Wellington, July 11, 1997
[122] The 2002 HRA had an identical entry for the PAM
[123] Watts, 2003 pp 22-23

conflicts of interest that both the Ombudsman and Commissioners would express concern about.

In early 2003, a briefing paper to the Minister from the Deputy Director, Public Health, had noted that health officials considered further work was required as a result of the Blackmore report. The MoH had asked scientists from the Institute of Environmental Science and Research (ESR) to consider "developing methodology to analyse the data held by the PAM health service and Auckland District Health Board (DHB) and report on the public health implications, in particular, advising whether the data supports the findings of the Blackmore report". [124] This work was not done, but subsumed into the Wellington School of Medicine (WSM) study instead.

As noted earlier, the Ombudsman considered the Ministry expected this WSM study would "close off any further protests" about the spraying. The PAM community were in fact delighted the health impacts of the Btk spray were finally being taken seriously – but they had a problem. Part of the Health Minister's terms of reference (TOR) for the study was to:

> receive, collect, and summarise reports from the public, community groups, territorial authorities, Aeraqua and the Auckland Regional Public Health Service (as well as other stakeholders, community groups, organisations and individuals) on *their health concerns* associated with the Foray 48B aerial spraying programme. (Emphasis added)

In media releases and in answer to questions in parliament the Minister of Health was explicit, saying researchers would receive, collect, and summarise reports from interested parties on "*perceived health risks associated with [the spraying] …"*

The PAM community groups immediately rejected these TOR. Their strong view was that they would not participate in a study that described the experienced health effects only as "concerns" and "perceptions". This was ably articulated to Dr Simon Hales, lead author and researcher of the study, by a health and social science researcher on the PAM community team.

> I have added (in blue) a simple addition to the [TOR] wording which I believe will offer a wider and more profound scope to the study. It may appear to you to be a case of simple semantics, but language is powerful and without the addition of the word "effects" to the brief the study runs the risks of taking a particular bias which would alienate many people from this study. To explain the point … using the word 'concerns' belittles the very real 'effects' that many people in the community have experienced – and although these 'effects' may not be able to be (or have not been) 'scientifically' measured it does not make them any less real a health event for those who have experienced them.[125]

It is to the credit of the WSM researchers that they listened to, and worked with the community, and negotiated and changed the TOR to *health concerns, symptoms and effects.* But, as the Ombudsman and Commissioners comprehensively detail, the study would go on to generate controversial resistance and opposition from the authorities. Much of that appeared to be fuelled by Public Health in Auckland, who took an extraordinary oppositional stance to the study from the very beginning through to hyper-critical peer reviewing.

Even before the study got underway senior officials at the MoH were reporting that Auckland Public Health was protesting to them that they had not been consulted on the contract and TOR with the WSM. A comment about a phone call to the MoH from

[124] Report of the Ombudsman, *13.28*
[125] Community email correspondence with WSM researchers

Auckland noted that the caller seemed to "be of the opinion that they and MAF have things under control and our [MoH] handling of it will play into the hands of the STOP group." [126]

As detailed by the Commissioners, internal emails released under OIA show there was concern at the very top of the Ministry that Auckland Public Health had got too close to this and "may not be seen by the wider public to be totally impartial …" [127] Concerns were also raised by MoH regarding an Auckland Public Health member on the ethics committee that oversaw the WSM application as well as later unease about the two Auckland Public Health members appointed as peer reviewers for the WSM study.

Critical questions about impartiality and bias were also in evidence in a later email from Auckland's Medical Officer of Health in response to an update from the WSM researchers on their progress with the study.

> A non-representative sampling procedure presents substantial risks to the measured and appropriate management of the health issues and to risk communication. Along with reports to Waitakere City Council, the existing reports cover the issues and overlap substantially. Any independent repetition of these will reinforce these as validated health problems rather than stated health concerns.[128]

The author of this email was the same Medical Officer of Health for *Operation Evergreen* and co-author of both the 1997 and 2002 HRAs which discounted community-reported symptoms and effects of that campaign. This 'belief' that there were only concerns that had to be managed, not actual health effects, was, unfortunately, not new either. It appeared to have been an established opinion before spraying even commenced in NZ.

As the first spray was underway in 1996, this Medical Officer of Health was publishing her opinion that [the 1996] risk assessment [129] had not identified any potential health effect of the spray. 'Apparently', major urban spraying overseas had been conducted "without any observed health effects." Co-authored with Aeraqua's Francesca Jenner (Kelly) – author of the 1996 HRA - the article *Managing the Perception of Risk* [130] instead considered there would be other hazards like psychological distress and therefore there was "a need to manage the public's perception of the risk and their fears."

Seven years later and it appears nothing had changed this initial opinion that reported health effects would basically be 'all in the head'.

It is noted that the reports referred to in this 2003 email above that were made by the public to Waitakere City Council (WCC) were not actually supplied to the WSM. There would be no independent assessment of the 235 health complaints sent to the WCC and any possible "overlap" with other submissions, because the WCC had not retained or analysed these reports themselves. [131] They had sent all the letters to Auckland Public Health who simply provided the WSM with a data summary, not the written experiences, symptoms and effects communicated. This data would actually be published shortly in October 2003 for the AGM HRA. [132] Additionally, all WSM attempts to contact the PAM Health Service

---

[126] Report of the People's Inquiry *2.2.3 pp43* – Note: STOP here is probably the west Auckland *Stop Aerial Spraying* Group – SAS.
[127] Email of 9/05/03. Also see Report of the People's Inquiry *2.2 pp 43* for full story
[128] Email 28 June 2003 - PAM update to stakeholders from Simon Hales.
[129] Jenner Consultants / Auckland Healthcare 1996
[130] Hope V, Peters J, Jenner F. Tussock Moth Spraying in Auckland: managing the perception of risk. The New Zealand Public Health Report. Vol. 3 No.11. November 1996
[131] There was a complaint from at least one member of the public that the WCC had sent these submissions to Public Health without their permission. As WCC had told the public these reports were necessary before they could take action under the Health Act – there had been an assumption that WCC would do the analysis themselves not 'farm' them out to public health whose views were already well known.
[132] ARPHS 2003

(Aeraqua) failed and no data was supplied from them in spite of it being an explicit component of the TOR for the study.

Given their earlier published opinion and the fundamental opposition to the WSM study as subsequently evidenced, were these submissions deliberately withheld by both organisations to invalidate the scope of the WSM findings?

This rigid position demonstrated by Auckland Public Health - that there were "no validated health problems" from the spraying persisted throughout the programmes. There were many complaints from the community that like the Aeraqua Health Service, Public Health were beholden to and working for MAF, and consequently were not independent officers of health 'on the side of the people' they are supposed to protect. The apparent bias in favour of, or support for, MAF's eradication over concerns about health effects from the PAM incursion response was raised by the Commissioners.

The Commissioners had expressed concern that the government contracted Aeraqua Health Service failed to provide assistance to many affected people because it was working to a 'pre-determined script' that did not describe their symptoms as being an effect of the spray. As that 'script' would have been based on the conclusions of previous HRAs and surveillance reports, the author of who was now the Director of both the PAM and AGM Health Service, questions about lack of independence or conflicts of interest were raised.

> The agencies involved in looking after the public's health in connection to the PAM programme were seen by some as compromised for those roles by their other activities. The Director of Aeraqua was also employed as MAF's independent medical advisor and had earlier advised MoH and the Ministry of Forestry that Foray 48B spray was safe to use in connection with the white spotted tussock moth programme.[133] Auckland Public Health Services, whose role includes investigating health hazards and health complaints for the people of Auckland, had also carried out the 2002 Health Risk Assessment much cited by MAF. Many in the community felt that these involvements in vetting Foray48B would make these agencies reluctant to recognise unforeseen health impacts of the spray—in other words, that they represented a conflict of interest. This is not an unreasonable concern. [134]

Both the Commissioners and the Ombudsman raise additional and more serious concerns about conflicts of interest involving the Government and its Ministries. Apart from the primary concerns about MAF's involvement in contracting and paying for all health services and risk assessments as well as research and monitoring for the programmes, the Commissioners go further and question whether it should even manage the health impacts of its own incursion response.

> In our view it is inappropriate that an agency (MAF) primarily committed to the protection of primary production and trade should have responsibility for managing the human-health impacts of an incursion response. In our view, it is doubtful that any community expected to bear the health risks of an incursion response will have confidence in MAF to properly consider health impacts when primary-production sector interests are at stake. [135]

The Ombudsman raises almost identical concerns about the need to ensure that human health issues that arise from a biosecurity campaign should be dealt with by an agency that is "demonstrably separate" from that engaged in the eradication process.

---

[133] Jenner Consultants Ltd., *Health risk assessment of Btk spraying in Auckland's Eastern Suburbs to eradicate White-Spotted Tussock Moth (Orgyia thyellina),* Report to the Ministry of Health and the Ministry of Forestry commissioned by the Northern Regional Health Authority, 4th September 1996; Jenner Consultants Ltd., *Clarification of Issues raised in "Our Case Against Moth Spraying".* Report to the Ministry of Forestry, January 1998; Aeraqua® Medicine Ltd (formerly Jenner Consultants Ltd*). Health Surveillance following Operation Ever Green: A programme to eradicate the white-spotted tussock moth from eastern suburbs of Auckland*. May 2001. [footnote in original]

[134] Report of the People's Inquiry *1.5.3*

[135] Ibid *1.5.2.*

> While I am well aware of the value in some circumstances of a "whole of government" approach and indeed have advocated it, I believe it is important, if public confidence is to be restored in operations of this nature, that the Ministry of Health should be charged (and be seen to be charged) with the responsibility of ensuring that the health concerns of the population liable to be sprayed receive at least equal consideration with ecological or biosecurity issues. I am not convinced that was so in the West Auckland and Hamilton operations. [136]

In short, it was found that at government level there was a conflict of interest between the desire to eradicate the pest as efficiently and quickly as possible, and the responsibility to prevent, ameliorate or manage the side effects of that response on the people being sprayed. The investigations show quite clearly that when MAF was responsible for both aspects of the programme, its primary function and responsibility to eradicate the pest took precedence and health was insufficiently considered and protected.

Further evidence of this failure to protect was a noticeable attitude that developed within MAF and Biosecurity during the PAM campaign that people were simply a nuisance, and dealing with them was getting in the way of what had to be done. Illustrative of this was public comment from Biosecurity Minister Jim Sutton a year into the aerial spraying that what he called the "human collateral" of the spraying, was "worth it" because

> it is necessary to endure some discomfort and inconvenience in order to avoid the grave risks and greater problems of introducing this potentially very serious new pest to our environment." [137]

The fact that Minister Sutton did not live (or work) in the spray area and therefore was not required to endure anything was criticised, but was condemned more eloquently several years later by People's Inquiry Commissioner Tom Kerns recalling the proverb that "the burdens that are easiest to bear are those that are borne by others."

> What actually occurred here is that the "collateral damage," i.e., the impact of the aerial spray programme on community members, was trivialized by their government, and the dramatic impacts that many West Aucklanders experienced … all counted for less, in MAF's assessment, than the presumed (but undocumented and unproven) advantages to the country of eradicating the PAM via aerial spraying. The sufferings of the "few," in other words, when weighed against presumed benefits to the many, were simply counted as less important… [138]

The insensitive attitude displayed by Minister Sutton above is in contrast with *Operation Evergreen* where the relationship between the forestry people working on the tussock moth campaign and the affected community was somewhat different. Apart from a communications strategy of complete openness, with the then Minister John Falloon promising the local community (and upholding it) that "whatever I know, you will know",[139] staff and contractors seconded to the operation were required to live, and be visible, within the spray zone. [140]

There is no doubt this contributed to some degree of goodwill between the community and on-the-ground scientists and staff of the Ministry of Forestry – with some relationships enduring up to, and through, the PAM and AGM campaigns. Many of these scientists gave generously of their time with the PAM community. This included a Special Science Meeting with the Community Advisory Group to evaluate and refine the Community's

[136] Report of the Ombudsman 40 pp 12
[137] Report of the People's Inquiry 5.6 pp 93 – quote from "Spray Day"- Dateline film, June 2003.
[138] *Ibid*
[139] This openness included supplying the community with every document, study, report, etc that was requested.
[140] Hosking et al, Tussock moth eradication – a success story from New Zealand. International Journal of Pest Management, 2003

Option [141] for a 2002 government decision on whether it would continue the eradication campaign and in what form. Valuable insight into the science and political aspects of the eradication campaigns was also given by these scientists during oral testimony to the People's Inquiry and comprehensively covered by the Commissioners in their subsequent Report.

But relationships between MAF and the PAM community deteriorated rapidly around this decision-making time. By the middle of the first year of aerial spraying it seemed that in MAF's view, people were not just a nuisance but had become 'the enemy'. This government attitude appears to have its origins at operational level during the second expanded phase of the PAM campaign after a new operations manager was appointed. The manager was later quoted [142] as saying it was a waste of time meeting with the public who in his opinion were "rude, crude and horrible people," and had been advised by MAF officials that "…the CAG – [Community Advisory Group] had lost the plot and I was to disengage. I wasn't to get involved with them … meaningful dialogue was not possible."

This derogatory and dismissive attitude extended in many respects not just to the community and local government but anyone who appeared to question MAF and its programme. This was highlighted by a disturbing incident in November that year when the Commissioner for Children flew in to Auckland and slipped into Waitakere` to experience a scheduled spray operation, and basically see for himself the impact on children and schools that had been reported to him.

This visit came less than a week after huge concern about the continuing impact of the spraying on schools led to a meeting of 200 members of the educational community. They had passed nine resolutions to protect the health and safety of their children and staff, including a recommendation to Boards of Trustees to close schools and early childhood centres on spray days.

The Commissioner had not notified anyone he was coming, nor issued any press release, and specifically requested that he did not want to meet any mayors, politicians or MAF. This was respected by the CAG, and the author quietly accompanied him around a primary school and a childcare establishment and an afternoon meeting with an evacuated family.

Whilst still at the school the Commissioner was in the middle of a radio interview relaying his worrying experience - including watching children in the school playground frantically running for cover from an unexpected plane spray - when he received a phone call from the MAF /Biosecurity ministry in Wellington telling him to basically 'shut up, get off the air and get out of town'. This was extraordinarily disrespectful.

It was understood later that MAF in Auckland were blamed for all this, having received a blistering telling off by the Ministry. "How dare [the Commissioner] criticise us".[143] So, it is considered no surprise that nothing that happened during the fact-finding visit by the Commissioner for Children changed MAF's course or view.

As covered by McEntee in her case study (McEntee 2005), MAF's new course had already been decided months earlier and the MAF team had launched a major advertising campaign whose objective was to draw focus away from human health issues. As quoted by "management" in her study:

[141] Watts M, Blackmore H. 2002. Report and Recommendations of Special Science Meeting – Painted Apple Moth Eradication – Community Option
[142] Metro Magazine March 2003 – "Wipe Out"
[143] Confidential communication received by the author.

> The primary purpose of that was to create moral high ground on which we could stand because previously we had had none. We were under attack from a wide variety of sources. We weren't particularly loved by the local government in Auckland, who were also under pressure from activists who were looking for the opportunity to ankle tap the programme … People obviously hadn't accepted that this was a threat with a clear and present danger, as opposed to a human health related issue". [144]

This change of emphasis appeared to harden when MAF expanded their operations to Hamilton to tackle the Gypsy Moth in late 2003. This is detailed in a study When Moths Attack. Aerial Spraying West Hamilton 2003: The creation of a Risk Discourse (McNeill 2005). [145] McNeill found that the decision to enact an emergency biosecurity response "rather than allowing time for careful deliberation of balanced scientific and social considerations" resulted in an evidenced MAF initiated media campaign "where the techniques of propaganda were instituted in an attempt to quell any public concerns which could slow the process of getting an aerial spray programme underway." [146]

McNeill found this change of focus led to a more confrontational attitude which resulted in the portrayal of anyone opposing or criticising the campaign as "unpatriotic". She also found parallels with the 'for us or against us' mentality after the 9/11 attacks in the United States, which were echoed in west Auckland with many sick residents bearing the brunt of the government-provoked backlash from the unaffected public at large.

As noted at the time, it was as if the government declared war on the people being sprayed, and then invited everyone else in the country to join in because the so-called "whining westies" were putting the entire economic future of the country at risk. They were being selfish in wanting the aerial spraying stopped and this was equated with them not wanting the pest eradicated. One local journalist epitomised this denigration of the people.

> "The bitching and moaning about the spray programme is only to be expected in this wimpish age, especially in a city that calls itself eco and which is inhabited by more than its fair share of tree-huggers, whale-savers, animal-righters, vegans, organicists, herbalists and such other strange folk."

This journalist went on to suggest that the remedy was to implement the US Military's idea of using Valium for crowd control by mixing it in the spray. [147]

And what of the people actually experiencing this backlash? One mother, whose whole family was affected and had to be evacuated each PAM spray, wrote to the Waitakere City Environment Manager begging him to do everything he could to stop the aerial spraying:

> … though I am very grateful that we are no longer being sprayed on and the accommodation is being paid for, it has proven very costly to us – not just financially, but stress-wise as well. In terms of the actual relocations, the motels themselves have varied in terms of suitability ranging from unsanitary conditions complete with cockroaches to unbelievably rude motel hosts who make it very clear they think my children and I are just hypochondriac bludgers who are abusing tax-payers money. [148]

This mother was far from unpatriotic going on to say that she wanted to get rid of the PAM as much as anyone, but just did not agree aerial spraying was the answer. "I know there are many people who are not experiencing health reactions to the spray and they are very

[144] McEntee 2005 pp124
[145] Kellie McNeill – Unpublished Thesis in partial fulfilment of the requirements for a Master's degree – University of Waikato 2005
[146] McNeill 2005 pp 75
[147] Garth George, One More Ingredient and the Moth-blitz row is solved. 5.12.2002
[148] Copy of February 2003 letter held in PAM health effect records.

fortunate indeed. But I cannot help but wonder – who made the decision that the people who are not being affected by the spray are more important than those who are?"

Even after the spraying was over this sense of abandonment did not stop, nor the reality that in the end people actually were. This is graphically illustrated with the abrupt closure of the PAM Health Service in May 2004 because the campaign was apparently over. The closure left many people struggling to cope with not only the costs of unresolved and ongoing health problems related to the spraying, but a compensation process that turned out to be fraudulent and unattainable.

This is detailed in an urgent report from the PAM Community Network to the Prime Minister in late 2004. (Blackmore, 2004) [149] The community was asking for a full public inquiry and the urgent setting up of an independent body to review, mediate and settle all compensation claims. The failure of the government to even consider a review led directly to the community setting up its own independent People's Inquiry, held 16 months later.

The 2004 report details how patients hurriedly discharged at the end of the spraying were instructed by MAF doctors to put in any outstanding claims as soon as possible. Medically related costs they had incurred would be settled by the PAM Health Service, and all other compensation claims were to be directed to MAF. What followed was distressing.

- Requests for reimbursement or compensation were rejected on the grounds that MAF doctors had determined, without claimant involvement or consultation, that the patient's condition was not 'spray related'.
- People were told after months of delay that either the Medical Service had closed without their claim being dealt with or resolved, or there was "no funding left", and
- Those applying to MAF for compensation discovered their sort of claim did not even fall within the relevant rules of the Biosecurity Act, which can only deal with damage to property or loss due to restrictions on movements of goods. [150]

All these compensation denials had a devastating impact on many individuals and families as later detailed by Commissioner Tom Kerns. Loss of jobs and businesses; loss of schooling and opportunities; loss of careers; loss of homes; loss of earnings and savings. [151] The extensive human rights section of the Inquiry Report by Kerns should be read to fully understand the impacts on the community being sprayed.

This final act of dismissal of the affected people came at the point where although the closure of the health support service would indicate the campaign was over, there was no guarantee the PAM and AGM were eradicated [152] - and therefore no guarantee spraying would not be required again in the near future. In fact, another active pest in Auckland, the Fall Webworm, was being lined up for eradication, with funding already set aside by Cabinet for aerial spraying.

It would seem, as both the Ombudsman and the Commissioners strongly agreed later, that biosecurity was taking precedence in all considerations, and the ongoing health and social effects of the already sprayed population were not just insufficiently considered, but actively denied and rejected. And for many people the continued downplaying and denial of reported health effects and the attribution of symptoms to mere psychosomatic responses had left an enduring mark.

---

[149] Blackmore H. October 2004. The Legality of Aerial Spraying

[150] *Ibid*

[151] Report of the People's Inquiry *pp 70-72*

[152] Both were declared eradicated March 2006 - the opening day of the People's Inquiry.

The refusal to recognise the adverse effects and suffering people had experienced, and the denial of any compensation, led to several families laying complaints with the Human Rights Commission (HRC). Mediation was, and always is, confidential and cannot be reported here, but it did not resolve the complaints.

Although it appeared the Director of Human Rights was prepared to take their cases to the Human Rights Tribunal, time ran out on him waiting for the final Inquiry report and the overworked Director, however sympathetic, had to take on other urgent cases. A lawyer from the HRC had in fact attended some of the public hearings – and several international Human Rights lawyers who just happened to be visiting New Zealand at that time were able to spend a day at the hearings and to watch for themselves the Inquiry in progress.

As for the Commissioners, at the end of all this evidence, they could do little more than highlight yet again their concerns not just about the way people had been treated, but the wider implications for national biosecurity. These concerns will have a significant bearing on the issues raised all these years later about the so-called "loss of social licence to spray". But as the Commissioners concluded at the time:

> "Testimony strongly indicated not only that the authorities' lack of acknowledgement of the affected community's experience itself had a considerable impact on people, but also that the treatment received by many who sought assistance generated hurt, anger, mistrust and alienation that has outlasted the PAM programme and can be expected to influence residents' orientation toward "the national interest" in the future." [153]

As one witness to the Inquiry put it:

> Even after all this is over, and I look better and I am better in myself …Emotionally – this is something unfortunately I don't think we'll ever get over because we never got acknowledged. We were made out that we were making it all up. And if they'd ever just kindly said we are very sorry. But to have the cheek to say on top of it all you did it all to yourself to me was the cruellest thing they ever could have done to people." (Oral testimony 107) [154]

* * * * *

[153] Report of the People's Inquiry *1.4 pp 29*
[154] *Ibid*

IF YOU DON'T LOOK - YOU CAN'T FIND
Of Flying Saucers, Delays, Denials, Downplays and Cover Ups

As documented throughout this review, the refusal by Public Health at both local and national level to give any credence to the thousands of community reported health effects of the three eradication campaigns, is, all these years later, still baffling. But it is clear that throughout and beyond all three aerial spraying campaigns a disciplined public face was maintained by Public Health - there were no adverse effects.

Was there a conflict of interest or bias within Public Health and the Ministry of Health that led them to prioritise eradication and therefore abdicate responsibility for public health protection? To protect this position did a tenet develop within these bodies that *any* acknowledgement of *any* health impacts would risk their "measured and appropriate management of the health issues and to risk communication"?

Comments from Biosecurity Minister Sutton soon after the aerial spraying was over did appear to show this was a compelling management strategy with evidence of a strong underlying fear at government level that the spray *could* be found unsafe for human health and therefore "rule out the best most effective weapon available to us to protect our people, our environment, and our livelihoods."

That this comment came in a 2005 TV documentary [155] where the Minister was excoriating the lead author of his own government's commissioned study is revealing. It was the Wellington School of Medicine (WSM) study that had raised for the first time - anywhere in the world? - scientific concerns about the safety of Btk products used in a community setting. The WSM, in fulfilling their terms of reference, had then detailed recommendations for scientifically robust follow-up studies to answer these questions of safety. Did these very recommendations then become the 'motive' for the shutting down and cover-up of the WSM study - a fear of what they might find – so let's not look?

Part of the WSM research story has already been covered in this review, but further detailing throws some additional light on why this study would have such profound consequences and why such an extraordinary position was taken, over what appeared to be such an ordinary study.

It is perhaps relevant at this point to recognise that for many in the PAM community the WSM study was *their* study. The first commissioned by the government as a result of their community research and actions, and the first researchers to consult with them and consider the impacts and effects of *their* experience. As the WSM report acknowledged:

> The structure of the report and the order in which we document these data sources reflects our emphasis on first describing the experience of communities and individuals and secondly trying to understand the reported experience in terms of scientific knowledge. [156]

From early framework meetings, through regular updates, to reporting back after publication, the community was kept in the loop. Is it possible this involvement and support from the community was another of the reasons why ultimately the study provoked such a backlash from the government? Could they afford to give even the slightest legitimacy to possible health effects of the spray that would vindicate community calls for

[155] Sunday: Safe and Sorry. Producer Hunter Wells
[156] Hales et al, 2004 *pp11*

cessation of aerial spraying and the establishment of long-term monitoring and follow up studies?

A lot of questions to find answers to, but in light of the actions and reactions from the Government to its measured findings, it has to be seriously considered that the WSM study was the pivotal or watershed moment that changed everything - the one that had slipped through the carefully constructed Public Health fortification of assessments and so-called surveillance and monitoring reports, behind which the Btk spray with its much vaunted "clean bill of health" and "no adverse human health effects" had taken cover.

The WSM findings and recommendations did not even appear to be outliers. Similar recommendations for further research from other scientists and government-appointed health groups had arisen since the beginning of the spray campaigns.

Even when the first programme, against the Tussock Moth in 1996, escalated far beyond the 3-5 sprays assessed there was no acknowledgement, except from one Public Health officer in 1997, that spraying on this scale would even raise concerns.

> To be frank, our original health assessment was not for 44 sprays. Ongoing, intensive spraying at that level would cause us concern … you might get to the point where you are moving outside the parameters of the literature. As the spray numbers went up we went back to [the Ministry of] Forestry. They told us the spray programme would be finished shortly, so we agreed for it to be finished. We haven't discussed issues for next year, but if there is going to be an intensive amount of spraying we would revisit it. [157]

Not only was there no revisiting of this programme, but as the subsequent post-spray 1997 Tussock Moth HRA[158] had determined that none of the hundreds of reported adverse health outcomes met any causal criteria, there was a rejection of *any* prospective health studies in the later PAM campaign [159] - because "there were no effects".

Although the same supposed non-effect was advanced before any NZ spraying took place, the MoH at the time did feel there was a need to be cautious and proposed to undertake a comprehensive health study before any spraying was undertaken. But as the minutes of the 1996 Tussock Moth Science Panel shows, the MoH was also anxious "not to oversell the non-effects of Btk" as "only two epidemiological studies had been done overseas." They advised the Panel they would in fact do a cohort study in the event of aerial spraying. "This would need to be sufficiently sensitive to identify any related miscarriages and congenital defects." [160]

But only two weeks later the panel was told by the MoH they had to look at a much smaller-scale study because additional government funding was not approved. After detailed discussions the Panel agreed to advise ministers there was "scientific merit in a well-designed health study, especially in light of repeated sprayings."

It is difficult to track what actually happened, because, as discussed earlier, no well-designed health study eventuated, only a passive reporting system that captured a handful of adverse reports after the first four months of spraying. This was 'blamed' on the 1996 HRA by Public Health as the HRA had "suggested no specific condition for monitoring - due to lack of evidence on residential populations."

---

[157] Veil of Fears – is the Tussock Moth Spray making people sick? North and South July 1997
[158] Auckland Healthcare. September 1997 *pp63*
[159] As noted previously – there was one study supported by Public Health - into health perceptions. See Petrie et al, 2005
[160] Science Panel minutes – 12 & 26 July 1996

Doctors and local GPs [161] would also receive this 'no effect' advice from Public Health throughout the three eradication campaigns, as so many frustrated and rejected residents unable to get health effects recognised would confirm. It is of interest that in 2004 after two and a half years of spraying for the PAM this had to some degree, changed. A local survey carried out by a community newspaper of GPs in the area, found that doctors at seven practices - (out of 11 who had responded) - said "they believe there is a link between the various problems experienced by [their] patients and the spraying." [162]

But in 1996 the first HRA (Jenner Consultants,1996), had in fact specifically excluded any form of surveys and emphasised that:

> [T]here will *not* be any work towards future or follow-up studies nor research questions on such matters as patterns of asthma, respiratory complaints, community perceptions and experience of the programme, etc. [163] (Emphasis in original).

The shelving of a 1996 cohort study that could have identified "any related miscarriages and congenital defects" is ironically prescient given the clusters that were reported from both the Tussock Moth and the PAM spraying zones. It is also reported that similar pockets of problems were beginning to appear in the Hamilton population at the end of the Gypsy Moth spraying … "every midwife in Hamilton has a story". [164]

As well as the 1997 Tussock Moth premature births and miscarriages detailed earlier in this review, the PAM campaign also saw concerning adverse health events out west. As the Commissioners report;

> Meredith Youngson, a medical microbiologist and Board Member of HealthWest, testified that midwives in the spray area were reporting unprecedented numbers of early bleeding, late bleeding and miscarriages (with twelve stillbirths in a three month period during the spray months, more than in the entire previous twelve month period.) [165]

There were also a number of reports from senior health professionals about a worrying rise of cleft palate anomalies, and a significant rise in motor neurone cases. Although formally reported to the Medical Officer of Health, there is no evidence of any case being verified or investigated.

A journalist, Peter Malcouronne, whose mother developed and subsequently died of Motor Neurone disease (MND) during the spraying campaign, gave evidence to the People's Inquiry of his own investigation of the incidence of the disease that should have been done by Public Health, but wasn't. The publication in the NZ Metro magazine of his mother's story and his subsequent investigation is attached to his testimony and makes for uneasy reading, even though figures he eventually managed to extract from a health authority source did not appear to show an increased incidence of MND in the spray area whatever the anecdotal evidence. [166]

As covered in this review, a subsequent retrospective case-control study [167] of PAM birth defects was invalid because of 'control' exposure.

---

[161] General Practitioners (family doctors)
[162] *Doctors answer spray questions*. Matthew Gray, Western Leader 6 May 2004
[163] Jenner et al, 1996. *pp 51*
[164] See McNeill 2005. *pp 105*
[165] Report of the People's Inquiry *5.3.1 pp 73*
[166] Submission 94 – People's Inquiry
[167] White P, Borman B 2006. (Frampton et al 2007 reports this is a retrospective *cohort* study not a case-control)

Community concern about the unprecedented number of sprays during the 1996/1997 *Operation Evergreen* campaign and the lack of any proposed long term follow up health studies of an operation of this magnitude did finally provoke the government into setting up a register of exposed residents. Unfortunately, it was not of the whole population sprayed but only the most exposed residents in the eastern suburbs.[168]

Although the register was designed and set up to "address community concerns about potential future diseases not anticipated by current medical knowledge about Btk", [169] it has never been accessed for any studies. This is even though only two years after it was set up came the apparent cluster of new thyroid conditions including congenital hypothyroidism in the Tussock Moth spray area where accessing the register would have been appropriate, practical and timely. Instead, the subsequent cluster investigation illustrates how community concern was deflected and neutralised.

The investigation of this cluster initially fell to the resident's group STOP with whom it had been raised in early 2000 by two local mothers with hypothyroid babies. As their reporting included information from their pharmacists who were concerned about the number of thyroxine prescriptions for new babies in the spray area – five at one pharmacy where the pharmacist had never seen any cases in the ten years he had been there - questions were raised in Parliament by STOP to try and determine if these numbers were unusual or simply part of a national increase in congenital hypothyroidism. The Minister responded that "information on hypothyroid babies was unavailable as statistics were not collated nationally". [170] This was disappointing and frustrating.

That is where it may well have remained, but a year later in May 2001 came the first intimation there may be aerial spraying in west Auckland for the PAM with the same Btk formula. Public Health and Biosecurity as well as the respective Ministers were informed by STOP they *must* investigate the thyroid 'cluster' before any suggestion of aerial spraying again. It was not until later in the year after a limited local poster campaign initiated and carried out by the resident's group to elicit any other cases, that Public Health agreed to start a formal cluster investigation. [171]

This was reassuring, and there was relief the issue was being taken seriously. Rapid action by the resident's group and Dr McKean, the Public Health specialist brought in to conduct a preliminary survey and interviews of the 26 STOP-identified thyroid cases, [172] meant that less than a month later Dr McKean reported back to Public Health with his recommendations.

McKean's first cut assessment "did not suggest any obvious clustering" except for four cases of congenital hypothyroidism that required more detailed follow-up. His recommendations included accessing "as quickly as possible" the Guthrie Tests to provide firm diagnostic data on congenital hypothyroidism, and approaches to both adult and child endocrine specialists on their views of incidence levels in the previous three years. In all McKean made six detailed recommendations for immediate action.

At this point all urgency seemed to disappear and no further investigation was evident on the part of any government or official player. In spite of intense lobbying and liaison between community groups, politicians and Auckland Public Health that the PAM

[168] Only 5,640 residents out of 80,000 were included in the register.
[169] F. Kelly, Ethics Ctte application – Nov 1997. Retrieved from National Archive 2018.
[170] Parliamentary written answer from the Minister of Health to MP Jeanette Fitzsimons – 29 June 2000
[171] Meeting Minutes – Nicholas Jones, Director Disease Surveillance, Auckland Public Health Protection. 19.10.01
[172] 36 cases actually identified by STOP.

programme should not go ahead unless it was determined there were no congenital effects arising from the spray, the PAM aerial operation commenced in January 2002.

The Health Risk Assessment for this programme was not in fact completed and published until March; two months *after* the spraying went ahead. It's assessment of the hypothyroid risk was that although the study to investigate the possible cluster was yet to be completed "results to date suggest there is no cluster". [173] Public Health announced later in the year that the investigation had found nothing to support theories of a link, [174] but requests for the data they had based this on and a copy of the final report - any report - were never supplied. [175]. A number of years later in his report to Waitakere City [176], toxicologist Peter Di Marco referenced a 2005 nine-page draft report to MAF from the Auckland Medical Officer of Health David Sinclair. This has never been sighted.

After the huge and urgent effort put in by the community and Dr McKean this was pretty disquieting. Were these simply delaying tactics meant to keep the community quiet so the spraying for the PAM could go ahead unhindered, or was this a cover-up?

Notwithstanding this possibility, *all* community groups and members who had interactions with Public Health during this time expressed concern there was a distinct reluctance to investigate anything, and a marked lack of urgency if they did. Is this what happened to all the health research proposals that arose before, during and after the PAM programme?

As the Commissioners report, three months before the PAM spraying commenced a MAF media release announced that MAF proposed to carry out a pre-spray health monitoring study under the guidance of a health monitoring group. This was confirmed at a Community Advisory Group meeting of the same date which records this programme would include:

- An empirical study of persistence of the spray ingredients in homes and gardens, and
- A (before-during-after) study in selected GP practices of prevalence of presentations to GPs of adverse outcomes, i.e., asthma, eyes, skin, severe anaphylaxis and allergy.

Even though elements of these very studies were being actively sought by the community for implementation at that time [177] no such studies were done. As reported earlier by the Commissioners, the community requests for studies were rejected because MAF said it would be difficult for them to justify spending government funds in this area when their health experts were telling them there were no effects. [178] If MAF already knew this was the funding situation, then it would appear their announced studies were a sham. Designed once again to deflect attention and keep the community quiet?

Eventually, as both the Ombudsman and Commissioners record, the Government-convened PAM Health Advisory Group (HAG) did draw up a prioritised list of health monitoring proposals in 2003 and 2004 which would (however late in the day) cover some of the community concerns about the lack of follow-up studies and future programmes. A number of research and surveillance proposals were made including:

- Research into the evaluation of health surveillance activities
- Research into possible links between miscarriages and the spray

[173] Kalemba et al, March 2002, pp5
[174] Western Leader, 19.10.02. *Foray into Medical Relief*
[175] Recommendations in Guidelines for Investigating Clusters of Non-Communicable Disease – Ministry of Health, June 1997 – (Read.D, Borman. B) supplied to the author.
[176] Di Marco, 2006
[177] See Blackmore, H, November 2001
[178] Report of the People's Inquiry *2.1.1 pp 37*

- Evaluation of health information and services provided,
- Research into precipitation and exacerbation of asthma;
- Research on effects utilising GP records, and
- A community symptoms study.

Similar recommendations were made earlier to the MoH by ESR public health medicine specialist, Dr David Phillips, in his review (Phillips, 2003) of the Blackmore Report. These included:

- Understand, including model, the nature and extent of exposure and possible mechanisms of this exposure.
- Consider the use of epidemiological studies, both case control and cohort, in tandem with support to a community based monitoring system.
- Understand the nature and distribution of adverse effects, with particular regard to exposure, geographic, demographic and other features including the possible contribution of pre-morbid and/or environmental conditions.
- Consider individual exposure studies to clarify the nature of the allergic skin and conjunctival reactions.

Toxicologist Peter Di Marco in his report to the Hamilton City Council (Di Marco, 2003) on the potential risks of the AGM spraying programme concurs with this review and recommends that [all] Dr. Phillips's recommendations be implemented, as well as

- a comprehensive environmental monitoring programme to be able to assess exposure more reliably … similar to the one used in Canada [179] where viable spores were measured. [180]

None of these research proposals were undertaken. Of note is that most of these recommendations above - particularly the HAG recommendations - were within government control and *could* have been implemented and undertaken in 'real time' during the Hamilton AGM spraying. But it appears the HAG were simply drawing them up as a paper exercise – nothing urgent here.

Other recommendations that could also have entered the equation were raised before the WSM study was commissioned. Firstly, from the study (Petrie et al, 2003) published in the New Zealand Medical Journal, that:

- Further research should focus on the potential effects of the spray on upper airway and gastrointestinal symptoms in populations exposed to it and should investigate the relationship between such symptoms and evidence of *B.thuringiensis* infection.

Secondly, although not arising from a formal report or study, the recommendations of Auckland allergy specialist Dr Rohan Ameratunga that were highlighted in a MAF-sponsored Allergy New Zealand publication during the PAM spraying, should be considered. Ameratunga's concerns, picked up by the Ombudsman, were about the danger of people becoming sensitised to ingredients in the spray, and the need to undertake properly conducted studies. [181]

- "There's little literature available as to what the longer term risks are. A MEDLINE search has shown there are only a handful of articles on the health effects of the 48B spray in humans." … Dr Ameratunga says there is a need for studies looking at longer-term effects using an appropriate study design, and it would be important for the findings to be published in appropriate peer-reviewed scientific journals. It will also be important for long-term studies to determine if there is a risk of new sensitivities or allergies developing due to exposure to the spray. [182]

[179] Teschke et al, 2000
[180] Di Marco, 2003 pp 8
[181] The Ombudsman's Report, *13.15*
[182] Painted Apple Moth – What's at stake? Winter 2003 (Sponsored by MAF)

Other scientific recommendations that would complement, inform or cover some of these health research proposals above had been detailed by the community to MAF and Public Health in 2001 and 2002.[183] The Teschke Canadian study's follow-up recommendations for future BTK exposure included measuring:

- indoor concentrations for up to 9 days after spraying to determine the half-time of the Btk in indoor environments
- factors such as UV light intensity, aerosol size distributions, traffic into and out of homes, humidity, temperature, local wind speeds, presence of open windows, and natural air infiltration to determine which factors are associated with increased and reduced Btk concentrations in both indoor and outdoor environments
- air concentrations more distant than 1 km away from the spray zone (perhaps up to 25 km away), to allow estimation of the maximum drift distances
- personal exposures with filter or Andersen sampling techniques, as Kromcote cards were not an effective indicator of airborne exposure to Btk.

In correspondence before spraying commenced for the PAM, Kay Teschke commented to the author that there remained many unanswered questions arising from her report, and was enthusiastic about New Zealand initiating some of her follow up studies. In answer to some of the community concerns about how to clear a house (or school) of the Btk, Teschke suggested that the first tack was to determine the decay profile of the Btk indoors.

> "At the same time it would be worth trying to determine the causes of persistence indoors – is it related to the aerosol sizes which get inside or the differences in UV levels both inside and out? Both would be worth monitoring. Once these things are known, it will be more possible to suggest mitigation procedures and public health recommendations during and after spraying".

Teschke went on to comment that New Zealand may not find the same patterns as they did. "Ours was the first study to examine some of these issues, and additional studies are needed to simply determine how generalizable the results are." [184]

Even though these study suggestions were raised with Public Health during the 2002 HRA drafting none of these research proposals were undertaken. As highlighted earlier in this review, later criticisms by NZ government researchers of the failure to measure exposure levels "necessary" they said to prove causal links, are provocative, given the rejection by the government of these very studies listed above that might have enabled this.

Further concerns that would have been brought to the attention of the government at this time included legal advice to the West Auckland Stop Aerial Spraying group (SAS) from constitutional lawyer, and ex-Prime Minister, Sir Geoffrey Palmer (Palmer G, 2002). Palmer met with ministers and members of the government caucus. In his opinion

- there exists a strong case on the available evidence of adverse effects that should persuade the Government to look again at the human health consequences to which its decisions are exposing increasing numbers of people … My conclusion on the work that I have done so far is that the health effects are sufficiently serious to warrant getting together as much evidence relating to the health consequences as can be assembled in preparation for legal proceedings. [185]

It is recognised that the pressure on the government at this point in early 2003 would have been considerable. So, whether intentionally or by happenstance, it would appear the entire basket of eggs was laid in the lap of the Wellington School of Medicine (WSM).

[183] Blackmore H, November 2001; CCPAM October 2002.
[184] Personal correspondence with the author 5.12.2001
[185] Legal Opinion on the Painted Apple Moth spraying to Jane Schaverien, Stop Aerial Spraying. 24.12.2002

So, when the WSM reported nine months later with a 'new' plausible mechanism of adverse effect that warranted caution and further long term follow up studies of exposed populations, the community were probably as surprised as the government. Here at last was scientific recognition there *was* a possible basis for some of the health effects the community had been reporting for years, and more important, there were valid follow-up studies that could be done.

These were not light or casual recommendations, they were relevant and detailed, and included an overarching recommendation that the safety of biological insecticides be re-assessed by New Zealand's EPA [186] and that Workplace Exposure Standards for bioaerosols be developed:

Exposure assessments

- Analysis of air quality monitoring data for all Auckland monitoring stations with hourly particulate data available for the years 2002-3.
- Modelling of the probable spatial and temporal distribution exposure to Foray 48b and potentially active chemical and biological constituents during aerial spraying.

Clinical testing

- Immunological testing of individuals if sensitisation is suspected clinically.
- Immunological testing of a representative sample from the community.
- Objective tests of individuals with symptoms temporally related to the spraying, including exacerbation of existing conditions. (eg. respiratory function tests, nasal lavage).
- Similar assessment of a sample of people on the White Spotted Tussock moth register, with emphasis on respiratory disease and allergies.

Epidemiological studies

- Reanalysis of White Spotted Tussock moth data to account for possible exposure of 'control' groups.
- Studies of symptom prevalence in a representative sample children and adults in Auckland census areas. Symptoms to be considered include those relevant to respiratory health, asthma and allergies, gastrointestinal and skin diseases. Previous studies with relevant data on respiratory health, asthma and allergies have been published and may well be worth repeating.
- Time series studies of routinely collected mortality and morbidity data for Auckland CAUs, 2000-2003. (eg mortality, hospital admissions, prescription data, GP data where available).
- Long term follow-up of exposed communities for chronic respiratory diseases. [187]

What followed was - without question - coordinated and concerted action to both discredit the authors and bury the WSM Report, its findings and its recommendations. This was not an abdication of responsibility it was a clear cover-up - or at least an attempted cover-up. The evidence as presented by both the Ombudsman and the Commissioners was clear.

> Correspondence released under the Official Information Act shows that MoH and MAF Biosecurity were in frequent contact concerning the study, and that MAF and others involved in the PAM programme attempted to influence the terms of reference, ethics approval process, peer review process, and release of the study... [188]

Given the unprecedented manner in which the WSM report, the peer review process and the authors were treated it may have to be considered this was a deliberate strategy that was developed some time before publication.

The MoH knew some four months *before* the study was officially submitted to them of the concerns being raised by the authors about the aerial spraying of biological insecticides. Did the MoH take early action with MAF and seed opposition in a deliberate tactic to pre-

[186] Environmental Protection Authority
[187] Hales et al, 2004 *pp49-52*
[188] Report of the Peoples Inquiry 2.2.3 *pp40*

empt and discredit the findings? Subsequent actions would suggest this is not a far-fetched idea. Hales in an email to the Ombudsman:

> Our scientific concerns (in the form of a draft literature review) were made available to MOH in September 2003, and again in more complete form in December, with a recommendation that they be passed on to the Minister. From that time on, it is my perception that MOH began dragging their feet. [189]

The Commissioners cover the known manoeuvres around the WSM Report in detail including the supposed reactions of MAF to the first full report sent to reviewers in early 2004. They show that MAF's Director of the PAM Programme wrote to MoH in mid-February 2004 declaring the draft report "substandard" and that "MAF would be reluctant to purchase a report that is of questionable quality and therefore dubious value. The report can be improved by drawing to the attention of the authors the expressed concerns and then subjecting the report to [extensive further internal and external peer review and revision].'"[190]

These concerns were relayed by MoH to the WSM researchers who responded that they did not consider it appropriate to participate in a further round of peer review, though, "the [MoH] are, of course, free to obtain further review comment. Although we do not intend to redraft the report in the light of such comments, we would welcome an opportunity to respond informally". Finally, they comment that ...

> …as scientists, we do not wish to become involved in an essentially political discussion between Government officials about the validity, interpretation and significance of our findings. [191]

As the Commissioners detail, the WSM submitted their final revised report to MoH in late February 2004, and it was forwarded by MoH to a "variety of government agencies and actors associated with the PAM programme." Four days later, the MoH suggested a number of options to MAF to deal with the report - presumably to meet MAF concerns:

> "…refusing to accept the report; "release the report with a Ministry of Health analysis and critique as part of a communications strategy"; undertaking an additional full round of peer review (and in addition "providing an opportunity for the original peer reviewers to reconsider the report"); or give the raw data to another researcher to produce a different report. [192]

These suggestions are profoundly disturbing, even now, all these years later. Even the suggestion that the "raw data" was the basis of the study and could be re-interpreted, demonstrates an utter misunderstanding of the report, as one of the co-authors, Prof. Woodward, would later explain to the Ombudsman. Had anyone actually read it?

Although the MoH would inform the authors late in March that they were indeed seeking further comment, it has to be considered that if details of the report had not been leaked to the press three weeks later, the report may never have seen the light of day. [193]

The publication of the WSM findings headlined as a "secret study" [194] raised alarm bells. It forced Ministers to answer questions about why they were continuing to allow aerial spraying whilst covering up a report that was raising concerns about its safety. Comment

---

[189] The Ombudsman's Report, *16.41*
[190] Report of the Peoples Inquiry 2.2.3 *pp40*
[191] *Ibid pp41*
[192] *Ibid*
[193] See Kedgley, MP press release below.
[194] Moth Spray can harm: secret study. Sunday Star Times. 18.4.2004

from Biosecurity Minister Sutton that it "might never be publicly released" because it was "flawed, unsound and biased" (even though he claimed he had not read it) caused further concern in the community. The story, and media releases from community groups through to politicians, were picked up around the country, with one Member of Parliament writing

> Frankly it's scandalous that the Government has deliberately suppressed a report because it doesn't like the conclusion it has reached. Tuesday's spray must be halted and the report published immediately so everyone has the opportunity to consider its findings. [195]

The Report was finally released nine days later, but spraying would not cease for another three weeks. The release of the report, and the OIA information obtained by a journalist, of behind the scenes activities of MoH and MAF, sparked a further media flurry centred on the apparent cover up of the report findings and accusations that the release was being deliberately delayed so that spraying could be completed.

Further concern was generated by what many saw as the 'spin' put on the report by the MoH, with the Acting Director of Public Health saying that many of the symptoms reported were "nothing new", and that "none of the scientific studies to date have found any association between exposure to the spray and actual health effects." [196] The irony of criticising a report that was fulfilling his own government's Terms of Reference in proposing scientific studies to answer these *very* questions, seems to have escaped the Director.

The downplaying continued with the statement that the report "poses a theoretical question about whether biological insecticides could contribute to chronic respiratory conditions such as asthma" but goes on to say that it was important to note "this theoretical risk did not lead the authors to recommend stopping or modifying the existing spray programme" - implying even the authors did not take this risk seriously. [197]

It is to be remembered that Dr Hales *had* alerted the Ministry/Minister six months earlier to express their scientific concerns and would shortly go on to express his view to the Ombudsman that in his opinion it would be prudent to avoid aerial spraying the Btk formula over populated areas. That, somehow, the MoH/Director of Public Health was unaware of any of this is not credible.

One of the co-authors, Prof Alastair Woodward, in the same correspondence with the Ombudsman clarified some of these Ministry (mis)interpretations, noting it was important to bear in mind the terms of reference they were given and that they were *not* asked to investigate whether the spray caused the symptoms reported to them.

> Consequently, in my view, little weight should be given to the argument that the report was deficient because it did not recruit a larger and more balanced sample of participants – this was not our brief. Similarly, the criticism that the report failed to establish the validity of complaints missed the mark, because we never attempted such an assessment.
>
> In summary, I suggest it is important to appreciate the limited nature of our report, and that the objectives were set by the Ministry of Health, not the Wellington School of Medicine.[198]

Reassurances from MoH to the authors during the peer review process that they were "considering how best to advance the recommendations in the report to make sure we

---

[195] Press Release. Sue Kedgley MP. 18.4.2004
[196] Report urges change to spray campaigns. Anne Beston. NZ Herald. 28.04.2004
[197] Report on the effects of the painted apple moth spray programme. MoH media release. 27 April 2004
[198] Report of the Ombudsman 15.17

continue to progress the *important issues you have identified*,"[199] and the statement from the Acting Director of Public Health that "we are seeking expert advice from outside the Ministry about how to effectively implement some of the recommendations and work is already underway to progress others," [200] would *appear* to show Public Health were taking the issues raised seriously - notwithstanding the rest of the dismissive media statements above.

But it is also entirely relevant to know that at this point in 2004 not only was there no way to know if MAF/Biosecurity would not need more aerial sprays to complete eradication of the PAM, but there was a new and potentially serious biosecurity threat – the fall webworm (FWW) that had been found the previous year 15km away from Waitakere in the Auckland suburb of Mt Wellington - site of the secondary PAM infestation in 1999.

Minutes of the government's Technical Advisory Group (TAG) confirmed that advice was to use aerial spraying if further finds were made, and a request to Cabinet for the funding for this was already in hand in late October 2003 - *after* Hales had raised the WSM's scientific concerns about the spray with the ministry. A substantial newspaper and radio campaign at the same time publicly confirmed an aerial spraying option.

> Newspaper advertisements taken out by the Ministry of Agriculture and Forestry are warning of the threat posed by the fall webworm …. Maf director of forest biosecurity Peter Thomson said the ads were an effort to alert the local community to the pest and also to the possibility of an aerial spray campaign. "This is a significant pest and if we find it, we are going to have to take further action - and aerial spraying is one of the options on the cards," he said. [201]

So, faced by the possibility that aerial spraying *could* be taken off the table if the issues raised by the WSM report were indeed taken seriously does this suggest that covering up the findings and possible adverse effects of Foray 48B became an imperative? This, again, is not an unreasonable question. The fact that the PAM Health Advisory Group (HAG) abruptly ceased meeting at this critical point just as the WSM Report was released, reinforces this hypothesis. It seems the advice of the HAG with its supposed role at a "strategic level" was no longer required, nor any of their carefully drawn up health monitoring proposals - now shelved. There would be no scrutiny of the WSM report nor its recommendations by this 'expert' advisory group.

Strongly indicative that MAF were now seeking all avenues out of the dilemma, was the commissioning of a new internal study from the MoH's Public Health Intelligence unit (PHI). This would literally replicate the literature review component of the WSM Report and presumably 'produce a different report' - as cynically suggested by the MoH earlier.

This new literature review on The Health Impacts of the Aerial Spraying of Pesticides and Methodologies for Detecting Health Impacts in an Exposed Population [202] produced only weeks after the release of the WSM Report did indeed come to a different conclusion (or the same 'standard' conclusion) of reassurance of non-effect.

> This review has found that there have been some studies already conducted on the health effects of aerial pesticide spraying, in the United States, Canada and New Zealand. These studies have found that the spray Foray 48B has no adverse health effects on exposed residents, although it may cause some symptoms in a small proportion of people.

[199] Report of the Peoples Inquiry 2.2.3 *pp41*
[200] MoH media release – 27 April 2004
[201] NZ Herald – *Moth adverts seen as softener.* 31.10.2003
[202] Public Health Intelligence June 2004 (updated Jan & May 2005)

The WSM Report was referenced, but only the Focus Group component, which was used to illustrate one of PHI's "methodologies for detecting health impacts". The WSM report and its critical findings and recommendations on bioaerosols went un-examined and un-reported – as indeed would be the actual findings of the Focus Group– also ignored.

This PHI study - which was updated in 2005 with little amendment - was followed by another PHI report for MAF in mid-2006. Defined as an "Overarching Report" of Population Health Impacts Arising from the Foray 48B Aerial Spray Eradication Programme,[203] it summarised what it considered the relevant research about the Btk pesticide.

Once again, this report failed to include or reference the WSM findings. In this case it appears to be because the terms of reference *specifically excluded* all "literature reviews" and papers on occupational exposures - the very components of the WSM study that detail the bioaerosol effects and scientific concerns. Whilst the 'overarching' authors did recognise that two papers relating to occupational exposure they had excluded "did suggest the potential for increased sensitization, infection and consequently a health effect," the PHI report concluded that

> …there is little risk to human health from the aerial spray application of Foray 48B. This is not to say that no ill-health effects were reported … these effects are similar across all of the studies … [and] can be categorised as medically minor …

As an important rider to this, there is no mention in this Overarching Report (or the earlier PHI literature review) of the Hamilton High School incident or its OSH Report. Obviously, the OSH report itself did not in any sense meet the criteria of a peer reviewed paper, and it was 'theoretically' about occupational exposure - an excluded component. But it presents an extraordinary situation where a causal link between adverse health effects and exposure to Foray 48B, that was confirmed in an entire cohort of seriously affected people - has seemingly vanished. As with the PAM asthma hospitalisation rates that were significantly elevated as shown in Gallagher et al, these effects at the Hamilton high school confirmed by OSH could in no way be considered "medically minor" at all. Disturbingly, there may be another explanation for its 'exclusion'. *The affected people at the school are not recognised or 'counted' by the MoH.*

This is because of New Zealand's peculiar situation - as noted by the Ombudsman earlier [204] - of separation of health and safety responsibilities between workers protected under OSH, and the community by MoH. [205] It appears that from the moment the Principal brought in OSH the entire exposed community of seriously affected people at the school were 'disappeared' by MoH from their data and accounting. They were now workers being sprayed and not members of the public.

Is this what happened to the other serious reports highlighted earlier in this review about apparently un-recorded incidents during *Operation Evergreen?* Did the same thing happen at other schools in East Auckland previously noted by the Ombudsman where there were a number of unrecorded "sore throats, respiratory illness and fatigue" suffered by a number of staff and pupils? [206] What about the incidents recorded by the Health and Safety Co-ordinator at Douglas Manufacturing and other businesses in the PAM spray area? Given

[203] Public Health Intelligence. 2006
[204] See Page 23 of this review – "I have been informed by the Ministry of Health that … it has no responsibility or accountability for occupational health and safety …"
[205] See Pierce N. 2022 Pesticides and Health, How New Zealand fails in Environmental Protection, for full history
[206] Report of the Ombudsman. 4.10

the importance this Overarching Report would play later, these omissions have consequences.

Yet another commissioned report by MAF and Biosecurity would be undertaken a year later in 2007. This was a comprehensive generic examination of the Environmental and Health Impacts of Aerially-Applied *Bacillus thuringiensis kurstaki*-Based Insecticides. (Frampton et al, 2007). For the third time the WSM Report is not included.

Frampton does review the Overarching Report though, commenting that it was unfortunate that the PHI terms of reference meant it excluded from its overall assessment of the human health impacts of Btk what it considered two "important observational cohort studies [207] of occupational Btk exposure amongst workers - the very studies noted as being excluded by the Overarching Report authors.

But they are also the very studies the WSM had considered in its evaluation and examination - over three years earlier. Essentially these two papers are noting an important potential for increased sensitization in people from the biological spray. The fact that the Auckland allergy specialist, Dr Ameratunga, had also highlighted this 'danger' only adds to the concern about the failure to even reference the WSM study - anywhere.

So, in spite of the intense publicity the WSM study had aroused, its Report and precautionary findings and recommendations had simply disappeared, eliminated from government reviews, reports and studies as if it never existed. This cannot be unintentional in such a close scientific community, and in such a small country. What would warrant this extraordinary action to suppress and bury it? This became clearer not long after its release.

Early in 2005 came reports of further finds of the fall webworm (FWW) in other areas of Auckland, thus triggering government funding for aerial spraying. This was followed shortly by reports that MAF were obtaining blanket permission to spray *any* pest susceptible to Btk over 300,000 hectares [208] of Greater Auckland – from Warkworth in the north, to Pukekohe in the south.

As reported by the NZ Herald newspaper,[209] gaining permission from other agencies like the Department of Conservation was, MAF said, "a pragmatic solution to an ongoing issue which will allow for rapid deployment of response and reduce the requirement for additional approvals in this area." In other words, if they had to spray to eradicate any 'vulnerable' pests, they could do so quickly without having to conduct any further studies or risk assessments – including of health. This blanket approval would last for five years.

Biosecurity Director, Peter Thomson refused community requests to have 'stakeholder' status and input into any decision over the FWW. But he said that if further action [on the FWW] was needed "the general public will be fully informed." [210] The general public *were* 'fully informed' two months later in July 2005, but not in a way the government probably wanted.

The airing of the second TV documentary of the PAM campaign [211] was sparked by this threat of further aerial spraying for the FWW. Telling the story of a terminally ill West

[207] Bernstein et al 1999 and Jensen et al 2002
[208] 741,000 acres or 1,158 square miles
[209] Aerial blitz planned on moth pest – NZ Herald – 12.4.2005
[210] Letter to the author 28.4.2005
[211] Safe and Sorry – 'Sunday' documentary – 3 July 2005

Auckland teacher fighting to prevent any new spraying,[212] the film featured Dr Simon Hales. He was detailing his concerns about the safety of Btk sprays in the community and exposing what he saw as the cover up of legitimate scientific concerns raised by the WSM Report, and the attacks on the people who had written it. Bizarre comments about Hales by the Biosecurity Minister seemed to confirm that Hales had hit a sore spot.

> "He seems to have made a giant leap into the unknown there and he might have said well there might be flying saucers out there so we shouldn't go outside until we prove its not."

Further disturbing comments from the Biosecurity Minister strongly suggest the prevailing opinion he was still getting from his ministry was there were no health effects from the spray - it was all psychological. In answer to the journalist's question: "are you saying it's psychosomatic – it's all in their heads?"

> You're saying that. I'm not saying that. I'm taking the expert advice I receive. As of now the best expert advice available in the world to MAF and to me is that Btk spray does not cause any significant sickness – but that people who have a perception of risk, they can have their health directly affected by this perception. So, we take moves to control that perception by moving those people out of range of the spray.

Even though the journalist says she understood that MoH apparently now 'accepted' that Hales had found a gap in MAF's research (and "studies were underway"), none of this addressed the possible long-term effects of bioaerosols. As the journalist notes, "[Dr Hales] claims studies done so far are flawed - too small and too short-term – and that, he says, is irresponsible."

> What I find most astonishing is the extremely poor quality of the evidence in relation to this spray... admittedly there is no positive evidence that the spray is causing long term harm. But really nobody's looked."

It would appear that the failure of the MoH to initiate any timely studies to indeed 'look', led Dr Hales to undertake his own research. He had already been in touch with the PAM community, coming up to Auckland to present the WSM findings, but he now re-connected to see if the community would be supportive of an application to the Health Research Council (HRC).

By early November 2005, Hales had met again with the community in west Auckland, giving a full and frank outline of the studies he hoped to conduct with funding from the HRC. He received in return, unanimous and appreciative approval for his application for research into clustering of childhood asthma, bioaerosol and urban pollution exposure, together with *in vitro* assays of particulate air pollution. The HRC application was submitted in late November 2005 with the written support of community groups in West Auckland.

These HRC studies would also follow up on the recent publication of the MoH commissioned study by the ESR (Gallagher et al, 2005) that Hales had participated in. As detailed earlier, this was the only WSM recommendation (partially) implemented - that examined hospital discharge rates for respiratory conditions in the PAM spray zone. It had found statistically significant trends in the increase of asthma admissions for residents in the spray zone, particularly for children.

It appears that MoH were blindsided yet again by research that was now confirming there were some serious adverse health effects of the spray. This study received the same 'spin'

[212] Teacher, Viv Shapcott died of Motor Neurone Disease a week after the documentary aired. See her story as related by her son, journalist Peter Malcouronne – (p 47 of this review for links)

as the WSM Report with government officials not only downplaying the results but appearing to deliberately misrepresent the findings. In the media release announcing the completion of the study MoH reported that:

> [T]here is nothing to suggest a significant adverse impact on the incidence of respiratory diseases for the West Auckland population. It is pleasing to be able to report this to the community as we know some people have been concerned about the effects that this eradication programme may have had on health. (MoH media release, 8 November 2005)

It would seem, that once again, the MoH had difficulty accepting any result that did not align with the position they were trying to hold of non-effect of the spray. Four months later, Simon Hales described the findings to the People's Inquiry rather differently: 'there were increases in asthma hospital visits that could plausibly be related to the aerial spray operations.'

> Dr Hales also described his efforts to avoid involvement in this study, as he feared his earlier role in the WSM study could cause difficulties for ESR's relationship with the Ministry of Health. Despite these efforts, due to the departure of relevant personnel, Dr Hales was asked to join the research team. [213]

[Hales] reported to the Inquiry that there was pressure to downplay the findings of the ESR study and that he subsequently resigned as a result."

This pressure to produce negative results was confirmed to the author a number of years later by another scientist involved in the study. [214]

As well as his lodged HRC research application, Hales' related paper on the clustering of childhood asthma admissions in NZ (Hales et al, 2005) had concluded that "the hypothesis that chronic exposure to biological insecticides may lead to asthma exacerbations deserves further study". But there would be no further study. Dr Hales contacted the PAM community three months after the Inquiry in June (2006) to report that his HRC research application was turned down.

Did the MoH interfere and block this independent science research funding? Events covered here following the publication of the Ombudsman's Report would appear to show this is far from an outrageous suggestion.

* * * * *

[213] Report of the Peoples Inquiry 2.2.3 *pp 43-44*
[214] Correspondence with the author 2011

MOVE ALONG – NOTHING TO SEE HERE
The Final Shut Down, and Burial

It was late 2007 before the Ombudsman's Report and the report from the People's Inquiry were finally published, barely a month apart. Both the Ombudsman and the Commissioners made strong recommendations for further health research.

Although many of the Commissioners twenty-seven recommendations [215] were forward looking 'next time' advice - to the best of knowledge *none* of them were considered let alone implemented.

Months after publication of the Inquiry report, over two dozen official questions were lodged in Parliament by MP Sue Kedgley, asking what action had been taken to implement each of the Inquiry recommendations. These were all repudiated in one misleading and dismissive reply from the Biosecurity Minister, re-quoted and repeated for every question, even for those ministries outside his portfolio.

> … The Inquiry's report is based on the submissions of a self-selected group of 125 people, which is a very small proportion of the more than 200,000 people in the affected communities. The report adds to the great deal of literature that now exists internationally on moth eradication programmes, but I do not consider Government action as a result of the report is warranted…[216]

It appears this was an orchestrated parliamentary response from the Government that was over-riding any consideration by other Ministers. Appropriate and specifically directed questions to other ministries were ignored and the 'blanket' biosecurity reply substituted. Even recommendations for review by designated Select Committees or outside bodies like the Human Rights Commission were not passed on for consideration.

- The acceptability of agreements that result in the involuntary exposure of people to a product whose ingredients cannot be revealed to them should be reviewed by the Human Rights Commission and by the Health and the Justice and Electoral Select Committees. (Recommendation 6)

- … the Human Rights Commission should establish a procedure for hearing PAM-related complaints publicly and should disseminate their concerns widely. It should work with the Waitangi Tribunal to explore possible violations of the spirit, intent and letter of the Treaty of Waitangi. (Recommendation 26)

The breadth and importance of the Commissioners' recommendations for 'next time' action is all the more relevant now in light of the current expressed concerns about obtaining social licence to spray. The health-related research recommendations from the Commissioners that went unanswered by the Government included both these future preparations and immediate actions:

- The recommendations made by the reviewer of the Blackmore (2003) health monitoring interim report should be acted upon. (Recommendation 8)

- The research recommended by the Wellington School of Medicine Report (Hales et al. 2004) should be carried out, if this is still technically feasible. (Recommendation 19)

[215] See Appendix 1 and Report of the People's Inquiry *pp 2-4*
[216] Parliamentary published replies 19.5.2008

- Should it be necessary in the future to expose a population to a potentially harmful substance in the interests of biosecurity, independent research must be funded and undertaken to:

    1. Establish baseline levels and patterns of health and illness;
    2. Determine actual exposures experienced by members of the community in a variety of relevant circumstances; and
    3. Carry out follow-up studies of exposed populations. (Recommendation 13)

It is considered these recommendations were not in any way extraordinary, and were in fact no different than those being called for by other scientists and even the MoH's own researchers. (See Appendix 1 for the full table of Inquiry recommendations).

One month later the four year investigation by the Ombudsman was published, reaching the same basic conclusions as the Commissioners. The Ombudsman made vital health recommendations that "… it is desirable that further research at an appropriate level be conducted into the relationship to human health of the frequency, duration and intensity of spray operations." [217] The Ombudsman made clear he was most concerned about the lack of long-term research.

> In the Ministry's most recent memorandum – *Part 3 – The MOH's Concern About individual Health Effects* – it is stated that it was important that it be made clear to individuals in the spray zone that there was no evidence of serious long-term health effects resulting from the spray. However, the absence of such evidence was due to two factors, namely that the events had just recently occurred, and secondly, that no research into long-term effects had been conducted. It is unclear to me whether that second situation remains. If it does, I consider that it is a matter which should receive the Ministry's urgent attention. [218]

Correspondence obtained under OIA in 2008 shows near panic at government level in the days after the Ombudsman's Report was published. Urgent discussions within the MoH about the Ombudsman's recommendations for action on further health research, showed a scramble to justify what had been, or not been, done. But the most disturbing responses came in internal correspondence around how to avoid implementing *any* research.

This included an email to the Director-General of Health and other senior MoH personnel by the long-term senior MoH Project Leader for the PAM the day after the Ombudsman's Report came out that:

> We DON'T want to be forced into actioning the WSM (or other) recommendations. Paul White (PHI) [219] and I are able to come down any time to brief you. (Emphasis in the original)

Other emails to the Director-General show continuing misinformation, if not contempt, about the WSM and ESR studies. After dismissing the WSM report as "[only] collecting information about the community's concerns … not to assess the safety of the spray," comment was made about the ESR study on respiratory hospitalisations in the spray zone (Gallagher et al, 2005) that "… it resulted from the recommendations in the WSM report, but when it didn't find anything (!) further research was not considered a priority compared with other Health funding needs." [220] This level of what is in reality government *dis*information, is worrying. It is also noted the quotations above are from Ministry media releases. i.e. MoH 'records' appear to be Government spin not study findings.

[217] Report of the Ombudsman 41 pp 13
[218] Ibid 36 pp 12
[219] Public Health Intelligence
[220] Internal MoH email 12.12.2007 – author added exclamation mark!

The same day, email correspondence details additional justifications for dismissing any further studies. Prof Jeroen Douwes of the Centre for Public Health Research, Massey University, whose area of expertise includes bioaerosol health effects, had emailed Paul White expressing interest in being involved in researching the long-term health effects of the Foray 48B spray ... "in particular, we would be happy to be involved in research investigating potential health risks". (Prof. Douwes was familiar with the PAM and AGM eradications and had in fact reviewed both the Gallagher study and Paul White's 2006 Overarching Report).[221]

This same Paul White, responded to Prof. Douwes by dismissing further research saying there was no evidence to suggest that specific long term studies would yield epidemiological information of value. Although Dr White said he 'appreciated' that "absence of evidence is not evidence of absence" he concluded "… that unnecessary anxiety could be generated by surveilling the population in long term studies for which there is no clear epidemiological reason for doing so."

It is disturbing that a health scientist / epidemiologist with considerable familiarity and knowledge of the New Zealand aerial spraying campaigns should still be pushing this 'anxiety' line without being totally aware it was resident concerns expressed throughout the three spraying campaigns about the *lack* of long term health studies that was creating the so-called 'anxiety'.

As the earliest example of official acknowledgement of community concern notes, when the government created a register in 1998 of residents in the inner spray zone of *Operation Evergreen*, it was to specifically "facilitate any future long term health studies." [222] In particular, because, as summarised in the application for ethics approval;

> "The Register is being compiled in response to expressed desires from residents for greater health research … The concerns about future, as yet unrecognized, health effects and requests for health research have been expressed with greater frequency by those residents in the infested zone …" [223]

It is further noted in this ethics application that "it is conceivable that, as a result of future studies based on the register, decisions on future spraying programmes for other insect pest introductions could be modified." So, a pretty clear vehicle for further research that was set up because of pressure from the community. But as noted earlier the Register has never been accessed, and even the senior MoH government personnel in 2007 did not know what it recorded or where to find it. [224]

In hindsight, it appears the register was just another one of the government sops to keep the community quiet.

But back in 2007, in response to Paul White, it seems Prof Douwes was not put off, replying that whilst he agreed that long-term health symptoms were unlikely to result from incidental exposures, "I believe it is plausible that Foray 48B (just like most bio-aerosols) can cause acute respiratory health effects." He goes on to say that if the MoH intended to undertake long term studies "then I/we'd be happy to act as an external advisor (and/or be involved in it".) It is not known if there was further correspondence with Prof Douwes or consideration of his offer, but the prevailing MoH attitude did not bode well for any open consideration of further research whatever the Ombudsman's opinion.

---

[221] Public Health Intelligence, 2006
[222] F. Kelly, Ethics Ctte application – Nov 1997. Retrieved from National Archive 2018.
[223] *ibid*
[224] Internal email 15.4.2008

The MoH media statement on the Ombudsman's report said "the Ministry would discuss with ERMA, MAF and the Health Research Council the Ombudsman's recommendation for further research". But the purpose of a high level joint meeting that took place a few months later in March 2008 was to "primarily review [previous findings] and determine if the decision that there is no justification for long-term research remains valid".

Disturbingly this meeting was not minuted, so there is no record of who was present, what papers and reports were reviewed and what was discussed or agreed. The Minister for Biosecurity had confirmed to the PAM community in July 2008 [225] that there were no minutes of the meeting, but that "it was agreed at the meeting that the MoH and MAF would jointly provide advice to the Minister of Health and myself. This advice would include implementing the recommendations of the report as appropriate." [226]

Was the lack of minutes a deliberate evasion of government requirements to ensure that full and accurate records of all proceedings are created and maintained? [227] With no documentation of the meeting the public/community was denied vital information requested under OIA for it to press its case at that point for the long-term health research recommendations of both the People's Inquiry and the Ombudsman to be carried out.

It is particularly galling in this case because both MAF and Biosecurity had been publicly censured only five years earlier in 2002 over their failure to record vital meetings at the beginning of the PAM campaign. At that time, the Auditor General (OAG) [228] had rebuked MAF for failing to minute earlier meetings of its Technical Advisory Group.

> 'Proceedings of the first two TAG meetings were not minuted, terms of reference for the TAG were not agreed until after the group had met five times, and the response had been under way for more than two-and-a-half years before an operational plan was produced. Decisions taken by the TAG, such as to target-spray as opposed to blanket-spray, were not clearly documented." [229]

Picking up on this, the Commissioners noted that the lack of documentation associated with meetings of this group was particularly important as MAF defended its actions by arguing they were supported by TAG. [230] These earlier unrecorded TAG decisions would have far-reaching consequences. It appears this 2008 meeting was taking exactly the same tack in keeping decisions out of the public arena.

It would be another three months before the official Government response to the Ombudsman's Report and Recommendations was finally given to him in October 2008 nearly a year after its publication. The Response shows the government continuing to procrastinate, deferring any decision about implementing the Ombudsman's (*urgent*) health recommendations by suggesting they were still in discussions about them and the possible need to review the evidence.

> MAF and Health Officials discussed the need for long-term research towards completion of the eradication programme, and the Ministry of Health's Public Health Intelligence section prepared a report summarizing the relevant research. Long term research was not felt justified at that time. The report concluded that "*there is little risk to human health from the aerial spray application of Foray 48B. This is not to say that no ill-health effects were reported … these effects are similar across all of the studies … [and] can be categorised as medically minor …"*

[225] Email to West Auckland Stop Aerial Spraying (SAS)
[226] Letter 28 July 2008 from the Hon. Jim Anderton
[227] Detailed in the Public Records Act 2005
[228] Controller and Auditor-General. 2002. Report of the Controller and Auditor General. *Management of Biosecurity Risks: Case Studies.* November 2002
[229] Report of the People's Inquiry *pp 5-7*
[230] Ibid

This is a very misleading statement and probably sounds familiar - because it is.

This quoted PHI report was not prepared in response to the Ombudsman's Report, as implied here. It was MAF's Overarching Report [231] produced over two years previously that had already been supplied to the Ombudsman as part of his investigation – and obviously pre-dated his recommendations from it on further health studies.[232] (This was the PHI report whose TOR not only excluded the WSM Report from its assessment of the human health impacts of Btk, but the two "important observational cohort studies" [233] that were considered relevant not only by the WSM but the Frampton Report 2007 which postdated the 2006 Overarching Report and was, of course, not reviewed there).

The exclusion of the WSM Report also meant the loss of its valuable study component authored by ESR's Virginia Baker - Painted Apple Moth Focus Group Study. (Baker 2004). So, it would appear that even here at this late date, significant and relevant up-to-date research and recommendations were not being considered by the government.

But there was other vital research and information that, for whatever reason, was excluded or missing from this supposed "overarching" report that was being relied on by the government. The OSH report on the Hamilton High School incident which detailed the severe medical reactions of a number of staff, and confirming a causal link to Foray 48B, had completely disappeared. The Birth Defects Report [234] was also missing, although it would be examined and critiqued later by Frampton – but also missing of course. [235] (Frampton also failed to notice the exposure of controls in this Birth Defects Report and therefore its unsound conclusions).

So, five New Zealand studies missing or excluded from this 'final' Report – seven, if they had also included two other entirely relevant New Zealand PAM studies; Dr Hales peer reviewed Ecohealth Journal paper, Precautionary Health Risk Assessment: Case Study of Biological Insecticides (Hales. S 2004a) and his paper on the Clustering of Childhood Asthma Hospital Admissions in New Zealand … (Hales et al 2005).

Relevant research referenced elsewhere in government papers or reports was also not examined or reviewed in the Overarching Report. The prime example is a study noted in the PAM health risk assessment [236] warning about research showing the "enhancement of Btk toxicity by a viral infection seems plausible."[237] Patrick Durkin in his final Human Health and Ecological Risk Assessment of Btk for the US Department of Agriculture (USDA 2004) summed this research up by warning that …

> Pre-treatment with an influenza virus substantially increased mortality in mice exposed to various doses of B.t.k. This effect raises concern about the susceptibility of individuals who have influenza or other viral respiratory infections to severe adverse responses to B.t.k. exposure. The viral enhancement of bacterial infections is not uncommon and the enhancement of B.t.k. toxicity by a viral infection is, in some respects, not surprising. The relevance of this observation to public health cannot be assessed well at this time.

[231] Public Health Intelligence. July 2006
[232] The Ombudsman had actually endorsed (as a minimum requirement) its recommendations to engage early with community groups/leaders and to undertake a formal Health Impact Assessment prior to any new eradication programme. Report of the Ombudsman 15.18.
[233] See Frampton et al 2007
[234] White, P Borman, B. 2006
[235] Ibid
[236] Kalemba et al, 2002
[237] Hernandez et al. 2000 Super-infection by *Bacillus thuringiensis* H34 or 3a3b can lead to death in mice infected with the influenza A virus. FEMS immunology and Medical Microbiology 29 (2000) 177-181

But Durkin does go on to say that "[t]his issue is likely to be the subject of further study in the coming years and should be *monitored by groups involved in the use of B.t.k."* [238] (pp3-32). Hernandez et al themselves warned;

> "… these results suggest that Bt spraying around human populations could be dangerous, especially for immunocompromised patients. Even if no cases of pulmonary infection have been described, they underline the necessity of worker protection during aerial spraying by the use of such safety materials as security masks, gloves, work clothes and goggles." [239]

But due to its restricted TOR, the Overarching Report authors do not review the Hernandez research (or the Durkin analysis). It therefore fails to make the vital connection between this research and the significance of the Gallagher study (Gallagher et al, 2005) which records there was, in fact, an influenza epidemic - with increased hospitalisations – already in progress in the PAM area as the spraying commenced.

Kalemba et al in their 2002 PAM HRA had in fact dismissed the Hernandez studies because although the research suggested "immune-compromised mice may be susceptible to infection with *Btk"* this had "not been proven to date in human epidemiological studies." Of course this is a circular argument, because no human epidemiological studies had/have been carried out, as the Ombudsman emphasised in his Report.

All in all, it is more than obvious that conspicuous "relevant research" was never examined or included in this "overarching" report that has been held up by the government as the supposed final and definitive word on the risk to human health of the Btk spray in New Zealand.

Finally, comment in the government Response to the Ombudsman's Report said the MoH would discuss the Ombudsman's recommendation with the Health Research Council who "should consider it" and whether there was a need to update the PHI report. Given the MoH's stated aversion to implementing *any* research made nearly a year earlier, were these suggested "updates" just another deliberate mechanism to continue delaying work on any health recommendations until the passage of time made them irrelevant or no longer feasible to implement, as the Commissioners had worried?

It is not known who made the final decision not to implement the Ombudsman's health research recommendations, and why, but the events reported back to the complainant by the Ombudsman in mid-2009 on his efforts to ensure follow-up long term studies is deeply disturbing. The relevant section of his letter is quoted here in full.

> The Government had initially agreed to discuss the need for further research into the effects of the spray with the Health Research Council. Because the Government's commitment was general in nature and did not include a time frame for the discussions, my letter of 13 March [2009] endeavoured to elicit a more specific commitment. I asked officials to report back on those discussions within six weeks of receipt of the letter, and requested that the discussion be conducted with a view to seeking agreement that the research be undertaken. I suggested that in the event that the two proposed areas for research needed prioritising, the need for long term research was the most pressing.
>
> In response the Government provided a copy of a letter that it had written to the Health Research Council on 10 February 2009. Rather than seeking the Health Research Council's agreement that the research be undertaken, the letter reiterates the Government's viewpoint that the health effects of

[238] Emphasis added

[239] Ibid … Although obvious - what about non-workers - young children and babies for example - breathing in the spray and its residue 24 hours a day? Commissioner Kerns highlighted this anomaly by observing that "[t]he inconsistency of requiring applicators to wear protective clothing while spraying the insecticide on adults and children who were not wearing protective clothing is here noted." (Report of the People's Inquiry *pp 83)*

> the spray are minimal and the long term studies into the spray programmes are not required. The Health Research Council has since copied me a letter it has written to the Ministry of Health advising that it does not consider further research to be necessary.

This is extraordinary contempt for the Office of the Ombudsman. When the Ombudsman conceded defeat, he wrote in his letter to the original complainant that where an agency decides not to implement an Ombudsman's recommendations, "there is little more to be done than report the matter to Parliament". There is no mandatory government requirement in New Zealand to implement recommendations from the Ombudsman, though it appears exceedingly rare not to do so.

And for all the weight and powers the Ombudsman is able to wield – even he was unable to break through the barriers erected by the Ministry of Health. His was not an insignificant investigation. Four years work; hundreds of documents examined and reviewed; 45,000 words; recommendations thoroughly argued and substantiated. Yet the government had effectively buried him and his Report. And with it any lasting hope there would be any further research and long term study into the adverse effects reported by the people subject to this biological spray.

* * * * *

BACK TO THE FUTURE – A Social Licence to Spray?

> *It is my view that those people who lie in the path of a government policy have a right, based on natural justice, to be directly involved in formulating and implementing that policy. Consultations, submissions and public meetings are not sufficient mechanisms for ensuring appropriate democracy. The 'scientists' only approach adopted by MAF has been shown to be socially and even scientifically flawed, and ethically inadequate. It is time for government to work with the communities that will be affected by a biosecurity programme, and the public interest groups that support them, in a partnership approach.* Dr Meriel Watts, 2006

The government rejection of both the Commissioners and Ombudsman's recommendations for further research into the adverse health effects of the Btk spray appeared to be a powerful punctuation point on the futility of any further community action. There had in fact been no further aerial spraying since the end of the PAM campaign in May 2004, even though five new incursions of the PAM moth were found in 2005 alone, [240] and the Fall Webworm and Gum Leaf Skeletoniser operations were ongoing. So why worry?

As the years went by, there is little doubt everyone relaxed. They felt the case against aerial pesticide spraying had been made, and the government had paid attention, even if they had not admitted there were problems or implemented any further health studies. So, the discovery in 2018 of the report into how to "regain" the ability to aerial spray urban areas in New Zealand was jarring.

The recommendations for the regaining of community support for aerial spraying, are described in a 2017 joint report from the New Zealand Forest Owners Association (FOA), Scion, [241] and the Ministry for Primary Industries (MPI) - Obtaining social licence to operate: case study – gypsy moth eradication programme, British Columbia. Canada.[242] The report was presenting findings from a delegation to British Columbia, that was undertaken because

> FOA has been concerned for some time that MPI has lost its social licence to apply organic insecticides – [Btk] - (from ground or air) in urban areas in New Zealand and considers this a serious potential risk to the primary production sector, the conservation estate, and the parks and gardens of New Zealand." [243]

That it is the FOA that are raising this concern – the very industry that was 'saved' from having to pay anything for any potential eradication of the PAM or AGM in their plantation forests, by the people of Waitakere and Hamilton cities enduring the spray on their behalf – says a lot about where their focus still lies 13 years later. And it's not with the people who potentially lie in the path of their operations.

The conclusion from Dr Simon Hales of the Wellington School of Medicine way back in his 2005 TV interview that "public health should come first and economic considerations second, and there shouldn't be a trade-off between the two," highlights the fact that, as evidenced, all these years later, economic considerations are *still* preeminent and over-riding, and 'industry' appears to have learnt nothing from history.

---

[240] The ability to scientifically 'type' later PAM catches confirmed they were all new incursions not remnants of the original infestation. (DNA testing, using a new technique of stable isotope analysis developed by Otago University) (*Postscript to a case program* – The Australian and New Zealand School of Government. Version 5.02.07)
[241] A forestry Crown Research Institute
[242] See Forest Owners Association, MPI, Scion. Joint Report 1 Sept 2017. Obtaining social licence to operate: case study … British Columbia, Canada.
[243] *Ibid*

It was people, ordinary citizens, not industry that were affected by the aerial spraying. The people bore all the risks of the incursion response but saw no benefits – not even compensation - for all the ill health, social disruption and financial hardships endured. So, to find out all these years later that nothing has changed and the community are being sidelined, ignored and potentially 'disappeared' all over again was a shock.

The apparent absence of any industry awareness of the health impacts of the Btk spraying in New Zealand makes the information in this joint report all the more disturbing. The most concerning information is, in fact, the disclosure of possibly *the* prime component of British Columbia's (BC) so-called social licence to operate [244] "…the *benefit* of legislation that prevents residents lodging a complaint [against the spraying] on human health grounds." [245]

Investigation shows there appears to have been no further health research or studies of any kind in BC since their 1999 human health surveillance [246] - conducted as an order-in-council condition permitting an aerial spraying operation at that time. This means no later evidence from New Zealand will have been considered. All internet queries for information and health advice on the Canadian use of Btk leads to a page stating "we have archived this page and will not be updating it". None of the NZ health studies detailed in this review are covered in this archived Canadian information.

But the key finding, taken away by NZ, was that all the BC approaches and planning (including the legislative change), were simply *to avoid public opposition* to aerial and ground spray operations. [247] Couple this with the fact that although there were numerous Canadian approaches described that were directly and easily applied in NZ, not one of these approaches includes engagement with the community. Only "informing", "notifying" or "managing" individuals, with outreach strategies that are "considered to vastly improve residents understanding and *acceptance of the spray programme."* [248]

Any idea this model could operate successfully in New Zealand is not only unlikely, as painfully discovered during the PAM operation, but would negate everything that was learnt during the ten years of the aerial spray campaigns. Like the described Canadian operations, the absence of any consideration in this NZ report of seeking community viewpoint, input and involvement - and most importantly, partnership - is troubling.

This 'controlling' top-down Canadian operation contrasts with what appears to be the broad concept generally accepted today, that to gain and maintain a social licence to operate involves a bottom-up community engagement and partnership process. A 2016 article - Social licence in New Zealand – What is it? [249] - has been heavily leant on here, and was comprehensive and informative.

But too much should not be read into this one FOA report, which is already eight years old at this time of writing. It is more a warning marker along the way that has brought into sharp focus that a lot of time has passed, and the lack of any major biosecurity pest incursion into NZ since 2003 warranting a national eradication attempt means NZ has not been 'tested'. It is worth noting here that this may well be just good luck. 10,000 suspected

[244] Author – a social licence to operate (SLO) is broadly defined as local/community acceptance and/or support of an activity that affects them.
[245] Obtaining social licence to operate pp12. As described by the NZ Authors. Emphasis added.
[246] See reference Anon 1999.
[247] Obtaining social licence to operate - pp3
[248] *Ibid* pp12 – emphasis added.
[249] See reference P Edwards & S Trafford (2016) …

pests are reported to MPI every year with about 750 reports leading to a formal investigation.[250]

It is also not known if there has been any work undertaken by those involved since the 2017 Canadian visit, though Scion has been doing some practical work on alternative spray options they believe could improve licence to operate in urban areas. But even this Scion examination of the use of drones to spray [251] underlines the apparent lack of strategies for alternative approaches to avoid aerial spraying in the first place and for community involvement in any operation, biosecurity or other.

The failure by MAF to engage with the community was in strong evidence throughout the PAM campaign and was seen as potentially a serious problem, then – let alone now - by both the Ombudsman and the Commissioners.

In their examination of the community relationship with MAF during the PAM incursion response, the Commissioners had recognised actual dangers to national biosecurity.

> Ultimately, biosecurity itself can be compromised by the orientation to the community described above. As the 2003 Biosecurity Strategy emphasises, public support is crucial to the attainment of biosecurity goals. Adequate responses to pest incursions depend upon local knowledge and community participation, e.g., the discovery of new pests (the vast majority of pests have been discovered by members of the community outside the biosecurity agencies), sightings of existing pests, and pest control activities (such as trapping). Local knowledge of micro-climates, micro-habitats, and social practices can be essential to designing effective control/eradication strategies, monitoring their effects and minimising their harmful impacts.
>
> With the PAM programme, testimony indicates that MAF ignored and then destroyed an important opportunity to cultivate community involvement in protecting New Zealand's biosecurity. Waitakere City—the "Eco-city"—contained many groups and individuals committed to protecting New Zealand's native biodiversity. As the chair of the CAG noted, the community had experience in working with regional authorities for biosecurity goals; and as a local community board member told us, "it would have been so easy to get people on board here." New Zealand's future biosecurity depends significantly on harnessing this commitment, not alienating those who embody it. [252]

This strong opinion led to an equally strong recommendation that:

> Whenever and wherever an incursion or an incursion response has the potential to affect a community, the community or its representatives should be, from the initial stages, actively involved in the analysis of the situation, decision-making as to the response, and planning of any response. *253*

This recommendation for community involvement supports the testimony given to the Inquiry by Dr Gordon Hosking. Hosking was not only conversant with all the eradications but the scientist who led the team in the successful *Operation Evergreen* (WSTM) [254] response and in its latter stages was the Chief Forestry Officer for MoF and subsequently MAF. His view was unequivocal:

> One of the strongest recommendations emerging from a review of the WSTM programme was that the affected community should be involved in analysis and decision making from day 1. Community participation and support was seen as the single most critical factor in the success of any such future

[250] See www.mpi.govt.nz
[251] Scion. *Impact story: UAVs for pest control take off – January* 2025
[252] Report of the People's Inquiry – pp21
[253] *Ibid* – recommendation R4
[254] See Hosking et al, 2003. Tussock moth eradication – a success story from New Zealand.

> operations. MAF retreated from the less than perfect WSTM position to a bureaucratic fortress mentality. (Submission 41) [255]

This compelling support of the need for community participation in future programmes had already been quietly advanced in early writings by a number of scientists conversant with the three NZ aerial spray campaigns. Even a limited search found several early concepts of 'social licence' approaches - of "integrating community perspectives into the design of future incursion responses." [256]

Van Santen et al in this 2004 article above articulated the concept of an ongoing "anticipatory dialogue" with communities in exploring and evaluating general options and approaches to incursion responses that would be "well in advance of any *particular* incursion event." Her case study [257] the following year looked at an interactive (participative) decision-making process. Of interest, was the finding during interviews, that MAF employees generally did not think public involvement in an incursion was essential - the Biosecurity Act did not require it – but scientists differed. Their prevailing opinion was summarised in one interesting quote:

> The social risk might be our Achilles heel.

McEntee, whose comparative study of the WSTM and PAM operations has already been described in this review, would concur several years later. If MAF was to learn anything from its experience with the PAM, "in future campaigns it must step beyond the narrow operational focus of its statutory obligations and engage meaningfully with communities affected by its actions … future biosecurity programmes need to incorporate communication and participatory strategies in their design." [258]

McEntee's expansion on this view in the International Journal of Interdisciplinary Social Sciences, was clear.

> The participatory approach calls for a win/win relationship, it creates a new balance between experts and the public (Yankelovich, 1991). It requires a commitment on all stakeholders to engage meaningfully in an atmosphere based on mutual trust and understanding. This calls for all sides to work together and to learn from the mistakes of past experiences. During conflict, it is time to engage, not withdraw. [259]

"Learn from the mistakes of past experiences" would seem to be a compelling starting point for bringing ordinary citizens back into the fold. The on the ground knowledge they bring is vitally important for any future partnership.

In looking for immediate guidance on how this partnership 'balance' could be achieved the experience of Dr Meriel Watts, already quoted extensively throughout this review and in the opening quote for this chapter, should be considered. Dr Watts close involvement with all three aerial spraying campaigns in New Zealand, together with her decades of work on pesticides, people and communities around the world makes her insight invaluable.

---

[255] *Ibid* pp 22
[256] See Van Santen et al, 2004. The Role of Community Involvement in Future Incursion Responses
[257] Protecting New Zealand's Uniqueness: What is at stake? A study of the theory and practice of handling biosecurity operations with a potential high impact on people and the environment. (Study in partial fulfilment of a Master's degree in Forest Policy and Management.)
[258] Marie McEntee: Lessons in mishandled anti-moth campaign. New Zealand Herald 16 Dec 2007
[259] McEntee M.J., (2007). Participation and Communication Approaches that Influence Public and Media Responses to Scientific Risk: A Comparative Study of Two Biosecurity Events in New Zealand.

In her submission to the People's Inquiry [260] Dr Watts lays out compelling arguments for community participation in all future biosecurity operations, including five recommendations on policy principles. These can be read in full in appendix 2, but one policy/recommendation is highlighted here because it stands out with its relevance for the integration of the people's perspective into every biosecurity response or operation.

> *d) Community involvement:* inclusive and democratic
>
> The community implicated in an intended biosecurity programme should be fully involved in that programme from its inception, in a meaningful way and based on a partnership approach. This includes:
>
> - recognition of lay expertise and wisdom within the community and its public interest groups;
> - recognition of anecdotal evidence of health effects experienced by the community;
> - recognition of social impacts;
> - participation of community-selected representatives on all scientific and policy groups and processes;
> - community advisory groups formed with the intention of meaningful two-way dialogue;
> - inclusion of community views in all policy decisions.

Finally, for FOA, MPI and all the other industries and organisations concerned about this New Zealand biosecurity issue, there can be no moving-forward-solutions without the 'looking back' this review provides. For what cannot be ignored, or casually passed over, is that what is being talked about here is not a "social licence to aerially spray urban areas"

… but a social licence to spray ***people***.

Its simple truth cannot be avoided. Instead, it should be recognised as the primary reason for the involvement of the people and communities in how to deal with any biosecurity incursion response, *before aerial spraying is ever contemplated*, let alone necessary.

When it comes to a social licence, it should not just be a licence to operate, but to *engage.*

* * * * *

[260] Submission 75 on the People's Inquiry website.

CONCLUSION

The prime purpose of this project and review arose from concerns about the potential loss of valuable research and evidence from the Btk pesticide aerial spraying campaigns in New Zealand between 1996 and 2004. It was considered important to document and preserve the findings of the three aerial spray campaigns, not least because of the continued and active use of the pesticide on other urban populations around the world. They too need access to this information.

What was not foreseen was how important this project would become with the discovery in 2018 of an active investigation into how to (re)-gain the ability to aerial spray urban areas in New Zealand. Detailing the facts and on-the-ground reality about the adverse health impacts and effects of spraying human populations with a Btk-based pesticide became of vital importance, not least because of what appears to have been a deliberate cover up of unpalatable results in New Zealand.

The evidence, as documented throughout this review, shows that from the earliest point during the Tussock Moth campaign in 1996-1997 when people began to report unexpected adverse effects from the Btk spray the Government were quietly alarmed. As they would appear to finally acknowledge, they were afraid their "best most effective weapon available" could be ruled out if it was found unsafe for human health.

It is considered this led to a deliberate and systematic denial, downplay and cover-up of the adverse health impacts experienced by the people being aerially sprayed during the three eradication campaigns. Actions, from the local to the highest levels of government, included the effective shutdown and silencing of all opposing voices and opinions and the burial of legitimate scientific concerns, raised, in particular, by the Wellington School of Medicine Report authors.

The aversion and unwillingness at all government levels to implement numerous recommendations for additional and follow-up studies that might shine a light on the presenting impacts and effects of the Btk spray, is illustrated by the evidence of an '*if you don't look – you can't find'* pattern of inaction by Public Health described throughout this review.

In the end this inaction coupled with overt actions to 'shoot the messengers' that were undertaken to cover up the concerns about this biological spray, only serves to highlight concerns raised so many years later by the report that the loss of so-called 'social licence' to aerially spray urban areas was considered a serious potential risk to primary production in New Zealand.

The phrase 'adding insult to injury' comes to mind in describing the effect of this opinion. It is as if what happened to the people during the aerial spraying campaigns never happened, that somehow, all this history, together with the people who actually experienced it have been disappeared.

The people impacted by the spraying haven't forgotten, but it appears that all these years later, industry, together with their government partners, have. The evidence shows they appear to have suffered a total generational loss of memory about what actually happened to the people during those eight years of aerial spraying over Auckland and Hamilton cities. Their use of the soothing euphemistic phrase that they are only talking about a

"social licence to aerially spray urban areas", when in fact they would be spraying people again, seems to have convinced them there is nothing wrong here.

So, it has to be concluded finally, that firstly there can be no 'moving forward' solutions unless those implementing future biosecurity responses have not only listened to, but *heard* those affected and impacted by the Btk pesticide sprays. Secondly, work has to be done as soon as possible to regain the trust of the people and communities in a genuine partnership that works.

It may help for industry to recognise that, perhaps, *the* strongest recommendation for the involvement of the community in any future biosecurity response was from one of their own – scientist, Dr Gordon Hosking – who argued at the end of the successful White Spotted Tussock Moth campaign that

> "…community participation and support was seen as the ***single most critical factor*** in the success of any such future operations."

It is also good to end the conclusions to this review of New Zealand's experience – not on the negative impact of the Government's clear and patent cover up of the adverse health effects of the Btk pesticide spraying – but on a positive note that a 'partnership approach' in the future, with scientists and industry working with people and the community - the path forward is clear.

Hana Blackmore
May 2025

REFERENCES

AerAqua Medicine. 2001. *Health Surveillance Following Operation Ever Green: A programme to eradicate the white-spotted tussock moth from the eastern suburbs of Auckland*. A report to the Ministry of Agriculture and Forestry prepared by AerAqua Medicine Ltd (formerly Jenner Consultants Ltd). May 2001

Anon, 1999. *Human Health Surveillance during the Aerial Spraying for Control of North American Gypsy Moth on Southern Vancouver Island, British Columbia, 1999*. A Report to the Administrator, Pesticide Control Act, Ministry of Environment, Lands and Parks, Province of British Columbia.

Anon, 2001. Washington State Department of Health. Report of Health Surveillance Activities. Aerial Spraying for Asian Gypsy Moth – May 2000 Seattle, WA.

ARPHS, 2003. Auckland Regional Public Health Service 2003. Human Health Considerations in the Use of Btk-Based Insecticide Foray 48B for Asian Gypsy Moth in Hamilton. Summary report prepared for the Ministry of Health, Ministry of Agriculture and Forestry and Waikato DHB Public Health Unit. October 2003. … https://www.tewhatuora.govt.nz/assets/Publications/Environmental-health/arphs_final_report.pdf

Auckland Healthcare. 1997. *Health Risk Assessment of the proposed 1997-1998 Control Programme for the White-Spotted Tussock Moth in the Eastern Suburbs of Auckland.* A Report to the Ministry of Forestry by the Public Health Protection Service, Auckland Healthcare Services Ltd. September 1997.

Baker, Virginia, 2004. ESR. Painted Apple Moth Focus Group Study - A component of a wider investigation led by the University of Otago's Wellington School of Medicine and Health Sciences. April 2004.

Barrar, Meredydd 2003. NZEI West Auckland Aerial Spraying Survey

Blackmore H. February 2001. Timeline comparison of Two Moth Eradication Programmes.

Blackmore H. November 2001. Aerial spraying against the Painted Apple Moth. Btk pesticide exposure, spray drift and environmental persistence.

Blackmore H. 2002. PAM Health Effect Table - Spray-related health & Incident Reports.

Blackmore H. Feb 2003. Interim Report of the Community-based health and incident monitoring of the aerial spray programme – January-December 2002.

Blackmore H. October 2004. Report to the Prime Minister. Painted Apple Moth Eradication Campaign (Legality of Aerial Spraying).

Blackmore H. March 2008. The Light Brown Apple Moth (LBAM) and the Relevance of the New Zealand Experience. Report to CASS.

Blackmore H. October 2008. Gypsy Moth Control Programme Hamilton, Ontario. Relevance of the New Zealand Experience.

Blackmore H. 2002. PAM Health Effect Table 2001-2006. Updated November 2024

Broadwell et al, 1996. Presence of *Bacillus thuringiensis* var *kurstaki* (*Btk*) in the tussock moth outbreak area of eastern Auckland. Report to the Ministry of Forestry September 1996.

CCPAM October 2002. Exposure Risks for schools during the Painted Apple Moth Aerial Spray Programme.

Controller and Auditor-General. 2002. Report of the Controller and Auditor General. *Management of Biosecurity Risks: Case Studies.* November 2002

Di Marco, 2003. Report to the Hamilton City Council on the Potential Risks of a Spraying Programme using Foray 48B.

Di Marco, 2006. Assessment of Health Effects of Aerial Spraying of Foray 48B (including Assessment of Individual Inert Ingredients) Commissioned by Waitakere City.

Douglas Manufacturing Staff Survey, 2002 – See Appendix in Blackmore H Feb 2003

P Edwards & S Trafford (2016) Social Licence in New Zealand – What is it? Journal of the Royal Society of New Zealand, 46:3-4, 165-180, DOI: 10.1080/03036758.2016.1186702.

Frampton ER, Stark JD, Frampton CM, Glare TR, Beckert L. Environmental and Health Impacts of Aerially-Applied *Bacillus thuringiensis kurstaki*-Based Insecticides. Report for Biosecurity New Zealand. June 2007

Forest Owners Association, Ministry for Primary Industries, Scion. Joint Report 1 Sept 2017. Obtaining social licence to operate: case study – gypsy moth eradication programme, British Columbia, Canada. https://www.nzfoa.org.nz/resources/file-libraries-resources/forest-health/pinenet/610-social-licence-to-operate-canada-visit/file

Gallagher L, Pirie R, Hales S. 2005. Descriptive study of hospital discharges for respiratory diseases in spray zone for Painted Apple Moth (Auckland), relative to local and national statistics 1999-2004. Report by the Institute of Environmental Science and Research Ltd ("ESR") for the Ministry of Health.

Goven J, Kerns T, Quijano R, Wihongi D. 2007 Report of the March 2006 People's Inquiry into the impacts and effects of aerial spraying pesticide over urban areas of Auckland.

Green M, Heumann M, Sokolow R, Foster LR, Bryant R, & Skeels M (1990) Public health implications of the microbial pesticide Bacillus thuringiensis: An epidemiological study, Oregon, 1985-1986. Am J Publ Health, 80: 848-852

Gribben JR 2002. The expected persistence and effects of Btk biopesticide sprays in the West Auckland environment. Report to the Ministry of Agriculture and Forestry July 2002.

Hales S, Baker V, Dew K, Moata'ane L, Martin J, Rochford T, Slaney D, Woodward A. 2004. Assessment of the potential health impacts of the Painted Apple Moth Aerial spraying programme, Auckland. A report by the Wellington School of Medicine and Health Sciences for the New Zealand Ministry of Health. February 2004.

Hales S, Sabel C, Exeter D, Crane J, Woodward A. 2005. Clustering of childhood asthma hospital admissions in New Zealand, 1999-2004. Presented at SIRC 2005 – the 17th Annual Colloquium of the Spatial Information Research Centre University of Otago, Dunedin, New Zealand. November 24th-25th 2005.

Hales S. 2004(a). "Precautionary Health risk Assessment: Case Study of Biological Insecticides. EcoHealth Journal Consortium 2004. Published online 6.10.2004

Hernandez et al. 2000 Super-infection by *Bacillus thuringiensis* H34 or 3a3b can lead to death in mice infected with the influenza A virus. FEMS immunology and Medical Microbiology 29 (2000) 177-181

Hope V, Peters J, Jenner F. Tussock Moth Spraying in Auckland: managing the perception of risk. The New Zealand Public Health Report. Vol. 3 No.11. November 1996

Hosking G, Clearwater J, Handiside J, Kay M, Ray J, Simmons N. Tussock moth eradication – a success story from New Zealand. International Journal of Pest Management, 2003, 49(1) 17-24.

Jenner Consultants /Auckland Healthcare, 1996. *Health Risk Assessment of* Btk *(*Bacillus thuringiensis *var.* kurstak*i) Spraying in Auckland's Eastern Suburbs to Eradicate White-Spotted Tussock Moth (*Orygia thyellina*).* Report by Auckland Healthcare and Jenner Consultants Ltd to the Ministry of Health and the Ministry of Forestry. Commissioned by the Northern Regional Health Authority, North Health, 4 September. 1996.

Jenner Consultants. September 1996. *Addendum Health Risk Assessment of* Btk *(*Bacillus thuringiensis *var.* kurstak*i) Spraying in Auckland's Eastern Suburbs to Eradicate White-Spotted Tussock Moth (*Orygia thyellina*).* Report to the Ministry of Health and the Ministry of Forestry. 26 September. 1996.

Kalemba K, Hope V, Sinclair D. 2002. *Health Risk Assessment of the 2002 Aerial Spray Eradication Programme for the Painted Apple Moth in some Western Suburbs of Auckland.* A Report to the Ministry of Agriculture and Forestry by the Public Health Service, Auckland District Health Board. March 2002.

McEntee M. 2005. Science Communication in an Age of Risk. A Case Study of Two Biosecurity Incursions.

McEntee, M. J. (2007). Participation and Communication Approaches that Influence Public and Media Response to Scientific Risk: A Comparative Study of Two Biosecurity Events in New Zealand. *International Journal of Interdisciplinary Social Sciences, 2*(4),195-203.

Marie McEntee, 2007. Lessons in mishandled anti-moth campaign. New Zealand Herald, 16 December 2007.

McNeill K. 2005. When Moths Attack. Aerial Spraying West Hamilton 2003: The creation of a Risk Discourse.

Noble et al. 1992. Microbiological and Epidemiological Surveillance Programme to Monitor the Health Effects of Foray 48B BTK Spray. For The Ministry of Forests, Province of British Columbia. September 30th 1992

Office of the Ombudsman. 2007. Report of the Opinion of Ombudsman Mel Smith on complaints arising from Aerial Spraying of the Biological Insecticide Foray 48B on the population of parts of Auckland and Hamilton to destroy incursions of Painted Apple Moths, and Asian Gypsy Moths, respectively during 2002-2004.

OSH, 2003. Occupational Safety and Health Service, James R Napier, Health and Safety Inspector. Hamilton's Fraser High School. Complaint from Martin Elliott about Gypsy Moth Spray Programme. Final Report. 2003

Palmer, G. December 2002. Legal Opinion on Painted Apple Moth Spraying.

Pearce M, Behie G, Chappell N. Spring 2002. The Effects of Aerial Spraying with Bacillus Thuringiensis Kurstaki on Area Residents. Environmental Health Review. p19-22.

Pearce N. Pesticides and Health. How New Zealand Fails in Environmental Protection. BWB Texts 2022.

Petrie K, Thomas M, Broadbent E. 2003. Symptom complaints following aerial spraying with biological insecticide Foray 48B. The New Zealand Medical Journal, Vol 116 No 1170.

Petrie et al 2005. Worries about Modernity Predict Symptom Complaints after Environmental Pesticide Spraying. Psychosomatic Medicine 67:778-782 (2005)

Phillips D. 2003. Commentary to MoH on report titled: "Draft Interim report of the Community–based health & incident monitoring of the aerial spray programme January – December 2002. Institute of Environmental Science and Research (ESR).

Public Health Intelligence. 2004. Literature Review - Health impacts of the aerial spraying of pesticides, and methodologies for detecting health impacts in an exposed population. Ministry of Agriculture and Forestry. (updated Jan 2005, May 2005)

Public Health Intelligence. July 2006. Overarching Report - Population Health Impacts Arising from the Foray 48B Aerial Spray Eradication Programme (exotic species incursions – Asian Gypsy, White Tussock, and Painted Apple Moths). For Ministry of Agriculture and Forestry.

Public Health Intelligence. July 2006. Population health impacts of airborne spraying in Auckland: A retrospective case-control study of birth defects and congenital hypothyroidism. For Ministry of Agriculture and Forestry. (Also referenced at White P, Bormann B)

Read D. 2003. Review of: Watts M. Painted Apple Moth eradication programme: health risks and effects (2003)

Teschke et al, May 2000. Airborne Exposures to *Bacillus thuringiensis* var.*kurstaki* During Gypsy Moth Eradication." Final Report to the Capital Health Region.
https://open.library.ubc.ca/soa/cIRcle/collections/facultyresearchandpublications/52383/items/1.0048188

Teschke K, Chow Y, Bartlett K, Ross A, van Netten C, 2001. Spatial and Temporal Distribution of Airborne *Bacillus thuringiensis* Var. *kurstaki* during an Aerial Spray Program for Gypsy Moth Eradication. University of British Columbia, Canada. Environmental Health Perspectives, Vol 109 (number 1) January 2001

Thorogood et al 1996. Aerial spraying of *Bacillus thuringiensis* var *kurstaki* in Auckland. I. Btk spore penetration into dwellings. II Persistence of air-borne Btk spores. Report to the Ministry of Forestry December 2006.

USDA. 2004. Human Health and Ecological Risk Assessment for *Bacillus thuringiensis* var *kurstaki (B.t.k)* Final Report for USDA, Forest Service. Submitted by Patrick R. Durkin. Syracuse Environmental Research Associates, Inc.

Van Santen L, Goven J, Langer L. The role of community involvement in future incursion responses. NZ Journal of Forestry, November 2004.

Van Santen L. (2005) Protecting New Zealand's Uniqueness: What is at stake? A study of the theory and practice of handling biosecurity operations with a potential high-impact on people and the environment. (Study in partial fulfilment of a Master's degree in Forest Policy and Management.)

Vettori C, Paffetti D, Saxena D, Stotzky G, Giannini R (2003a) Persistence of toxins and cells of Bacillus thuringiensis subsp. Kurstaki introduced in sprays to Sardinia Soils. Soil biology &Biochemistry 35 (2003) 1635-1642.

Vettori C, Paffetti D, Stotzky G, Giannini R (2003b) Genetic exchange between Bacillus thuringiensis subsp. Kurstaki and the indigenous microbiota in soils of Sardinia. Abstract presented to the Tromso workshop. Work in progress.

Washington State Department of Health. Report of Health Surveillance Activities. Aerial Spraying for Asian Gypsy Moth – May 2000 Seattle, WA. July 2001.

Watts M. 2003. Painted Apple Moth Eradication Programme: Health Risks and Effects.

Watts M, Blackmore H. 2002. Report and Recommendations of Special Science Meeting – Painted Apple Moth Eradication – Community Option.

Watts MA. 2000. Ethical Pesticide Policy: Beyond Risk Assessment. PhD thesis, University of Auckland, Auckland.

Watts M. 2006. Submission to the People's Inquiry into Aerial Spraying of Foray 48B.

White P, Borman B. 2006. Birth Defects Report – Population health impacts of airborne spraying in Auckland: A retrospective case-control study of birth defects and congenital hypothyroidism. For Ministry of Agriculture and Forestry. July 2006.

See the Peoples Inquiry website for additional and complementary reports and studies.
https://peoplesinquiry.co.nz/wp-content/uploads/2018/05/reference-table-of-studies.pdf

VIDEO LINKS

"Spray Day" – Dateline SBS – 2003
https://www.youtube.com/watch?v=Eod2BT3n9tA

"Safe and Sorry" - Sunday: Producer Hunter Wells – 2005
https://www.youtube.com/watch?v=86L9e1IIIQw

WEBSITES

www.peoplesinquiry.co.nz

https://peoplesinquiry.co.nz/inquiry-testimonies/

APPENDIX 1

Recommendations from the Report of the People's Inquiry – pp2-4

Recommendations from Part 1:

R1. The government should issue a formal apology to the affected community for the impacts of the PAM spray programme on people's health, employment and education and for the inadequate support provided to those affected.

R2. The government should establish a compensation fund, to be administered by a third party acceptable to representatives of the affected community, to reimburse major expenses and losses incurred by the affected community as a result of the PAM programme. The fund should be financed by central government and the forestry industry.

R3. The data collected by the Aeraqua PAM Health Service should not be assumed to be a reliable measure of the health impacts of the PAM programme and should not form part of the evidence base for any future health risk assessments of Foray48B or similar products.

R4 Whenever and wherever an incursion or an incursion response has the potential to affect a community, the community or its representatives should be, from the initial stages, actively involved in the analysis of the situation, decision-making as to the response, and planning of any response.

R5. The Health Select Committee and the Primary Production Select Committee should review the decision processes and priorities that led to a decision to spray a residential area with a pesticide in order, in part, to spare the forestry industry the costs of spraying their forests with that pesticide.

R6. The acceptability of agreements that result in the involuntary exposure of people to a product whose ingredients cannot be revealed to them should be reviewed by the Human Rights Commission and by the Health and the Justice and Electoral Select Committees.

R7. The Official Information Act should be amended to prevent the charging of fees that block access to information for those without extensive financial resources.

R8. The recommendations made by the reviewer of the Blackmore (2003) health monitoring interim report should be acted upon.

R9. All those involved in assessing the risks of incursions and incursion responses should be required to understand, consider and acknowledge the limitations of conventional risk-assessment methods.

R10. Assessment of and advice on health impacts of incursions and incursion responses should not be sought from those having financial or reputational interests, or the appearance of such interests, in the outcome of the assessment.

R11. All health-related aspects of biosecurity, including the health impacts of future incursion responses and research on those impacts, should be the responsibility of the Ministry of Health. They should be neither funded by nor delegated to MAF or Biosecurity New Zealand.

R12. Sections 7 and 114 of the Biosecurity Act should be reviewed by the Health Select Committee, the Primary Production Select Committee and/or the Local Government and Environment Select Committee, which should consider the proposed amendments contained in Submission 34, Appendix A, to limit the powers currently granted to the "chief technical officer" and the Minister of Biosecurity, in view of the fact that actions taken to protect the primary production sector from pest incursions have the potential to impact adversely on human health and the environment.

R13. Should it be necessary in the future to expose a population to a potentially harmful substance in the interests of biosecurity, independent research must be funded and undertaken to: 1/ establish baseline levels and patterns of health and illness; 2/ determine actual exposures experienced by members of the community in a variety of relevant circumstances; and 3/ carry out follow-up studies of exposed populations.

R14. The attribution of health effects reported by the community to psychosomatic processes should be given no credence in future risk assessments unless and until such a diagnosis can be supported with empirical, medical evidence.

R15. Symptoms should not be dismissed as psychosomatic simply because their nature and pattern does not fit what the assessor expected based on past risk assessments, particularly where the level of exposure is unusual (e.g., long-term, repeated exposure of an urban population to Foray48B).

R16. All requests for publicly funded research should be publicly notified and open to all bidders.

R17. The process of awarding public research funds should be transparent.

R18. The State Services Commission should develop processes and prohibitions adequate 1/ to ensure that publicly funded research that produces results inconvenient to government agencies is neither interfered with nor kept from the public; and 2/ to protect researchers who produce results at odds with the interests of the government or its agencies from denial of opportunities to obtain public research funding and interference with other legitimate research and business activity of the researcher.

R19. The research recommended by the Wellington School of Medicine Report (Hales et al. 2004) should be carried out, if this is still technically feasible.

R20. Section 162 of the Biosecurity Act should be amended to account for the impacts of biosecurity programmes on urban populations, including changes to the provisions for compensation to recognise the full array of harms that can be inflicted by biosecurity measures.

R21. The Biosecurity Act should be reviewed by the Human Rights Commissioner and the Justice and Electoral Select Committee in order to ascertain whether it is compatible with an acceptable level of protection of the rights of New Zealanders.

R22. The shortcomings of conventional risk-assessment methods in relation to health and environmental impacts should be acknowledged and efforts made to develop and implement methods that are better able to consider these impacts.

R23. Biosecurity decision-making should be recognised as being political rather than solely technical, in the sense that it involves decisions regarding whose interests will be protected and to what degree, who will pay the cost of that protection, and who will bear the risks. Biosecurity decision processes should thus be made transparent to the public and should take into account a wider range of interests, views and knowledge than has been the case until now.

Recommendations from Part 3 (by Dr Tom Kerns):

R24: All ingredients in any pesticide formulation that will be deployed in or near any vicinity where human beings are likely to be exposed to direct spray, spray drift or spray residues should be fully and publicly disclosed. If full disclosure is not possible, then the pesticide should not be deployed in any location where humans will be exposed. "Fully disclose or don't expose" should be a key operating principle in MAF's pesticide policy. The Ministry of Health, whose primary responsibility is to the health of New Zealand citizens, has an even stricter duty than MAF to insist on full disclosure.

R25: The government should make Foray 48B labels (indeed all pesticide labels) readily available to the public. The public has a right to know 1/ precisely what is on the pesticide's label; 2/ whether the New Zealand label for Foray 48B is less restrictive and cautionary than labels for the same product in other countries; 3/ if it is less restrictive, why it is so and how it did it come to be so; and 4/ how pesticide labeling is determined, and what negotiations about labeling, if any, occur between the New Zealand government and a pesticide's manufacturer.

R26: In keeping with the mandates of recently legislated new "primary functions" for the Human Rights Commission (under the Human Rights Amendment Act 2001)

- to advocate and promote respect for and appreciation of human rights in New Zealand society...
- to advocate and promote, by education and publicity, respect for, and observance of, human rights;
- to make public statements promoting an understanding of, and compliance with, the New Zealand Bill of Rights Act 1990; …
- to promote, by research, education and discussion, a better understanding of the human rights dimensions of the Treaty of Waitangi and their relationship with domestic and international human rights law

the Human Rights Commission should establish a procedure for hearing PAM-related complaints publicly and should disseminate their concerns widely. It should work with the Waitangi Tribunal to explore possible violations of the spirit, intent and letter of the Treaty of Waitangi.

R27: The government should make public assurances to the community that what happened in West Auckland will not happen again anywhere in New Zealand. In support of those assurances it should take action to reform the Biosecurity Act as outlined in R12, R20 and R21 above.

APPENDIX 2

Extract from the 2006 submission to the People's Inquiry from Dr Meriel Watts

Introduction

For the last 16 years I have worked on behalf of spray–affected people and their communities at a local, national, regional and international level.

I am currently coordinator of Pesticide Action Network Aotearoa New Zealand, a member of the Steering Council of Pesticide Action Network Asia and the Pacific and Co-convenor of its Pesticides Task Force. Prior to that I have worked for the Soil & Heath Association and Greenpeace on pesticide issues. I have sat on numerous government bodies relating to pesticides, including the Pesticides Board, various Ministry of Agriculture (MAF) spray drift working groups, the Agrichemical Trespass Ministerial Advisory Group, the Ministry for the Environment's Reference Group for a National Pesticide Risk Reduction Strategy, and am currently on the Agricultural Compounds and Veterinary Medicines Advisory Committee.

On all those committees I have been the token representative of the interests variously of consumers, the community, the environment, and/or organic growers, depending on the context. Invariably mine has been a voice of one against the many, and discounted because I represent the views and needs of the spray-affected community - and therefore do not have any expertise, or am biased, or operating from a basis of emotion/hysteria. Tired of having my views discounted for those reasons, I set out to remedy the situation. I studied for a Masters degree in an eclectic mix of environmental economics and law, planning law and entomology – followed by a PhD on ethical pesticide policy.

You will probably not be surprised to learn that I am still largely regarded by those same people in elevated positions of authority as 'not to be taken heed of' because I still work on behalf of the community. It was illuminating for me to be asked by these people, when I was still doing my PhD – so what will you do when you have finished – will you stay on at the University, will you work for the government? No I said, I will continue to do what I have done for years, work for the community. …

……..

3. Community Participation

No community advisory group existed in West Auckland, until the decision had been taken to begin aerial spraying. At that point I was approached by Dr Ruth Frampton of MAF, who headed the PAM eradication programme, to represent the community of West Auckland. I responded that I could not do that as I didn't live in that community and had no mandate, but that I would assist in setting up a community advisory group. Subsequently I became a member of that group - the PAM CAG - at the invitation of the community, and later, for a period was an observer on behalf of the PAM CAG on the Technical Advisory Group – until MAF ceased to notify me of meetings.

I was deeply concerned by MAF's failure to establish a community advisory group when the moth was first found, when they were ground spraying with the highly toxic organophosphate insecticide chlorpyrifos [Attachment 6].

When they did finally establish the CAG, it rapidly became evident that MAF had no intention of working in partnership with the community, or even of paying any heed whatsoever to what the community through its CAG was advising them. For example despite many pleas to stop using Decis (deltamethrin) as a ground spray and to use the Foray 48B instead as had been successfully done in the WSTM programme – and at one stage a promise that they would – they did not. MAF's agenda appeared to be to use the CAG to tell the community what it, MAF, wanted the community told. The CAG refused to function as a conduit for MAF, as testimony from other members of the CAG will no doubt reveal, and as a result the relationship between MAF and the community became acrimonious and non-productive. [Attachment 7]

In essence the community was not permitted to engage in a constructive process with the government during the PAM programme but was sidelined and disenfranchised.

There are two issues here: whether or not the government has all the wisdom and the community has none at all, and whether the community has a right to have a say in a programme that effect their lives.

Community wisdom:

The essential problem was that MAF attempted to maintain sciences' cultural authority, failed to pay any respect to the community and failed to acknowledge community wisdom. Wisdom involves common sense, experience, intuition, emotion, contextual and holistic thinking, and can provide profound insight and broad foresight (Watts 2000).

MAF persisted in the view that because the CAG was 'community' it had no expertise and therefore nothing worthwhile to contribute – even though using its own definitions of expert there were several on the CAG, including Dr Peter Maddison the entomologist who original found the painted apple moth.

There is little doubt that the government did not know all that there is to know about effective painted apple moth eradication. The analysis I have provided above of the risk assessment of Foray 48B has shown that it is not the rigorously scientific method it is promoted to be. Evidence from others with expertise in entomology will show that the programme was flawed from that perspective too.

MAF failed to incorporate societal values, and to acknowledge social and economic effects of its programme. Determining the acceptability of risks is first and foremost an exercise in social discourse

Conversely, it was my experience that the community itself did have considerable expertise and wisdom that could have contributed significantly to a successful PAM programme, resulting in far less acrimony. I believe that the antagonism generated by MAF's approach to the community could have a serious adverse effect on the future success of biosecurity programme. Not the least because it has made some people very reluctant to report the findings of possibly alien insect species.

It is also my experience of many years, and working with many communities, that there is considerable expertise and wisdom in the lay community when it comes to issues involving pesticides and their effects on health and the environment, and generally also a willingness to participate in finding acceptable alternatives.

Community's right to be involved:

It is my view that those people who lie in the path of a government policy have a right, based on natural justice, to be directly involved in formulating and implementing that policy. Consultations, submissions and public meetings are not sufficient mechanisms for ensuring appropriate democracy. The 'scientists' only approach adopted by MAF has been shown to be socially and even scientifically flawed, and ethically inadequate. It is time for government to work with the communities that will be affected by a biosecurity programme, and the public interest groups that support them, in a partnership approach.

4. Recommendations for future biosecurity programmes

a) ***The precautionary principle*** should be applied to all aspects of an intended biosecurity programme.

The precautionary principle is an internationally recognised method of dealing with uncertainty when scientific knowledge is incomplete – as it obviously was with the aerially spraying of Foray 48b. The principle states that:

> *When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically.*
>
> Wingspread statement.

Essentially the precautionary principle directs that action be taken to reduce risk from chemicals in the face of uncertain but suggestive evidence of harm. There was suggestive evidence of harm of aerial application of Foray 48B from previous community exposures.

b) ***The principle of minimum harm*** should be applied when choosing methods to manage or control the intended species.

As a natural extension of the precautionary principle, it is sensible to choose the method or methods for managing or eradicating the intended species which are effective but which cause the minimum harm to people and the environment. This principle is more weakly expressed in the substitution principle, which requires that hazardous chemicals be replaced with safer alternatives, and in alternative assessment which requires that all alternatives to a pesticide should be considered. In applying the principle of minimum harm, one starts with the questions 'what do we want to achieve and what is the least harmful way of achieving it', rather than simply establishing whether or not aerial spraying poses no unacceptable risk to health (Watts 2000, Chapt 5).

c) Right to know: if a pesticide of any sort is to be used in a biosecurity programme, the community must be provided with the full ingredient list of that pesticide and information on all known potential adverse effects.

It is a fundamental tenet of natural justice that when people are to be exposed to a substance they be given full information on the constituents, so that they can themselves determine what is acceptable to them.

d) Community involvement: inclusive and democratic

The community implicated in an intended biosecurity programme should be fully involved in that programme from its inception, in a meaningful way and based on a partnership approach. This includes:

- recognition of lay expertise and wisdom within the community and its public interest groups;
- recognition of anecdotal evidence of health effects experienced by the community;
- recognition of social impacts;
- participation of community-selected representatives on all scientific and policy groups and processes;
- community advisory groups formed with the intention of meaningful two-way dialogue;
- inclusion of community views in all policy decisions.

See People's Inquiry Website for Dr Watts full submission.

www.peoplesinquiry.co.nz
Submission 75

ISBN 978-0-473-78383-9 pdf