

Crop spraying:

Could pesticide exposure have caused your M.E.?

Award-winning AfME member Georgina Downs of the UK Pesticides Campaign looks at case studies and research linking pesticide exposure to onset of M.E., asks why two Government advisory bodies disagree over the existence of such a link, and questions the adequacy of current regulations on crop spraying

The link between M.E. and pesticides is contentious. In his book *Living with M.E.* (Vermillion, 1999), Dr Charles Shepherd describes exposure to pesticides as one of the triggers that can lead to M.E. and says on page 25 that “there is reliable research evidence now present” to back this claim. Similarly, former GP John Richardson, who studied M.E. for 50 years, stated in 2000 that: “Amongst the group of clinical features known as M.E., the possibility of pesticide poisoning should always be borne in mind.”

Given the lack of epidemiological and biomedical research into the causes of M.E. it's perhaps not surprising that there is uncertainty over the exact nature and importance of the link between M.E. and pesticides. But considering that many pesticides are toxic to the nervous system, and that there is a growing body of evidence linking pesticides to various chronic neurological and neuro-degenerative diseases, then an association with some cases of M.E. would appear highly probable.

Currently farmers are legally allowed to spray right up to the open window of any occupied premises, whether a house, school, home for the elderly or any office or workplace. A Royal Commission on Environmental Pollution report estimated the number of properties adjoining farmland at approximately half a million. Considering the distances pesticides are known to travel, this figure will be far higher if including all the homes, schools and other properties that might not be directly adjoining fields, but could still be contaminated by pesticide spray.

My own story

In the early '80s my parents purchased a piece of land in the countryside on which they designed and built their 'dream home'. About a year after we moved in, a local farmer switched use of the surrounding fields from grazing to arable crops, which were frequently sprayed with pesticides. From then on I suffered from many health problems ranging from flu-type illnesses and sore throats covered in blisters, to headaches, dizziness, tinnitus and memory and concentration problems. By 1991, my health had deteriorated to such a degree that I was hospitalised with severe muscle wastage and other chronic symptoms. I knew something had gone seriously wrong with me neurologically, but at that time, I didn't know the correct terminology to be able to explain it.

I was determined to discover why my health had deteriorated, but it wasn't until I was sitting at home one day looking out the window that the penny finally dropped. I saw a tractor in the

adjoining field spraying something and started to wonder what it was. Following some initial inquiries, I was astonished to discover that the tractor was actually spraying a cocktail of poisonous chemicals into the air where we live and breathe, and even more astonished to find out that a farmer is legally permitted to do so under existing UK Government policy.

Lack of protection for rural communities

In 2001 I started presenting a case to the Government regarding the lack of regulation, as it became apparent that there was a fundamental failure at all levels to protect people in the countryside from exposure to pesticides.

The current method of assessing the risks to public health from crop-spraying is based on the predictive model of a 'bystander'. This model assumes that there will only be occasional, short-term exposure from the spray cloud at the time of the application, and furthermore, to only one individual pesticide at any time.

I've argued that this model is clearly inadequate to address the long-term exposure of residents living near sprayed fields, where they will be repeatedly exposed to mixtures of pesticides and other hazardous chemicals throughout every year and in many cases, for decades.

Public exposure to pesticides

Pesticides, by their very nature, are designed to kill living organisms. People can be exposed to these chemicals via air, water, contaminated surfaces and food, amongst other sources, and the routes of exposure include through the



Photo by Vincent Fallon



Georgina Downs and her father Ray are regularly exposed to pesticides in their surrounding air and living environment. A worker is legally allowed to know what chemicals they are using, and the potential health effects, and is required to wear protective equipment, (similar to what Ray is wearing). Yet members of the public, breathing in the same air, are not.

lungs (inhalation), the skin (dermal absorption) and the eyes, as well as ingestion (orally). Once pesticides have been absorbed, they can enter the blood stream and be carried throughout the body.

Many pesticides have neurotoxic, carcinogenic and hormone-disrupting capabilities. Studies have shown that even very low doses of pesticides can disrupt hormone systems at levels significantly lower than previous research considered safe (e.g. Hayes et al., 2002 and 2003).

Babies, children, pregnant women, the elderly and those with pre-existing medical problems are particularly vulnerable to the effects of pesticides.

However, the UK has a substantial crop protection industry. Sales of pesticides in 2004 were £467 million, with agricultural and horticultural uses accounting for 86% of the value of sales and 80% of the amount used (DEFRA 2006).

Evidence presented

Since launching my campaign, I've presented evidence to all the Government agencies and advisors responsible for pesticides. One video I produced featured a 'family' of mannequins, made up of a pregnant woman, two babies and a young child situated in our garden, next to the field being sprayed. My aim was to demonstrate the inadequacy of the current risk assessment in protecting rural residents. When I presented this at the Advisory Committee on Pesticides

(ACP) Open Meeting on 10th July 2002 I asked the attendees to raise their hands if they thought that the video had shown an acceptable system for protecting public health. Not a single hand went up!

I subsequently met with Government ministers and called for a ban on crop-spraying near human habitation and direct public access to information on the chemicals sprayed on crops. The ministers stated that I had made a powerful case and eventually decided to launch two consultations on crop-spraying in July 2003.

Astonishingly, ministers subsequently concluded that on the basis of the advice received from the ACP, amongst others, the existing system provided full reassurance. However, they did request that the Royal Commission on Environmental Pollution (RCEP) carry out a study to re-examine the evidence regarding the risks to people from pesticides (Michael A, 2004).

The Royal Commission's Report

The RCEP report, published in September 2005, concluded that crop-spraying is a potential health risk and that chronic illnesses and diseases reported by people in rural areas, including cancer, Parkinson's, M.E. and Multiple Chemical Sensitivity (MCS) could be associated with pesticide exposure.

The Commission were highly critical of both the ACP and Government

regulators, the Pesticides Safety Directorate (PSD), concluding that the level of confidence and assurance that had been given by the ACP to ministers, as well as to the public, regarding the safety of residents and bystanders exposed to agricultural pesticides "represented too sanguine a view of the robustness of the scientific evidence".

However, the Royal Commission's report then contradicted its own findings by making recommendations that won't actually prevent people's exposure to pesticides from crop-spraying. While acknowledging the need for 'no spray zones' between sprayed fields and residential property or other buildings, it suggested these be just five metres wide.

This recommendation has been widely criticised since there is an extensive body of scientific evidence to show that pesticides can travel in the air and spread over vast distances, measured in miles rather than metres (e.g. Lee et al, 2002, and CALPIRG Charitable Trust, 1998). As a result of such evidence, some US states now require 'no-spray zones' of up to 2.5 miles around schools in an attempt to protect children from exposure (Alarcon et al, 2005).

Advisory Committee hits back at RCEP report

In February this year, the Advisory Committee on Pesticides hit back at the Royal Commission's criticisms of their approach in one of the most extraordinary documents to be published by a Government advisory committee charged with advising ministers on the protection of public health (ACP, 2006).

The ACP relies on highly selective literature in an attempt to support its view that pesticide spraying is more of a social issue than a scientific one and that any ill-health reported is likely to be predominantly of a psychological origin following an awareness of exposure.

In relation to M.E./CFS and multiple chemical sensitivity, the ACP stated that, "There is strong evidence that psychological factors have an important role in CFS and MCS. A number of studies have indicated that the frequency of psychiatric illness is higher in CFS than in other medical disorders..."

The ACP goes on to state that, "Considerations such as these have led earlier reviewers, who have examined the relevant scientific evidence in greater depth, to conclude that chemical toxicity is unlikely to contribute importantly to MCS or CFS. A more plausible explanation is that these disorders represent a psychologically mediated response to a triggering event or exposure (e.g. a viral infection that causes acute fatigue, or perceived exposure to an environmental hazard) that is conditioned by cultural influences as well as by individual beliefs and mental health."

That such arguments can be presented four years after the Chief Medical Officer's Report recognised CFS/M.E. as a "genuine and disabling condition" and a serious national health problem, seems extraordinary.

Studies linking pesticides with M.E./CFS

There have been a number of studies linking exposure to pesticides and other chemicals with onset of both M.E. and MCS. For example, a study published last year reported 26 patients who developed CFS after exposure to insecticide products, and it was associated with MCS in a third of cases. The authors concluded that, "CFS and Multiple Chemical Sensitivity are well-defined illnesses that may appear after some toxic exposures" (Fernandez-Sola et al, 2005).

Another study published last year found altered gene expression in 16 genes of M.E./CFS patients compared with normal controls, including upregulation of an associated gene product called neuropathy target esterase (NTE). The report stated that, "NTE is a target for organophosphates and chemical warfare agents, both of which may precipitate CFS." The authors concluded that, "The involvement of genes from several disparate pathways suggests a complex pathogenesis involving T-cell activation and abnormalities of neuronal and mitochondrial function and suggests possible molecular bases for the recognised contributions of organophosphate exposure and virus infection, respectively" (Kerr et al, 2005).

An earlier Italian study published in 2001 assessed five patients who developed clinical features of M.E./CFS several months after exposure to

environmental toxic factors, including pesticides and solvents, amongst others. The authors concluded: "Our preliminary findings confirm the presence of a dysfunction of the immune system in CFS patients with a history of toxic exposure previous to CFS onset... three of the five examined patients also showed decreased numbers of natural killer CD56+ cells. So CFS patients with a post-toxic exposure onset might represent a well defined CFS subgroup characterized by specific immune dysfunction probably precipitated by the toxic exposure itself" (Racciatti D et al, 2001).

"If I had realised these sprays were so toxic I would have moved sooner"

Insecticides were also linked to neurological problems in some US farmers following "moderate lifetime exposure" according to data collected by Macker et al from 18,000 Dakota agricultural workers.

In addition, there's a growing body of evidence in relation specifically to pesticide exposure and cognitive effects in children. For example, a study in Mexico found that children living in an area with heavy pesticide use had strikingly impaired hand-eye coordination, decreased physical stamina, short-term memory impairment and difficulty drawing, compared to children living in areas with little or no pesticide use (Guillette et al, 1998). Similar research findings are being reported from a study in North Dakota (Moulton et al, 2006).

Other studies have shown a link between chronic pesticide exposure and degenerative neurological diseases including Parkinson's, motor neurone disease, and multiple sclerosis (Seaton A, 2005; ABCNewsOnline, 2006).

Devastated lives

Over the last five years I've received thousands of e-mails, letters and calls from rural residents, not only across the UK, but from all over the world, reporting acute and chronic long-term illnesses and diseases in rural communities surrounded by fields that are regularly sprayed with pesticides. One of the most highly reported illnesses is M.E.

Marion's story

In 1987 Marion Tait and her family moved to a house in Cambridgeshire surrounded by crop fields on three sides that were regularly sprayed with pesticides. Before moving there Marion, now 56, says she was "completely fit and well".

However, within two years she started to suffer recurrent symptoms that coincided with the spraying. Marion explains, "I had all the usual acute symptoms when they sprayed, starting with sore throats and burning eyes. It never occurred to me when I saw the sprayer run up the side of the house that they might be spraying poison and so I stayed out gardening."

In early 1992 Marion's health deteriorated further. She started to feel really tired and 'spaced out', and was experiencing dizziness, balance problems and stomach bloating.

As time went on Marion suffered other symptoms including pain in her arm, shoulder, chest, rib and back, and had difficulties coordinating her feet. She gave up riding, as simply putting the saddle on the horse left her exhausted. She tried to exercise in an attempt to improve her stamina, but it only made her worse.

In October 1995, Marion collapsed with tremors and was admitted to hospital. However, after undertaking some blood tests, the hospital discharged her without any diagnosis.

Marion became increasingly convinced that her health problems were connected to the crop-spraying, saying: "Every time the fields were sprayed my head felt like cotton wool and I would collapse."

A year later she was eventually diagnosed with M.E. and Marion is now adamant that pesticides destroyed her health.

She says, "Since the beginning of 1997 I have been mainly bedridden and in terrible pain. The Government did nothing to protect me from exposure to these poisons and someone should be held responsible for taking my life away and leaving me in this state. If I had realised these sprays were so toxic I would have moved sooner, but I never dreamt the Government would allow the use of something so dangerous to human health."

Sarah's story

As a child Sarah*, now 39, had attended a West Country primary school surrounded by sprayed fields, for seven years. She explains, "On at least two occasions the pesticides fell down on us like a fine rain during a PE lesson – we had to go inside because the smell was so awful and it was difficult to breathe. I myself began to fall ill at the age of nine – migraines, terrible hayfever and a shorter ability to concentrate. This gradual deterioration continued until at the age of 23 my body had a physical collapse and M.E. was diagnosed."

Sarah's close friend Paul*, 36, has had M.E. since he was 18. He also has a history of pesticide exposure, as he grew up in houses close to sprayed fields. Paul explains that he used to easily be able to cycle 20 miles, but has been severely disabled by M.E. for the last 16 years and now relies on a mobility scooter to get around. His symptoms include memory and concentration problems and confusion, and he has difficulties processing information.

Sarah says, "The chemicals in these sprays are designed to kill animal and plant life so how can they not be harmful to humans? It makes me sad that without recognition from the Government, future generations will continue to have their lives blighted by our rural toxic air."

Jan's story

In the late 80s, Jan Simpson, now 48, moved his family to a house in Lincolnshire, situated right next to crop fields. Like Marion Tait, before moving Jan says he used to be "fit as a fiddle". He worked in carpentry, and would often labour until 3am.

However, after a few years in his new home, Jan gradually started feeling very tired and unwell. He remembers one spring having an extended flu-type illness, with symptoms including a feeling of seasickness, racing heartbeat, a high temperature that left him drenched in sweat, and being unable to get up.

Jan says, "I firmly believe this could have been a result of a gradual build up of toxicity following repeated exposures to the toxic chemicals sprayed on the fields." He points out that the farmer used to wear protective

gear, including overalls and a mask, when carrying out any spraying, while nearby residents had nothing to protect themselves from exposure.

In the late 90s, following a further deterioration in his health, Jan's GP diagnosed M.E. For the next few years he was completely housebound and pretty much bedbound. Then about eighteen months ago, Jan moved the whole family six miles down the road to the centre of the village, which is not situated next to fields. Since living in the new house and changing his diet to one that's predominantly organic, Jan has improved to a degree that he can now carry out limited activity, although his condition continues to fluctuate.

He concludes, "I have more good days now than bad days, as opposed to before when we were next to the fields suffering almost continuous exposure to pesticides. I'm nowhere near normal, but at least I'm no longer bedbound. I hope things will improve further, but I'm aware having lived with this condition for so long that nothing is set in concrete."

The way forward – Government action

It appears that substantial evidence already exists linking pesticide exposure to a number of chronic neurological and neurodegenerative diseases, including M.E.

The total cost to the UK with regard to M.E. alone has been estimated at £6.4 billion per year according to a recent Action for M.E. report. It's not known what proportion of these costs could be attributable to people having developed M.E. following exposure to pesticides or some other environmental toxin. Obviously the personal and human costs to individuals suffering any pesticide-related ill health, cannot be calculated in financial terms.

I'm still calling on the UK Government and the EU to take immediate action. The only way to protect public health and prevent any illnesses that could be associated with pesticides, both now and for future generations, is to avoid exposure altogether through the widespread adoption of truly sustainable non-chemical and natural methods, as an alternative to chemical pest control. This would obviously be more in line with the Government's commitment to sustainable development, sustainable

food and farming and sustainable communities, as the reliance on complex chemicals designed to kill plants, insects or other forms of life cannot be classified as sustainable.

**Names of these case studies have been changed at their request*

A full list of references is available on request from the editor (e-mail interaction@afme.org.uk)

About the author

Georgina Downs runs the UK Pesticides Campaign to highlight the adverse health and environmental effects of pesticides. Georgina lived next to regularly sprayed fields for 22 years and has long-standing health problems. She was the first to identify serious fundamental flaws regarding the bystander risk assessment, and for the last five years has presented a case to the Government for a change in the regulations governing crop spraying, calling for an immediate ban on such pesticide use near to people's homes, schools, workplaces and other places of human habitation.

Georgina has recently been awarded the prestigious Andrew Lees Memorial Award at the British Environment and Media Awards, and is also a nominee for Campaigner of the Year in the *Observer* newspaper's 2006 Ethical Awards. In addition, *Farmers Weekly* magazine included Georgina in their list of the 'Top 20 power players in UK farming' following the impact of her campaign.



Passionate Campaigner: Georgina's efforts resulted in her winning the Andrew Lees Memorial Award

Haematologist and NHS Clinical Champion for CFS/M.E. in the Norfolk, Suffolk and Cambridgeshire areas, Dr Terry Mitchell comments:

While many patients referred to our M.E./CFS service had suffered one or more infections and a history of stress prior to getting ill, a minority of referrals have had a different clinical history involving exposure to (mainly organophosphate) pesticides.

Working in a semi-rural community it was clear that the most affected were agricultural workers, but just as the use of pesticides was widespread, the social circumstances of those who became ill also varied greatly. There was the couple with eight dogs regularly treated for fleas with pesticides, a shepherd from Scotland who'd been sheep dipping without protective clothing, greenhouse workers, and the 'innocent bystanders' described so elegantly in Georgina Downs' article. For instance, I recently saw a whole family who were caught in a crop spray many years ago. The only member not adversely affected was the baby who was in a covered buggy at the time, while the mother and sister have suffered full-blown M.E./CFS ever since.

As seen in cases with a post-infective onset, the illness of people affected by pesticides was worsened by quite minor episodes of stress, so this subset of patients reacted much as those with a more conventional infective trigger.

They also behaved in the same way by pushing themselves on good days and subsequently suffering a worsening of symptoms.

As a consultant in a physical speciality I never considered the psychiatric diagnosis attributed to some of these patients as a serious possibility. However, like my haematology patients, (many of whom had life-threatening but often chronic disease), there were inevitable psychological consequences and some patients with a pesticide exposure trigger became anxious and depressed.

The history of medicine often shows evidence of conflicts between apparently widely spaced protagonists, but in the end this can provide the catalyst for understanding what were regarded at the time as complex and enigmatic illnesses. With the identification of a CFS-associated gene product (neuropathic target esterase¹), our understanding of pesticide-linked chronic fatigue and neurological illness will surely be improved and further defined. I've been discussing this fascinating finding with lead researcher Dr Jonathan Kerr who agrees that we need to understand why for some, one exposure to pesticides seems to be sufficient to produce a significant illness, while in others the effect is cumulative and relapse is associated with re-exposure to the product.

The links between chronic illness and pesticide exposure seem significantly robust for action to be taken by those whose duty it is to guard the nation's health.

Ref 1: Drs Kaushik et al J. of Clin Path, 2005

A FLY IN THE SOUP, MADAM? WE'LL SOON SORT THAT OUT.



Further information

- for more information on the author's campaign visit www.pesticidescampaign.co.uk. Georgina has also produced two videos entitled *Pesticide Exposures for People in Agricultural Areas – Part 1: Pesticides in the Air;* and *Part 2: The Hidden Costs*. For more details e-mail georgedowns29@yahoo.co.uk or write to the author at Box No. 4403 via Action for M.E.
- relevant previous *InterAction* articles include: Organophosphates and M.E. (issue 44, p26-30, and 45, p32-34); research updates on treatment for pesticide poisoning (issue 36, p37) and studies linking pesticide exposure to M.E./CFS (issue 53, p27); and our multiple chemical sensitivity feature which listed many useful resources for support (issue 52, p18-23; also at www.afme.org.uk under 'publications')
- the Soil Association promotes sustainable, organic farming and champions human health. Visit: www.soilassociation.org or tel. 0117 314 5000
- WWF-UK is running a chemicals and health campaign and has a wealth of information for the public. Visit: www.wwf.org.uk/chemicals or tel. 01483 426444 for details
- organic, chemical-free produce is available from home shopping companies like Goodness Direct – see page 33 for their latest reader giveaway or check out the Healthy House at www.healthy-house.co.uk (tel 01453 752216)

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