

# Press Briefing

## Children's Exposure to Pesticides in Apples and Pears

August 2004

### Introduction

Pesticide residues in food are a concern for many parents. The Government routinely monitors residues in fresh produce and claims that, even though residues are regularly found, this is not a concern because they are mostly below legal limits (maximum residue levels). However, peer reviewed and published research<sup>i</sup> by Friends of the Earth shows that between 10 and 220 young children per day could be exposed to residue levels in excess of internationally accepted safety levels (acute reference dose), just from eating a single apple or pear. This occurred even when the pesticide residue was below the legal limit and was a particular problem for imported produce. The research was conducted by Friends of the Earth in conjunction with two leading experts on pesticide exposure, Professor Andrew Watterson of Stirling University and Dr Vyvyan Howard of Liverpool University.

### Background

The Government has been monitoring pesticide residues in foodstuffs for several decades. This is done to ensure that residue levels in produce are below legal limits for the level of each pesticide allowed in the food, referred to as the maximum residue level (MRL). Until the mid 1990s, it was assumed that residues were distributed evenly across produce. As a result, the official procedures for residue testing require samples to be taken from blended mixtures. For example, the method used by the UK Pesticide Safety Directorate to test for residues in apples is to take a sample of ten fruits, blend them together and then produce an average residue measurement for the whole mixture. However, in the mid 1990s the Pesticide Safety Directorate conducted residue testing on individual fruits and vegetables for the first time. What they discovered was that residues on individual items were very unevenly distributed, with some fruits or vegetables containing no residues, while others had residues at many times the average for the sample batch. For example, in one study of imported pears the residue concentration in an individual fruit was 21 times greater than the batch average<sup>ii</sup>.

Some pesticides can have immediate (acute) toxic effects, even from a single exposure, and so there was concern that individuals could be exposed to high levels of pesticides by eating just one item of fruit. Small children are at particular risk from exposure to pesticides because of their small body mass and because they are still growing and developing. In addition, it has been calculated that, in proportion to their bodyweight, children consume twice as many fruit and vegetables as adults<sup>iii</sup>. Yet, despite the problem of pesticide residue

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variation being well known within Government, the Food Standards Agency continues to maintain that there is no problem:

*“...levels of pesticides currently found in food are not a safety concern, if they were the Agency would take immediate action”<sup>iv</sup>*

## **The New Research**

Friends of the Earth's new research, in conjunction with leading independent scientists, used the Government's own data to predict rates of exposure to pesticide residues for young children who eat apples or pears as part of their diet. Apples and pears were chosen because the National Dietary Survey shows that around half of all children eat some quantity of apples or pears during the course of a week<sup>v</sup>.

Data for pesticide residues in apples and pears were taken from the results of the Government's pesticide residue monitoring<sup>vi</sup>. These are published quarterly and set out the average residues found in sample batches taken from shops around the country. Friends of the Earth used only recent results (2000 to 2002) in order to realistically reflect current agricultural practice. In order to get accurate data on how much apple or pear young children eat on a single day, data were taken from the Government's detailed national dietary survey for children aged 1.5 to 4 years, which was conducted in 1995. The national dietary survey is based on food diaries created by the children's parents and provides linked information on how much an individual child was eating and how much they weighed. This ensured that the sample was representative of the real diets of children of different weights and ages.

The research used mathematical modelling to predict exposure to pesticide residues for those children who eat apples and pears. Out of the UK's 2 million plus children aged between eighteen months and four years old, around 60,000 eat up to one pear and around 400,000 up to one apple on any given day<sup>vii</sup>. The research looked at exposure to three pesticides - dithiocarbamates, phosmet and carbendazim. These are not the only pesticides that have been commonly detected as residues in apples and pears in recent years, but they have been determined as most likely to cause acute toxic effects by the World Health Organisation.

The Government's published pesticide residue results give only an average result for samples of ten apples or pears. But in reality, when someone buys fruit in a shop, the residues will be distributed unevenly across the produce. It is possible an individual fruit can contain a high level of residue, well above the average. Although this is a worst case scenario, and was modelled in the research as occurring in less than three per cent of cases, there are many millions of fruits sold in the UK and so high residue fruit are likely to occur fairly regularly.

The computer model randomly selected the averaged pesticide residue data from the Government's published monitoring results, including batches for which no residue was found. It then set a level of variation to this residue data, based on published research about the likelihood of high residue fruits occurring in a batch. The model then randomly picked an

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amount of apple or pear eaten, linked to the child's weight. The linkage between the amount eaten and the weight of the child ensured that consumption levels really reflected the diets of children at different ages. The pesticide exposure from eating the fruit was then calculated and compared to the acute safety level (acute reference dose) for each pesticide. The model was run ten times for each set of data, in order to take account of random variability.

## The Findings

The computer modelling predicted that, based on the residue levels found in government surveys, between 10 and 220 young children per day could be being exposed to pesticide residues in excess of the acute reference dose, depending on the fruit eaten and type of pesticide (see table). The numbers do not represent a special group of children, for example those who eat lots of fruit, because from day to day the variation in residues and diet mean that different children would be exposed. The acute reference doses for the three pesticides are internationally agreed standards on safe levels of pesticide exposure. They were breached even though the legal limits for these pesticides were not regularly exceeded. There is a clear mismatch between the predicted pesticide exposure and the legal maximum residue levels, to which growers work. For example, the permitted maximum residue level for phosmet in pears is 10 mg/kg, but the research showed that exposure of young children to phosmet in excess of safety limits could occur at residue levels of just 0.193 mg/kg.

Further analysis by Friends of the Earth has found that high levels of pesticides were more likely to occur in imported produce than in UK produce.

Year	Produce/ Pesticide	Source of high residue fruit	Predicted number of children (aged 1½ to 4) exposed to residues above safety level (Acute Reference Dose)
2000	Apple/carbendazim Apples/dithiocarbamates	UK & imported Imported only	32.5 per day 10 per day
2000	Pears/ carbendazim Pears/ dithiocarbamates Pears/ phosmet	UK & imported Imported only Imported only	19 per day 205.2 per day 102.6 per day
2001*	Apples/carbendazim	Imported only	17.9 per day
2002	Pears / dithiocarbamates Pears/ phosmet	Imported only Imported only	12.7 – 68.6 per day 48.4 – 226.6 per day

\* The Government did not monitor residues in pears in 2001

## The Pesticides

Dithiocarbamate pesticides and carbendazim are used in orchards and storage to control fungal diseases and are licensed for UK use. They are suspected hormone disruptors. Phosmet is an organophosphate insecticide for which use is not permitted in the UK, so it is only found on imported produce. It has the potential to damage the nervous system, as well as induce carcinogenic and mutagenic changes to cells. There may not be obvious immediate symptoms from ingestion of these pesticides at levels above the acute reference

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dose, however there may be long term implications from these exposures. For example, very little is known about the effects on the immune system, development, hormone systems or the nervous system from short term, high dose exposure to pesticides during childhood. Children can be particularly susceptible, because they are still growing and developing, but again very little is known about what the consequences of such exposure might be. Friends of the Earth considers that the Government must take a precautionary approach to pesticide exposures in excess of internationally agreed safety limits, particularly when so little is known about the long term health consequences.

Alternatives for most uses of carbendazim and dithiocarbamates are available, but replacing one chemical pesticide with another could simply cause different health concerns. In the UK the Government could help apple and pear growers by making sure that new research into non-chemical ways of preventing and treating fungal disease is promptly passed on to them, and by ensuring that effective non-chemical products which are currently only licensed overseas are made available to growers here.

## Conclusions

The research by Friends of Earth, in conjunction with leading scientists, showed that young children can be exposed to pesticide residues at levels in excess of international safety limits, just by eating one apple or one pear. This occurs even when legal limits on pesticides are not breached and was a particular problem for imported produce.

The EU has already regulated to ensure that processed infant food does not contain detectable pesticide residues, this same level of protection should be given to older children and babies whose parents prepare their food from fresh produce. The legal limits (MRL) for these pesticides on apples and pears need to be re-assessed to provide real protection, in line with safety limits. Friends of the Earth emphasises that children and adults should continue eating apples and pears, which are extremely important as part of a healthy diet.

**The Government and Food Standards Agency** should stop being complacent about pesticides and must take urgent action to address the problem. The FSA's 'action plan' for pesticides does not go far enough. Maximum residue levels should be reduced for these pesticides, in order to ensure that safety limits are not breached. The Government should also provide funding for research into why variation occurs and into alternatives to pesticides as well as advice and support to growers on how to reduce pesticide use.

**Supermarkets** should act to ensure that fresh produce is free of detectable pesticide residues by supporting growers to eliminate high risk products and minimize use. This could partly be done by supermarkets reducing their exacting cosmetic standards for fruit; a recent Friends of the Earth grower survey indicated supermarket pressure to produce perfect fruit increased pesticide use. Supermarkets could also commit to buying varieties of fruit from growers which are more resistant to common diseases like scab. They should also publish their own pesticide residue monitoring data and make the information easily accessible to customers so that they can make informed choices about what to buy.

**Parents** concerned about pesticide exposure can choose organic produce, but this is not

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affordable for everyone. The research also found that British apples and pears are a safer choice, because there were far fewer instances of high residues when compared to imports. Peeling and thorough washing of fruit may reduce, but will not always eliminate, residues. Parents can use their power as voters and consumers to lobby for swift and effective action to eliminate the risk of high pesticide residues in fresh produce.

Copies of 'Modelling the Dietary Pesticide Exposure of Young Children' by Emily Diamand, Frank Pennycook, Professor Andrew Watterson and Dr Vyvyan Howard, published in the *International Journal of Occupational and Environmental Health 2004; volume 10, pages 315-320*, can be obtained from [www.ijoeh.com](http://www.ijoeh.com)

## Notes

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<sup>i</sup> Published in the International Journal of Occupational and Environmental Health, August 2004

<sup>ii</sup> Pesticides Safety Directorate. Unit to unit variation of pesticide residues in fruit and vegetables. London, DEFRA. 1997

<sup>iii</sup> Lawrie CA. Different dietary patterns in relation to age and the consequences for intake of food chemicals. Food Additives and Contaminants. 1998;15 sup; 75-81

<sup>iv</sup> Food Standards Agency, 2004, FSA Board Paper 13<sup>th</sup> May 2004 Progress on an Action Plan to Minimise Residue in Food.

<sup>v</sup> Gregory J, Collins D, Davies P et al. The National dietary and Nutritional Survey: children aged 1½ to 4 ½ years. London, HMSO.1995

<sup>vi</sup> available at [www.pesticides.gov.uk](http://www.pesticides.gov.uk)

<sup>vii</sup> Gregory J, Collins D, Davies P et al. The National dietary and Nutritional Survey: children aged 1½ to 4 ½ years. London, HMSO.1995

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