

V.P.C. (93) 196

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VETERINARY PRODUCTS COMMITTEE: 21 OCTOBER 1993

ORGANOPHOSPHORUS SHEEP DIPS - INTERIM REPORT FROM THE NATIONAL POISONS UNIT

This interim report from Dr Virginia Murray at the National Poisons unit covers continuing surveillance and assessment of cases of exposure to sheep dips reported from May 1993 to the end of July 1993.

Veterinary Medicines Directorate
October 1993

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Effects on human health from exposure to sheep dips

Continuing surveillance and case assessment

of cases reported from 01.05.93 to 31.7.93

INTERIM REPORT

to

THE VETERINARY MEDICINES DIRECTORATE

AUGUST 1993

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Effects on human health from exposure to sheep dips Continuing surveillance and case assessment

Cases reported from 01.05.93 to 31.7.93

Interim Report

Aims

1. to identify cases with acute clinical effects following suspected exposure to sheep dip;
2. to undertake a risk assessment for each of the cases identified, in order to attempt to determine whether the acute reactions were due to cholinergic poisoning, and whether they were due to exposure to organophosphate sheep dips.
3. to make such information available to the Veterinary Medicines Directorate, and other agencies, as appropriate, with full regard to patient confidentiality.

Methods

1. Some cases were identified by the National Poisons Information Service, London, from routine enquiries for information on diagnosis and management of poisoning. Other cases were referred directly to the study team by general practitioners or patients who had read or heard about the study. At the time of the enquiry, information about each patient was collected from the enquiring doctors regarding:
 - circumstances of exposure;
 - the identity of the dip;
 - use of protective clothing;
 - acute clinical effects.
2. If the exposure had occurred less than 48 hours before the enquiry, blood and urine samples were requested at the time of the initial emergency case enquiry. The protocol allowed for a second sample to be requested one month later and a third 3-6 months later. The NPU Toxicology Laboratory analysed red blood cell and plasma cholinesterase activity, and sent the urine samples to HSE to undertake analyses for urinary alkyl phosphates. To minimise the possibility of enzyme reactivation between taking the sample and performing the analysis, the doctor was asked to send the

samples by first class post, between Monday-Thursday, storing them in the refrigerator until Monday if they were taken between Friday-Sunday.

3. Follow-up questionnaires were despatched to the doctor and patient requesting confirmation of the information already collected, and additional information on treatment, outcome, past medical history and previous exposure to organophosphates. The first questionnaire was sent immediately after the enquiry accompanied by a yellow Suspected Adverse Reaction reporting form to be returned to the Veterinary Medicines Directorate.

The protocol stipulated that another follow-up would be sent one month later with requests for biological samples one month after exposure, and a third will be sent 3-6 months later, with a reminder to take more samples.

Results

This report includes information on cases reported between 1.5.93 and 31.7.93. The information is taken from initial telephoned or written reports to the NPU and from follow-up questionnaires or doctors' letters received before 20th August.

38 cases were reported between 1.5.93 and 31.7.93. The reports came from doctors in 30 cases and from the patients themselves, their relatives or other members of the public in 8 cases. Six cases reported by patients or their relatives were inadequately documented and it was not thought appropriate to send follow-ups to the patients in these cases. Thus a total 32 cases have been included in this report, 26 of these could be categorised according to the date of last exposure and the presence or absence of acute effects associated with a specific exposure, and 6 cases could not be categorised because the follow-up had not been returned, and inadequate information about exposure and symptoms had been given in the initial report (Table 1).

Table 1. Nature of effects reported and date of onset in cases reported since 1.5.93

Cases reported since 1.5.93	Number of cases
Acute effects associated with exposure since 1.5.93	11
Acute effects associated with exposure before 1.5.93	7
Chronic effects from exposures before 1.5.93	8
Date of exposure unknown	6
Total cases reported	32

The overall age and sex distribution is shown in Table 2. The age range was between 20-68 years, with most patients aged between 40-60 years. The majority of patients were men. This was similar to the age and sex distribution found by previous NPU surveillance of sheep dip exposure.

Table 2. Age and sex distribution of patients exposed to sheep dip

Age (years)	M	F
20-29	2	1
30-39	6	-
40-49	7	4
50-59	6	1
60+	3	-
unknown	2	-
Total	26	6

Occupation: 22 patients worked on farms, one man worked at an agricultural college, one had been a student at agricultural college at the time of exposure, and one was an office administrator but had helped on a farm for five years. In 7 cases occupation was not stated.

Products used were identified in 21 of the 32 cases. Patients were exposed to diazinon in 15 cases, propetamphos in 11 cases, and chlorfenvinphos in 2 cases. Five patients were exposed to both diazinon and propetamphos, and one patient was exposed to both diazinon and chlorfenvinphos, through using more than one dip or, in one case, from using a compound-dip. One patient reported exposure to organophosphate dips but stated that he usually used flumethrin dip. Five patients reported other sources of exposure to organophosphate compounds in products such as flea spray.

Duration of exposure related to date of onset and duration of clinical effects: Ten patients had been exposed intermittently to sheep dip for periods ranging between ten to 46 years (Table 3). Seven patients reported only acute episodes of clinical effects related to exposure, 11 patients reported chronic effects with acute episodes following re-exposure, and eight patients reported chronic effects without any associated acute episodes.

In 12 cases both the duration of exposure and the year of onset of chronic effects were known (Table 4). Onset of chronic effects was not obviously related either to a particular duration of exposure or to a particular time period. Duration of exposure before onset of effects ranged from less than one year to 46 years. No-one reported onset of chronic effects before 1983, but date of onset of chronic effects ranged from 1983-1992, and several people exposed from or before the early 1980s did not develop chronic effects until after 1988 or 1991.

Table 3. Duration of exposure, nature of effects reported and date of onset

Duration of exposure (years)	acute effects after May 93	acute effects before May 93	chronic effects only	Total
<10	-	3	4	7
10-19	2	1	-	3
20-30	3	-	-	3
30-40	2	1	-	3
>40	-	-	1	1
unknown	4	2	2	8
isolated exposure only			1	1
Total	11	7	8	26

Table 4. Duration of chronic effects and year of onset, duration of exposure before onset of chronic effects and existence of concurrent acute episodes.

Duration of chronic effects (years)	Year of onset of chronic effects	Duration exposure (years) before onset of chronic effects	Acute episodes also reported (Yes/No)
10-12	83-85	30	Y
9	84	<1	N
8	85	13	Y
7	86	33	Y
7	86	13	Y
5	88	7	N
5	88	5	N
3	90	5	Y
3	90	2	Y
2	91	38	Y
1-2	91-2	46	N
<1	92	5	Y

Patients reporting acute episodes associated with exposures since 1.5.93

There were 11 patients in this category. Follow-up questionnaires were received in four cases from both general practitioner and patient, in one case from patient only, in 2 cases from the general practitioner only, and in one case information was obtained from Guy's outpatient clinic. In three cases information was only available from initial telephone conversation or doctors' letters.

The patients were 10 men and one woman, aged between 29 and 55 years, with an average age of 41 years. Nine worked on farms, one man worked at an agricultural college, and occupation was unknown in one case.

History of exposure was stated in 7 cases, and in all these cases had occurred intermittently for more than 10 years, and in two cases was about 40 years. In five of these patients the long term exposure had resulted in chronic symptoms lasting between 2-10 years. Four of them had been dipping for many years before experiencing these effects, two patients for 13 years and two for at least 30 years. The acute symptoms resulting from re-exposure during the study period were distinct from the chronic effects.

Blood cholinesterase activity was measured in seven patients. Both plasma and red blood cell activity was within the "normal range" in all patients, but additional blood samples will be requested after 3-6 months to assess their base-line cholinesterase activity. Urine specimens were sent from five patients.

Patients reporting acute episodes associated with exposures before 1.5.93.

There were seven patients in this category. Follow up reports have been returned for 6 cases to date, from both the general practitioner and the patient in 3 cases, from the doctor only in 2 cases, and from the patient only in one case.

The patients were 5 men and 2 women aged between 21 and 58 years, with an average age of 43 years. Five worked on farms, one was an office administrator but had helped on a farm for five years, in one case occupation was not stated.

Dates of exposure associated with acute episodes were: 1984, 1985, 1989, 1990 (2 cases), 1991 and 1992 (2 cases). History of exposure was stated in 5 cases. Four patients had been exposed intermittently for less than 3 years and one patient for 40 years.

Six patients reported chronic symptoms, lasting for periods ranging from less than a year in one case to seven years. One patient had been dipping for two years before experiencing these effects, two patients had been dipping five years, and one patient had been dipping for 33 years.

Blood cholinesterase activity was measured for three patients and was within the "normal

range" in all cases. No urine samples were received.

Patients reporting chronic effects without any acute episodes.

There were eight patients in this category. Follow up questionnaires were returned from both general practitioner and patient in four cases and from general practitioner only in one case.

The patients were 6 men and 2 women, aged between 24 and 68 years, with an average age of 49 years. Six patients worked on farms, one was a student at agricultural college at the time of exposure and in one case occupation was not known. Duration of exposure was stated in six cases, one patient had been exposed for 46 years, four had been exposed for 5-10 years and one patient had only been exposed on two occasions in two years.

The duration of chronic effects was known in 6 cases, and ranged from 1 to 9 years. One patient had been exposed for 46 years before onset of chronic effects in 1991, the others had been exposed for less than one year, five years and seven years.

No blood cholinesterase activity measurements were carried out for this group.

Cases that cannot be categorised because of insufficient information

Six cases could not be put into one of the above categories. No follow up questionnaires were returned and insufficient details of history of exposure or the patient's clinical condition was available from initial contact with the NPU. In four cases initial contact was a request made to the laboratory for analytical toxicology. Both plasma and red cell activity was normal in all four patients. Urine specimens were sent from two patients.

Conclusion

Compared with NPU surveillance in 1991 and 1992, the cases identified in this study show similarities in age and sex distribution (mostly men over 30 years, with many older than 50 years), and in occupation (mostly farmers or shepherds but with a few people exposed through related occupations, or from helping with dipping although not employed to do this).

About a third of the cases reported during the study had experienced acute symptomatic episodes related to exposure occurring during the study period, the others either reported acute symptomatic episodes related to exposure occurring before the study period, or reported chronic effects without any acute episodes.

The Steering Group made an initial review of the cases that had experienced acute symptomatic episodes related to exposure occurring during the study period, based on information available at the 20th August 1993. In some cases written follow-up reports had

not been returned and in other cases the information given on follow-up needs clarification. Results of analysis of urine for alkyl phosphates are not yet available. In five cases it was judged likely that the patients were suffering effects from exposure to sheep dip, and in two cases it was judged that the association between exposure to sheep dip and clinical effects was confirmed. In four cases there was not enough information for assessment.

1993 Draft interim report: cases reporting acute effects from exposures occurring after 1.5.93										
Case	Sex Age	Occupation and history of exposure	chemical used	Protective clothing	Clinical effects	Time exposure to effect	Time effects lasted	cholin- esterase activity (ku/L)	Follow-up (fu) received	Assess- ment
20	M 51	Farmer. Dipping for about 20 yrs 5.7.93.dipping 4-5 hrs. Pushing sheep under dip. Inhalation and possibly skin contact.	Coopers Border (pro- petamphos)	5.7.93: gloves, coat, leggings, boots, hat. Washed and changed after.	Since 1986: nausea, parasthesia, poor memory, aching joints, nerve damage in arms and fingers, depression and fatigue after 2-3 hrs work, abdo pain. Acute: sweating, dizziness, anxiety, tremors, tiredness.	1-4 hrs	1-4dys	undated: RBC 17.49 plasma 5.56 (urine) 7.7.93 RBC 21.85 plasma 5.6	pt fu	likely

1993 Draft interim report: cases reporting acute effects from exposures occurring after 1.5.93										
Case	Sex Age	Occupation and history of exposure	chemical used	Protective clothing	Clinical effects	Time exposure to effect	Time effects lasted	cholin- esterase activity (ku/L)	Follow-up (fu) received	Assess- ment
27	M 28	Helping with dipping for 21 yrs since 7 yrs old (1972). Contract shepherd dipping 1000's of sheep a year until 1989. 1987 immersed in dip. Now a shearer. 18.6.93: for 7 days, sheared sheep dipped 8 wks before, and hand treated sheep for maggots.	1993: Ectomort (pro- petamphos)	18.6.93:none. washed hands afterwards.	19.6.93:nausea, sweating, parasthesia, blurred vision, dizziness, fever, tight chest, ataxia, anxiety, poor short term memory, confusion, stiff muscles, lethargy. Since 1985: aching joints, tiredness after dipping (healthy between attacks)	max effect at 14h 24-48h	 2-3dys	10.6.92 RBC 15.19 plasma 4.0 20.6.92 RBC 15.65 plasma 3.96 9.8.93 RBC 18.2 plasma 4.58 (urine)	20.6.93 attended hosp. Self discharge. (no 1993 fu).	confirmed, with analytical evidence

1993 Draft interim report: cases reporting acute effects from exposures occurring after 1.5.93										
Case	Sex Age	Occupation and history of exposure	chemical used	Protective clothing	Clinical effects	Time exposure to effect	Time effects lasted	cholin-esterase activity (ku/L)	Follow-up (fu) received	Assessment
28	F 45	Farmer. dipped sheep for 20 yrs. 12.6.93: spilt conc. dip on hands from a corroded can. July 93: re-exposed Uses other OP insecticides on livestock every year. Affected by inappropriate use of flea spray at home.	12.6.93: Pro-dip. (pro-petamphos)	12.6.93 washed off almost at once. None on clothes.	12.6.93: nausea, headache, dizziness tiredness myalgia, abdo pain skin rashes, blurred vision, hay fever. July 93: headache, dizziness, vomiting, diarrhoea, ataxia	< 1hr a few hrs	10 dys > 20d 10 d		GP & pt fu	likely
35	M 23	Shepherd dipping for 7 years. Sprayed sheep 28.6.93-4.7.93	Top clip (diazinon) and formaldehyde	28.6.93 none. did not wash afterwards.	28.6.93: nausea, abdo pain, diarrhoea, parasthesia, tight chest, heavy eyes, fatigue, hypersensitivity of chest wall. PMH: irritable bowel	24hr	24hr	29.6.93 RBC 18.2 Plasma 4.6 (urine)	developed shingles GP & pt fu	insufficient information on producty
36	M 40	Works at agricultural college. 2.7.93 sprayed sheep all morning in a shed	Fly strike. diazinon.	no mask	Acute: nausea, abdo pain, numbness, dizziness, tight chest, ataxia, poor short term memory, fatigue. unconsciousness	10-15 m		2.7.93 12.00h RBC 22.44 plasma 4.21 15.45h RBC 22.54 plasma 4.04	attended A & E. Given hydrocortisone and salbutamol . No fu.	likely

1993 Draft interim report: cases reporting acute effects from exposures occurring after 1.5.93

Case	Sex Age	Occupation and history of exposure	chemical used	Protective clothing	Clinical effects	Time exposure to effect	Time effects lasted	cholin- esterase activity (ku/L)	Follow-up (fu) received	Assess- ment
42	M 55	Farmer. Dipped for 40 yrs. 1991: 5dys a month for 4 months. 10/6/93. Close to dip for 1 hr.	1993: diazinon 1991: Ectomort (pro- petamphos)	1993: face shield, mask, apron, leggings, rubber boots. Changed clothes and showered after.	10.6.93: nausea, abdo pain, diarrhoea, sweating, blurred vision, dizziness, fever, couging, fasciculations of face muscles, headache, poor short term memory, anxiety, tiredness Since 1991 acute effects after dipping. Chronic: headache, tiredness, shoulder pain.	a few hrs	1 wk?	1992 undated RBC 22.7 plasma 4.6 17.11.92 RBC 22.8 plasma 5.7	1991: attended A & E. 1993: Guy's tox clinic pt.	likely
50	M 34	Farmer. 18.7.93 sprayed sheep for 20 mins in a barn. previous exposures in 1992.	Coopers fly dip (chlorfen- vinphos)	18.7.93: wore mask, did not wash afterwards	19.7.93: vomiting, fever, dizziness, nausea, anorexia, sweating, tiredness, headache 1992: acute effects after exposure	24hr	1d 3d 5d 7d	22.7.93 RBC 17.43 plasma 7.12 (urine)	GP fu	likely

1993 Draft interim report: cases reporting acute effects from exposures occurring after 1.5.93

Case	Sex Age	Occupation and history of exposure	chemical used	Protective clothing	Clinical effects	Time exposure to effect	Time effects lasted	cholin- esterase activity (ku/L)	Follow-up (fu) received	Assess- ment
53	M 52	Farmer, dipping for 40yrs. Last exposed 24.7.93 moving sheep, 2.8.93 at an enclosed cattle market	24.7.93: Coopers border dip (prope- tamphos) and diazinon	dipping: coat, leggings, boots, waterproof spray coat	Acute effects after dipping for last 10- 12yrs. 1993: nausea sweating, salivation, blurred vision, dizziness, tight chest, ataxia, anxiety, coughing, depression, tiredness, aching legs	24-48hr	48hr 1-3 wks		GP & pt fu	No analytical data, but 24.7.93 exposure confirmed
54	M 46	Farmer. Latest exposure July 93. dipping 150 ewes and 80 cows	?	?	Since 1991: sweating, fatigue, headaches. July 93: symptoms exacerbated				no fu	insufficient informa- tion
55	M 32	Farmer. dipping for 13 years. Exposed 6.7.93, 3.8.93 for 7 hrs, 4.8.93 for 5 hrs.	Topclip gold shield (diazinon)	6.6.93: none 3-4.8.93: face shield, gloves, apron, boots, spray suit. Clothes not contaminated	June 93: poor short term memory, depression, tiredness, parasthesia in hands, May 1991: acute symptoms.	< 1week	2mths still present	2.8.93 (pre-dip) RBC 20.6 plasma 5.03 (urine) 5.8.93 (post- dip) RBC 17.35 plasma 4.7	treated with dothiepin for depression	insufficient informa- tion

1993 Draft interim report: cases reporting acute effects from exposures occurring after 1.5.93										
Case	Sex Age	Occupation and history of exposure	chemical used	Protective clothing	Clinical effects	Time exposure to effect	Time effects lasted	cholin- esterase activity (ku/L)	Follow-up (fu) received	Assess- ment
56	M 38	Mid July 1993			20.7.93:abdo pain, petechial rash consistent with thrombocytopaenia.	at once	several days		GP fu but no pt fu.	insufficient informa- tion

1993 draft interim report. Cases reported since 1.5.93 with acute effects before 01.05.93.

Case	Sex Age	Occupation and history of exposure	Chemical used	Protective clothing	Clinical effects	Time exposure to effect	Time effects lasted	cholin- esterase activity (ku/L)	Follow-up (fu) received, other sources of data
18	M 21	"each year for many years".	n/k	n/k	Oct 92: Acute viral illness: nausea, dizziness, blurred vision, anxiety, poor short term memory, depression, fatigue, headache, myalgia, arthralgia, tiredness Chronic: tiredness.	?	1 year	4.5.93 RBC 14.1 plasma 8.04 (urine screen negative)	Guy's tox clinic pt
19	M 49	Farmer and fieldsman for abattoirs. Dipped twice a year for 6 years. 1990-2 daily contact selecting sheep for market. Last dipped Nov 1992. dipped 400 sheep over 8hrs. Splashed on face and in mouth. ?? 1993: rubbing dip into wounds. contact with other OP products.	Used Top Clip (diazinon) on wounds. Usually dips with Bayticol (flumethrin), Nov 92 and some other times, used Coopers Border Dip (prope- tamphos)	Apron, leggings, boots. Washed off splashes within seconds.	1992. General flu like symptoms: nausea, vomiting, abdo pain, diarrhoea, anorexia, sweating, pricking hands and legs, blurred vision, high temperature, tight chest, weakness, anxiety, fatigue. Long term: stiffness in joints and muscles, weakness, listlessness, main problem: poor short term memory.	1-2mths	many months		pt fu.

1993 draft interim report. Cases reported since 1.5.93 with acute effects before 01.05.93.

Case	Sex Age	Occupation and history of exposure	Chemical used	Protective clothing	Clinical effects	Time exposure to effect	Time effects lasted	cholin- esterase activity (ku/L)	Follow-up (fu) received, other sources of data
31	F 43	works on a farm. May- June 1989, handling and putting sheep into dip for 8 hrs. Last exposed 1991	Top clip (diazinon)	leggings and boots. Showered afterwards	1989: nausea, abdo pain, diarrhoea, anorexia, sweating, dizziness, pyrexia, headache 1990: no ill effect June 1991: muscle pain, fatigue, dizziness, depression headaches, nausea, shaking, vomiting Since 1991: continuous malaise, muscle pain, headaches, lethargy, depression, unable to work.	12-24 hrs	48 hrs.	20.7.93 RBC 23.4 plasma 3.0	1 other person ill at same time. Reported to VMD. Referred to Guys clinic. GP fu.
							2yrs		

1993 draft interim report. Cases reported since 1.5.93 with acute effects before 01.05.93.

Case	Sex Age	Occupation and history of exposure	Chemical used	Protective clothing	Clinical effects	Time exposure to effect	Time effects lasted	cholin- esterase activity (ku/L)	Follow-up (fu) received, other sources of data
32	F 58	Office administrator. Dipping for 5 yrs as helper, daily contact with sheep. Last exposed June 1992, dipped 30 sheep in 2.5.hrs	1990: Coopers winter scab (prope- tamphos) 1991-2: Top Clip (diazinon)	1990: not known 1992: Gloves, leggings, boots. Clothes soaked, removed in 2 hrs and showered.	1990: blurred vision, sweats, diarrhoea, headaches, extreme weariness, depression, nausea, sweating, dizziness, poor short term memory, aching joints,	< 14dys	continues	14.6.93 RBC 17.8 plasma 5.28	Gp & pt fu
38	M 45	Farmer. Dipped 1985- 1990, weekly contact with dipped sheep. Last exposure Nov 1990, dipped 100 sheep in 2.5h. Skin and inhaln.	Nov 1990: Coopers powerpack summer dip (chlorfenvin- phos & diazinon)	dipping: gloves, leggings, boots; handling concentrate: also apron and mask. Clothes slightly wet, changed after dipping. Washed off skin within seconds.	Nov 1990: severe cough, tight chest, hot and cold flushes, fever, sweating difficulty in breathing, numbness and tingling in arms, hands, fingers, headache, fatigue, lethargy, poor memory.	3 weeks	10 weeks still present		Referred to neurologist GP & pt fu
37	M 32	Farmer. 1984: dipped 100 sheep. Got dip in cut on hand. last exposed 1990	Coopers border type (propetamphos)	was wearing protective clothing but not specified	1984: darkening vision, fatigue, nausea, excess salivation, abdo pain, insomnia 1987: nausea after exertion.				1984: admitted to hosp for 2 dys. Given atropine and pralidoxime. pt phone call, no fu.

1993 draft interim report. Cases reported since 1.5.93 with acute effects before 01.05.93.

Case	Sex Age	Occupation and history of exposure	Chemical used	Protective clothing	Clinical effects	Time exposure to effect	Time effects lasted	cholin- esterase activity (ku/L)	Follow-up (fu) received, other sources of data
43	M 53	Sheep farmer dipping for 40 yrs. Last exposed Sept 1986, 3 days dipping 1500 sheep. Has used warble fly dressing for 20 years.	Top clip (diazinon)	1986: gloves, apron, leggings, boots. Plus face shield when handling concentrate.	Acute after dipping over many years: headache, sleepiness, nausea, sickness, muscle tightening in limbs. 1985: shaking in right hand 15.9.86: recurrence of shaking in right hand. Collapse with severe tremors. Since 1986: shaking, parkinsonism.		6hrs several dys		1986: inpt for 2- 3 dys. treated with sinemet and selegiline. CT scan nad EEG normal. Gp & pt fu

1993 draft interim report: cases reported since 1.5.93 with chronic effects

Case	Sex Age	Occupation and history of exposure	Chemical used	Protective clothing	Clinical effects	Time exposure to effect	Time effects lasted	cholin- esterase activity (ku/L)	Follow-up (fu) received, other comments
25	M 68	"helper" . dipped twice per year for 1981-1991, weekly contact with sheep until 1991. "used to stroke sheep". Last exposure Oct 91, for 30-45 mins, dipped 50 sheep. dip on skin and inhaled. Also sprayed with crop spray.	1989 Prodip. 1991. Top clip, (diazinon).	Wore gloves when handling dip concentrate, not when handling dipped sheep. Clothes not contaminated, skin washed minutes after contamination.	Since 1988: ataxia, unstable on his feet, anxiety, depression, fatigue and tiredness. Since 1989: dysarthria, weakness in arms, upper motor neurone signs in right arm and hand. depressed lower limb reflexes. severe, progressive glaucoma		still present		May be demylinating disease or real pathology. Pt will not tolerate scan, so pathology not known. GP & pt fu
26	M 58	farm labourer, dipping for 46 yrs. Daily contact with sheep. Last exposed Sept 91, dipped 300 sheep in 1 dy. Dip on skin, in eyes and inhaled.	Coopers Scab, Youngs Ectomort, Youngs Summer dip (all propetamphos), Golden fleece, Top Clip Gold Shield. (both diazinon).	waterproof trousers, but dip got inside. Wore contaminated trousers several hrs. only washed at end of day.	Since 1991: salivation March 1992: diarrhoea, sweating, salivation, parasthesia of hand, coughing, tight chest, anxiety, poor memory, depression, headaches, severe shaking episodes, tremors, fever, depression, tiredness, involuntary eye closures Since May 93: dysphoea		continuing		Dr fu: thought to be functional. pt fu

1993 draft interim report: cases reported since 1.5.93 with chronic effects

Case	Sex Age	Occupation and history of exposure	Chemical used	Protective clothing	Clinical effects	Time exposure to effect	Time effects lasted	cholin- esterase activity (ku/L)	Follow-up (fu) received, other comments
24	F 24	1987-8: student at agricultural college. helped empty dip. Stood in it.	not known	none: clothes completely soaked. Changed clothes and showered after 7 hrs.	Since 1991: asthma.		to present		Treated for asthma. GP & pt fu
30	M 60	last exposure 2 yrs ago			Late onset asthma,				no fu
29	M 37	Shepherd. Dipping 1983-93	Top clip gold shield (diazinon)	not known	Since 1988: fatigue, headache, arthralgia of feet and knees. Since 1993: joint pains				GP fu
40	M 53	Owens farm holiday complex. 1984-1991 dipped each April and July. Last exposed 1991. Dichlorvos fly lantern in bedroom.	1984-9: Top Clip Gold Shield (diazinon); 1990-1: Coopers Border Type Dip (propetamphos)	Gloves and boots when handling concentrate. None when dipping. Clothes soaked but removed in less than 30 mins and showered.	Since 1984: tight chest, breathlessness, poor short term memory Since 1988: sweating Since 1991: blurred vision ?Date onset: tiredness, breathlessness, weakness in calves and thighs on walking, trembling in leg muscles, aching joints, eyes feel tired and hot; irritable bowel syndrome.		continuing		GP & pt fu

1993 draft interim report: cases reported since 1.5.93 with chronic effects									
Case	Sex Age	Occupation and history of exposure	Chemical used	Protective clothing	Clinical effects	Time exposure to effect	Time effects lasted	cholin- esterase activity (ku/L)	Follow-up (fu) received, other comments
47	M Ad	Farmer. Dipping for 5 yrs, twice a yr. Last exposure 1991. Skin contamination. Put arms in dip.	n/k	Yes, unless hot, but not specified.	Asthma, fatigue, loss of muscle power. Allergy to barley.	?	to present		no fu.
48	F 44	Sheep shearer. Last exposed Dec 1988	n/k		Since 1988: nausea, vomiting, abdo pain, dizziness, ataxia, vertigo, hearing loss.	?	?		thought to be viral. No fu

1993 draft interim report: cases reported since 1.5.93 with little information about exposure or symptoms									
Case	Sex Age	Occupation and history of exposure	Chemical used	Protective clothing	Clinical effects	Time exposure to effect	Time effects lasted	cholin- esterase activity (ku/L)	Follow-up (fu) received?
22	F 46	Uses sheep dip, maggot spray, footrot spray.	n/k	n/k	intermittent sore throat	n/k	n/k		no fu
33	M 68	works with organo- phosphates. ??? sheep dip	n/k		muscle weakness			8.6.93 RBC 16.8 plasma 5.08	no fu
34	M 48	sheep farmer	n/k		right facial pain and numbness, memory problems, limb parasthesia.			25.6.93 RBC 16.5 plasma 5.4 5.7.93 plasma 5.63 (urine)	no fu
41	M 44	Working with insecticides. ??? sheep dip.	n/k	n/k	n/k			23.12.92 Plasma 4.6 10/6/93 RBC 18.7 plasma 5.16	no fu
45	M 44	dipping	diazinon	wore face shield, gloves, apron					no fu
57	M ad	Farmer. Last exposed 2.8.93. inhaled dip	Seraphos (propeta mphos)		n/k			3.8.93 RBC 18.53 plasma 8.93 (urine)	no fu