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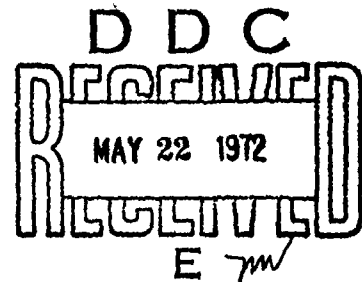
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# A "FOLLOW UP" OF VOLUNTEERS TO GB (SARIN)

by

**[R]**

R.J. Moylan-Jones

Technical Note No. 120 ✓

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C.D.E. TECHNICAL NOTE NO 120  
DATED: FEBRUARY 1972

7) FOLLOW UP OF VOLUNTEERS EXPOSED TO GB (SARIN) [R]. 8)

10) R.J. MOYLAN-JONES

11) Feb-72

SUMMARY

12) 11p.

An investigation was made into the medical history of a group of 35 volunteer observers who had previously been exposed to a concentration time of 15 min.  $\text{mg m}^{-3}$  of sarin (GB). The findings were compared with those from a similar number of men who attended CDE during the same period but were not so exposed.

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No significant differences were found between the number of hospital admissions, of out-patient specialist appointments, of incidents of reporting sick or of days lost through illness before or after the men's service at CDE. No significant differences in these indices were found between the records of the group exposed to nerve agent and those of the individuals not exposed.

The diagnoses relating to instances of illness are listed and discussed, but no significant difference was found on a "between groups" comparison.

(Sgd) F.W. BESWICK  
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210 ✓

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C.D.E. TECHNICAL NOTE NO 120

DATED: FEBRUARY 1972

## A "FOLLOW UP" OF VOLUNTEERS EXPOSED TO GB (SARIN)

by

R.J. MOYLAN JONES

### INTRODUCTION

It has been mooted that those who have been in contact with nerve agents, even in small quantities, might suffer from an increased incidence of illness, after such contact. Experience at CDE in no way bears out this allegation, but it was considered appropriate to undertake a limited survey of the problem by studying the medical histories of volunteers at CDE between 1964 and 1969.

The medical records department of the Royal Air Force only was used for the present survey.

### METHODS

A "blind" survey was carried out by the author into the medical records of 70 volunteers from the Royal Air Force, who served at CDE between October 1964 and March 1969. The names of 35 men who had been exposed to the nerve agent sarin (GB) at a Concentration - Time (Ct) of 15 min.mg m<sup>-3</sup> were first obtained and paired at random with 35 men who had not been so exposed but who had been at CDE during the period under review and had taken part in other experiments not involving exposure to a nerve agent. The author was not informed which group was which until the analysis of the results was complete.

Four indices of illness were selected, and their incidence before and after serving at CDE was recorded; these indices were:

- a. Admissions, including admissions to a Station Medical Centre and periods of sickness away from their unit.
- b. Out-patient attendances involving specialist consultation.
- c. Occasions of reporting sick to their own Medical Officer.
- d. Days of work lost through illness, excluding time spent in travelling to or waiting for specialist appointments.

The relative incidence of these occurrences before and after attendance as CDE volunteers within each group, and the relative incidences after

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attendances between the two groups were reduced to incidences per week (i.e. quarter month) of service in the Royal Air Force before and after serving at CDE, and the results were analysed. Where any appreciable difference in the means of incidences appeared, the differences were submitted to a t test on pair differences.

Diagnoses made during illness were classified, and their incidence compared.

RESULTS

The mean age of those exposed to GB was 22.1 years (standard deviation 7.22) and of those in the control was 26.7 years (standard deviation 9.17).

There was no significant difference between the incidence of admissions, out-patient attendances or days lost through illness in the group who were exposed to GB after service at CDE and before. There was a significant reduction ( $p < 0.01$ ) in the number of occasions of reporting sick to their own Medical Officer after service at CDE.

The group who were not exposed to GB showed no significant alteration in any of the indices of illness recorded before and after volunteering.

The means, standard deviations, of these observations are shown in Table 1.

The mean number of months of service in the Royal Air Force among the group exposed to GB was 75.1 (standard deviation 39.30) before attending at CDE and 51.8 (std. dev. 23.12) afterwards; that among the control group was 47.1 (std. dev. 30.83) before attending and 46.9 (std. dev. 25.73) afterwards.

The diagnoses made during instances of illness are shown by groups in Table 2. These figures are not corrected for periods of service, but as the mean number of months of service before and after attending at CDE are not greatly different in the control group and are only in the ratio, approximately, of 1.5 to 1 in the group exposed to GB, approximate comparisons may be made. Little important difference is seen, except that psychiatric diagnoses were made in 5 of the men who had been exposed to GB, leading to invaliding in 3 instances, whereas among the control group 4 psychiatric diagnoses were made, leading to invaliding in 1 instance. All instances of invaliding on psychiatric grounds occurred in 1965 or 1966, when the incidence of psychiatric

invaliding in the Royal Air Force as a whole was 1384 in a total strength of 124,448 during 1965 and 817 in a total strength of 100,143 during 1966. Among the group who had been exposed to GB, 2 psychiatric invalidings occurred in 1965 and 1 in 1966.

No man in either group was invalided from the Royal Air Force with any diagnosis other than a psychiatric one.

#### DISCUSSION

Although the medical records service of the Royal Air Force is the most complete of its kind, a survey of this nature obviously cannot cover a period longer than that between service at CDE and either the subjects' leaving the Service or the date of the survey. The mean period, in the case of those who were exposed to GB, was 51.8 months, which should prove ample time for any sequelae of exposure to nerve agent to become manifest; recovery of cholinesterase from inhibition by nerve agents, the easiest measurable sign of intoxication, has been found to be complete in 50 days (Davies - unpublished data).

No significant increase in admissions to hospital, to medical centre or to illness at home, in out-patient appointments with specialists, in occasions of reporting sick or in days lost through illness were found after exposure to GB, and there was no significant difference in these indices of illness after attendance at CDE between those exposed to GB and those who were not exposed.

The only striking feature of the breakdown of diagnoses causing instances of illness is the occurrence of 3 instances of psychiatric invaliding among the exposed group, as compared with only 1 instance in the control group.

At the time of attendance of these volunteers at CDE, other work was in progress involving the use of mental incapacitants, from which any man thought to have any tendency to psychological instability was excluded, and this had the effect of diverting any volunteer, whose complete stability was in question to the programme of work on GB.

Since the general rates of invaliding as a result of a psychiatric diagnosis in the Royal Air Force in 1965 and 1966 were 11.12 and 6.77 per 1,000 respectively, and applying Rosenbaum's nomogram method (1) in order to test the significance of the difference between the two rates in each year, no significance can be found, although it is admitted that the rates in the two groups of volunteers are based on very small samples.

It is concluded from this study that exposure to GB did not have any

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adverse effect upon the health of the volunteers exposed to this agent.

The apparent reduction in the incidence of upper respiratory infections in both groups after attendance at CDE is doubtless due to the fact that the men's service before attending CDE included the periods of recruit training, when the incidence of such infections is always higher than during later service, owing to recruits' relative lack of immunity to the viruses common in barrack rooms.

Further studies into the medical histories of volunteers from the other services, who have been exposed to GB are recommended.

ACKNOWLEDGEMENTS

Director General of Medical Services of the Royal Air Force and the Statistician in Charge of the records, Ministry of Defence (Air MA7) permitted access to the records; and Mr K H Kemp, CDE, provided the names of the men.

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REFERENCES

1. Rosenbaum, S. (1963). Brit. med. Jour. i 169-170.

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TABLE 1

MEAN INCIDENCE OF INDICES OF ILLNESS PER MONTH OF SERVICE

(Standard Errors in Brackets)

Index	Group Exposed to GB		Group not so exposed	
	Before Attendance at Porton	After Attendance at Porton	Before Attendance at Porton	After Attendance at Porton
Admissions	0.05 (0.01)	0.05 (0.013)	0.05 (0.017)	0.03 (0.007)
Out-patients	0.03 (0.004)	0.05 (0.01)	0.03 (0.007)	0.06 (0.04)
Reporting Sick	0.25 (0.06)	0.21 (0.04)	0.22 (0.07)	0.14 (0.03)
Days Lost	0.48 (0.11)	0.33 (0.12)	0.4 (0.1)	0.65 (0.39)

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TABLE 2

DIAGNOSES LEADING TO INSTANCES OF ILLNESS\*

Diagnostic Group	Group Exposed to GB		Group not so exposed	
	Before Attendance at CDE	After Attendance at CDE	Before Attendance at CDE	After Attendance at CDE
Upper Respiratory Infections	30	13	23	13
Gastroenteritis Non specific	7	6	7	8
Traumatic Lesions	9	10	13	5
Minor Genito-Urinary (including venereal)	4	3	2	4
Dental	1	3	2	4
Minor ophthalmic (including refraction)	8	7	7	6
Specific Infections	5	2	3	2
Minor Dermatological	4	3	-	1
Minor Surgical	5	5	6	8
Operative General Surgery	1	4	2	-
Ear Nose & Throat Diseases	6	5	5	2
Pleurisy pneumonia & pneumonitis	2	1	1	2
Hay Fever	-	1	-	-
Renal glycosuria	-	-	-	1
Iron deficiency Anaemia	-	-	1	-
Psychiatric illness without invaliding	-	2	-	3
Psychiatric invaliding	-	3	-	1

\* These figures are not corrected for length of service, but, as this factor does not differ very greatly before or after attendance at CDE, approximate comparisons may be made.

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