New Zealand Nuclear Test Veterans Study:

A Pilot Project (Psychological Impact)

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Of course, responsibility for this report in its entirety lies with the authors.

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SUMMARY

In 2001 the New Zealand Nuclear Test Veterans' Association agreed to fund a pilot study looking into the long-term genetic effects of exposure to nuclear radiation. About 550 NZ Navy personnel took part in Operation Grapple during 1957 and 1958, where they witnessed one or more nuclear bomb blasts. Since the 1980s, these men have become increasingly concerned that this exposure to nuclear radiation could have harmed their own health and that of their children. The principle aim of the present investigation was to conduct several genetic tests on blood samples collected from 50 Exposed men and 50 (non-exposed) Controls. The genetic study is being conducted by the Institute of Molecular Biosciences at Massey University under the guidance of the principle investigator, Dr R.E. (Al) Rowland.

A secondary aim was to generate a psychological profile of the nuclear test veterans. Because of limited funding and the requirements for collecting data for the genetic analysis, it was not possible to obtain enough data for a detailed profile. On the basis of previous research, it seemed likely that at least some of the New Zealand nuclear test veterans would be suffering from chronic stress. The stress occurs because of the uncertainty about whether exposure had caused any adverse health effects. If the men were suffering from chronic stress, then, compared to a non-exposed Control group, they should be more depressed, have poorer perceived general physical and mental health, and possibly poorer perceived memory. Tests to measure these variables were administered during 2002 and 2003, partly through a mail-out survey and partly through a face-to-face interview.

Data were also collected on some factors that had the potential to confound the dependent measures, for example, age, income, education level, alcohol consumption, lifetime smoking, and lifetime trauma. Scores on the depression scale, the physical and mental health scales, and the memory scales were adjusted to remove any effects of these covariates. Data on long-term health problems were also examined for any effects of these covariates.

The adjusted scores showed that the Exposed men were considerably more depressed than Controls, had poorer perceived physical and mental health, and poorer perceived memory. They also had more long-term health problems. These are exactly the results to be expected from people under stress.

Based on the psychological data gathered and on previous research, we conclude that many of the New Zealand nuclear test veterans are suffering from chronic stress. At present, there are no definitive biomedical tests that can link a physical abnormality to radiation exposure (unless the exposure is extreme). In most cases, the physical abnormality could be caused by something entirely different. It is this high degree of uncertainty, coupled with the Exposed men's increasingly strong belief that radiation exposure may have harmed them that probably results in the elevated stress levels. These stress levels may be further exacerbated by the men's frustration at the perceived lack of progress in resolving the issues arising from their exposure to nuclear radiation over 40 years ago. This state of affairs notwithstanding, our results show that the psychological profile of these men is far from normal.

Recommendations:

1. The nuclear test veterans be offered assistance in helping them cope with the chronic stress that at least some of them are experiencing. As long as the situation they find themselves in remains unresolved, stress levels will remain elevated. Learning stress management techniques is not to be seen as a solution to the issues arising from nuclear radiation exposure; rather, it offers a way of reducing the risk of ill health that accompanies chronic stress, until a solution is found.

2. Compared to the control participants, it is clear that quality of life is compromised for at least some of the nuclear test veterans. Developing strategies for addressing these health inequalities is a matter of some urgency.

INTRODUCTION

Throughout history people have been exposed to dangerous levels of toxic chemicals and radiation, usually in occupational settings or in times of war. Such exposure is now known to have adverse genetic and biological effects (Brain, 2000; Lifton, 1967; Miller, 1993; Vyner, 1988a). Ionising (nuclear) radiation is especially dangerous. High energy emissions, such as X-rays and gamma rays, can easily pass into humans, ionising atoms in the body. The ensuing damage can be severe: vomiting, cataracts, genetic damage, cancer, and much more (Brain, 2000).

In recent times, toxic exposure to ionising radiation has resulted from nuclear accidents, such as that at the Chernobyl nuclear power plant in Russia (van den Bout, Havenaar, & Meijler-Iljina, 1995; Wroble & Baum, 2002). Additionally, the use of atomic bombs at the end of WWII (1945) resulted in thousands of Japanese in Hiroshima and Nagasaki being exposed to lethal radiation doses. Many victims died of leukaemia and other cancers, blood diseases, and heart and liver problems. Very few of those exposed to the fallout from these bombs have gone medically unscathed. Many may have passed on genetic abnormalities to their children (Lifton, 1963).

It might seem that the tragedy suffered by the citizens of Hiroshima and Nagasaki was enough to warn of the serious medical threat posed by exposure to ionising radiation. Nevertheless, thousands of armed forces personnel took part in nuclear weapons testing as several countries strived to perfect the atom and hydrogen bombs, and to find out more about the effects of nuclear fallout on humans. It is claimed that many of these men were deliberately exposed, so that any effects at a "safe" distance from the blast could be examined (Veterans' Claims for Disabilities from Nuclear Weapons Testing, 1979, cited in Vyner, 1983, 1988a).

The USA led the world in nuclear weapons development, beginning atmospheric tests in the Pacific at Bikini atoll in 1946 (Roberts, 1972). A major testing programme began in 1951, continuing with tests in the Pacific and on home soil in the Nevada desert. Over the years of testing, some 250,000 personnel participated (Veterans' Claim for Disability from Nuclear Weapons Testing, cited in Vyner, 1983, 1988a). Many of these men became aware of the dangers of exposure to radiation, seeking to address their concerns through the several atomic veterans' associations that developed for just this purpose (e.g., see the web site of the National Association of Atomic Veterans, Inc: http://www.naav.com).

New Zealand's Involvement

Following the United States' lead, the UK began testing in Australia in 1952 (Roberts, 1972). New Zealand became involved in this programme in 1956, when it was announced that Britain would carry out atmospheric tests off Malden and Christmas Islands in the mid-Pacific. The NZ government offered two Royal NZ Navy frigates, HMNZS Rotoiti and HMNZS Pukaki, for weather reporting (Crawford, 1989; Roberts, 1972). The testing programme, named Operation Grapple, took place in 1957 and 1958. Forces personnel from the UK, Australia, and Fijii took part along with the 550 New Zealanders on the Rotoiti and the Pukaki.

Nine bombs were exploded, dropped from the air from an altitude of at least 2000 metres. The NZ ships were stationed anywhere from 20 to 150 nautical miles from "ground zero", the location of the blast (Crawford, 1989). At the time of testing, most of the men were required to be on the upper deck with their backs to ground zero and their hands covering their eyes. Once the bomb had exploded, they could turn and view the mushroom cloud. The amount of protective clothing worn ranged from nylon suits with cotton hoods, goggles, and gloves, to shorts and jandals (Crawford, 1989; R.S. (Roy Sefton), personal communication, 2003).

Health Concerns

At the time of Operation Grapple it appears that few of the men were concerned about exposure to the bomb blasts (R.S., personal communication, 2004). No information was provided on the dangers of exposure despite the NZ government's concern about nuclear fallout from these tests (Roberts, 1972). It took until the late 1970's before a few of the test veterans began to question the number and type of illnesses from which they suffered. By the late 1980's, the profile of the test veterans sharpened as the press began to pick up on the large number of concerned men and their families. Some research was conducted (Pearce et al., 1990) which seemed to indicate that the test veterans had no more illnesses compared to the population at large. Many veterans disagreed with the conclusions and the New Zealand Nuclear Test Veterans Association (NZNTVA) was formed in 1995 to "take one voice to the government" (R.S., personal communication, 2004).

While there has been little research carried out on the New Zealand nuclear test veterans, a few overseas studies have been conducted, some examining the psychological impact of the tests on US veterans.

PSYCHOLOGICAL EFFECTS OF EXPOSURE TO NUCLEAR RADIATION

Vyner (1983) carried out the first study of the psychological effects of radiation exposure on atomic veterans. He noticed a set of symptoms in US veterans which he referred to as Radiation Response Syndrome (RRS)[1]. The two main features of RRS are, first, the 'self-diagnostic belief' (Vyner, 1983) that one has been harmed by radiation, and second, a set of behavioural symptoms consistent with this belief. For example, a heightened sensitivity to illness, and great concern over the health of one's children.

[1] A somewhat related construct is that of 'fear of future illness' (Brown & Lees-Haley, 1992; Williams, Lees-Haley, & Randall Price, 1996). It refers to "emotional distress over anticipated illness resulting from perceived or actual exposure to toxic substances, radiation, exposure, impact trauma, and the like" (Williams et al., 1996, p.55).

Apart from Vyner's work, there have been only a few other psychological investigations of the US atomic veterans (e.g., Murphy, Ellis, & Greenberg, 1990). However, much more has been done examining people exposed to nuclear accidents, such as the Chernobyl disaster, and this may shed some light on the psychological experience of the men exposed during the nuclear testing programmes. For instance, Stiehm (1992) discusses the chronic worry experienced by people possibly exposed to nuclear fallout in the Chernobyl accident. He reports that many children in the Ukraine were being diagnosed with 'vegetative dystonia' (not unlike chronic fatigue syndrome), but the peak of this epidemic was too long after the accident to result from direct radiation exposure. Stiehm concludes that it was 'psychological fallout' that was being experienced; a psychological reaction in parents and some doctors resulting from the anxiety created by the unknown consequences of exposure.

Remennick (2002), investigating how chronic stress might come about following radiation exposure, found that people exposed to radiation at Chernobyl who immigrated to Israel perceived their mental and physical health to be worse than a control group of non-exposed immigrants. They also had higher levels of depression, and higher levels of anxiety about developing cancer than the controls.

Van den Bout et al. (1995) proposed that at least some of the health problems and illness behaviours of those exposed to Chernobyl radiation resulted from the stress of having been exposed to radiation, with the radiation itself having no direct effect. Their stress model is shown in Figure 1. Those exposed to radiation will have heightened sensitivity to any sensations they perceive as unusual and possibly arising from the exposure. People then label these sensations as symptoms and attribute them to the effects of radiation, further increasing their stress levels. The ensuing increase in anxiety and depression characterises the "stress-related syndromes" (p. 230), and contribute to various illness behaviours.

To test this theory, Havenaar, Savelkoul, van den Bout, Bootsma, and van den Brink (1999) collected data from residents of the Gomel area in the direct vicinity of the Chenobyl plant, and from a group of non-exposed controls from the Tver region, 1000 km away. In Phase 1 of the study, self-reported levels of psychological distress

(measured by the General Health Questionnaire – GHQ), and subjective health (Short Form Medical Outcomes Study questionnaire – MOS-SF) were substantially higher in the 1617 exposed participants compared to the 1427 controls. Medical consumption was also higher in the exposed group.

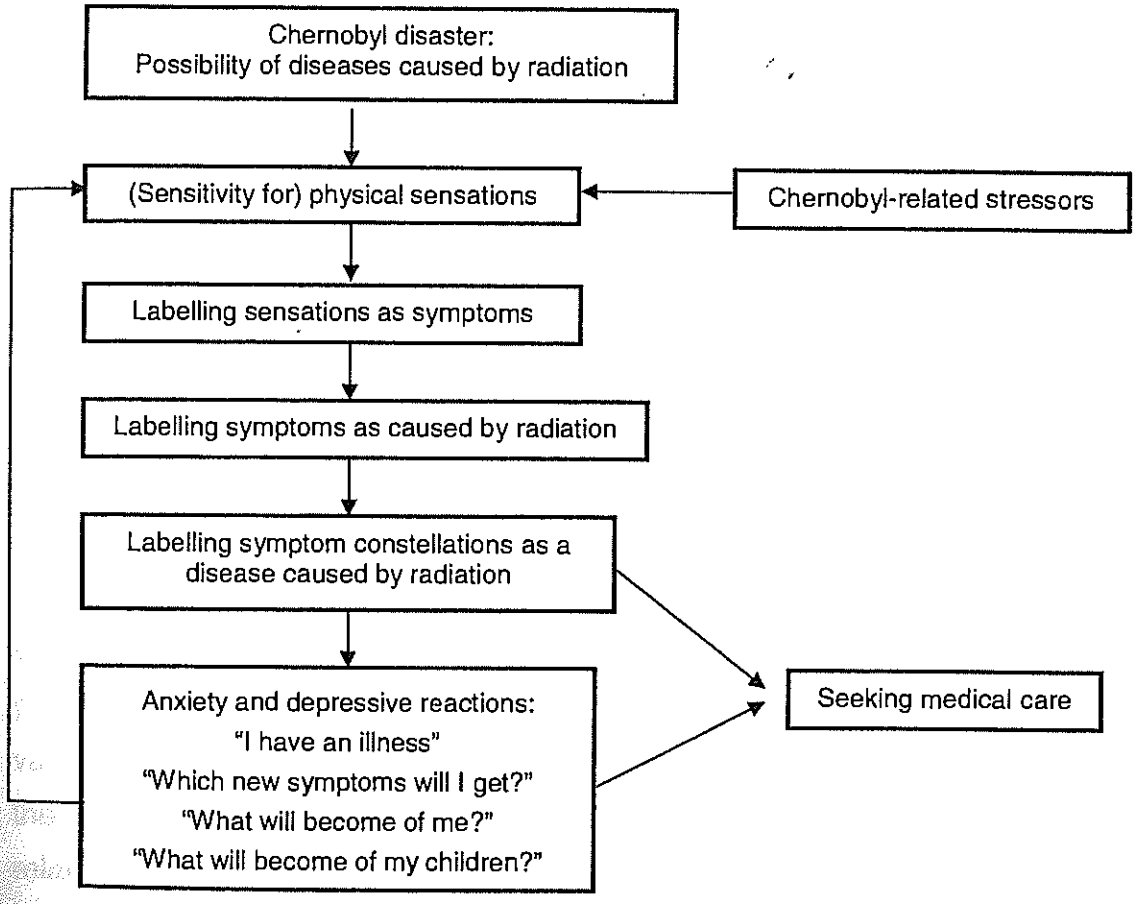

Figure 1. Psychosocial stress model of pathways linking Chernobyl stress to illness behaviour (van den Bout et al., 1995, p. 229).

Individuals scoring high on the GHQ made up Phase 2 of the study which focussed on 265 Gomel and 184 Tver residents. There was no difference in the prevalence of psychiatric disorders between the two groups, but the Gomel sample had more physical illnesses (unrelated to radiation exposure). The authors concluded that the symptoms and illness behaviours exhibited resulted from psychological stress, rather than direct exposure to radiation.

Similar psychological effects have been observed in residents living near the Three Mile Island (TMI) nuclear power plant after its accidental release of radiation. Baum,

Gatchel, and Schaeffer (1983) took emotional, behavioural, and physiological measures of stress from a sample of these residents and compared them to data obtained from three control groups: people living 20 miles from any nuclear plant, within 5 miles of an undamaged plant, and from a 5-mile area around a coal-fired plant. The TMI group exhibited higher depression and anxiety scores, and had more concentration problems. They also performed poorly on two measures of cognitive function, compared to the three control groups. Further, they had higher catecholamine levels in their urine, suggesting chronic sympathetic nervous system arousal. Importantly, these measures were taken over a year after the TMI accident, strongly suggesting that the observed psychological effects were due to the chronic stress residents were experiencing as a result of the uncertainty and threat of potential illnesses resulting from exposure.

Finally, Collins and Bandeira de Carvalho (1993) report that portions of a radioactive cesium isotope, stolen from an old radiotherapy machine, were distributed among some of the residents of Goiania, in Brazil. Three and a half years after this exposure, the authors compared a group of these residents to two non-exposed control groups. Amongst other things, the exposed residents showed lower levels of perceived overall health, poorer performance on a maze test, and higher excretion of vanillymandelic acid (greater sympathetic nervous system activation), compared to the controls. The conclusion was that the exposed residents were suffering from relatively high levels of stress due to uncertainty about their future general health, fear of developing cancer, and diminished quality of life.

The Psychosocial Impact of Exposure to Nuclear Radiation

In the illustrative studies described above, it seems clear that exposure to nuclear radiation has been associated with increased psychological stress, despite the fact that the circumstances of exposure have varied widely. Vyner discusses the stress reaction to toxic exposure in his book: "*Invisible trauma: The psychological effects of invisible environmental contaminants*" (1988b). He argues that individuals experience stress because they are unable to deal with the perceived threat posed by the exposure. It is impossible to remove, or even reduce, the threat because of

the lack of solid information surrounding the exposure, resulting in feelings of uncertainty and ambiguity. The following material is a brief outline of Vyner's (1988a, b) position.

Invisibility and Ambiguity

The inability to remove or adapt to the threat associated with exposure is based on three issues: environmental invisibility, medical invisibility, and diagnostic ambiguity. Environmental invisibility means that the contaminant (radiation in the present case) cannot be detected through the normal sensory pathways. The nuclear test veteran cannot ascertain if he is in danger because he does not know whether he absorbed radiation, and if he did, how much. If he has absorbed radiation, he has no real idea whether or not he is in danger; even the experts cannot agree!

Medical invisibility refers to the fact that, at some point, radiation exposure is invisible to the person exposed and to his medical advisors. For instance, an individual may not become symptomatic until years after the exposure. A specific form of medical invisibility is etiological invisibility: symptoms cannot easily be linked to the exposure. As Vyner (1988b, p.16) puts it, "*There is no morphological or biochemical marker that distinguishes the diseased white blood cells of a leukaemia caused by radiation from the diseased white blood cells of a leukaemia caused by some other agent.*"

These invisibilities open up the flood gates of ambiguity and uncertainty. It is not possible for the exposed person to adapt to the situation. There are constant, nagging doubts and concerns, resulting in frustration and chronic stress.

A Psychological Theory of Stress

A predominant psychological theory of stress is the stress and coping theory (Lazarus, 1966, 1999; Lazarus & Folkman, 1984). Lazarus notes that whether or not a situation is stressful depends upon the individual's perception. Thus, stress is the outcome of a transaction between 'person variables' and the environment.

Central to the experience of stress is the concept of threat. Threat is the anticipation of harm based on present cues (Lazarus, 1966). Our *appraisal* of the situation determines whether or not it is threatening. According to Lazarus, two forms of appraisal can take place. The first, *primary appraisal*, is when the individual evaluates the personal significance of the threatening event. An event is threatening when it thwarts one's goals and values, such as the desire to live a long and healthy life. The more ambiguous the situation, the more difficult it is to properly appraise the threat. For example, a high degree of uncertainty about the level of danger from exposure to radiation makes the appraisal of the threat it poses problematic.

Secondary appraisal occurs when the individual determines what coping strategy to use from those available. For instance, a person may learn as much as possible about exposure to radiation. Lazarus (1999) notes that primary and secondary appraisal are interdependent. Appraising a situation as threatening depends partly upon determining if a coping strategy exists to deal with the threat.

Lazarus (1966) describes various coping patterns and the appraisal that accompanies each of them. For example, the coping-reaction pattern of attack (aggression) is related to anger, the avoidance pattern to fear, and the inaction pattern to apathy. If complete hopelessness exists (no coping pattern is available), then depression may be the outcome.

In Lazarus' (1966) theory, then, stress is the result of appraising the situation, finding it threatening, and not having adequate resources (personal or otherwise) to cope successfully. He describes four types of stress response: disturbed affect (e.g., depression), motor-behavioural reactions (e.g., increased muscle tension), inadequate cognitive functioning (e.g., disturbed judgement and problem solving skills), and physiological changes (e.g., increased blood pressure and circulating stress hormones). Making the reasonable assumption that the NZ test veterans' exposure to nuclear radiation has had the same impact as in other studies that we have described, one would expect to see the signs of chronic stress in these men. For example, there may be mental and physical health problems, cognitive problems, and depression.

AN INVESTIGATION OF THE PSYCHOLOGICAL STATUS OF A SAMPLE OF NZ NUCLEAR TEST VETERANS

Previous research strongly suggests that a common consequence of radiation exposure is stress. This results from the threat of developing a radiation-related illness, especially cancer. According to Lazarus' (1966, 1999) stress and coping theory, to adapt successfully to such a threat, appraisal must take place. However, if there is ambiguity and uncertainty caused by a lack of accurate information, the threat cannot be properly appraised. Without proper appraisal, it is not possible to develop a coping strategy, leaving the individual in a stressed state. Stress can be manifested in many ways, including poor physical and mental health, disturbed mood, and possibly abnormalities in cognitive functioning.

The present study set out to investigate the psychological effects of exposure to nuclear radiation in a sample of NZ nuclear test veterans. This is the first study to attempt to develop a psychological profile of these men. Based on previous findings, we expected to find:

1) The Exposed group to be more depressed than a matched Control group, as assessed by the Geriatric Depression Scale. Stress is thought to elevate the level of certain hormones, especially cortisol (Claes, 2004). Elevated cortisol levels create changes in the brain that increase a person's risk of developing depression (Tafet & Bernadini, 2003).

2) The Exposed group would perceive their general health to be poorer than the Controls. It was predicted that the Exposed group would obtain lower scores on all eight subscales of the SF-36, a frequently used scale for assessing health-related (physical and mental) quality of life. Remennick (2002) found that self-reported mental and physical health scores of a group of Chernobyl survivors were worse than those of matched controls.

Furthermore, on the basis of previous findings (Havenaar et al., 1999; Van den Bout et al., 1995), we expected that the Exposed men would report a greater number of chronic health problems than their Control counterparts. Participants were asked to report whether or not they had any long-term (6 months or more) health problems. Examples of health problems associated with chronic stress are an increased likelihood of respiratory conditions, bowel disorders, gastrointestinal ulcers, and bacterial and viral infections.

3) The memory (a measure of cognitive functioning) of the Exposed group would be poorer than that of the Controls, as shown by lower scores on the MAC-S, a self-report measure of everyday memory. Research has shown that the elevated cortisol levels arising from chronic stress can affect the hippocampal area of the brain, resulting in impairment of long-term memory (McEwen, 1995). In addition, chronic stress is believed to disrupt the encoding of information and the retrieval of information from memory (Bremner, Krystal, Southwick, & Charney, 1996).

The factors of age, income, education level, alcohol consumption, smoking, and previous trauma are known to be associated with depression, perceived poor health, and memory problems (see below). Therefore, the study was planned to include an assessment of these factors, removing any effects they might have on the main measures. In this way, we could have more confidence that any differences between the two groups of men were due to the ongoing stress created by the knowledge of exposure to nuclear radiation some 45 years ago.

METHOD

Participants

Participants were 50 male New Zealand naval nuclear test veterans (Exposed group) and 50 male age-matched Controls who had also undergone military or police

training when they were younger[2]. All were North Island residents, not compensated for their participation.

Demographics. Participant age (at the date of their interview) ranged from 58 to 76[3], with the mean age for the Exposed and Control groups being 65.9 years (SD[4] = 3.1) and 66.5 years (SD = 3.8), respectively. The majority of the Exposed group (72%) had completed no more than 5 years at secondary school. Only 2% held a tertiary qualification, although 26% held a trade/professional certificate or diploma. Of the Controls, 58% had completed no more than 5 years secondary schooling, 12% had a tertiary qualification, with 28% holding a trade/professional certificate or diploma. Gross annual income averaged $33,929 for the Exposed group and $48,378 for the Controls.

Exposed Group

Initial contact with the atomic veterans was made through the NZNTVA Chairman, Roy Sefton. At this stage, the inclusion criterion was exposure to at least one nuclear blast in the Operation Grapple programme.

There were 8 exclusion criteria, the first 3 involving potential genetic damage[5]. Participants were excluded if they met the following criteria:

1) Service in a theatre of war or nuclear-related area;
2) Exposure to toxic substances[6] for a year or more;
3) Having received radiation treatment or chemotherapy;
4) Aged over 75 (to avoid confounding effects of age);
5) Air Force aircrew (exposed to cosmic radiation, confounding nuclear radiation exposure);
6) Too ill to participate;

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[2] Ideally, participant numbers would have been higher, but funding was limited.
[3] Due to difficulties acquiring suitable participants, 3 people fell outside the originally proposed range of 60-75 years.
[4] SD = standard deviation
[5] The Method described here is for the multi-disciplinary study, mentioned in the Summary, which included taking blood samples for genetic analysis.
[6] These included asbestos, tanilised timber, oil/petrol fumes, microwave radiation, road transport (dust and chemicals), and radiography work.

7) Death subsequent to survey completion; and
8) Resident in the South Island. (There were insufficient funds to cover trips to interview and collect blood from the 15 eligible South Islanders.)

Controls

Controls were obtained through regional Returned Services Associations, and the assistance of Exposed participants through personal contacts. Controls were age-matched individually where possible. The inclusion criterion was service in the NZ Army or NZ Air Force, the NZ Police Force, or some form of compulsory military training. The main aim of this criterion was to control for the *healthy soldier effect.* This involves the expectation that, due to strong demands for physical fitness and mental toughness in military and police selection and subsequent service, those who have been in such service will generally be fitter and healthier than civilians (Medical Follow-up Agency, 1995, cited in MacDonald, 1997).

All of the exclusion criteria for the Exposed group also applied to the Controls. Additional exclusion criteria were:

1) Service in HMNZ Navy (due to possible ship contamination);
2) Inability to match for age in a particular geographic region;
3) Too high an education level (e.g., a surgeon was excluded);
4) Recent immigration to New Zealand (attempting to control for variable background radiation levels);
5) Service without compulsory military training.

Sample Selection

In July 2001, the NZNTVA Chairman (Roy Sefton) sent out a questionnaire (see Appendix 1) to all the veterans on the NZNTVA mailing list, asking for volunteers. About 200 veterans were contacted, of which 151 (approximately 75%) responded positively. Sixty three were excluded using the exclusion criteria outlined earlier, leaving 88 volunteers from which to select.

To control for any variation in background radiation exposure, a stratified sampling procedure was employed. Potential Exposed group members were identified as

belonging to one of 5 North Island regions: Wellington/Kapiti, Central North Island, Bay of Plenty/Waikato, Auckland, and Northland.

Table 1 shows how the 88 acceptable volunteers for the Exposed group membership were distributed by region. The 50 Exposed group members were randomly selected from the pool of potential volunteers (Table 1), with the restriction that the proportion of members selected from each geographic region reflected the original distribution of 88 potential participants. For various reasons, 6 participants withdrew from the study. These men were replaced with another 6 drawn from the remaining acceptable volunteers.

Table 1: *Number of Exposed Volunteers, Potential Participants, and Selected Participants, including Mean Age, by Region*

Code	Region	Volunteers	Potential	Selected	Mean Age
A	Wellington/Kapiti	13	5	3	67.0
B	Central North Island	16	12	9	65.6
C	Bay of Plenty/Waikato	17	13	7	70.0
D	Auckland	70	46	25	66.2
E	Northland	13	12	6	65.0
	Total	**129**	**88**	50	

An invitation for Controls to participate appeared in the general RSA Review in April 2002 and in the Auckland regional RSA Review in August 2002. The response from Auckland did not match the number of Exposed men in that region, so further attempts to recruit Controls were made through the RSA Head Office in Wellington and Field Supervisors in Auckland and Northland, a Second NZ Regiment Reunion newsletter, and the Waiheke Island Rotary.

The Modified Mini-Mental State Examination (3MS)

The 3MS (see Appendix 2, Part 3, pages 8-13 of Face to Face Interview) is a shortened version of the Mini Mental State Examination (MMSE; Folstein, Folstein, & McHugh, 1975), originally developed as a screening test for dementia (Teng & Chui, 1987). The 3MS covers a broader range of cognitive functions than the MMSE, enabling better discrimination among respondents and their cognitive ability levels (Bravo & Herbert, 1997). It tests memory of birth details, immediate and short-term recall, temporal and spatial orientation, naming items, and copying a simple geometric figure, amongst other things. The 3MS has acceptable reliability and validity (Teng & Chui, 1987).

Scores below a cut-off of 74 would have indicated an unacceptably low level of cognitive functioning (Nadler et al., 1995), but none of the 100 men scored this low.

Geriatric Depression Scale (GDS)

The 15-item short-form version of the GDS (see Appendix 2, Part 1, pages 1-2 of Face to Face Interview) was used (Sheikh & Yesavage, 1986). The scale includes such items as, "Are you basically satisfied with your life?" and, "Do you feel that your life is empty?" Each question requires a simple Yes/No response, the total score ranging from 0-15 with higher scores being indicative of more depressive symptomology.

In the current study, the GDS was found to have a more than adequate (Almeida & Almeida, 1999) internal consistency score (a measure of reliability; in the present case, Cronbach's alpha) of .84. The test also correlates well with other tests of depression, such as the Hamilton Rating Scale (Sheikh & Yesavage, 1986).

The Memory Assessment Clinics Self-Rating Scale (MAC-S)

Crook and Larrabee's (1990) MAC-S (see Appendix 2, Part 3, page 7, for the Global items; and Appendix 3, Part 6, pages 45-48, of the Mail Out Survey for the Ability and Frequency of Occurrence items[7]) is a self-rating memory scale developed to assess every day memory. The scale is made up of two subscales, the first

[7] The MAC-S Global items were reserved for the face to face interview. This gave the interviewer the opportunity to collect any missing responses from the MAC-S items included in the postal survey.

focussing on a person's ability to remember particular types of information (the Ability Scale), such as "The name of a person just introduced to me", and "Telephone numbers or address codes that I use on a daily or weekly basis." Memory ability is rated on a 5-point scale from (1) *very poor* to (5) *very good.* The second subscale looks at the frequency of various memory problems (Frequency of Occurrence Scale). "Having difficulty recalling a word I wish to use" and, "Dialling a number and forgetting who I was calling before the phone is answered" are two examples from this subscale. Items are rated from (1) *very often* to (5) *very rarely.*

The Ability scale has 5 factors: Remote Personal Memory, Numeric Recall, Everyday Task-Oriented Memory, Word Recall/Semantic Memory, and Spatial/Topographic Memory. The Frequency of Occurrence Scale also has 5 factors: Word and Fact Recall, Attention/Concentration, Everyday Task-Oriented Memory, General Forgetfulness, and Facial Recognition. (Full details can be found in Crook and Larrabee, 1990.)

The MAC-S also includes 4 global memory items, each rated on a 5-point scale:

1) "In general, as compared to the average individual your age[8], how would you describe your memory?" (rated from *very poor* to *very good);*

2) "How would you describe your memory, on the whole, as compared to the best it has ever been?"(rated from *much worse* to *much better*);

3) "Compared to the best your memory has ever been, how would you describe **the speed** with which you now remember things?" (rated from *much slower* to *much faster*);

4) How much concern or distress do you feel about your memory at this time? (rated from *very serious concern* to *no concern)*

[8] The wording "your age" was added to ensure the reference group for this question was the same age cohort.

SF-36 Health Survey

The Medical Outcomes Study 36-item Short-Form Health Survey (SF-36; see Appendix 2, Part 2, pages 1-6) is a measure of health-related quality of life. It is generic, assessing universal health concepts (Ware, 1997).There are 8 subscales: Physical Functioning, Role-Physical (limitations in role resulting from poor physical health), Bodily Pain, General Health, Vitality, Social Functioning, Role-Emotional (limitations in role due to poor mental health), and Mental Health. Individuals rate the degree to which they are limited in activities of daily living for physical or emotional reasons, and their degree of bodily pain. They also rate their perceived health and their emotional experiences. Scores on all subscales are standardised (0-100); the higher the scores, the better the perceived health. There is a single further item which asks individuals to rate their general health compared to what it was a year before (the Health Transition Item).

Across 14 studies, Ware (1997) examined the reliability coefficients of the 8 SF-36 subscales. The median coefficient equalled or exceeded .80 for each of the subscales, except the Social Functioning subscale (.76). In the present study, the reliability coefficients (Cronbach's alpha) ranged between .84 and .94.

The SF-36, 3MS, GDS, and part of the MAC-S were administered during the face to face interview. This was done to minimise missing data from the key dependent measures.

Long-term Health Problems

It is well known that chronic stress can affect physical health, either directly or by compromising immune functioning (e.g., see Maier, Watkins, & Fleshner, 1994). Therefore, participants were asked which, if any, of 23 "long-term health problems" (6 months or more) they were suffering from at the time the survey was completed (see Appendix 3, Part 5, pages 40-41, for the full list of health problems). We expected to find a higher percentage of Exposed participants experiencing several of these illnesses (e.g., gastrointestinal ulcers, skin disorders), compared to the Controls.

Covariates

It will be recalled from the Introduction that there was reason to think that age, income, education level, current alcohol consumption, smoking, and exposure to previous trauma might be related to the dependent measures described above. Dependent measure scores were therefore adjusted by removing any effects of these covariates.

Age

Mental and physical health and memory are known to covary with age. Older people report more depressive symptoms than younger people (Blazer, 2002). SF-36 scores have been found to decrease with increasing age, particularly on the physical health subscales (Ministry of Health, 1999).

Participants' date of birth was ascertained and their age at the time of the face to face interview was used in all analyses involving age.

Income

Income was used as an indicator of socioeconomic status (SES). Lower SES levels positively correlate with health risks, such as smoking, high blood pressure, and alcohol abuse (Ministry of Health, 1999).

Participants were asked what their individual total gross income was for the past 12 months, and also what the collective gross income was for all other members residing at the participant's abode over the past 12 months. These two amounts were combined to give the total household income.

Education

Education level is an important factor partially determining both psychological and physical well-being (Wilkinson & Marmot, 1998). The lower the level of education, the greater the risk of ill health.

In seeking information on the participants' education level, we asked the following question:

What is your highest educational qualification?

Less than 3 years at secondary school
From 3 to 5 years of secondary school
School qualifications, University entrance and above
Trade certificate or professional certificate or diploma
University degree, diploma, or certificate
Other (specify)

There were several "other" responses, such as "primary school only", "School certificate while in the army (or prison service)", and "telegraph qualification". These were categorised as one of the options listed above "Other".

Alcohol Consumption

Alcohol can contribute to a number of physical problems, including cirrhosis of the liver, high blood pressure, stroke, and various cancers. It affects mental health as well, for instance, increasing the risk of psychosis, amnesia, and dementia (United States Department of Health and Human Services, cited in Ministry of Health, 1999). Veterans have been shown to have more hazardous drinking patterns compared to the general population (Goldberg, Richards, Anderson, & Rodin, 1991).

As a guide to help determine what questions we should ask about drinking patterns, we turned to the Alcohol Use Disorders Identification Test (AUDIT: Saunders, Aasland, Babor, De La Fuente, & Grant, 1993). This test was developed by the World Health Organisation to screen for those who may be at risk of developing alcohol problems (Babor & Grant, 1989). This was not our purpose, and we deliberately omitted 3 of the 10 questions we felt might be embarrassing to both the veterans and the Controls: "How often during the last year have you had a feeling of guilt or remorse after drinking?"; "How often during the last year have you been unable to remember what happened the night before because you had been drinking?"; and "Have you or someone else been injured as a result of your drinking?"

The remaining 7 questions (see Appendix 3, Part 4, pages 35-36) covered the categories of hazardous alcohol consumption, abnormal drinking behaviour, and problems created by the adverse effects of drinking. Examples are: "How often do you have a drink containing alcohol?", and "How often during the last year have you found that you were not able to stop drinking once you had started?" Questions are scored from 0 to 4. It was felt that the 7 remaining questions[9] would be sufficient to give us a clear indication of veteran drinking patterns compared to those of the Controls.

Smoking

Smoking is an obvious health-related risk factor (Ministry of Health, 1999). It has been associated with increased rates of cancer, heart disease, stroke, and chronic respiratory diseases (Doll, 1998). It is also the "major cause of preventable death in developed countries (World Health Organisation, 1997). Smoking is not only known to adversely affect objective health (which can subsequently affect mental health), but to affect self-reported health as well. In the 1996/97 NZ health survey, non-Maori males who were current smokers rated their perceived physical and mental health as significantly poorer than those who had never smoked, on all scales of the SF-36. The same was true of ex-smokers compared to those who had never smoked, except that ratings on the Role Physical and Mental Health scales did not reach significance (Ministry of Health, 1999).

The questions participants were asked in the present study were modelled on those from the 1996/97 New Zealand Health Survey. Participants were asked the following questions about their current smoking habits:

1) Do you currently smoke any substance other than tobacco?
2) Does anyone (including yourself) currently smoke tobacco products inside your home every day, or most days?
3) Do you currently smoke any tobacco products?

[9] Only questions 1 and 4-9 are taken from the AUDIT; questions 2 and 3 were added to identify non drinkers.

Participants were also asked the following questions regarding their smoking history:

1) Have you ever smoked any substance other than tobacco?
2) Have you ever been a smoker of any tobacco products in the past?
3) Were you ever a regular, daily smoker of tobacco products, before you stopped smoking?
4) What date did you last smoke?
5) About how many years did you smoke tobacco products before you stopped?

Finally, the following specific questions were asked regarding the smoking of cigarettes, cigars, and pipes:

1) Do you currently smoke one or more cigarettes/cigars/pipes full a day?
2) Please specify the month and year you first started smoking one or more cigarettes/cigars/pipes full a day.
3) About how many years have you been smoking one or more cigarettes/cigars/pipes full a day?
4) Have you always smoked one or more cigarettes/cigars/pipes full a day from the date you specified right up until today's date?
5) How many cigarettes/cigars/pipes full do you smoke on an average day?

For the question of "How many" they smoked, participants were given the options of 1 to 10 a day, 11 to 20 a day, 21 to 30 a day, and 31 or more a day for cigarettes. For cigars/pipe: only occasionally, 1 cigar/pipe full in an average day, 2 to 3 cigars/ pipes full in an average day, and 4 or more cigars/pipes full in an average day.

For the purposes of this pilot study, only the total number of cigarettes smoked over a person's lifetime was considered. The average number of tobacco products smoked per day was multiplied by the number of years smoked to get the total amount of tobacco smoked. One cigar and one pipe full were each considered equivalent to one cigarette.

Trauma

High levels of depression have been noted in people exposed to traumatic events (Vrana & Lauterbach, 1994), and lifetime trauma has been shown to adversely affect the physical health of older adults (Krause, Shaw, & Cairney, 2004). Thus, it seemed prudent to include trauma as a potential covariate.

The Traumatic Events Scale (TES: Flett, Millar, Long, & MacDonald, 1998) was developed to collect information about traumatising, or potentially traumatising, experiences. The 13-item scale[10] (see Appendix 2, Part 1, pages 3-4) includes questions about military combat, sexual abuse, assault, theft by force, accident, natural disaster, and traumatic death or injury of a loved one. Each question requires a simple Yes/No response, and the total number of exposures is the final score.

Data Collection

The Mail Out Survey booklet (MOS; see Appendix 3) was completed and piloted in March 2002[11]. Data were collected over a 14-month period from May 2002 to July 2003. Each participant was sent a MOS (with a personalised letter, information sheet, and consent form – see Appendix 4), and given approximately one month to complete it. Follow-up telephone calls were made to encourage completion from those men who agreed to participate. Those who did not wish to participate returned the MOS. In most cases, each completed MOS was coded before the participant was interviewed. This allowed the interviewer to deal with any unanswered questions, and to resolve any ambiguities in the MOS responses.

One major difficulty was that the participants were asked to recall events that had taken place sometimes as long ago as 40 years or more. It is known that as the time interval and detail required increase, recall becomes less accurate (Berney & Blane, 1997). One method of improving recall is to get participants to construct a time line of important events that span the period under investigation, for example, date of marriage, and partner's birthday (Fredenreich, 1994). Such key events can be used as anchors around which other events and memories can be built. Berney and Blane

[10] One item was dropped from the scale; see the Results section.
[11] Most questions in the MOS related to the genetic analysis.

successfully used this "lifegrid" approach to improve the accuracy of recall in their participants over a 50-year period. (They were able to check the quality of information provided by accessing archival data relevant to the period and events being recalled.)

The participants in the current investigation were sent such a life events grid (see Appendix 4) to fill out before they completed the MOS. This contained such events as starting and finishing years at primary and secondary schools, the starting date for military service, dates of significant long-term relationships, and births of children and grandchildren.

Usually within one month of returning the MOS, the participant was interviewed by an experienced interviewer (who interviewed every one of the participants). Interviews were conducted in the participant's home, or, if requested, in an office at the local RSA. These interviews lasted about one hour, where most of the psychological test data were collected, any MOS ambiguities clarified, and assistance provided to answer any missed MOS questions that the participant was willing to answer. Finally, a blood sample was collected for the chromosomal analyses. The blood sample had to be returned to Massey University (Palmerston North campus) within 24 hours of collection.

For regions A, B, and C, data were collected from members of both the Exposed and Control groups in a mixed order. However, for regions D and E, data were collected from all Exposed participants first. This was to save time while remaining Control participants were being recruited.

Analysis

The Statistical Package for the Social Sciences, Version 11.5 (SPSS Inc., 2002) was used to analyse the data. The family-wise significance level was set at .05. Group comparisons were carried out using *t*-tests for independent samples, and Analyses of Covariance (ANCOVAs) were used to assess the impact of the covariates on all dependent measures bar one, the number of long-term health problems. The

dependent variable here was dichotomous (Yes/No), so logistic regression analyses (see Tabachnik & Fidell, 2000) were used to assess the effects of the covariates.

Even though the number of *t*-tests exceeded 20, it was decided not to adjust the significance level (for example, by using a Bonferroni correction). Both statistical significance and effect sizes (ESs) were used to assess the importance of the main outcomes. Cohen's *d* statistic (Cohen, 1988) was used to assess ESs (employing a 95% confidence interval) associated with the group mean differences. An ES of .20 is considered small, .50 medium, and .80 large (Cohen, 1988). Partial η^2 was used as the estimate of variance accounted for in the ANCOVAs, and the Nagelkerke R^2 for logistic regression analyses (Tabachnick & Fidell, 2000).

RESULTS

Preliminary Analysis

Prior to the main analysis, the data were examined for accuracy, missing values, and normality of distributions. The assumption of normality was violated for the GDS distributions, 6 of the SF-36 subscales, and one MAC-S variable for both the Exposed and Control groups. We did not transform these data due to difficulties of interpreting transformed variables. Besides, *t*-tests are reasonably robust to violations of this assumption (Tabachnick & Fidell, 2000).

Altogether, across all dependent measures, 9 datum points were found to be outliers (using SPSS). After careful inspection, it was decided that there were no compelling reasons for removing these few outliers, and they were left in the data set for the main analysis.

Screening Tool

Modified Mini-Mental State Examination (3MS). We checked for equivalent basic cognitive functioning of the two groups by comparing the means and SDs for the 3MS scores. As Table 3 shows, the means were very similar, $t(97) = .93$, $p = .36$. The minimum scores were 78 and 81 for the Exposed and Control groups, respectively – well above the cut-off score of 74 (Nadler et al., 1995).

Table 3: *Means (M) and Standard Deviations (SD) for the 3MS*

Scale	Group			
	Exposed		Control	
	M	*SD*	*M*	*SD*
Total 3MS	90.82	4.86	91.68	4.42

Dependent Measures

Geriatric Depression Scale (GDS)

Because of the likely ongoing stress being experienced by at least some of the Exposed participants, it was expected that they would produce a higher average GDS score than the Controls. GDS means and SDs for the two groups are presented in Table 4.

Table 4: *Means (M), Standard Deviations (SD), t-test Statistics and ES for the GDS*

Scale	Group					
	Exposed		Control		*Sig.*	*d**
	M	*SD*	*M*	*SD*		
GDS	3.92	3.50	0.90	0.97	<.001	1.18 ± .42

* *d* = ES for *t*-tests

The Exposed group has an average depression score more than 4 times as large as the Control group. Neither mean reached the cut-off score of 5 for depressive symptomology (Van Marwijk et al., 1995), but 24% of the Exposed group and 0% of the Controls did score above this cut-off. It is worth noting that the SD for the Exposed group was more than 3 times that for the Controls. Investigation of the distributions of GDS scores suggests a greater overall variability in the scores was the cause, rather than just the subgroup of high scores in the Exposed group causing the larger SD.

The difference between the GDS group means was highly significant, $t(57) = 5.88$, $p < .001$[12], $d = 1.18 \pm .42$[13], showing that the Exposed participants were considerably more depressed on average than the Controls. The effect size (d) is very large.

SF-36 Health Survey

It was expected that Exposed participants would perceive their health to be worse than that of the Controls, thus producing lower scores on the SF-36 subscales and a higher score on the Health Transition Item.

Table 5 shows the Exposed and Control group means and SDs for the 8 SF-36 subscales, and the Health Transition Item. Exposed group mean scores are uniformly lower than those of the Controls. Furthermore, the Exposed group mean on the Health Transition Item is higher than the Control group mean, indicating that the Exposed participants perceived their current health to be worse than Controls, compared to one year ago. Additionally, 30% of Exposed participants compared to 6% of Controls considered their health to be worse than it was a year ago. Conversely, only 8% of the Exposed participants but 14% of the Controls considered their health to be *better* than it was a year ago.

As for the GDS, the Exposed group SDs were generally much larger than those of the Controls, indicating greater variability across the individual scores.

[12] All t-tests reported are with equal variances **not** assumed.
[13] 95% confidence interval

Table 5: *Means (M) and Standard Deviations (SD) for the SF-36 Subscales and the Reported Health Transition Item*

SF-36 Subscale/Item	Group			
	Exposed		Control	
	M	*SD*	*M*	*SD*
Physical Functioning	71.00	22.45	85.90	15.87
Role-Physical	64.50	43.48	90.50	25.20
Bodily Pain	64.24	26.72	74.50	25.70
General Health	54.90	23.49	78.86	14.69
Vitality	58.30	23.38	77.10	12.21
Social Functioning	81.25	24.78	92.75	16.58
Role-Emotional	73.33	41.51	96.00	15.99
Mental Health	77.84	21.09	90.24	10.45
Health Transition Item	3.20	.73	2.88	.66

Note: *Lower* scores indicate perceived poorer functioning, except for the Health Transition Item.

It can be seen from Table 6 that there were statistically significant differences between the means of the Exposed and Control groups for each of the 8 subscales.

Table 6: *t-test Statistics, Cohen's d Values and Confidence Limits for the SF-36 Subscales*

SF-36 Subscale/ Item	*df*	*t*	*Sig.*	*d*
Physical Functioning	88.17	3.83	<.001	0.77 ± .41
Role-Physical	78.58	3.66	<.001	0.73 ± .41
Bodily Pain	97.85	1.96	.05	0.39 ±.39
General Health	82.25	6.12	<.001	1.22 ± .42
Vitality	73.88	5.04	<.001	1.01 ± .42
Social Functioning	85.55	2.73	.01	0.55 ± .40
Role-Emotional	63.23	3.60	.001	0.72 ± .40
Mental Health	71.68	3.73	<.001	0.75 ± .41

Exposed group participants saw their health as worse than that of the Controls on every factor. ESs ranged from a small .39 for Bodily Pain to the very large values of 1.01 for Vitality and 1.22 for General Health.

The Memory Assessment Clinics Self-Rating Scale (MAC-S)

The self-assessed memory status of the Exposed men was expected to be lower than that for their Control group counterparts, shown through lower scores on the MAC-S. The means for each subscale are given in Table 7 along with the SDs.

Table 7: *Means (M) and Standard Deviations (SD) for the Factors of the MAC-S*

Factor	Group			
	Exposed		Control	
	M	*SD*	*M*	*SD*
	Ability Scale			
Remote Personal Memory	13.82	3.29	15.16	2.40
Numeric Recall	13.30	3.55	13.96	2.77
Everyday Task-Oriented Memory	15.34	2.81	16.04	2.19
Word Recall/Semantic Memory	11.28	2.03	11.66	1.97
Spatial/Topographic Memory	11.52	2.64	12.38	1.75
	Frequency of Occurrence Scale			
Word & Fact Recall or Semantic Memory	16.36	3.97	17.96	3.03
Attention/Concentration	17.42	3.87	18.86	3.06
Everyday Task-Oriented Memory	13.32	3.56	15.16	2.38
General forgetfulness	13.02	2.04	13.72	1.47
Facial Recognition	10.40	2.38	11.68	2.13

It can be seen that the Exposed group means are lower than the Control group means for every subscale. Once again, greater variation occurred in the Exposed group scores compared to Controls.

Table 8 shows the Exposed and Control group means and SDs for the four Global Memory items in the MAC-S. The values reveal the now typical outcome for this study: the Exposed group have lower mean scores in all memory categories compared to the Controls, but higher variability across the individual scores within each category.

Table 8: *Means (M) and Standard Deviations (SD) for the Global Memory Items of the MAC-S*

Global Memory Item	Group			
	Exposed		Control	
	M	*SD*	*M*	*SD*
In general, as compared to the average individual your age, how would you describe your memory?	3.74	0.85	3.94	0.74
How would you describe your memory, on the whole, as compared to the best it has ever been?	2.38	0.64	2.54	0.58
Compared to the best your memory has ever been, how would you describe the speed with which you now remember things?	2.24	0.56	2.40	0.54
How much concern or distress do you feel about your memory at this time?	3.64	1.01	4.22	0.86

When comparing their memory to an average person their age, 10% of the Exposed group versus 2% of the Controls rated it as poor, 22% versus 18% as fair, and 68% compared with 80% as good or very good. Comparing their memory to the best it has ever been, 58% of the Exposed men versus 50% of the Controls considered their memory to be worse, 40% versus 46% rated it the same, and 2% compared with 4% rated it as better than the best it had ever been.

Comparing their speed of memory now to the best it has ever been, 70% of the Exposed group compared to 62% of the Controls considered it to be slower, 30% versus 36% rated it the same, and 0% versus 2% rated it as faster. Finally, in regard to the amount of concern/distress felt about their memory, 6% of the Exposed group compared with 2% of the Controls expressed serious concern, 50% versus 22% had some concern, and 44% versus 76% had rare concern or no concern at all.

The only Global memory item to show a statistically significant difference between the two groups was concern or distress about memory, $t(96) = -3.09$, $p = .003$, $d = .62 \pm .41$. However, the other 3 items produced small ESs of .25, .26, and .29, respectively. Taken together, these results indicate a small but consistent difference in the way the Exposed men perceived their overall memory compared to the Controls.

Table 9 summarises the ESs and *t*-test results for each of the 10 MAC-S factors. Only one of the Ability scale factors reached statistical significance, whereas all the Frequency of Occurrence factors did so. The ESs, along with the *t*-test results, show that, overall, the differences between the Exposed and Control groups were largest for the factors making up the Frequency of Occurrence Scale. It can be noted, however, that the Exposed group had lower scores on all 10 factors across both scales.

The factors making up the Ability and Frequency of Occurrence scales can be condensed to produce one total score for each scale (Feher et al., 1989, cited in Crook & Larrabee, 1990). This was done for the ANCOVA, reported below. For the Ability scale, the mean scores were 65.26 (SD = 12.59) for the Exposed men and 69.20 (SD = 8.56) for the Controls. For the Frequency of Occurrence scale, the

means were 70.52 (SD = 14.26) for the Exposed group and 77.38 (SD = 9.91) for the Controls.

Table 9: *t-test Statistics and Cohen's d Values for the Factors of the MAC-S*

MAC-S Factor	*df*	*t*	*Sig.*	*d*
		Ability Scale		
Remote Personal Memory	89.64	-2.33	.02	0.47±.40
Numeric Recall	92.50	-1.04	.30	0.21±.39
Everyday Task-Oriented Memory	92.54	-1.39	.17	0.28±.39
Word Recall/Semantic Memory	97.89	-.95	.34	0.19±.39
Spatial/Topographic Memory	85.12	-1.92	.06	0.38±.40
		Frequency of Occurrence Scale		
Word & Fact Recall or Semantic Memory	91.59	-2.26	.03	0.45±.40
Attention/Concentration	93.06	-2.07	.04	0.41±.40
Everyday Task-Oriented Memory	85.44	-3.04	.003	0.61±.40
General forgetfulness	89.23	-1.97	.05	0.39±.40
Facial Recognition	96.83	-2.83	.01	0.57±.40

Covariate Analysis

Preliminary Analysis

The covariates were examined for accuracy of data entry, missing values, and any violations of the assumptions underlying ANCOVA. The data distributions for Education, Income, Alcohol consumption, Smoking, and Trauma violated the assumption of normality. As there are difficulties with interpretation of transformed variables (Tabachnick & Fidell, 2000), we decided that it was probably best to stick with the original distributions. All data were examined for outlying points. A few were found, but their deviations were not serious enough to warrant removing them from the data set.

Age. The mean age for the Exposed group was 65.9 years (SD = 3.1) and for the Controls 66.5 years (SD = 3.8). Even though the mean age difference was small, we decided to keep Age as a covariate, as there was some variation in the Age distributions.

Education. Table 10 shows the distribution of levels of education for both the Exposed men and their Controls. A greater proportion of Controls (12%) than Exposed men (2%) had obtained a University qualification. In contrast, more Exposed men (52%) than Controls (36%) had had less than 3 years of High School education. These education level differences had to be controlled for.

The education data were categorically scaled rather than continuously scaled, as were the other covariates. Therefore, we recoded the 5 levels of education shown in Table 10 into 3 categories: no High School qualifications, High School qualifications, and post-High School qualifications. Education was then included in the ANCOVAs as a second independent variable (group membership being the other).

Income. Mean income for the Exposed group was $33,929, and for the Control group, $48,378, a difference of almost $15,000. Thus, Income was included as a covariate to control for this difference.

Table 10: *Educational Make-up of the Exposed and Control Groups*

Highest Education	Exposed (%)	Controls (%)
Less than 3 years at high school	52	36
From 3 to 5 years at high school	20	22
School qualifications, UE, and above	0	2
Trade certificate, Professional certificate, or diploma	26	28
University degree, diploma, or certificate	2	12

Alcohol Consumption. The mean AUDIT scores were 2.20 (*SD* = 2.39) for the Exposed group, and 2.20 (*SD* = 3.10) for the Control group. While the average drinking habits for both groups appeared to be the same, the Control group had a larger range (16) on the AUDIT than the Exposed group (10). Thus, this variable was included as a covariate.

Smoking. The mean total tobacco smoked over the lifetime was 192,596 units for the Exposed group, and 97,449 units for the Control group. Clearly, there was a large difference between the two groups in the amount of tobacco smoked, with the Exposed group having smoked almost twice as much tobacco as the Control group. This result, and the knowledge that current and ex-smokers tend to rate their physical and mental health as poorer than non-smokers (Ministry of Health, 1999), made it necessary to include smoking as a covariate.

Trauma. The mean TES scores were 1.88 for the Exposed group and 1.22 for the Controls. However, there was some concern that some of the men may have misinterpreted the first item on the TES: "Have you ever been engaged in military

combat?", and it was dropped from the analysis. The subsequent mean scores were 1.56 for the Exposed group and .94 for the Controls. Therefore, the TES scores were included as a covariate.

Analysis of Covariance (ANCOVA)

For the SF-36 health survey, only the physical functioning and mental health subscales were employed in the ANCOVA. These two subscales have been found to "perform well as summary measures of physical and mental health" (Tobias, Ministry of Health, personal communication, 2004). As stated earlier, the items making up the 5 factors of the Ability and Frequency of Occurrence subscales were collapsed into a total score for each subscale for the ANCOVA involving the MAC-S.

For each ANCOVA, checks of the assumptions of normality, linearity, homogeneity of variances, and homogeneity of regression slopes were made (for details, see Tabachnick & Fidell, 2000). For all 5 ANCOVAs run, the homogeneity of variances assumption did not hold on 3 occasions. However, the impact of this on the analyses appeared to be minimal. No other assumptions were violated.

GDS

A 2-way, between-groups ANCOVA with the GDS scores as the dependent variable and Group and Education as the independent variables was run. Age, Income, Alcohol consumption, Smoking, and Trauma were the covariates. Table 11 shows the means and SEs[14] for the Exposed and Control groups for the unadjusted scores and the scores adjusted for the effects of the covariates. The unadjusted mean difference is 3.02, the adjusted difference 2.52, a difference that remained highly statistically significant, $F(1,89) = 16.99$, $p < .001$, partial $\eta^2 = .16$[15]. There was no main effect for Education and no interaction effect between Group and Education[16]. Of the covariates, Trauma explained 9% of the variance in GDS scores and was by far the biggest contributor to the adjusted scores. None of the remaining covariates accounted for more than 1.5% of the variance in the GDS scores.

[14] SE = Standard Error = $SD/\sqrt{N}$
[15] Partial η^2 is a measure of the variance explained by the variable in question.
[16] This outcome for Education and the Group by Education interaction held for all 5 ANCOVAs.

Table 11: *Unadjusted and Adjusted Means (M) and Standard Errors (SE) for the GDS*

Result Type	Group			
	Exposed		Control	
	M	*SE*	*M*	*SE*
Unadjusted (N=100)	3.92	0.49	0.90	0.14
Adjusted (N=100)	3.59	0.42	1.07	0.40

SF-36

The ANCOVAs for the SF-36 were identical to that run for the GDS except that the Physical Functioning and Mental Health subscales were the dependent variables.

Physical Functioning Subscale. That the covariates had some impact on Physical Functioning can be seen in the unadjusted and adjusted scores in Table 12.

Table 12: *Unadjusted and Adjusted Results for the Physical Functioning Subscale of the SF-36*

Result Type	Group			
	Exposed		Control	
	M	*SE*	*M*	*SE*
Unadjusted (N=100)	71.00	3.18	85.90	2.24
Adjusted (N=100)	74.87	3.15	82.91	3.00

The difference between the means of the Exposed and Control groups dropped from 14.90 to 8.04 when the effects of the covariates were removed. This adjusted mean difference did not quite reach significance, $F(1,89) = 3.02$, $p = .09$, partial $\eta^2 = .03$.

Smoking had the biggest effect, accounting for 4.2% of the variance in the Physical Functioning scores, while Trauma accounted for 2.7% of the variance. Each of the other covariates accounted for 2% or less of the variance.

Mental Health Subscale. The unadjusted and adjusted mean scores for the Mental Health subscale of the SF-36 are given in Table 13.

Table 13: *Unadjusted and Adjusted Results for the Mental Health Subscale of the SF-36*

Result Type	Group			
	Exposed		Control	
	M	*SE*	*M*	*SE*
Unadjusted (N=100)	77.84	2.98	90.24	1.48
Adjusted (N=100)	80.04	2.61	87.89	2.48

The difference between the means for the two Groups is 12.40 for the unadjusted scores but only 7.85 for the adjusted scores, a drop of 37%. However, this adjusted difference remained statistically significant, $F(1,89) = 4.21$, $p = .04$, partial $\eta^2 = .05$. The Trauma covariate had a sizeable impact on the Mental Health scores, accounting for 12% of the variance. The other covariates each accounted for less than 3% of the variance in the Mental Health scores.

In summary, the Exposed group produced lower Physical Functioning and Mental Health scores on the SF-36. It is worth noting that the Trauma covariate had a significant impact on the Mental Health scores.

MAC-S

Two ANCOVAs were conducted for the MAC-S, one on the Ability Scale, the other on the Frequency of Occurrence scale. Except for the change in dependent variable, these analyses were identical to those reported above.

Ability Scale. Table 14 presents the unadjusted and adjusted means for the MAC-S Ability subscale. The Exposed group produced a slightly lower mean score than the Controls, but this difference was not statistically significant, and remained so after adjusting for the covariates, $F(1,89) = 0.63$, $p = .43$, partial $\eta^2 = .01$. The small change between the unadjusted and adjusted means shows that the covariates had little or no effect, Trauma having the biggest effect but accounting for just 1.8% of the variance in the Ability subscale scores.

Table 14: *Unadjusted and Adjusted Results for the MAC-S Ability Scale*

Result Type	Group			
	Exposed		Control	
	M	*SE*	*M*	*SE*
Unadjusted (N=100)	65.26	1.78	69.20	1.21
Adjusted (N=100)	66.19	1.80	68.30	1.72

Frequency of Occurrence Scale. The unadjusted and adjusted means scores for the Frequency of Occurrence subscale are given in Table 15.

Table 15: *Unadjusted and Adjusted Results for the MAC-S Frequency of Occurrence Scale*

Result Type	Group			
	Exposed		Control	
	M	*SE*	*M*	*SE*
Unadjusted (N=100)	70.52	2.02	77.38	1.40
Adjusted (N=100)	72.14	2.01	75.79	1.92

The mean difference between scores for the two groups was statistically significant for the unadjusted score, $t(87) = 2.79$, $p = .01$, but failed to reach significance when the effects of the covariates were removed, $F(1,89) = 1.52$, $p = .22$, partial $\eta^2 = .02$. Of the covariates, Smoking accounted for 3.8% of the variance, and Trauma 2%. Other covariate effects were very small.

In summary, the Exposed and Control groups differed little on the Ability and Frequency of Occurrence subscales of the MAC-S once the effects of the covariates were removed. However, it can be noted that even though some differences on the SF-36 and the MAC-S failed to reach significance, every single score on these two measures, and the GDS, were lower for the Exposed group compared to the Controls.

Long-term Health Problems

If the Exposed men were chronically stressed, then it might be expected that more of them would have long-term health problems than the Controls. Participants were asked to indicate (Yes/No) if they had received a medical diagnosis for any of the health problems listed in Table 16. The problem had to have persisted for six months or more. A statistically significant greater percentage of Exposed men, compared to Controls, reported the two health problems marked with an asterisk and in capitals (normal approximation binomial test; Walpole, 1974). However, at a descriptive level, the percentage of Exposed participants was greater than that of the Controls for 15 of the 23 illnesses.

By far the largest ratio of Exposed to Control men having a health problem occurred for Cancer (ratio = 12 : 1). That is, 12 of the 50 Exposed men reported having cancer, compared to just one Control. It is interesting to note that 9 of these 12 men reported suffering from skin cancer. One of these 9 also had prostate cancer and bladder cancer. There was one further case of prostate cancer and one each of kidney and colon cancer.

Table 16: *Percentages of Exposed and Control Participants Having One or More Chronic Health Problems for at Least Six Months*

Health Problem	Group	
	Exposed	Control
*CANCER	24	2
Diabetes	14	18
Epilepsy	2	0
High Blood Pressure	38	36
Heart Trouble	24	20
Stroke	2	2
Asthma	6	6
Other Respiratory Conditions	24	10
Stomach/Duodenal Ulcers	12	4
Liver Trouble	0	0
Bowel Disorders	16	8
Hernia	20	16
Kidney/Urinal Tract Problems	6	8
*CHRONIC SKIN CONDITIONS	40	12
Arthritis/Rheumatism	58	38
Hepatitis	6	4
Sight Impairment	66	54
Hearing Impairment	64	42
Glandular Fever	6	0
Herpes	2	4
AIDS	0	0
Meningitis	0	0
Bacterial/Viral Infections	12	4

Note: A statistically significant higher percentage of Exposed men suffered from the illnesses in capitals with an asterisk, compared to Controls.

Skin Problems (other than skin cancer) yielded the second highest ratio (3.3 : 1), followed by gastrointestinal Ulcers and Bacterial/Viral infections (each 3.0 : 1), and Respiratory conditions, other than Asthma (2.4 : 1). The Exposed men also had higher rates of Bowel problems, Arthritis/Rheumatism, and Hearing problems (Table 16). The overall pattern of these long-term health problems clearly shows that they fall disproportionately on the Exposed men.

Covariates

The earlier reported ANCOVAs indicated that some covariates, notably Smoking and Trauma, accounted for a small proportion of the variance associated with the GDS, SF-36, and MAC-S scores. It is possible that these same covariates may account for some of the differences seen between the Exposed and Control groups for the long-term health problems. The following analysis explored this possibility for the two long-term health problems that occurred at a statistically significant higher rate in the Exposed group (Cancer and Chronic skin conditions).

The dependent measure for the long-term health problems was dichotomous (Yes, I have had the illness for at least 6 months, versus No, I do not have the illness). With 6 covariates (one categorically scaled) to be considered (Age, Education, Income, Alcohol consumption, Smoking, and Trauma), the appropriate analysis was logistic regression (Tabachnick & Fidell, 2000). A separate analysis was conducted for each of the two long-term health problems.

For each of these disorders, it was first ascertained which of the covariates made a statistically significant contribution to the regression model. Then a second analysis was conducted to determine the percentage of variance each of these covariates contributed. The Nagelkerke R^2 value was used to provide an approximation of this contribution (Tabachnick & Fidell, 2000).

When all six covariates were entered, according to the Wald criterion, Smoking was the only one to reliably predict Cancer status, $z = 6.45$, $p = .01$. A model run, entering Group in Block 1, showed this variable to contribute to the prediction of Cancer status, $z = 8.72$, $p = .003$, $R^2 = .22$. Entering Smoking in Block 2 revealed

that this covariate added modestly to the predictive power of the model, $z = 4.60$, $p = .03$, R^2(Group + Smoking) = .31, about 9%.

A similar analysis conducted with Chronic skin conditions as the dependent variable showed Trauma to be the only covariate making a reliable contribution to classification, $z = 3.76$, $p = .05$. Both Group (Block 1; $z = 7.39$, $p = .01$, $R^2 = .15$), and Trauma (Block 2; $z = 4.47$, $p = .04$, R^2(Group + Trauma)) = .22, contributed to the model. Once again, the covariate made a modest contribution to the predictive power of the model (about 7%).

In summary, the differences in the two long-term health problems investigated do not appear to be due, in large part, to uncontrolled differences between the Exposed group and Controls. Only two covariates, Smoking and Trauma, had any impact.

DISCUSSION

Previous research involving individuals exposed to nuclear radiation, either by accident or by design, has shown that these individuals frequently suffer from long-term stress as a result (e.g.,Van den Bout et al.,1995; Vyner, 1983, 1988a, b). Likewise, there is every reason to believe that many of the men who witnessed nuclear bomb blasts during Operation Grapple have also suffered from long-term, or chronic, stress over a number of years. If this is the case, then the current psychological profile of these men should reflect this chronic stress in higher than normal levels of depression, poorer perceived physical and mental health, more long-term health problems, and perhaps poorer than average self-rated memory (Lazarus, 1966, 1999). The central aim of the present investigation was to investigate this hypothesis.

Our findings are quite clear. Compared to an age-matched group of normal (non-exposed) Controls, the Exposed group were markedly more depressed, self-reported physical and mental health (as assessed by the SF-36) was worse, and self-reported

memory difficulties were greater. In addition, a greater percentage of the Exposed men suffered from a range of long-term health problems, compared to Controls.

Depression

The mean GDS score for the Exposed group was considerably higher than that of the Controls, even after correcting for the effects of the covariates (about 3.5 times). This result is consistent with previous studies of people exposed to nuclear fallout. For example, Chinkina and Torubarov (1991) found that individuals with Acute Radiation Syndrome from the Chernobyl accident suffered from high levels of depression. Similarly, Havenaar et al. (1999) found residents in the direct vicinity of Chernobyl to have higher levels of psychological distress (including depression) than controls. In both cases, it was concluded that these symptoms resulted from psychological stress rather than radiation exposure. Other studies (Baum et al., 1983; Green, Lindy, & Grace, 1994) have drawn similar conclusions.

Van den Bout et al. (1995) propose that psychological stress arising from exposure is linked to illness behaviour. Sometime after exposure there is a realisation that radiation could give rise to disease. Exposed individuals then develop sensitivity to any physical sensations, labelling these as symptomatic of exposure. This results in anxiety and depressive reactions as people worry about their own health and that of their children. It is quite possible that the depression experienced by the present group of Exposed men has developed in this way.

Perceived Health

The mean scores on the 8 subscales of the SF-36 were all lower for the Exposed men compared to the Controls. The Exposed group, on average, perceived their physical and mental health to be poorer than that of the Controls. This finding is consistent with the previous research of Havenaar et al. (1999) who found perceived health to be poorer in a group exposed to Chernobyl radiation compared to a Control group (see also Remennick, 2002). Similarly, Collins and Bandeira de Carvalho (1993) found that radiation-exposed residents in Goiania, Brazil had a perceived lower level of overall health than their control counterparts. It was concluded that the

exposed individuals, suffering from uncertainty about their future health, increased fears about cancer, and diminished quality of life, were chronically stressed by their experience.

This perceived poor level of physical and mental health could easily be an outcome of the belief systems these men have developed, the foundation belief being that exposure to radiation *has* harmed their health. The resulting increase in anxiety and stress experienced over many years reinforces the belief that any unusual signs or symptoms of physical and mental illness must be due to the radiation. This, in turn, further increases anxiety and depression levels. Under such circumstances, the men could be expected to be hypersensitive to changes in their physical and mental well-being.

Memory

Mean scores for the remote personal memory factor of the Ability Scale and all 5 factors of the Frequency of Occurrence Scale of the MAC-S were statistically significantly lower for the Exposed group versus Controls. For the remaining 4 factors that did not reach statistical significance, there were small effects sizes, all consistently showing poorer memory for the Exposed men. Previous research has shown poorer cognitive functioning for people exposed to radiation compared to matched controls. For example, Chinkina and Torubarov (1992) found people suffering from Acute Radiation Syndrome to have reduced cognitive functioning. Baum et al. (1983) found similar results for residents of Three Mile Island who were exposed to radiation leakage.

The probable chronic stress suffered by many of the NZ test veterans over the past 20 or so years may well have contributed to these perceived memory problems. The hippocampus, a brain structure involved in memory functioning, is sensitive to the level of circulating cortisol (McEwen, 1995). Chronic stress is accompanied by elevated cortisol levels, resulting in increased binding at cortisol receptor sites in the hippocampus. Over time, high cortisol levels can damage the hippocampus, causing a loss of neurons and probably contributing to depression as well as memory difficulties (McEwen, 1995; Sapolsky, 1996, 2003, 2004; Sheline, Wang, Gado,

Csernansky, & Vannier, 1996). Thus, a small decline in memory functioning is entirely consistent with the hypothesis that, in general, the Exposed men in the present study were suffering from chronic stress when tested.

Long-term Health Problems

The Exposed group had a significantly higher percentage of men suffering from two long-term health problems, cancer and chronic skin conditions. However, the ratio of Exposed men with a long-term health problem, relative to Controls, was at least 2 : 1 for respiratory conditions, gastrointestinal ulcers, bowel disorders, and bacterial/viral infections. A larger sample size would have produced statistically significant differences between the two groups for this subset of disorders, as well as for cancer and chronic skin conditions. In other words, because only a relatively small number of men had these illnesses, our study was somewhat lacking in statistical power to assess these percentage differences.

The overall pattern of percentage differences between the two groups for these long-term health problems shows that the Exposed group are disproportionately affected. However, caution is required in the interpretation of this result. For example, 12 Exposed men, but only one Control, reported having cancer, but 8 of these 12 had skin cancer only. It is possible that this extraordinarily high rate arises from excess exposure to the sun while the Exposed men were at sea. The higher rate of long-term smoking among the Exposed men may be another factor contributing to the greater percentage of long-term health problems.

Nonetheless, it is well known that chronic stress can increase the likelihood of ill health (Akil & Morano, 1996). Chronic stress impairs immune functioning (Maier & Watkins, 1998), making it more difficult to ward off diseases such as stomach ulcers, bowel disorders, respiratory conditions, and the like. The higher level of long-term health issues in the Exposed men is consistent with the other data we have presented (e.g., higher levels of depression) in showing the Exposed group to have elevated levels of stress compared to their Control counterparts.

In summary, the higher level of depression, the poorer physical and mental health, the poorer memory, and the greater number of long-term health problems in the Exposed men, compared to the Controls, are the outcomes one would expect from people under chronic stress. The Introductory section of this report goes into some detail in explaining why people exposed to nuclear radiation might be expected to be suffering (or to have been suffering) from chronic stress. In the case of the NZ nuclear test veterans, it is in the last 20 or so years that there has developed an understanding that exposure to the bomb blasts in Operation Grapple could have been dangerous.

Vyner (1988b) presents a theory of the stress response that develops in the face of invisible contaminant exposure, such as the NZ nuclear test veterans experienced. Concerns about the exposure can arise either because the individual has developed an illness over the post-exposure years, or simply because the individual was exposed. Solid information is difficult to find, and the uncertainty leads the individual to become overly vigilant in respect to his health. Worse still, with little or no information about the individual's own exposure, he may turn to whatever information is available; for example, the radiation damage done to humans in the bomb blasts in Hiroshima and Nagasaki. Thus begins the formation of a belief system that may be somewhat distorted by the lack of useful and appropriate information. Furthermore, there develops a sense of powerlessness in the face of this invisible threat.

Vyner (1988b) describes his nuclear test veteran participants as having developed RRS (Radiation Response Syndrome). This syndrome phase develops once the veterans become aware of the dangers of exposure. In particular, individuals develop two things: first, a preoccupation with the effects of nuclear radiation on their health, and second, a belief system about this radiation. The latter is based on the (self-diagnostic) belief that the veterans "have developed and are developing illnesses caused by radiation" (Vyner, 1988b, p. 128). A number of themes can emerge from this belief system; for instance, that the veteran is slowly dying from radiation poisoning. Other themes may be that the health of children is at risk, that exposed veterans were used as guinea pigs, and that others think they are crazy. Because doctors cannot find any related illness, the veterans often develop disrespect for the medical profession. Preoccupation with the effects of exposure on

can suppress the immune system leaving the individual open to diseases and infections. Second, chronic stress has been shown to bring about changes in a brain structure called the hippocampus. Such hippocampal changes can negatively affect memory, and in the longer term might contribute to depression. In other words, it is undesirable to leave a person suffering from chronic stress without any support.

A major difficulty for the NZ nuclear test veterans and the NZ government alike is that the effects of nuclear exposure are far from obvious. There are no tests that can give a clear, definitive answer as to the effects of the exposure. This inherent ambiguity, highlighted in this present study, is most unfortunate, for it is a double-edged sword. The Exposed men not only suffer distress from the fear of what exposure to nuclear radiation might do to them and their children, but also from the frustration, anger, and bitterness associated with the strong perception of having been "forgotten". However, there can be little doubt that the psychological profile of these nuclear test veterans is far from normal. To leave these men with the kind of perceptions they have of their general physical and mental well-being would be highly unsatisfactory.

It is our strong recommendation that:

1) these veterans are offered assistance to help them cope with the chronic stress that some of them are experiencing. As long as the situation they find themselves in remains unresolved, stress levels are likely to remain high. There exist a number of useful techniques that could be taught to these men to help them cope with stress. Of course, this recommendation is *not* to be taken as a solution to the problem of compensation. However, while the debate continues, it would be in the men's best interests to minimise their stress levels.

2) given the clear evidence that at least some of the Exposed men are living with a compromised quality of life (in comparison to Controls and NZ men of similar age), there is an urgent need to formulate appropriate strategies that address these health inequalities.

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APPENDICES

APPENDIX 1

NZNTVA Research Questionnaire

NEW ZEALAND NUCLEAR TEST VETERANS ASSOCIATION

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NZNTVA Research Questionnaire.

FULL
NAME.....

ADDRESS.....

.....Telephone .....

SERVICE NUMBER..... SHIP SERVED.....

AGE.....

Please answer YES or NO or comment where appropriate.

Indicate that you are willing to participate in the research?.....

Are you able to travel to a collection point, ie RSA, naval hospital, local clinic etc, to give blood and be interviewed? .....

Have you served (including in other armed services, or in a civilian capacity), in any nuclear related area other than Operation Grapple?.....

Have you served aboard HMNZS Otago, HMNZS Canterbury, HMNZS Endeavour, HMNZS Tui, HMNZS Lachlan in the French testing at Mururoa?
(If so, state).....

Have you served in the Occupation Force of Japan (Jay-Force)?.....

Have you served on any ship stationed in Japan in relation to the Occupation forces?
(If so, state ship(s)) .....

Have you served in Vietnam?.....

Have you worked in any industry involving radiation or chemicals. I.e. radiation, X-ray departments, Timber treatment, Top dressing/crop spraying, toxin processing, toxin chemical retrieval or dumping etc?.

(State).....

.....

Have you served or worked in any other area where you consider that it may have adversely affected your health?.

(State).....

.....

Have you received radiation treatment for cancer or any other condition?.....

.....

Is there any other information regarding your health that you consider may be relevant to the forthcoming research?.

State briefly.....

.....

.....

.....

.....

.....

.....

Do you understand that by returning this form, that it is not the official research study questionnaire. That you are not formally bound to take part in the study, and that by returning this form, it does not positively mean that you will be selected to be a participant in the test group and the associated research? Answer "Yes" or "No if you agree to this.....

Signature.....

Date.....

N.Z. N.T.V.A.

APPENDIX 2

The Modified Mini-Mental State Examination (3MS)

Geriatric Depression Scale (GDS) – Short Form

The Memory Assessment Clinics Self-Rating Scale (MAC-S) – Global items

SF-36 Health Survey

Traumatic Events Scale

I/Date: _____ Time: _____ Region: _____ 1 5

6 11 12 15 Interviewer: _____ 16 Blood @ int. 17

New Zealand Nuclear Test Veterans' Pilot Study
Face to Face Interview: Self Report Questions

PART 1

These questions are about how you feel, and how things have been with you OVER THE PAST WEEK. For each question, please tick the circle ✓ for the answer that comes closest to the way you have been feeling. Please do not skip any questions.

	Please tick ONLY ONE circle on each line.	Yes	No	Office Use Only
1	Are you basically satisfied with your life?	○	○	18
2	Have you dropped any of your activities and interests?	○	○	
3	Do you feel that your life is empty?	○	○	
4	Do you often get bored?	○	○	
5	Are you in good spirits most of the time?	○	○	
6	Are you afraid that something bad is going to happen to you?	○	○	
7	Do you feel happy most of the time?	○	○	
8	Do you often feel helpless?	○	○	
9	Do you prefer to stay at home rather than going out and doing things?	○	○	26

These next questions are about how you feel, and how things have been with you OVER THE PAST WEEK. For each question, please tick the circle ✓ for the answer that comes closest to the way you have been feeling. Please do not skip any questions.

	Please tick ONLY ONE circle on each line.	Yes	No
10	Do you feel you have more problems with memory than most?	○	○
11	Do you think it is wonderful to be alive?	○	○
12	Do you feel pretty worthless the way you are now?	○	○
13	Do you feel full of energy?	○	○
14	Do you feel that your situation is hopeless?	○	○
15	Do you think that most people are better off than you are?	○	○

Office Use Only

27

32

Please check to make sure that you have answered ALL 15 questions in this section, before you turn the page. The next section focuses on stressful events that you may have experienced in your life

Self Report of Traumatic Experiences

These questions are about stressful events which may or may not have happened in your life. Please tick the circle (✓) in the 'Yes' or the 'No' columns that best indicates your response to each question.

	(Please tick <u>one</u> circle on <u>each</u> line.)	Yes	No	Office Use Only
1	Have you ever been engaged in military combat?	○	○	33
2	During your childhood, did anyone ever make you have sex by using force or threatening to harm you? (This involves all unwanted sexual activity.)	○	○	
3	Has anyone ever made you, as an adult, have sex by using force or threatening to harm you? (This involves all unwanted sexual activity, but **not** as a child.)	○	○	
4	Have you ever been seriously beaten or attacked by a member of your family? (such as your spouse, partner, parent, child)	○	○	
5	Have you ever been seriously beaten or attacked by someone who was **not** a member of your family?	○	○	
6	Has anyone ever taken or tried to take something from you by force, or threat of force, such as in a robbery, mugging, or hold-up?	○	○	38

Please tick the circle ✓ in the 'Yes' or the 'No' columns that best indicates your response to each question.

	(Please tick one circle on each line.)	Yes	No
7	Have you ever been in a serious motor vehicle accident in which one or more people were seriously injured or killed?	○	○
8	Have you ever been seriously injured in an accident other than a vehicle accident, such as at work?	○	○
9	Have you ever suffered serious injury and/or property damage because of a natural or manmade disaster such as a fire, flood, or earthquake?	○	○
10	Have you ever been forced to leave your home or take other precautions because of an approaching disaster such as flood, earthquake, or cyclone?	○	○
11	Have you ever experienced the violent or very unexpected death of a loved one, such as through an accident, homicide, or suicide?	○	○
12	Has anyone very close to you (a loved one) ever experienced violent assault, serious accident or serious injury?	○	○
13	Have you ever had any other experience which you feel was shocking, terrifying or otherwise traumatic, including any event which you find too difficult to name or to talk about?	○	○

Office Use Only

39

45

Please check that you have answered ALL 13 questions in this section, before telling the interviewer that you are ready to continue.

I/Date: Place: Interviewer:

New Zealand Nuclear Test Veterans' Pilot Study
Face to Face Interview: SF36 Questionnaire

PART 2

Questions in this part focus on your general health, how you feel, and how well you are able to do your usual activities. For each question please select the answer that best applies to you. If you are unsure about how to answer any question, please give the best answer you can. You should avoid selecting more than one response per question unless you're specifically asked to do so.

1 **In general, would you say your health is:**

(Please tick ONE CIRCLE.)

○ 1	○ 2	○ 3	○ 4	○ 5
excellent	very good	good	fair	poor

2 **Compared to one year ago, how would you rate your health in general now?**

(Please tick ONE CIRCLE.)

○ 1	○ 2	○ 3	○ 4	○ 5
much better now than one year ago	somewhat better now than one year ago	about the same	somewhat worse now than one year ago	much worse now than one year ago

Office Use Only

6

7

3 The following questions are about activities you might do during a typical day. Does <u>your health now limit you</u> in these activities? If so, how much?

Office Use Only

	(Please tick <u>ONE CIRCLE</u> on <u>each</u> line.)	Yes, limited a lot	Yes, limited a little	No, not limited at all	
a	<u>**Vigorous activities**</u>, such as running, lifting heavy objects, participating in strenuous sports	○	○	○	8
b	<u>**Moderate activities**</u>, such as moving a table, pushing a vacuum cleaner, bowling or playing golf	○	○	○	
c	Lifting or carrying groceries	○	○	○	
d	Climbing <u>**several**</u> flights of stairs	○	○	○	
e	Climbing <u>**one**</u> flight of stairs	○	○	○	
f	Bending, kneeling or stooping	○	○	○	
g	Walking <u>**more than one kilometre**</u>	○	○	○	
h	Walking <u>**half a kilometre**</u>	○	○	○	
i	Walking <u>**100 metres**</u>	○	○	○	
j	Bathing or dressing yourself	○	○	○	17

Office Use Only

4 During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities, as a result of your physical health? Answer Yes or No to each question.

	(Please tick ONE CIRCLE on each line.)	Yes	No	
a	Cutting down the **amount of time** you spent on work or other activities	○	○	18
b	**Accomplished less** than you would like	○	○	
c	Were limited in the **kind** of work or other activities	○	○	
d	Had **difficulty** performing the work or other activities (e.g. it took extra effort)	○	○	21

5 During the past 4 weeks, have you had any of the following problems with your work or other regular daily activities, as a result of any emotional problems (such as feeling depressed or anxious)? Answer Yes or No to each question.

	(Please tick ONE CIRCLE on each line.)	Yes	No	
a	Cutting down the **amount of time** you spent on work or other activities	○	○	22
b	**Accomplished less** than you would like	○	○	
c	Didn't do work or other activities as **carefully** as usual	○	○	

6 During the past 4 weeks, to what extent has your physical health or emotional problems interfered with your normal social activities with family, friends, neighbours, or groups?

(Please tick ONE CIRCLE.)

○ 1	○ 2	○ 3	○ 4	○ 5	25
not at all	slightly	moderately	quite a bit	extremely	

Office Use Only

7 How much bodily pain have you had during the past 4 weeks?

(Please tick ONE CIRCLE.)

○ 1	○ 2	○ 3	○ 4	○ 5	○ 6
none	very mild	mild	moderate	severe	very severe

26

8 During the past 4 weeks, how much did pain interfere with your normal work (including both work outside the home and housework)?

(Please tick ONE CIRCLE.)

○ 1	○ 2	○ 3	○ 4	○ 5
not at all	a little bit	moderately	quite a bit	extremely

9 These questions are about how you feel and how things have been with you during the past 4 weeks. For each question, please select the response that comes closest to the way you have been feeling.

(Please tick ONE CIRCLE on each line.)

	How much of the time during the past 4 weeks....	All of the time	Most of the time	A good bit of the time	Some of the time	A little bit of the time	None of the time
a	Did you feel full of life?	○	○	○	○	○	○
b	Have you been a very nervous person?	○	○	○	○	○	○
c	Have you felt so down in the dumps that nothing could cheer you up?	○	○	○	○	○	○
d	Have you felt calm and peaceful?	○	○	○	○	○	○

31

Office Use Only

9 contd. These questions are about how you feel and how things have been with you <u>during the past 4 weeks</u>. For each question, please select the response that comes closest to the way you have been feeling.

(Please tick <u>ONE CIRCLE</u> on <u>each</u> line.)

	How much of the time during the past 4 weeks....	All of the time	Most of the time	A good bit of the time	Some of the time	A little bit of the time	None of the time
e	Did you have a lot of energy?	○	○	○	○	○	○
f	Have you felt down?	○	○	○	○	○	○
g	Did you feel worn out?	○	○	○	○	○	○
h	Have you been a happy person?	○	○	○	○	○	○
i	Did you feel tired?	○	○	○	○	○	○

32

10 During the <u>past 4 weeks</u>, how much of the time has your <u>physical health or emotional problems</u> interfered with your social activities (like visiting with friends, relatives, etc.)?

(Please tick <u>ONE CIRCLE</u>.)

○ 1	○ 2	○ 3	○ 4	○ 5
all of the time	most of the time	some of the time	a little of the time	none of the time

37

11 How TRUE or FALSE is <u>each</u> of the following statements for you? *(Please tick <u>ONE CIRCLE</u> on <u>each</u> line.)*

Office Use Only

a **I seem to get sick a little easier than other people.** 38

○ 1	○ 2	○ 3	○ 4	○ 5
definitely true	mostly true	don't know	mostly false	definitely false

b **I am as healthy as anybody I know.**

○ 1	○ 2	○ 3	○ 4	○ 5
definitely true	mostly true	don't know	mostly false	definitely false

c **I expect my health to get worse.**

○ 1	○ 2	○ 3	○ 4	○ 5
definitely true	mostly true	don't know	mostly false	definitely false

d **My health is excellent.** 41

○ 1	○ 2	○ 3	○ 4	○ 5
definitely true	mostly true	don't know	mostly false	definitely false

That completes the part related to your general health. Now the questions will focus on your memory.

NZNTV Pilot Study Face to Face Interview: Global Memory Questions

PART 3

This part of the interview has statements that focus on your memory in everyday life. Four statements will ask you to rate your memory, by selecting the most appropriate response from a list of words in a response key.

(Give the participant a response key to look at.)

1 very poor	2 poor	3 fair	4 good	5 very good

Response:

1 In general, as compared to the average individual your age, how would you describe your memory? ☐ 42

1 much worse	2 worse	3 the same	4 better	5 much better

Response:

2 How would you describe your memory, on the whole, as compared to the best it has ever been? ☐ 43

1 much slower	2 slower	3 the same	4 faster	5 much faster

Response:

3 Compared to the best your memory has ever been, how would you describe **the speed** with which you now remember things? ☐ 44

1 very serious concern	2 serious concern	3 some concern	4 rare concern	5 no concern

Response:

4 How much concern or distress do you feel about your memory at this time? ☐ 45

Office Use Only

NZNTV Pilot Study Face to Face Interview: 3MS[1]

Before starting the 3MS, please record the day of the week, date & the place where you are conducting this interview, below.

week day	date	month	place

Ask: **"Which hand do you use for everyday tasks?"** *(Please tick ONE of the three below.)*

Mostly or exclusively your **RIGHT HAND**	Mostly or exclusively your **LEFT HAND**	Sometimes your **RIGHT & sometimes your LEFT HAND**

Office Use Only

1a **"What is your date of birth?"**
(Prompt for date, month, year)

date:		*Correct = 1*
month:		*Correct = 1*
year:		*Correct = 1*

1
2
3

1b **"Where were you born?"**
(Prompt for town & country)

town:		*Correct = 1*
country:		*Correct = 1*

5

2 **"I shall say three words for you to remember. Please repeat them after I have said ALL THREE words: SOCK BLUE CHARITY"**

***AFTER** the repetition say:*
"Try to remember those words as I will ask for them later."
(Tick the box next to each word if the word is repeated correctly the first time, otherwise record a cross.)

SOCK:		*First time = [1]*
BLUE:		*First time = [1]*
CHARITY:		*First time = [1]*

8

3a **Introduce the task of mental reversal by asking the participant to: "Please count backwards from 5 to 1."** *(Tick the appropriate box below.)*

5-4-3-2-1		*Accurate = [2]*
5-4-3-2-1		*1 or 2 errors/misses = [1]*
5-4-3-2-1		*Unable to do task [0]*

9

[1]Teng & Chui, 1987

3b "Now please spell WORLD backwards."

(Write letters in blocks provided below. Prompt participant to try again if unsure.)

NOTE FOR SCORING & CODING PURPOSES:

Each consecutive letter in its correct place (as per the correct answer below), is scored as correct & assigned a [1] - in a separate coding box.

D	L	R	O	W	*(Correct answer)*
					1st attempt
					2nd attempt
					3rd attempt
					4th attempt

Office Use Only

D 10
L
R
O
W
15

---

4 "What are the three words that I asked you to remember?"

(Please note the order in which the words are spontaneously remembered, by placing a number next to each word, as it is recalled & tick the appropriate score, below.)

	Order:		Score:
SOCK:		*Spontaneous recall?*	*[3]*
		Prompted: "Something to wear"	*[2]*
		Prompted: "Shoe, shirt or sock?"	*[1]*
BLUE:		*Spontaneous recall?*	*[3]*
		Prompted: "A colour"	*[2]*
		Prompted: "Blue, black or brown?"	*[1]*
CHARITY:		*Spontaneous recall?*	*[3]*
		Prompted: "A good personal quality"	*[2]*
		Prompted "Honesty, charity or modesty?"	*[1]*

Order: 16
Order: 18
Order: 20

---

5 "What is today's date?"

(Prompt for day of week, date, month, year, season)

(Record the response in the box provided & circle the appropriate score, if time.)

day of week:		*Accurate = 1*
date:		*Accurate = 3; 1-2 days out = 2; 3-5 days out = 1*
month:		*Accurate = 2 (5 days leeway); 1 month out = 1*
year:		*Accurate = 8 1 yr out = 4; 2 yrs out = 2; 3-5 yrs out = 1*
season:		*Accurate = 1 (1 month leeway)*

22

26

Office Use Only

6a "Where do you live?"

(Prompt for town/city, district/region, country)

Supply the following examples for district/region:

"For example Dunedin is in Otago & Christchurch is in Canterbury."

(Record each response in the box provided, below)

town/city:		*Correct = 1*
district/region:		*Correct = 2*
country		*Correct = 1*

27

6b "Are we at present at home, in an office building, or in hospital?"

(Record the response in the box provided, below.)

(If the correct response is NOT one of these three, substitute it for the second choice, office building [1].)

place:		*Correct = 1*

30

7 **Point to each body part listed below, and ask the subject to name it.**
Do NOT wait for the participant to mentally search for the name.

(Tick the appropriate box below if correct, otherwise record a cross.)

forehead:		*Accurate = 1; 0 = incorrect / cannot supply name readily*
chin:		*Accurate = 1; 0 = incorrect / cannot supply name readily*
shoulder:		*Accurate = 1; 0 = incorrect / cannot supply name readily*
elbow:		*Accurate = 1; 0 = incorrect / cannot supply name readily*
knuckle/s:		*Accurate = 1; 0 = incorrect / cannot supply name readily*

31

35

8 "What animals have four legs?"

Allow 30 seconds for the responses. If the participant gives no response in 10 seconds, repeat the question <u>once</u>.

The first time an incorrect answer is provided say:

"I want four-legged animals."

Do <u>not</u> correct for any subsequent errors. ONLY record correct responses

(Write ALL the responses below. Score for the number of correct responses, up to 10.)

1	6
2	7
3	8
4	9
5	10

37

39

Time

The following item (Similarities) samples abstraction or conceptual thinking. DO NOT COACH the participant in any of these items.

Office Use Only

9a "In what way are an arm and a leg alike?"

(Tick the appropriate box, below. Record less correct answer in space provided.)

Body parts / Limbs	☐	*Accurate = 2*
		Less correct answer = 1

40

9b "In what way are laughing and crying alike?"

(Tick the appropriate box, below. Record less correct answer in space provided.)

Feelings / Emotions	☐	*Accurate = 2*
		Less correct answer = 1

41

9c "In what way are eating and sleeping alike?"

(Tick the appropriate box, below. Record less correct answer in space provided.)

Essential for life / Bodily functions	☐	*Accurate = 2*
		Less correct answer = 1

42

In the following item (Repetition) pronounce the individual words clearly, but with the normal tempo of a spoken sentence (i.e. without artificial slowing or pausing after each word.)

10a "Now repeat: I would like to go home/out."

Use "home" in the sentence if the subject is not at home; otherwise, use "out."

(Tick each box above each word that is correctly repeated; otherwise record a cross.)

☐ I	☐ would	☐ like	☐ to	☐ go	☐ home/out

(Score all correct = 2; 1-2 errors = 1)

43

10b "Now repeat: No ifs, ands or buts."

(Tick each box above the phrase / word that is correctly repeated; otherwise record a cross. Underline any "S" that is missed at the end of a word.)

☐ No ifs	☐ ands	☐ or buts

(Assign 1 point for each of the 3 groupings above. Give no credit if the subject misses the "S". Score all correct = 3; 1-2 errors = 1)

45

47

49

11 *Hold up the piece of paper on which the command "CLOSE YOUR EYES" is printed and say:*

"Please do this."

If the participant does <u>not</u> close their eyes <u>within 5 seconds</u>, prompt them by pointing to the sentence and saying:

"Read and do what this says."

Allow 5 seconds for the response.

(Tick the appropriate box below, that reflects the participant's response.)

Complies, no prompting	☐	*Assign 3 points*
Complies, with prompting	☐	*Assign 2 points*
Reads aloud only	☐	*Assign 1 point*

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☐ 50

12 **Ask the participant to write the sentence:**

"I would like to go home / out."

Repeat the sentence, word by word if necessary, but allow a maximum of 1 minute after the first reading of the sentence for the response.

Assign 1 point for each correct word, but give no credit for "I." (all correct. = 5) Each word must be completely correct to earn 1 point. Do not penalise self-corrected errors. If the writing is ambiguous, judge whether or not the word can be readily recognised in isolation.

☐☐ 52

☐ 55

13 **Ask the participant to copy the diagram.**

Allow 1 minute for copying.

Assign points as follows (Max. = 10):

<u>Each pentagon:</u>

5 sided enclosure - only 1 imperfect closure permitted) = 4 ☐

Longest side > 2:1 times shorter = 3 ☐

<u>Not</u> 5 sided enclosed figure = 2 ☐

2/> line segments, not enclosed = 1 ☐

<u>Intersection:</u>

4 cornered intersection = 2 ☐

Other than 4 cornered intersection = 1 ☐

<u>Each pentagon:</u>

5 sided enclosure - only 1 imperfect closure permitted) = 4 ☐

Longest side > 2:1 times shorter = 3 ☐

<u>Not</u> 5 sided enclosed figure = 2 ☐

2/> line segments, not enclosed = 1 ☐

☐☐ 57

☐ 58

14 *NOTE: Ensure you remember whether the participant is RIGHT or LEFT handed, as the following instruction should refer to their NON-DOMINANT hand.*

Hold up a piece of white paper in plain view of the participant, but out of their reach, and say:

"Take this paper with your LEFT HAND (for a right handed person) / RIGHT HAND (for a left-handed person), fold it in half, and hand it back to me."

- *After saying the whole command, hold the paper within reach of the subject.*
- *Do NOT REPEAT any part of the command.*
- *DO NOT GIVE VISUAL CUES for the participant to return the paper, such as keeping a hand in a ready-to-receive posture.*

Step 1:	
Step 2:	
Step 3:	

Office Use Only

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62

15 **"What are the three words that I asked you to remember?"**

(Please note the order in which the words are spontaneously remembered, by placing a number next to each word, as it is recalled & tick the appropriate score, below.)

	Order:		Score:
SOCK:		*Spontaneous recall?*	*[3]*
		Prompted: "Something to wear"	*[2]*
		Prompted: "Shoe, shirt or sock?"	*[1]*
BLUE:		*Spontaneous recall?*	*[3]*
		Prompted: "A colour"	*[2]*
		Prompted: "Blue, black or brown?"	*[1]*
CHARITY:		*Spontaneous recall?*	*[3]*
		Prompted: "A good personal quality"	*[2]*
		Prompted "Honesty, charity or modesty?"	*[1]*

Order: 63

Order: 65

Order: 67

68

12 Write a sentence:

13 Copy this design:

NZNTV Pilot Study Face to Face Interview: Final Questions

PART 4

This final part has some general questions that will be helpful to us when we describe the characteristics of all those folk who have participated in this research study. The first questions relate to income.

(Provide an explanation regarding the link between health outcomes and income if the participant queries the necessity for collecting this data.)

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1 What would be the total income that YOU ALONE received in the past 12 months, from all sources, including benefits, before tax or anything was taken out of it?

$ _____ (approximately)

2 What would be the total income that EVERY OTHER MEMBER of your household received in the past 12 months, from all sources, including benefits, before tax or anything was taken out of it?

$ _____ (approximately)

The next series of questions clarify details related to ex-smokers' tobacco consumption. Check that the participant <u>DOESN'T CURRENTLY SMOKE</u> tobacco products, but <u>HAS DONE SO IN THE PAST</u> ....

(i.e responded 'No' to Q12 & 'Yes' to Q13 on p. 37 in the MOS)

3 When you were smoking did you EVER smoke one or more tobacco cigarettes a day?

○ Yes ○ No

(please continue) *(please go to Q6 below)*

4a Can you tell me the MONTH & YEAR you FIRST started smoking one or more cigarettes a day?

month year

4b About how many years did you smoke one or more cigarettes per day?

_____ *years*

4c Did you ALWAYS smoke one or more cigarettes per day from the date you specified above, right up until the date you quit?

○ Yes ○ No

5 When you were smoking, about how many cigarettes did you smoke in an average day?

○ 1 to 10 a day?	○ 11 to 20 a day?	○ 21 to 30 a day?	○ 31 or more a day?

6 Did you EVER smoke cigars?

○ Yes ○ No

(please continue) *(please go to Q9 on page 16)*

7a Can you tell me the MONTH & YEAR you FIRST started smoking cigars?

month year

7b About how many years did you smoke cigars?

(please specify) _____ *years*

7c Have you ALWAYS smoked cigars from the date you specified above, right up until the date you quit?

○ Yes ○ No

Office Use Only

13 15 21 22 24 25 26 28 34 35 37

8 When you were smoking how often did you smoke cigars?

○ only occasionally	○ 1 cigar in an average day?	○ 2 to 3 cigars in an average day?	○ 4 or more cigars in an average day?

9 Did you <u>EVER</u> smoke a pipe?

○ Yes *(please continue)*

○ No *(please go to the final instructions below)*

10a *Please specify below the <u>MONTH & YEAR</u> you <u>FIRST</u> started smoking <u>a pipe</u>.*

month year

10b About how many years did you <u>smoke a pipe?</u>

(please specify) _____ *years*

10c Have you ALWAYS smoked a pipe from the date you specified above, right up until the date you quit?

○ Yes ○ No

11 When you were smoking how often did you smoke a pipe?

○ only occasionally	○ 1 pipe full in an average day?	○ 2 to 3 pipes full in an average day?	○ 4 or more pipes full in an average day?

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39

41

47

48

49

Thank you for your time!

The interviewer will now clarify any incomplete responses in your postal survey, before making arrangements for taking a blood sample.

APPENDIX 3

The Mail Out Survey (MOS)

The Memory Assessments Clinic Self-Rating Scale (MAC-S)
(Ability and Frequency of Occurrence items)

Long-term Health Problems

Alcohol Use Disorders Identification Test
(Only 7 of the original 10 items used)

New Zealand Nuclear Test Veterans Postal Survey: A Pilot Study

A research project conducted on behalf of the New Zealand Nuclear Test Veterans Association by independent researchers from Massey University

Please read the following instructions carefully:

- All the information you give us is in confidence and will be used only for the purposes of this study.
- Please attempt every question and be careful not to skip any pages.
- There are no right or wrong answers; we want the response which is best for you.
- It is important that you give your own answers to the questions. Please do not discuss your answers with others.
- Do not linger too long over each question; usually your first response is best.
- The survey is comprehensive and appears long; however, we have used a large print size to make the text easier to read.
- We suggest that you plan to answer the questions over a few sittings. You will find a bookmark inside the front cover, to help you mark your place, as you progress through the survey. Each of the six parts of the survey is also printed in a different colour, to help you monitor your progress.

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

School of Psychology
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Palmerston North,
New Zealand
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Facsimile: 64 6 350 5673

NEW ZEALAND NUCLEAR TEST VETERANS: A PILOT STUDY

CONSENT FORM

I have read the Information Sheet and have had the details of the study explained to me in written form. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I understand that I have the right to withdraw from the study at any time, and to decline to answer any particular questions.

I agree to provide a sample of blood for chromosomal analysis on the understanding that I have access to my results, and that I be advised if any abnormalities are found. I understand that my blood sample will not be used for any other research, and will be disposed of sensitively.

I agree to provide information to the researchers on the understanding that my name will not be used without my permission.

(*The information will be used for this research and publications arising from this research project.*)

I agree to participate in this study under the conditions set out in the Information Sheet.

Signed .....

Name: *(please print)* .....

Date: .....

If you would like to receive feedback from this project in the form of a brief written report please tick the appropriate box below:

YES ☐ NO ☐

(Shaded area for Office Use Only)

Mail out date: (from Massey)

Date received: (at Massey)

After you have returned this survey, you will be telephoned by a member of the research team to arrange the time and venue for a face-to-face interview.

Please enter your telephone number below:

Telephone number: STD CODE NUMBER

Interviews will take place within a month of receiving this completed postal survey. If you know that you will be away at any time during this period, or have regular commitments on specific days, please specify the dates you will be away/otherwise occupied below, in order to assist us setting up the interviewing schedule:

_____

_____

_____

_____

_____

Thank you. Please complete the consent form on the next page, which will be removed, together with this page, when your completed postal survey is returned to Massey.

There are SIX PARTS to this survey. PART 1 begins on the page following the consent form. ☞

New Zealand Nuclear Test Veterans Postal Survey

PART 1

Firstly, we would like some general background information about you. Please tick the circle ✓ next to the answer which you believe gives an accurate indication of your CURRENT situation, or write details in the spaces provided.

Office Use Only

1 **What is your date of birth?** *(Please state* **day / month / year)**

				1	9		
day		month				year	

2 **What is your gender?**

○ Male ○ Female

3 **Which ethnic group/s do you belong to?**
(You may tick more than one circle.)

○ 1 New Zealander of European descent
○ 2 New Zealander of Maori descent
○ 3 Pacific Islander
○ 4 Asian
○ 5 Other (Please specify)

_____

4 **Which of the following best describes the area where you live?**
(Please tick one circle.)

○ 1 Main Urban Area:	A city with population of 30,000 or more e.g. Palmerston North
○ 2 Secondary Urban Area:	A town / city with a population of between 10,000 & 29,999
○ 3 Minor Urban Area:	A town with a population of between 1,000 & 10,000
○ 4 Rural Centre:	A town with a population of between 300 & 1,000
○ 5 Rural Area:	Outside a town / city boundaries

Please tick the circle ✔ which you believe gives an accurate indication of your CURRENT situation, or write details in the spaces provided.

5 **Do you live . . . .** *(You may tick more than one circle.)*

- ○ 1 with your spouse / partner and no one else?
- ○ 2 with your spouse / partner and family?
- ○ 3 with relatives?
- ○ 4 alone?
- ○ 5 with other adults?
- ○ 6 in a rest home / nursing home / veterans' home?
- ○ 7 Other *(Specify in the space provided below)*

_____

6 **Are you retired?**

○ Yes *(please continue)* ○ No *(please go to Q8 below)*

7 **IF** you **ARE RETIRED** what **was** your main occupation?

_____

8 **IF** you **ARE NOT RETIRED** what **is** your main occupation?

_____

9 **What is your highest educational qualification?**
(Please tick one circle.)

- ○ 1 **Less than 3 years** at secondary school
- ○ 2 **From 3 to 5 years** at secondary school
- ○ 3 School qualifications, University Entrance and above
- ○ 4 Trade certificate or Professional certificate or diploma
- ○ 5 University degree, diploma, or certificate
- ○ 6 Other (Specify in the space provided below)

_____

Office Use Only

32 38 39 40 41 42

Please tick the circle ✓ which you believe gives an accurate indication of your CURRENT situation, or write details in the spaces provided.

10 **In which branch of the service were you employed?**
(You may tick more than one circle.)

Office Use Only

1 ◯ NZArmy

2 ◯ RNZNavy

3 ◯ RNZAirForce

4 ◯ Other *(Please specify, for example, Royal Navy)*

_____

_____

_____

11 **What is/are your service number/s?**
(Please enter details in the boxes provided, below.
*Start entering data from the **LEFT hand side** of the boxes.*
When you have entered your number leave any spare boxes blank.
***If you have MORE THAN ONE service number**, please ensure you specify **WHICH BRANCH** each number is associated with, in the space provided **BENEATH** the boxes.)*

↓ *Start here*

Service Number: | | | | | | | | |
associated with ...

(Specify branch) _____

↓ *Start here*

Service Number: | | | | | | | | |
associated with ...

(Specify branch) _____

↓ *Start here*

Service Number: | | | | | | | | |
associated with ...

(Specify branch) _____

Please tick the circle ✓ which you believe gives an accurate indication of your CURRENT situation, or write details in the spaces provided.

Office Use Only

12 **Have you ever been in a situation where you have been exposed to a nuclear blast?**

○ **Yes** *(please continue)*

○ **No** *(please go to PART 2 on page 9)*

13 **Did you serve in OPERATION GRAPPLE?**

○ **Yes** *(please continue)*

○ **No** *(please go to Q17 below)*

14 **When did you serve in OPERATION GRAPPLE?**

From: ☐☐☐☐ (month / year) **To:** ☐☐☐☐ (month / year)

15 **What ship(s) did you serve on, in OPERATION GRAPPLE?**

_____
Ship(s)

16 **In what branch did you serve during OPERATION GRAPPLE?**

_____
Branch

17 **How many blasts were you exposed to?**

_____
number of blasts

If you are NOT an Operation Grapple veteran, but have been exposed to a nuclear blast, please turn to page 8 to record your responses to the questions.

The instructions that follow apply ONLY to OPERATION GRAPPLE VETERANS:

Pages 5, 6 & 7 list NINE Operation Grapple blasts in order (by operation name, place & date). Please record your responses to the questions (such as the type of protective clothing worn; where you were at the time of the blast; how long you remained in the exclusion zone etc.) for EACH OPERATION GRAPPLE blast that you were exposed to.

Once you have completed listing details related to ALL the blasts that you were exposed to, please go to PART 2 on page 9.

Record if you were present (or not) at EACH blast listed below.

Office Use Only

1 Did you serve on GRAPPLE 1? *(Malden Island on 15 May 1957)*

○ Yes *(continue)* ○ No *(go to Q2 below)*

[1a] WHERE were you at the time of the blast? *(Specify below)*

[1b] What protective clothing did you wear at that time? *(Specify below)*

[1c] Did you leave the exclusion zone immediately after your exposure to *this* blast? ○ Yes ○ No

[1d] If you did NOT leave the zone immediately afterwards, how long did you remain in the area (in days)? _____ days

[1e] What were you doing during this time? *(Specify below)*

→ 2 Did you serve on GRAPPLE 2? *(Malden Island on 31 May 1957)*

○ Yes *(continue)* ○ No *(go to Q3 below)*

[2a] WHERE were you at the time of the blast? *(Specify below)*

[2b] What protective clothing did you wear at that time? *(Specify below)*

[2c] Did you leave the exclusion zone immediately after your exposure to *this* blast? ○ Yes ○ No

[2d] If you did NOT leave the zone immediately afterwards, how long did you remain in the area (in days)? _____ days

[2e] What were you doing during this time? *(Specify below)*

→ 3 Did you serve on GRAPPLE 3? *(Malden Island on 19 June 1957)*

○ Yes *(continue)* ○ No *(go to Q4 on page 6)*

[3a] WHERE were you at the time of the blast? *(Specify below)*

[3b] What protective clothing did you wear at that time? *(Specify below)*

[3c] Did you leave the exclusion zone immediately after your exposure to *this* blast? ○ Yes ○ No

[3d] If you did NOT leave the zone immediately afterwards, how long did you remain in the area (in days)? _____ days

[3e] What were you doing during this time? *(Specify below)*

Record if you were present (or not) at <u>EACH</u> blast listed below.

Office Use Only

4 Did you serve on GRAPPLE X? *(Christmas Is. on 8 Nov. 1957)*

◯ Yes *(continue)* ◯ No *(go to Q5 below)*

[4a] WHERE were you at the time of the blast? *(Specify below)*

[4b] What protective clothing did you wear at that time? *(Specify below)*

[4c] Did you leave the exclusion zone <u>immediately</u> after your exposure to <u>*this*</u> blast? ◯ Yes ◯ No

[4d] If you did NOT leave the zone immediately afterwards, how long did you remain in the area (in days)? _____ days

[4e] What were you doing during this time? *(Specify below)*

5 Did you serve on GRAPPLE Y? *(Christmas Is. on 28 April 1958)*

◯ Yes *(continue)* ◯ No *(go to Q6 below)*

[5a] WHERE were you at the time of the blast? *(Specify below)*

[5b] What protective clothing did you wear at that time? *(Specify below)*

[5c] Did you leave the exclusion zone <u>immediately</u> after your exposure to <u>*this*</u> blast? ◯ Yes ◯ No

[5d] If you did NOT leave the zone immediately afterwards, how long did you remain in the area (in days)? _____ days

[5e] What were you doing during this time? *(Specify below)*

6 Did you serve on GRAPPLE Z1? *(Christmas Is. on 22 August 1958)*

◯ Yes *(continue)* ◯ No *(go to Q7 on page 7)*

[6a] WHERE were you at the time of the blast? *(Specify below)*

[6b] What protective clothing did you wear at that time? *(Specify below)*

[6c] Did you leave the exclusion zone <u>immediately</u> after your exposure to <u>*this*</u> blast? ◯ Yes ◯ No

[6d] If you did NOT leave the zone immediately afterwards, how long did you remain in the area (in days)? _____ days

[6e] What were you doing during this time? *(Specify below)*

You should record if you were present (or not) at <u>EACH</u> blast.

Office Use Only

→ 7 Did you serve on GRAPPLE Z2? *(Christmas Is. on 2 Sept. 1958)*

◯ Yes *(continue)* ◯ No *(go to Q8 below)*

[7a] WHERE were you at the time of the blast? *(Specify below)*

[7b] What protective clothing did you wear at that time? *(Specify below)*

[7c] Did you leave the exclusion zone <u>immediately</u> after your exposure to <u>*this*</u> blast? ◯ Yes ◯ No

[7d] If you did NOT leave the zone immediately afterwards, how long did you remain in the area (in days)? _____ days

[7e] What were you doing during this time? *(Specify below)*

→ 8 Did you serve on GRAPPLE Z3? *(Christmas Is. on 11 Sept. 1958)*

◯ Yes *(continue)* ◯ No *(go to Q9 below)*

[8a] WHERE were you at the time of the blast? *(Specify below)*

[8b] What protective clothing did you wear at that time? *(Specify below)*

[8c] Did you leave the exclusion zone <u>immediately</u> after your exposure to <u>*this*</u> blast? ◯ Yes ◯ No

[8d] If you did NOT leave the zone immediately afterwards, how long did you remain in the area (in days)? _____ days

[8e] What were you doing during this time? *(Specify below)*

→ 9 Did you serve on GRAPPLE Z4? *(Christmas Is. on 23 Sept. 1958)*

◯ Yes *(continue)* ◯ No *(go to Q10 on page 8)*

[9a] WHERE were you at the time of the blast? *(Specify below)*

[9b] What protective clothing did you wear at that time? *(Specify below)*

[9c] Did you leave the exclusion zone <u>immediately</u> after your exposure to <u>*this*</u> blast? ◯ Yes ◯ No

[9d] If you did NOT leave the zone immediately afterwards, how long did you remain in the area (in days)? _____ days

[9e] What were you doing during this time? *(Specify below)*

The entries below provide for responses from any participants who have been exposed to nuclear blasts OTHER THAN THOSE ASSOCIATED WITH OPERATION GRAPPLE. If this does not apply to you please go to PART 2 on page 9.

For EACH BLAST please record below:

Office Use Only

10 Where the blast occurred? _____ 1 0 3

When? _____ day & month 1 9 year 9

[10a] WHERE were you at the time of the blast? *(Specify below)* 12

_____

[10b] What protective clothing did you wear at that time? *(Specify below)* 15

_____

[10c] Did you leave the exclusion zone immediately after your exposure to *this* blast? ◯ Yes ◯ No 16

[10d] If you did NOT leave the zone immediately afterwards, how long did you remain in the area (in days)? _____ days 21

[10e] What were you doing during this time? *(Specify below)* 24

_____

11 Where the blast occurred? _____ 1 1 27

When? _____ day & month 1 9 year 33

[11a] WHERE were you at the time of the blast? *(Specify below)* 36

_____

[11b] What protective clothing did you wear at that time? *(Specify below)* 39

_____

[11c] Did you leave the exclusion zone immediately after your exposure to *this* blast? ◯ Yes ◯ No 40

[11d] If you did NOT leave the zone immediately afterwards, how long did you remain in the area (in days)? _____ days 45

[11e] What were you doing during this time? *(Specify below)* 48

_____

Do you need any extra formatted sheets to complete the list of nuclear blasts to which you have been exposed?

◯ Yes ◯ No 49

(Extra sheets will be brought for you to complete during your face-to-face interview.)

PART 2 questions, related to your occupational history, begin on the next page. ☞

New Zealand Nuclear Test Veterans Postal Survey

PART 2

The first section focuses on your past occupational history. Please write details in the spaces provided.

A Please list below ALL the occupations that you have had <u>from 1950 until the present</u>. For each entry record the start and end dates (month & year), and a <u>brief</u> description of the type of work. If you need to record <u>more than 24</u> entries you can request that extra formatted pages be provided at your face-to-face interview.

When you have completed recording your list of occupations *<u>turn to page 12</u>*.

	<u>Occupation & type of work</u>:	<u>From date</u>: month year	<u>To date</u>: month year	Office Use Only
[1]				3 – 9 – 11
[2]				14 – 20 – 22
[3]				25 – 31 – 33
[4]				36 – 42 – 44
[5]				47 – 53 – 55
[6]				58 – 64 – 66
[7]				69 – 75 – 77

A (contd.) Please continue to list below ALL the occupations that you have had from 1950 until the present. For each entry record the start and end dates (month & year), and a brief description of the type of work.

Please turn to page 12 when you have completed recording your list of occupations.

	Occupation & type of work:	From date: month year	To date: month year	Office Use Only
[8]				3 9
[9]				11 14 20
[10]				22 25 31
[11]				33 36 42
[12]				44 47 53
[13]				55 58 64
[14]				66 69 75
[15]				77 3 9
[16]				11 14 20 22

A [contd.] Please continue to list below ALL the occupations that you have had from 1950 until the present. For each entry record the start and end dates (month & year), and a brief description of the type of work.

Please turn to page 12 when you have completed recording your list of occupations.

	Occupation & type of work:	From date: month year	To date: month year	Office Use Only
[17]				25 31
[18]				33 36 42
[19]				44 47 53
[20]				55 58 64
[21]				66 69 75
[22]				77 3 9
[23]				11 14 20
[24]				22 25 31

B Do you need any extra formatted sheets to complete your list of occupations since 1950 to be provided during your face-to-face interview?

○ Yes ○ No

33 36

Now we would like some specific information about any substances that you have been exposed to since 1950, in your *WORK, HOME OR ANY OTHER ENVIRONMENT*. Please tick the circle ✓ next to the answer which you believe gives an accurate indication of your situation, and where appropriate, write further details in the spaces provided.

Since 1950 have you EVER been exposed, either by breathing or direct skin contact, to any of the substances listed below? Please answer 'Yes' or 'No' to each substance that is listed. If you answer 'Yes' to a substance, try and remember when you were first and last exposed to that particular substance, and the total length of time that you were exposed to it (which should be recorded in months wherever possible, but otherwise specified – e.g. 10 days).

Example: If you were exposed to Asbestos you would tick 'Yes'; then

- *record the date you were first exposed – May 1976;*
- *record the date you were last exposed – Oct 1987;*
- *record the total length of time exposed during that entire period – 3 & a half months (which could represent more than one occasion when you were exposed to the substance during the stated period).*

1 Asbestos?

○ Yes ○ No

First exposed: month / year

Last exposed: month / year

Length of time exposed: in months, if possible

2 Radiation *(EXCLUDING OPERATION GRAPPLE)*?

○ Yes ○ No

First exposed: month / year

Last exposed: month / year

Length of time exposed: in months, if possible

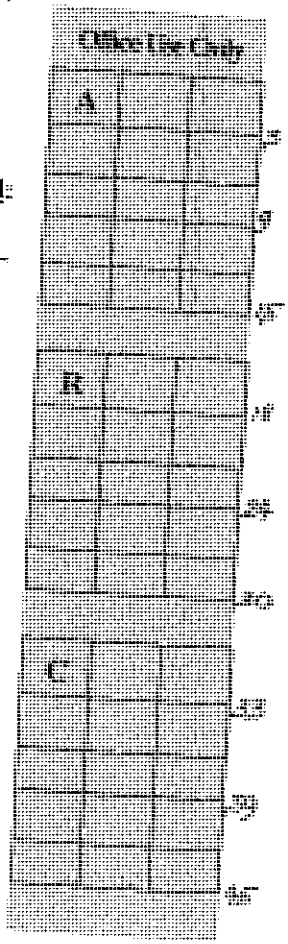
3 Coal products?

○ Yes ○ No

First exposed: month / year

Last exposed: month / year

Length of time exposed: in months, if possible



Since 1950 have you EVER been exposed, either by breathing or direct skin contact, to any of the substances listed below? Please answer 'Yes' or 'No' to each substance that is listed. If you answer 'Yes' to a substance, try and remember when you were first and last exposed to that particular substance, and the total length of time that you were exposed to it (which should be recorded in months wherever possible, but otherwise specified – e.g. 10 days).

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4 **Dust (such as wood or leather)?**

○ Yes ○ No

First exposed: month / year **Last exposed:** month / year **Length of time exposed:** in months, if possible

D 48 54 60

5 **Pesticides or herbicides?**

○ Yes ○ No

First exposed: month / year **Last exposed:** month / year **Length of time exposed:** in months, if possible

H 3 9 15

6 **Petroleum products?**

○ Yes ○ No

First exposed: month / year **Last exposed:** month / year **Length of time exposed:** in months, if possible

P 18 24 30

7 **Dyes?**

○ Yes ○ No

First exposed: month / year **Last exposed:** month / year **Length of time exposed:** in months, if possible

D 33 39 45

8 **Solvents?**

○ Yes ○ No

First exposed: month / year **Last exposed:** month / year **Length of time exposed:** in months, if possible

S 48 54 60

9 Since 1950 have you EVER been exposed, either by breathing or direct skin contact, to <u>ANY OTHER</u> chemicals/substances?

◯ Yes ◯ No

(please continue) *(please go to PART 3 on page 16)*

Office Use Only

62

If you answered 'Yes' to Q9 above can you think of the names of <u>ANY OTHER</u> specific chemicals/substances (other than the eight already identified on pages 12 & 13) which you know, or suspect that you were exposed to, by breathing or direct skin contact, in your <u>*WORK, HOME OR ANY OTHER ENVIRONMENT,*</u> since 1950? Please first write down the substance, and then the dates of your exposure to <u>that</u> substance, including the total length of time of your exposure, in the spaces provided below.

When you have completed recording your list of substances <u>please go to PART 3 on page 16</u>.

Office Use Only

10a Substance: _____

<u>First exposed</u>: month / year — <u>Last exposed</u>: month / year — <u>Length of time exposed</u>: in months, if possible

3 9 15

10b Substance: _____

<u>First exposed</u>: month / year — <u>Last exposed</u>: month / year — <u>Length of time exposed</u>: in months, if possible

18 24 30

10c Substance: _____

<u>First exposed</u>: month / year — <u>Last exposed</u>: month / year — <u>Length of time exposed</u>: in months, if possible

33 39 45

10d Substance: _____

<u>First exposed</u>: month / year — <u>Last exposed</u>: month / year — <u>Length of time exposed</u>: in months, if possible

48 54 60

If you need to continue recording more names of OTHER specific chemicals/substances (other than the eight already identified on pages 12 & 13) which you know, or suspect that you were exposed to, by breathing or direct skin contact, in your *WORK, HOME OR ANY OTHER ENVIRONMENT,* since 1950, space is provided below. Please first write down the substance, and then the dates of your exposure to that substance, including the total length of time of your exposure.

When you have completed recording your list of substances please go to PART 3 on page 16.

Office Use Only

10e Substance: _____

First exposed:		Last exposed:		Length of time exposed:	
month	year	month	year	in months, if possible	3 – 9

10f Substance: _____

First exposed:		Last exposed:		Length of time exposed:	
month	year	month	year	in months, if possible	15 – 18 – 24 – 30

10g Substance: _____

First exposed:		Last exposed:		Length of time exposed:	
month	year	month	year	in months, if possible	33 – 39 – 45

10h Substance: _____

First exposed:		Last exposed:		Length of time exposed:	
month	year	month	year	in months, if possible	48 – 54 – 60

Thank you for completing PART 2 of the survey.

PART 3 questions, which are related to your health, begin on the next page.

☞

New Zealand Nuclear Test Veterans Postal Survey

PART 3

These questions focus on your health during the PAST 12 MONTHS. For each question, please tick the circle ✓ for the answer that best applies to you.

When you respond 'Yes' to a question you will be asked to list further details. Each question provides for a specific number of listed responses. If there is insufficient space to accommodate your entire list of responses, you will be able to indicate this at the end of PART 3. This will ensure that extra response sheets for those specific questions will be given to you for completion during your face-to-face interview.

Please do not skip any questions, and do take your time, as this will ensure that your responses are as complete as possible. If you wish to attach any extra notes of your own, you are welcome to do so.

Please note that "the PAST 12 MONTHS" is the period:

From: ____ ☐☐ To: ____ ☐☐

OR (recorded in month and year format)

From: ☐☐ ☐☐ (month / year) To: ☐☐ ☐☐ (month / year)

Office Use Only ☐☐ 2 4

You should ONLY refer to this time period whilst completing questions 1 to 6. To assist you remember these dates, they will be repeated at the top of each page.

1 Have you had any surgery during the past 12 months?

◯ Yes *(please complete the list below, then go to Q2 on page 18)*

◯ No *(please go to Q2 on page 18)*

Office Use Only ☐☐ 7

If you have had any surgery during the past 12 months, please list below, for EACH time that you had an operation, the reason for the surgery, and the date when you had it (recorded in month and year format).

Surgery:

Date:

1a Reason: _____ ☐☐☐☐ (month / year)

_____

_____

☐☐ 13

Please note that "the PAST 12 MONTHS" is the period:

From: ____ ____ (month, year) To: ____ ____ (month, year)

1 contd. *If you need to list any further operations you had during the past 12 months, please continue to record the reason for each operation, and the date when you had it (specify the month & year). When you have completed entering your responses please go to Q2 on page 18.*

Surgery: **Date:** Office Use Only

1b Reason: ____________________ month year 19

1c Reason: ____________________ month year 25

1d Reason: ____________________ month year 31

1e Reason: ____________________ month year 37

1f Reason: ____________________ month year 43

1g Reason: ____________________ month year 49

1h Reason: ____________________ month year 55

1i Reason: ____________________ month year 61

Please note that "the PAST 12 MONTHS" is the period:

From: [ ][ ][ ][ ] To: [ ][ ][ ][ ]
month year month year

2 Have you had any fevers during the past 12 months?

○ Yes *(please complete the list below, then go to Q3 on page 20)*

○ No *(please go to Q3 on page 20)*

If you have had any fevers during the past 12 months, please list below, for EACH time that you had a fever:

- **the illness that was associated with that fever**
- **the date when you had the fever (recording the month & year each time)**
- **the medication you took for the fever**

2a Illness: _____

_____

Date: [ ][ ][ ][ ]
month year

Medication: _____

_____

2b Illness: _____

_____

Date: [ ][ ][ ][ ]
month year

Medication: _____

_____

2c Illness: _____

_____

Date: [ ][ ][ ][ ]
month year

Medication: _____

_____

Office Use Only

[ ][ ][ ] 3

[ ][ ][ ] 6

[ ][ ][ ] 10

13

[ ][ ][ ] 16

[ ][ ][ ] 20

23

[ ][ ][ ] 26

[ ][ ][ ] 30

33

Please note that "the PAST 12 MONTHS" is the period:

From: [ ][ ][ ][ ] (month year) To: [ ][ ][ ][ ] (month year)

2 contd. *Please continue to list any fevers you have had during the past 12 months. When you have completed entering your responses please go to Q3 on page 20.*

Office Use Only

2d Illness: _____

_____ 36

Date: [ ][ ][ ][ ] (month year)

Medication: _____

_____ 40 43

2e Illness: _____

_____ 46

Date: [ ][ ][ ][ ] (month year)

Medication: _____

_____ 50 53

2f Illness: _____

_____ 56

Date: [ ][ ][ ][ ] (month year)

Medication: _____

_____ 60 63

2g Illness: _____

_____ 3

Date: [ ][ ][ ][ ] (month year)

Medication: _____

_____ 7 10

2h Illness: _____

_____ 13

Date: [ ][ ][ ][ ] (month year)

Medication: _____

_____ 17 20

These next questions are about MEDICATION you have taken over the PAST 12 MONTHS.

Please note that "the PAST 12 MONTHS" is the period:

From: ☐☐☐☐ (month year) To: ☐☐☐☐ (month year)

3 Have you taken any medication prescribed by a doctor in the past 12 months (for example: blood pressure pills, antibiotics, insulin, tranquillisers, muscle relaxants, etc.)?

Office Use Only ☐☐☐ 3

○ Yes *(please complete the list below, then go to Q4 on page 23)*

○ No *(please go to Q4 on page 23)*

Please record below ANY PRESCRIBED MEDICATION taken during the PAST 12 MONTHS, & the REASON for taking it.

	Type of prescription medication taken:	From date: (month year)	To date: (month year)	
3a	_____	☐☐☐☐	☐☐☐☐	9
	Reason: _____			15
3b	_____	☐☐☐☐	☐☐☐☐	21
	Reason: _____			27
3c	_____	☐☐☐☐	☐☐☐☐	33
	Reason: _____			39
3d	_____	☐☐☐☐	☐☐☐☐	45
	Reason: _____			51
3e	_____	☐☐☐☐	☐☐☐☐	57
	Reason: _____			63

Please note that "the PAST 12 MONTHS" is the period:

From: month year To: month year

3 contd. *Please continue to record below ANY PRESCRIBED MEDICATION that you have taken during the PAST 12 MONTHS, & the REASON for taking it. When you have completed entering your responses please go to Q4 on page 23.*

Office Use Only

3f Type of prescription medication taken: _____ From date: month year To date: month year

Reason: _____ 69 75

3g Type of prescription medication taken: _____ From date: month year To date: month year

Reason: _____ 3 6 12

3h Type of prescription medication taken: _____ From date: month year To date: month year

Reason: _____ 18 24

3i Type of prescription medication taken: _____ From date: month year To date: month year

Reason: _____ 30 36

3j Type of prescription medication taken: _____ From date: month year To date: month year

Reason: _____ 42 48

3k Type of prescription medication taken: _____ From date: month year To date: month year

Reason: _____ 54 60

3l Type of prescription medication taken: _____ From date: month year To date: month year

Reason: _____ 66 72

Please note that "the PAST 12 MONTHS" is the period:

From: ☐☐☐☐ (month year) To: ☐☐☐☐ (month year)

3 contd. *Please continue to record below ANY PRESCRIBED MEDICATION that you have taken during the PAST 12 MONTHS, & the REASON for taking it. When you have completed entering your responses please go to Q4 on page 23.*

Office Use Only

3m Type of prescription medication taken: _____ From date: month year To date: month year

Reason: _____ 3 6 12

3n Type of prescription medication taken: _____ From date: month year To date: month year

Reason: _____ 18 24

3o Type of prescription medication taken: _____ From date: month year To date: month year

Reason: _____ 30 36

3p Type of prescription medication taken: _____ From date: month year To date: month year

Reason: _____ 42 48

3q Type of prescription medication taken: _____ From date: month year To date: month year

Reason: _____ 54 60

3r Type of prescription medication taken: _____ From date: month year To date: month year

Reason: _____ 66 72

3s Type of prescription medication taken: _____ From date: month year To date: month year

Reason: _____ 3 6 12

Please note that "the PAST 12 MONTHS" is the period:

From: month year To: month year

4 Have you taken <u>any non-prescription</u> medication in the past 12 months (for example: aspirin, antacid, anti-histamine, sedatives, or other drugs)?

◯ Yes *(please complete the list below, then go to Q5 on page 25)*

◯ No *(please go to Q5 on page 25)*

Office Use Only 3

Please record below <u>ANY NON-PRESCRIPTION MEDICATION</u> that you have taken during the <u>PAST 12 MONTHS</u> & the <u>REASON</u> for taking it.

4a <u>Type of non-prescription medication taken:</u> _____ <u>From date:</u> month year <u>To date:</u> month year 6 9

Reason: _____ 15

4b <u>Type of non-prescription medication taken:</u> _____ <u>From date:</u> month year <u>To date:</u> month year 18 21

Reason: _____ 27

4c <u>Type of non-prescription medication taken:</u> _____ <u>From date:</u> month year <u>To date:</u> month year 30 33

Reason: _____ 39

4d <u>Type of non-prescription medication taken:</u> _____ <u>From date:</u> month year <u>To date:</u> month year 42 45

Reason: _____ 51

4e <u>Type of non-prescription medication taken:</u> _____ <u>From date:</u> month year <u>To date:</u> month year 54 57

Reason: _____ 63

4f <u>Type of non-prescription medication taken:</u> _____ <u>From date:</u> month year <u>To date:</u> month year 66 69

Reason: _____ 75

Please note that "the PAST 12 MONTHS" is the period:

From: month year To: month year

4 contd. *Please continue to record below ANY NON-PRESCRIPTION MEDICATION that you have taken during the PAST 12 MONTHS & the REASON for taking it that you have not already listed on the previous page. When you have completed entering your responses please go to Q5 on page 25.*

Office Use Only

4g Type of non-prescription medication taken: _____ From date: month year To date: month year — 6 / 12

Reason: _____

4h Type of non-prescription medication taken: _____ From date: month year To date: month year — 18 / 24

Reason: _____

4i Type of non-prescription medication taken: _____ From date: month year To date: month year — 30 / 36

Reason: _____

4j Type of non-prescription medication taken: _____ From date: month year To date: month year — 42 / 48

Reason: _____

4k Type of non-prescription medication taken: _____ From date: month year To date: month year — 54 / 60

Reason: _____

4l Type of non-prescription medication taken: _____ From date: month year To date: month year — 66 / 72

Reason: _____

Please note that "the PAST 12 MONTHS" is the period:

From: [ ][ ][ ][ ] (month / year) To: [ ][ ][ ][ ] (month / year)

5 Do you currently take any vitamins or herbal remedies, or have you done so in the past 12 months?

Office Use Only [ ][ ][ ] 3

◯ Yes *(please complete the list below then go to Q6 on page 27)*

◯ No *(please go to Q6 on page 27)*

Please record below ANY VITAMINS / HERBAL REMEDIES that you have taken during the PAST 12 MONTHS & the REASON for taking it.

5a **Type of vitamin/herbal remedy taken:** _____ **From date:** month year **To date:** month year [ ][ ][ ][ ][ ][ ][ ][ ] 9

Reason: _____ [ ][ ][ ] 15

5b **Type of vitamin/herbal remedy taken:** _____ **From date:** month year **To date:** month year [ ][ ][ ][ ][ ][ ][ ][ ] 21

Reason: _____ [ ][ ][ ] 27

5c **Type of vitamin/herbal remedy taken:** _____ **From date:** month year **To date:** month year [ ][ ][ ][ ][ ][ ][ ][ ] 33

Reason: _____ [ ][ ][ ] 39

5d **Type of vitamin/herbal remedy taken:** _____ **From date:** month year **To date:** month year [ ][ ][ ][ ][ ][ ][ ][ ] 45

Reason: _____ [ ][ ][ ] 51

5e **Type of vitamin/herbal remedy taken:** _____ **From date:** month year **To date:** month year [ ][ ][ ][ ][ ][ ][ ][ ] 57

Reason: _____ [ ][ ][ ] 63

5f **Type of vitamin/herbal remedy taken:** _____ **From date:** month year **To date:** month year [ ][ ][ ][ ][ ][ ][ ][ ] 69

Reason: _____ [ ][ ][ ] 75

Please note that "the PAST 12 MONTHS" is the period:

From: month year To: month year

5 contd. *Please continue to record below ANY VITAMINS / HERBAL REMEDIES that you have taken during the PAST 12 MONTHS (including the REASON for taking them) that you have not already listed on the previous page. When you have completed entering your response please go to Q6 on page 27.*

Office Use Only

5g Type of vitamin/herbal remedy taken: _____ From date: month year To date: month year

Reason: _____ 6 12

5h Type of vitamin/herbal remedy taken: _____ From date: month year To date: month year

Reason: _____ 18 24

5i Type of vitamin/herbal remedy taken: _____ From date: month year To date: month year

Reason: _____ 30 36

5j Type of vitamin/herbal remedy taken: _____ From date: month year To date: month year

Reason: _____ 42 48

5k Type of vitamin/herbal remedy taken: _____ From date: month year To date: month year

Reason: _____ 54 60

5l Type of vitamin/herbal remedy taken: _____ From date: month year To date: month year

Reason: _____ 6 12

5m Type of vitamin/herbal remedy taken: _____ From date: month year To date: month year

Reason: _____ 18 24

Please note that "the PAST 12 MONTHS" is the period:

From: ☐☐☐☐ (month / year) To: ☐☐☐☐ (month / year)

6 Have you had a vaccination in the past 12 months?

○ **Yes** *(please complete the list below then go to Q7 on page 28)*

○ **No** *(please go to Q7 on page 28)*

Office Use Only ☐☐ 2

Please record below ANY VACCINATION that you have received in the PAST 12 MONTHS, and the DATE you had it.

Type of vaccination:

6a _____ **Date:** ☐☐☐☐☐☐ (day / month / year) 5

_____ 11

_____

_____

Type of vaccination:

6b _____ **Date:** ☐☐☐☐☐☐ (day / month / year) 14

_____ 20

_____

_____

Type of vaccination:

6c _____ **Date:** ☐☐☐☐☐☐ (day / month / year) 23

_____ 29

_____

_____

Type of vaccination:

6d _____ **Date:** ☐☐☐☐☐☐ (day / month / year) 32

_____ 38

_____

_____

Type of vaccination:

6e _____ **Date:** ☐☐☐☐☐☐ (day / month / year) 41

_____ 47

_____

_____

Office Use Only

7 Have you ever had any DENTAL X-RAYS?

◯ Yes *(please continue)*

◯ No *(please go to Q8 below)*

Did you have a dental X-ray ... *(please tick ONE only)*

◯ .. within the last month?

◯ .. within the last 6 months?

◯ .. within the last 6-12 months?

◯ .. over one year ago?

8 *(Please note the change in the time period you are asked to refer to in this question: Questions 1-6 all focused on "the past 12 months", but this question covers the period "since 1950".)*

Have you had any diagnostic or therapeutic X-rays (OTHER THAN DENTAL X-RAYS) since 1950?

◯ Yes *(please complete the list below then go to Q9 on page 31)*

◯ No *(please go to Q9 on page 31)*

Please record below the REASON FOR EACH X-RAY that you have had since 1950, the X-RAY SITE (e.g. chest), and the YEAR (e.g. 1972) that you had that X-Ray.

(Try to remember events in your life that required you to have an X-ray, and then link each event to a date.)

The reason for X-ray: Year:

8a Reason: _____ year

X-Ray Site: _____

8b Reason: _____ year

X-Ray Site: _____

8c Reason: _____ year

X-Ray Site: _____

8 contd. *If you need to continue listing any diagnostic or therapeutic X-rays (OTHER THAN DENTAL X-RAYS) that you have had since 1950, please continue as before.*

(Try to remember events in your life that required you to have an X-ray, and then link each event to a date. For each X-ray please record the REASON for having the X-ray, the X-RAY SITE, and the YEAR when you had it. When you have completed your list please go to Q9 on page 31.)

The reason for X-ray: **Year:**

Office Use Only

8d Reason: _____ year

X-Ray Site: _____ 3 7

8e Reason: _____ year

X-Ray Site: _____ 10 14

8f Reason: _____ year

X-Ray Site: _____ 17 21

8g Reason: _____ year

X-Ray Site: _____ 24 28

8h Reason: _____ year

X-Ray Site: _____ 31 35

8i Reason: _____ year

X-Ray Site: _____ 38 42

8j Reason: _____ year

X-Ray Site: _____ 45 49

8 contd. *If you need to continue listing any diagnostic or therapeutic X-rays (OTHER THAN DENTAL X-RAYS) that you have had since 1950, please continue as before.*

(Try to remember events in your life that required you to have an X-ray, and then link each event to a date. For each X-ray please record the REASON for having the X-ray, the X-RAY SITE, and the YEAR when you had it. When you have completed your list please go to Q9 on page 31.)

The reason for X-ray: **Year:**

8k Reason: _____ year

X-Ray Site: _____

8l Reason: _____ year

X-Ray Site: _____

8m Reason: _____ year

X-Ray Site: _____

8n Reason: _____ year

X-Ray Site: _____

8o Reason: _____ year

X-Ray Site: _____

8p Reason: _____ year

X-Ray Site: _____

8q Reason: _____ year

X-Ray Site: _____

Office Use Only

52
56
59
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3
7
10
14
17
21

8 contd. *If you need to continue listing any <u>diagnostic or therapeutic X-rays</u> (OTHER THAN DENTAL X-RAYS) that you have had since 1950, please continue as before.*

(Try to remember events in your life that required you to have an X-ray, and then link each event to a date. For each X-ray please record the <u>REASON</u> for having the X-ray, the <u>X-RAY SITE</u>, and the <u>YEAR</u> when you had it. When you have completed your list please go to Q9 on page 31.)

<u>The reason for X-ray</u>: **<u>Year</u>:**

8r Reason: _____ year

X-Ray Site: _____

8s Reason: _____ year

X-Ray Site: _____

8t Reason: _____ year

X-Ray Site: _____

9 **Are you aware of any birth defects, or other genetic disorders, or inherited diseases that do / did affect ...**

.. your parents? ○ Yes ○ No

.. your brothers &/or sisters? ○ Yes ○ No

.. children of your brothers &/or sisters? ○ Yes ○ No

If you responded 'No' to <u>ALL</u> of the above please go to Q10 on page 32. If you responded 'Yes' to <u>ANY</u> of the above please record brief details below.

_____

_____

_____

_____

_____

_____

Office Use Only

24

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48

54

10 Are you aware of any birth defects, or other genetic disorders, or inherited diseases that do / did affect ...

a) .. your <u>own</u> children? ◯ Yes ◯ No

b) .. your <u>own</u> grandchildren? ◯ Yes ◯ No

If you responded 'Yes' to (a) or (b) above, please record brief details below about the genetic health problems affecting <u>each</u> off-spring, including: whether that off-spring is your child/grandchild; their date of birth; their gender and the nature of their genetic disorder.

Office Use Only

55

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70

74

76

If you were unable to complete any of the PART 3 question response lists due to lack of space, and <u>you require extra formatted sheets</u> to complete during your face-to-face interview, please tick the SQUARE next to the relevant question/s below.

Q 1 – ANY SURGERY in the past 12 months ☐

Q 2 – ANY FEVERS in the past 12 months ☐

Q 3 - PRESCRIPTION MEDICATIONS in the past 12 months ☐

Q 4 - NON-PRESCRIPTION MEDICATIONS in the past 12 months ☐

Q 5 - VITAMINS/HERBAL REMEDIES in the past 12 months ☐

Q 6 - VACCINATIONS in the past 12 months ☐

Q 8 X-RAYS since 1950 ☐

Thank you for completing PART 3. Please ensure you have completed the response lists for <u>every</u> question, before continuing. If you have requested extra formatted sheets (as indicated above) these will be given to you at your face-to-face interview.

PART 4 starts on the next page. ☞

New Zealand Nuclear Test Veterans Postal Survey

PART 4

PART 4 focuses on your diet, starting off with questions about your current eating and drinking habits. For each question please tick the circle ✔ for the answer that best applies to you, or write the details in the spaces provided. If you are unsure about how to answer any question, please give the best answer you can.

Please avoid ticking more than one circle per question, unless asked to do so.

1 Do you eat vegetables?

○ Yes ○ No

2 Do you eat meat?

○ Yes ○ No

3 Do you use diet sweetners?

○ Yes ○ No *(please go to Q4 below)*

How many diet sweetners do you use per day OR per week?

(Please enter the number of diet sweetners in the space provided below, and ALSO indicate whether this is per day OR per week by circling the appropriate description.)

_____ diet sweetners **per day OR per week**

number *(Circle one of these terms)*

4 Do you drink diet drinks?

○ Yes ○ No *(please go to Q5 on page 34)*

How many units (measured as 250ml, which is equivalent to an average size glass) per day OR per week?

(Please enter the number of 250 ml unit diet drinks in the space provided below, and ALSO indicate whether this is per day OR per week by circling the appropriate description.)

_____ 250ml diet drinks **per day OR per week**

number *(Circle one of these terms)*

Office Use Only

1 2 3 6 7 10

Office Use Only

5 Are there any other comments that you would like to make regarding your diet that may not have been covered already? (e.g. do you follow a special diet such as low fat, high protein, low carbohydrate, etc.)

_____

_____

_____

_____

_____

_____

_____

_____

13 19

6 **Do you drink coffee?**

○ Yes ○ No *(please go to Q8 below)*

How many cups do you drink per day OR per week?

(Please enter the number of 250 ml cups of CAFFEINATED COFFEE in the space provided below, and ALSO indicate whether this is per day OR per week by circling the appropriate description.)

_____ 250ml caffeinated coffee **per day OR per week**

number *(Circle one of these terms)*

20 23

7 **How often do you drink decaffeinated coffee?**

○ 1	○ 2	○ 3	○ 4	○ 5
all of the time	most of the time	some of the time	a little of the time	none of the time

24

8 **Do you drink tea?**

○ Yes ○ No *(please go to page 35)*

How many cups do you drink per day OR per week?

(Please enter the number of 250 ml cups of TEA in the space provided below, and ALSO indicate whether this is per day OR per week by circling the appropriate description.)

_____ 250ml tea **per day OR per week**

25 28

number

(Circle one of these terms)

The next group of questions are about alcohol consumption.

As a guide a drink is:

- **a can or small bottle of beer (a third of a pub jug)**
- **a small glass of wine**
- **a nip of spirits (a 'single' in a pub)**

For each question, please tick the circle ✔ for the answer that best applies to you. Please do not skip any questions.

Please tick ONLY ONE circle in response to each question.

1 **Has a relative, or friend, or a doctor, or other health worker been concerned about your drinking, or suggested that you cut down?**

○ No | ○ Yes - but not in the last year | ○ Yes - during the last year

2 **Do you currently avoid drinking ALL alcohol because you have had difficulties in the past limiting the amount of alcohol that you drank?**

○ No *(please continue)* | ○ Yes *(please go to Q10 on page 37)*

3 **Have you had a drink containing alcohol in the last year?**

○ Yes *(please continue)* | ○ No *(please go to Q10 on page 37)* | ○ Don't know *(please continue)*

4 **How often do you have a drink containing alcohol?**

○ monthly or less | ○ 2 - 4 times a month | ○ 2 - 3 times a week | ○ 4 or more times a week

5 **How many drinks containing alcohol do you have on a typical day, when drinking?** *(Please tick ONLY ONE circle.)*

○ 1 or 2 drinks | ○ 3 or 4 drinks | ○ 5 or 6 drinks | ○ 7 to 9 drinks | ○ 10 or more | ○ don't know

Office Use Only

29 ☐

30 ☐

31 ☐

32 ☐

33 ☐

As a guide a drink is:

- a can or small bottle of beer (a third of a pub jug)
- a small glass of wine
- a nip of spirits (a 'single' in a pub)

For each question, please tick the circle ✓ for the answer that best applies to you. Please do not skip any questions.

Please tick ONLY ONE circle in response to each question.

6	How often do you have six or more drinks on one occasion? *(Please tick ONLY ONE circle.)*	○ never	○ less than monthly	○ monthly	○ weekly	○ daily or almost daily
7	How often during the last year have you found that you were not able to stop drinking once you had started?	○ never	○ less than monthly	○ monthly	○ weekly	○ daily or almost daily
8	How often during the last year have you failed to do what was normally expected from you because of drinking?	○ never	○ less than monthly	○ monthly	○ weekly	○ daily or almost daily
9	How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	○ never	○ less than monthly	○ monthly	○ weekly	○ daily or almost daily

Office Use Only

34

35

36

37

The following questions are about your smoking history. For each question, please tick the circle ✔ for the answer that best applies to you, or enter details in the space provided. Please do not skip any questions.

10a Do you currently smoke any substance other than tobacco?

○ Yes ○ No

10b Have you EVER smoked any substance other than tobacco?

○ Yes ○ No

11 Does anyone (including yourself) currently smoke tobacco products inside your home every day, or most days?

○ Yes ○ No

12 Do you currently smoke ANY tobacco products?

○ Yes *(please go to Q16 on page 38)*

○ No *(please continue)*

13 Have you ever been a smoker of ANY tobacco products in the past?

○ Yes *(please continue)*

○ No *(please go to PART 5 on page 40)*

14 Were you ever a regular, daily smoker of tobacco products, before you stopped smoking?

○ Yes ○ No

15a What date did you last smoke? *(please specify month and year)*

Date: ☐☐ month ☐☐☐☐ year OR ○ Don't know

15b About how many years did you smoke tobacco products before you stopped? *(Please specify below)*

_____ *years*

(If you currently DO NOT SMOKE ANY TOBACCO PRODUCTS please go to PART 5 on page 40)

Office Use Only

38 ☐

39 ☐

40 ☐

41 ☐

42 ☐

43 ☐

45 ☐☐

49 ☐☐

51 ☐☐

53

For each question, please tick the circle ✓ for the answer that best applies to you, or enter details in the space provided. Please do not skip any questions.

16 Do you currently smoke one or more tobacco cigarettes a day?

○ Yes *(please continue)* ○ No *(please go to Q19 below)*

17a *Please specify below the MONTH & YEAR you FIRST started smoking one or more cigarettes a day.*

month year

17b About how many years have you been smoking one or more cigarettes per day? *(please specify)* _____ *years*

17c Have you ALWAYS smoked one or more cigarettes per day from the date you specified above, right up until today's date?

○ Yes ○ No

18 About how many cigarettes do you smoke in an average day?

○ 1 to 10 a day? ○ 11 to 20 a day? ○ 21 to 30 a day? ○ 31 or more a day?

19 Do you currently smoke cigars?

○ Yes *(please continue)* ○ No *(please go to Q22 on page 39)*

20a *Please specify below the MONTH & YEAR you FIRST started smoking cigars.*

month year

20b About how many years have you been smoking cigars?

(please specify) _____ *years*

20c Have you ALWAYS smoked cigars from the date you specified above, right up until today's date?

○ Yes ○ No

Office Use Only

54 56 62 63 64 65 67 73 74

For each question, please tick the circle ✓ for the answer that best applies to you, or write details in the space provided. Please do not skip any questions.

21 How often do you smoke cigars?

○ only occasionally ○ 1 cigar in an average day? ○ 2 to 3 cigars in an average day? ○ 4 or more cigars in an average day?

22 Do you currently smoke a pipe?

○ Yes *(please continue)* ○ No *(please go to the final instructions below)*

23a *Please specify below the MONTH & YEAR you FIRST started smoking a pipe.*

month year

23b About how many years have you been smoking a pipe?

(please specify) _____ *years*

23c Have you ALWAYS smoked a pipe from the date you specified above, right up until today's date?

○ Yes ○ No

24 How often do you smoke a pipe?

○ only occasionally ○ 1 pipe full in an average day? ○ 2 to 3 pipes full in an average day? ○ 4 or more pipes full in an average day?

Office Use Only

1 2 4 10 11 12

Please check that you have answered every question that applies to you in PART 4, before turning to PART 5.

☞

New Zealand Nuclear Test Veterans Postal Survey

PART 5

The following questions focus on any long-term health problems that you may CURENTLY have.

Long-term health problems are more severe health problems that you have had for six months or more, or something that is likely to last for at least six months. Please tick the circle ✓ corresponding to the word 'Yes' OR 'No' to indicate if a doctor, nurse, or other health care worker has told you that you have any of the following long-term health problems. Please do not skip any questions.

(Please tick ONE CIRCLE on each line.)		Yes	No	Office Use Only
1a	Cancer?	○	○	1
1b	If you **DO** suffer from cancer, what type/s of cancer? *(specify below)*			5
1c	Have you ever received radiation therapy **OR** chemotherapy to treat your cancer?	○	○	6
2	Diabetes?	○	○	
3	Epilepsy?	○	○	
4	High blood pressure or hypertension?	○	○	
5	Heart trouble e.g. angina or myocardial infarction?	○	○	10
7	Stroke?	○	○	
7	Asthma?	○	○	
8	Other respiratory conditions e.g. bronchitis?	○	○	13
9	Stomach ulcer or duodenal ulcer?	○	○	
10	Chronic liver trouble e.g. cirrhosis?	○	○	14
11	Bowel disorders e.g. colitis or polyps?	○	○	
12	Hernia or rupture?	○	○	
13	Chronic kidney or urinary tract conditions?	○	○	18

Long-term health problems are more severe health problems that you have had for six months or more, or something that is likely to last for at least six months. Please tick the circle ✔ corresponding to the word 'Yes' OR 'No' to indicate if a doctor, nurse or other health care worker has told you that you have any of the following long-term health problems. *Please do not skip any questions.*

	(Please tick ONE CIRCLE on each line.)	Yes	No	Office Use Only
14	Chronic skin conditions e.g. dermatitis or psoriasis?	○	○	
15	Arthritis or rheumatism?	○	○	
16	Hepatitis?	○	○	
17	Sight impairment or loss?	○	○	
18	Hearing impairment or loss?	○	○	
19	Glandular fever (Infectious mononucleosis)?	○	○	
20	Herpes?	○	○	
21	AIDS?	○	○	
22	Meningitis?	○	○	
23	Bacterial or viral infection?	○	○	

24 Do you currently have, OR have you ever had any OTHER MAJOR illness?

○ **Yes** *(please continue)* ○ **No** *(please go to Q25 on page 43)*

Please record (in the space provided below) any OTHER MAJOR ILLNESS, stating WHEN you were ill (month & year to month & year), and the TREATMENT for that illness. Provision is made for you to make 7 entries in this booklet. ***If this is insufficient space, extra formatted sheets will be brought to your face-to-face interview. When you have finished recording your entries please go to Q25 on page 43.***

[24a] **Illness:** _____ **From:** ☐☐☐☐ (month / year)

_____ **To:** ☐☐☐☐ (month / year)

_____

Treatment: _____

_____

[24b] **Illness:** _____ **From:** ☐☐☐☐ (month / year)

_____ **To:** ☐☐☐☐ (month / year)

_____

Treatment: _____

_____

24 contd. *Please continue recording (in the space provided below) any OTHER MAJOR ILLNESS (not already listed in PART 5 Q1 to Q23), stating WHEN you were ill (month & year to month & year), and the TREATMENT for that illness.*

If there is insufficient space, extra formatted sheets will be brought to your face-to-face interview. When you have finished recording your entries please go to Q25 on page 43.

Office Use Only

[24c] **Illness:** _____ **From:** | | | | | (month / year)

_____ **To:** | | | | |

Treatment: _____ 6

_____ 7

_____ 7

[24d] **Illness:** _____ **From:** | | | | | (month / year)

_____ **To:** | | | | |

Treatment: _____ 3

_____ 9

_____ 15

[24e] **Illness:** _____ **From:** | | | | | (month / year)

_____ **To:** | | | | |

Treatment: _____ 18

_____ 24

_____ 30

[24f] **Illness:** _____ **From:** | | | | | (month / year)

_____ **To:** | | | | |

Treatment: _____ 33

_____ 39

_____ 45

[24g] **Illness:** _____ **From:** | | | | | (month / year)

_____ **To:** | | | | |

Treatment: _____ 48

_____ 54

_____ 60

24 contd. **Do you need any extra sheets at your face-to-face interview to record more entries for Q24?**

◯ Yes ◯ No | | 61

25 Please list <u>any other illness</u> (including cold and 'flu) that you have experienced in the <u>PAST 12 MONTHS</u>. Record the <u>ILLNESS</u>, <u>WHEN YOU WERE ILL</u> (month & year to month & year), and the <u>TREATMENT</u> for that illness. Provision is made for you to record 9 entries in this booklet.

If there is insufficient space, extra formatted sheets will be brought to your face-to-face interview. When you have completed recording your entries please go to PART 5 on page 45.

Please note that "the PAST 12 MONTHS" is the period

From: [ ][ ][ ][ ] (month year) To: [ ][ ][ ][ ] (month year)

Office Use Only

[25a] Illness: _____ From: [ ][ ][ ][ ] (month year)

_____ To: [ ][ ][ ][ ]

_____

Treatment:

_____ 2 9 15

[25b] Illness: _____ From: [ ][ ][ ][ ] (month year)

_____ To: [ ][ ][ ][ ]

_____

Treatment:

_____ 18 24 30

[25c] Illness: _____ From: [ ][ ][ ][ ] (month year)

_____ To: [ ][ ][ ][ ]

_____

Treatment:

_____ 33 39 45

[25d] Illness: _____ From: [ ][ ][ ][ ] (month year)

_____ To: [ ][ ][ ][ ]

_____

Treatment:

_____ 48 54 60

[25e] Illness: _____ From: [ ][ ][ ][ ] (month year)

_____ To: [ ][ ][ ][ ]

_____

Treatment:

_____ 63 69 75

25 *contd.* *Please continue to record any other illness (including cold and 'flu) that you have experienced in the PAST 12 MONTHS. Record the __ILLNESS__, __WHEN YOU WERE ILL__ (month & year to month & year), and the __TREATMENT__ for that illness. Provision is made for you to make 9 entries in this booklet. If there is insufficient space, extra formatted sheets will be brought to your face-to-face interview.*

Please note that "the PAST 12 MONTHS" is the period

From: ☐☐ ☐☐ (month / year) **To:** ☐☐ ☐☐ (month / year)

Office Use Only

[25f] **Illness:** ____________________

____

____

Treatment: ____________________

From: ☐☐ ☐☐ (month / year)

To: ☐☐ ☐☐

[25g] **Illness:** ____________________

____

____

Treatment: ____________________

From: ☐☐ ☐☐ (month / year)

To: ☐☐ ☐☐

[25h] **Illness:** ____________________

____

____

Treatment: ____________________

From: ☐☐ ☐☐ (month / year)

To: ☐☐ ☐☐

[25i] **Illness:** ____________________

____

____

Treatment: ____________________

From: ☐☐ ☐☐ (month / year)

To: ☐☐ ☐☐

---

25 *contd.* **Do you need any extra sheets at your face-to-face interview to record __more__ entries for Q25?**

◯ Yes ◯ No

Thank you for answering PART 5. Please ensure that you have answered __every__ question, before turning to PART 6. ☞

PART 6

The following two sections have statements that relate to your memory in everyday life. In Section I the statements focus on your ability to remember <u>specific types of information</u> (for example, the name of the person just introduced to you).

I

The statements below give examples of using your memory in everyday situations. Please indicate your ability to remember the specific type of information by writing the appropriate <u>number</u> in the box alongside the statement, using the key provided below.

<u>Example</u>: If you consider that your ability to remember your friends' telephone numbers is good, you should enter 4 (refer to the key below) in the box beside that statement; alternatively, if you think your memory to do this is poor, you should enter 2 (see the key below). Please do <u>not</u> leave out any statements.

Use the following key for your responses:				
1 very poor	2 poor	3 fair	4 good	5 very good

My ability to remember...

			Office Use Only
1	.. the gifts I have received on special occasions (for instance Christmas or my birthdays) during the past several years is ...		1
2	.. the name of a person just introduced to me is ...		2
3	.. to turn out lights, turn off appliances, and lock doors when leaving home is ...		3
4	.. specific facts from a newspaper or magazine article I have just finished reading is ...		4
5	.. verbal directions to a place given minutes earlier is ...		5
6	.. the details of holidays or special occasions of my childhood is ...		6
7	.. telephone numbers or address codes that I use on a daily or weekly basis is ...		7

I contd. *Please continue to indicate your ability to remember specific types of information by writing the appropriate number in the box alongside the statement, using the key provided below.*

Please do <u>not</u> leave out any statements.

Use the following key for your responses:				
1 very poor	2 poor	3 fair	4 good	5 very good

My ability to remember...

Office Use Only

8	.. to write letters I intend to write, or make telephone calls I intend to make is ...	8
9	.. the meanings of words I use only rarely is ...	9
10	.. which door I entered when shopping in a large department store or mall is ...	10
11	.. the details of family events that occurred during the past year is ...	
12	.. the addresses of close family members, friends or associates is ...	12
13	.. to take along, when leaving home or work, any items that I intended to take (for instance, an umbrella or a letter to mail) is ...	
14	.. the meaning of words that once I knew very well is ...	14
15	.. how to reach a place I have visited once or twice is ...	
16	.. who was with me at events attended weeks or months ago is ...	16
17	.. the telephone numbers or postal codes that I use on a monthly basis or less often is ...	
18	.. where I have put objects (such as keys) in my home or office is ...	18

Section II statements focus on <u>how often</u> you have trouble remembering specific things (for example, forgetting what you intended to buy at a grocery store or a pharmacy).

II **The statements below list examples of difficulties using your memory in everyday situations. Please indicate HOW OFTEN you have trouble with your memory by writing the appropriate number in the box alongside each statement, using the key provided below.**

Complete each statement below by selecting your response from the key provided. Simply write the number of that response in the box beside the statement. Please do <u>not</u> leave out any statements.

Use the following key for your responses:				
1 very often	2 often	3 some-times	4 rarely	5 very rarely

Complete these statements:

		Office Use Only
1	I have difficulty recalling a word I wish to use ...	19
2	I miss the point that someone else is making during a conversation ...	20
3	I go into a room to get something, and forget what I was after ...	
4	I have to stop and think when distinguishing right from left ...	22
5	I forget which waiter took my order in a restaurant ...	
6	I feel that a word or name I want to remember is 'on the tip of my tongue' but cannot recall it ...	24
7	I have difficulty following a conversation when there are distractions in the environment, such as noise from a TV or a radio ...	
8	I forget to bring up an important point in a conversation that I intended to mention ...	26
9	I dial a number and forget whom I was calling before the phone is answered ...	
10	I fail to recognise people who recognise me ...	28

II contd. *Please continue to indicate HOW OFTEN you have trouble with your memory by writing the appropriate number in the box alongside each statement, using the key provided below.*

Please do not leave out any statements.

Use the following key for your responses:				
1 very often	2 often	3 some-times	4 rarely	5 very rarely

Complete these statements:

		Office Use Only
11	I forget the name of a familiar object ...	29
12	I have to re-read earlier paragraphs from a news-paper or magazine story to understand the point ...	30
13	I arrive at the grocery store or pharmacy and forget what I intended to buy ...	
14	I forget an appointment or other event that is very important to me ...	32
15	I meet people who seem familiar, but can't remember where I met them ...	
16	I fail to remember a name or word when trying to, but recall it later ...	34
17	I have trouble finding my place again when interrupted in reading ...	
18	I store an important item in a place where it will be safe, and then forget where it is ...	36
19	I take a surprisingly long time to recall a fact that I know quite well (and do eventually remember)...	
20	I confuse one word with another when they sound the same ...	38

Thank you for completing PART 6.

Please read the final check list of instructions on the outside cover page, before you return your completed survey.

Postal Survey Final Page

Before you place your completed survey in the addressed, FREEPOST envelope, please complete the check list below:

Please ...

✔

- .. double check to see that you have NOT skipped any pages, as this is very easy to do! ☐
- .. triple check that you have entered ALL the details that you intended to, including any extra notes. ☐
- .. place your completed postal survey booklet in the supplied, addressed FREEPOST envelope. ☐
- .. post your completed survey booklet as soon as you have finished filling it in, and attended to the check list above. ☐

If you have any queries related to any aspects of this research project, please do not hesitate to contact us.

Research team contact details:

Telephone at:
(0 6) 3 5 0 5 5 5 8

Fax at:
(0 6) 3 5 0 5 6 7 3

Free-phone at:
(Only for callers outside the Manawatu toll free zone)
0 8 0 0 1 0 8 6 1 6

Mail at:
School of Psychology
Massey University
P/Bag 11 222
Palmerston North

Email Judy at:
J.A.Blakey@massey.ac.nz

Email Dr John Podd at:
J.V.Podd@massey.ac.nz

Email Dr Al Rowland at:
R.E.Rowland@massey.ac.nz

Thank you, once again, for your time completing this survey.

APPENDIX 4

Personalised Letter

Information Sheet (Exposed group)

Information Sheet (Controls)

Consent Form

Life Events' Grid

22 May 2002

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

School of Psychology
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 909
Facsimile: 64 6 350 5673

Dear

Re: **New Zealand Nuclear Test Veterans Postal Survey: A Pilot Study**

Thank you for agreeing to participate in this research project. Your contribution is appreciated, and the confidentiality of your responses will be assured at all times.

Enclosed with this letter are:

- a copy of the Information Sheet (which provides details related to this study)
- a Life Events' Grid sheet (which, when completed, will help you navigate through your memories of significant events in your life)
- a postal survey booklet (with a range of questions), a bookmark (with our contact details), and addressed FREEPOST envelope (to return the postal survey booklet)

Please read the Information Sheet *before* you complete the consent form, which is inside the front cover of the postal survey booklet. As researchers it is essential that we obtain each participant's informed consent, so please remember to do this ***before*** you start responding to the postal survey questions.

You will become aware from the study's background information sheet that two different groups of participants will be responding to this postal survey: Operation Grapple veterans and participants selected to form a matched comparison group. Both groups of participants will follow identical research procedures. As a result, you may well find that certain questions in this postal survey booklet do not apply to you (for example Question 12 on page 4). Please read each question carefully, and make every effort to follow the instruction guidelines when responding. If for any reason these instructions are unclear, please feel free to contact me to ask for clarification. (The **FREEPHONE 0800 108 616** is only for callers outside the Manawatu toll free zone; local callers can reach me on **(06) 350 5558**.)

The survey appears long, but at least 25 of the pages are formatted to gather multiple entries of the same biographical information. We have to cater for a wide variety of responses, so we have made sure there is more than enough space for each person to record as much as they need to! Some questions are of a personal nature, for example, those relating to your income, as well as your alcohol and tobacco consumption. The income measure will be used simply to describe the average socio-economic profile of all the participants in this study; the measures of alcohol and tobacco consumption are important when considering possible genetic damage.

The postal survey consists of six parts:

PART 1: collects general background information, including your service details;

PART 2: asks you to record your occupational history since 1950, including questions about your exposure to a variety of substances;

PART 3: primarily focuses on your health in the past 12 months, but also includes listing all the X-rays you have had since 1950;

PART 4: gathers details about your current eating and drinking habits, as well as your smoking history;

PART 5: questions relate to any long term health problems you may have;

PART 6: focuses on your memory in everyday life.

Many of the questions expect that you are able to remember information about events in your life, in some cases from as long ago as forty or more years. To assist you retrieve this information as accurately as possible we would like you ***first to create a life events' grid***; a fancy way of asking you to note down significant events in your life, such as when you left school, your marriage date, the birth of a child, etc. Research has shown that participants who use time lines with these sorts of reference points are able to remember more easily when other events occurred. So, spend a few moments **completing *your own* Life Events' Grid** (see attached sheet) ***before* you start PART 1.** You can use your grid as and when you need to establish reference points once you start responding to the questions. You do ***not*** need to return your grid with the completed survey booklet.

We are keen to have your completed survey booklet returned as soon as possible, but more importantly we urge that you are careful and thorough when completing it. Completion times will vary, depending on participants' health histories, and will probably take more than an hour. If you need a break, it's quite okay to complete the questions in more than one sitting. There will be time in your face-to-face interview to clarify any issues that crop up in the postal questionnaire. Also, extra formatted sheets will be on hand, if you need any. Missing information is the researchers' bugbear! So please try to answer all the questions that apply to you.

When you have completed the survey, place it in the enclosed addressed FREEPOST envelope and post it off. Once again, many thanks for your participation in this very important study.

Yours faithfully

Judy Blakey

Judy Blakey

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

School of Psychology
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099
Facsimile: 64 6 350 5673

NEW ZEALAND NUCLEAR TEST VETERANS: A PILOT STUDY

INFORMATION SHEET(E)

Thank you for expressing an interest in helping us with this Nuclear Test Veterans' Pilot Study, a study we now invite you to take part in. Before you agree, you should read the following information back- grounding the purpose of the study and your involvement in it, should you consent to take part.

Recently, we agreed to undertake two parallel studies, one funded by the New Zealand Nuclear Test Veterans Association and the other by the War Pensions Medical Research Trust Board. One aim of these studies is to find out if the genetic material of men exposed to a nuclear bomb blast during the 1950s might have been adversely affected. We also agreed to collect information that will help determine your current health status. Our names are Dr Al Rowland (Institute of Molecular Biosciences) and Dr John Podd (School of Psychology). Al is an expert in human cell analysis while John has expertise in research design and the collection and analysis of questionnaire data. We have worked together on several projects over the past few years. We can be contacted by telephone, Al at (06) 3569099 Ext 7977, and John at (06) 3569099 Ext 2067.

We are very keen to do the proposed study, having the full support of the War Pensions Medical Research Trust Board and the New Zealand Nuclear Test Veterans' Association. The purpose of this letter is to tell you more about the study and what you would be asked to do should you wish to be involved.

The study has two main purposes. The first is to examine human blood cells to see if some of the genetic material in those cells could have suffered damage due to exposure to the nuclear bomb blasts you witnessed in the Pacific in the 1950s. A relationship is known to exist between chromosome damage and ill health, such as some blood disorders and various cancers. In other words, as chromosomal damage increases so does the **risk** for some disorders increase. If we find evidence of suspected abnormal levels of damage to your chromosomes, it definitely does not mean you are sick, or even likely to get sick. Rather, it is an alert signal that there is an increased risk for ill health. **Any results of chromosome damage that we might find should not be used by anyone**

including your doctor, as a diagnostic result. What we wish to find out, by comparing veterans who witnessed the nuclear bomb tests with other men who did not, is whether these tests have increased the level of chromosomal damage observed in one group as compared to another. However, if such evidence is found, no conclusions or claims can be drawn other than those made by similar chromosome analysis studies. That is, while there is a correlation between chromosome damage and ill health, any damage observed does **not mean you are sick.** This would require further investigation by your doctor.

Taking a small blood sample from your arm (about 2 teaspoons) will take only a few minutes and will either by done at your local medical laboratory or by Judy Blakey from Massey University. Judy is fully trained and authorised to take human blood samples as well as being the Research Officer for this study. We have to take into consideration that over the past 40 or so years, activities such as tobacco smoking, alcohol intake, excessive exposure to X-rays or the sun, and a range of other things could also have brought about the genetic changes we will be looking for. Therefore, we have to gather further information to determine if any fraction of the damage we might find is due to these other factors. So, we will ask you to complete a questionnaire that seeks information on your life-style, occupation, and other matters that will help us determine the things we need to take into account in assessing your blood sample.

The second purpose of our study is to build a picture of your current health status. To do this, we will ask you to complete a number of questionnaires including ones about your memory for everyday events, your mood, your general health and how it affects daily activities, and any chronic illnesses you might have – like diabetes, heart problems, or chronic skin conditions. Some questionnaires will be sent to you by post. Others will need to be completed with the assistance of Judy Blakey, in a face-to-face interview. Judy has a Masters degree in Psychology and is a very experienced interviewer having just completed interviews with over 200 hundred men in a large study of hearing aid use among Veterans.

We will be collecting blood samples and giving the same questionnaires to a group of men of about your age and who served in the Armed Forces about the same time that you did. However, this "control" group will not have been exposed to a nuclear bomb blast as you were. When we look at the data from this group compared to those exposed to nuclear radiation, the only major difference should be the exposure to radiation.

To sum up, if you take part in our study, we would like you to provide a blood sample and to complete some questionnaires. Your total involvement should take no more than two and a half hours. Of course, you have the right to decline to take part, and even if you do agree to "sign on", you have the complete freedom to withdraw at anytime. You are in control! The only risk you are exposed to is having blood taken from a vein in your arm. The risk to you is negligible and no higher than having your own medical laboratory do this for some other purpose. If we detect any

chromosomal abnormalities in your blood, or if we find you are scoring at an unusually high level on any of the questionnaires, we would advise you to see your own doctor.

The blood samples will be destroyed once the blood cultures have been established and questionnaires will be destroyed at the completion of the study. We do need you to provide your name but we give you, your blood sample, and your questionnaire responses a code number. We remove the first two pages of the questionnaire booklet containing your name and signature. These will be locked away securely in the senior researchers' offices (Al and John). From that point on, we use only your code number. In this way, no one other than the researchers can associate your responses with your name.

We expect that the results we get will be of sufficient interest to the scientific community to warrant publication. Please be completely assured that it will be totally impossible to connect your name to any of the published data. **Your name will not be disclosed.** We are very much concerned about your welfare. Therefore, we will endeavour to obtain the best possible data that circumstances will permit. However, as scientists, we must remain objective and unbiased and not be seen to be taking sides. If we did, then this would taint our reputation in respect of future work we do. We will pass our findings on to The War Pensions Medical Research Trust Board and the New Zealand Nuclear Test Veterans' Association. It will be their sole responsibility to decide what to do next.

Finally and most importantly, you have clear and distinct rights if you should decide that you want to take part in this study. You have the right:

- to decline to participate;
- to refuse to answer any particular questions;
- to withdraw from the study at any time;
- to ask questions about the study at any time during participation;
- to provide information on the understanding that your name will not be used unless you give permission to the researcher;
- to be given access to a summary of the findings of the study when it is concluded.

Please ring either Al or John if you have any concerns whatsoever about this study. We will be freely available to you at any time.

John Podd

Al Rowland

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

School of Psychology
Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099
Facsimile: 64 6 350 5673

NEW ZEALAND NUCLEAR TEST VETERANS: A PILOT STUDY

INFORMATION SHEET(C)

Thank you for expressing an interest in helping us with this Nuclear Test Veterans' Pilot Study, a study we now invite you to take part in. Before you agree, you should read the following information backgrounding the purpose of the study and your involvement in it, should you consent to take part.

Recently, we agreed to undertake two parallel studies, one funded by the New Zealand Nuclear Test Veterans Association and the other by the War Pensions Medical Research Trust Board. One aim of these studies is to find out if the genetic material of men exposed to a nuclear bomb blast during the 1950s might have been adversely affected. We also agreed to profile the current state of health of this group. Our names are Dr Al Rowland (Institute of Molecular Biosciences) and Dr John Podd (School of Psychology). Al is an expert in human cell analysis while John has expertise in research design and the collection and analysis of questionnaire data. We have worked together on several projects over the past few years. We can be contacted by telephone, Al at (06) 3569099 Ext 7977, and John at (06) 3569099 Ext 2067.

We are very keen to do the proposed study, having the full support of the War Pensions Medical Research Trust Board and the New Zealand Nuclear Test Veterans' Association. We have already obtained a group of veterans who were exposed to a nuclear bomb blast. What we now need is a comparison group who are very similar to these men but who were not so exposed. In reality, the best we can do is to get a group of men who served in the armed forces around the same time as the exposed veterans. The comparison group will therefore be of about the same age and hopefully will have a similar background. And that's where you come in. You are a NZ Veteran, of similar age to the exposed men, who has expressed interest in taking part in this study.

Before you agree to take part, there are a few things about the study you need to be aware of. The study has two main purposes. The first is to examine human blood cells to see if some of the genetic

material in those cells could have suffered damage due to exposure to the nuclear bomb blasts witnessed in the Pacific in the 1950s. A relationship is known to exist between chromosome damage and ill health, such as some blood disorders and various cancers. In other words, as chromosomal damage increases so does the **risk** for some disorders increase. What we wish to find out, by comparing veterans who witnessed the nuclear bomb tests with men like yourself who did not, is whether these tests have increased the level of chromosomal damage observed in one group as compared to another.

To make these comparisons, we need to take a small blood sample from your arm (about 2 teaspoons). This will take only a few minutes and will either by done at your local medical laboratory or by Judy Blakey from Massey University. Judy is fully trained and authorised to take human blood samples as well as being the Research Officer for this study. We have to take into consideration that over the past 40 or so years, activities such as tobacco smoking, alcohol intake, excessive exposure to X-rays or the sun, and a range of other things could also have brought about the genetic changes we will be looking for. Therefore, we have to gather further information to determine if any fraction of the damage we might find is due to these other factors. So, we will ask you to complete a questionnaire that seeks information on your life-style, occupation, and other matters that will help us determine the things we need to take into account in assessing your blood sample.

The second purpose of our study is to build a picture of your current health status so we can compare it with the health profile of the exposed men. To do this, we will ask you to complete a number of questionnaires including ones about your memory for everyday events, your mood, your general health and how it affects daily activities, and any chronic illnesses you might have – like diabetes, heart problems, or chronic skin conditions. Some questionnaires will be sent to you by post. Others will need to be completed with the assistance of Judy Blakey, in a face-to-face interview. Judy has a Masters degree in Psychology and is a very experienced interviewer having just completed interviews with over 200 hundred men in a large study of hearing aid use among Veterans.

To sum up, if you take part in our study, we would like you to provide a blood sample and to complete some questionnaires. Your total involvement should take no more than two and a half hours. Of course, you have the right to decline to take part, and even if you do agree to "sign on", you have the complete freedom to withdraw at anytime. You are in control! The only risk you are exposed to is having blood taken from a vein in your arm. The risk to you is negligible and no higher than having your own medical laboratory do this for some other purpose. If we detect any chromosomal abnormalities in your blood, or if we find you are scoring at an unusually high level on any of the questionnaires, we would advise you to see your own doctor.

The blood samples will be destroyed once the blood cultures have been established and questionnaires

will be destroyed at the completion of the study. We do need you to provide your name but you will see we give you, your blood sample, and your questionnaire responses a code number. We remove the first two pages of the questionnaire booklet containing your name and signature. These will be locked away securely in the senior researchers' offices (Al and John). From that point on, we use only your code number. In this way, no one other than the researchers can associate your responses with your name.

We expect that the results we get will be of sufficient interest to the scientific community to warrant publication. Please be completely assured that it will be totally impossible to connect your name to any of the published data. **Your name will not be disclosed.** We are very much concerned about the welfare of the veterans exposed to nuclear radiation. Therefore, we will endeavour to obtain the best possible data that circumstances will permit. However, as scientists, we must remain objective and unbiased and not be seen to be taking sides. If we did, then this would taint our reputation in respect of future work we do. We will pass our findings on to The War Pensions Medical Research Trust Board and the New Zealand Nuclear Test Veterans' Association. It will be their sole responsibility to decide what to do next.

Finally and most importantly, you have clear and distinct rights if you should decide that you want to take part in this study. You have the right:

- to decline to participate;
- to refuse to answer any particular questions;
- to withdraw from the study at any time;
- to ask questions about the study at any time during participation;
- to provide information on the understanding that your name will not be used unless you give permission to the researcher;
- to be given access to a summary of the findings of the study when it is concluded.

Please ring either Al or John if you have any concerns whatsoever about this study. We will be freely available to you at anytime.

John Podd

Al Rowland

Massey University
COLLEGE OF HUMANITIES & SOCIAL SCIENCES

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Private Bag 11 222,
Palmerston North,
New Zealand
Telephone: 64 6 356 9099
Facsimile: 64 6 350 5673

NEW ZEALAND NUCLEAR TEST VETERANS: A PILOT STUDY

CONSENT FORM

I have read the Information Sheet and have had the details of the study explained to me in written form. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I understand that I have the right to withdraw from the study at any time, and to decline to answer any particular questions.

I agree to provide a sample of blood for chromosomal analysis on the understanding that I have access to my results, and that I be advised if any abnormalities are found. I understand that my blood sample will not be used for any other research, and will be disposed of sensitively.

I agree to provide information to the researchers on the understanding that my name will not be used without my permission.

(*The information will be used for this research and publications arising from this research project.*)

I agree to participate in this study under the conditions set out in the Information Sheet.

Signed .....

Name: ***(please print)*** .....

Date: .....

If you would like to receive feedback from this project in the form of a brief written report please tick the appropriate box below:

YES ☐ **NO** ☐

New Zealand Nuclear Test Veterans
Life Events' Grid

Please complete the questions listed below. You are encouraged to personalise this grid and add <u>any</u> events not already listed that are significant to you. Do keep this sheet handy as you go through the survey, so you can refer back to these events when you come across questions asking you to remember information that goes back a number of decades. Feel free to use this page to jot down notes to remind you of anything you need to remember, or to do, as you do not have to return it with the survey booklet.

Date of birth?

Started & finished primary school?

Started & finished secondary school?

Joined (& later left) the armed services?

Any significant event/s occur during your service?

Any significant event/s occur during tertiary/trade training?

Significant long term relationships?

Births of children/grandchildren?

Significant occupational changes?

Other significant dates? (e.g. over seas travel; health related events etc.)