

participate to ensure that a meaningful outcome is possible. Both scientific and ethical issues must be considered. The number of participants chosen must provide a statistical basis to test the hypothesis and provide an outcome based on set criteria. An HREC would consider, among other issues, whether there was under or over sampling and whether the study, and the research aims, had been conducted earlier.

An ongoing observation has been that determination of sample size for protocols has not always been rigorously addressed. The accepted approach is to conduct a power calculation based on predicted or known variability expected in a population.

Associated with determination of sample size is choice of an appropriate population and sample for a study relevant to the actual population within Defence who will directly benefit from the outcomes. Care must be exercised to ensure that results are valid as intended.

This presentation will consider both population choice and matching and provide a practical description and solution for sample size calculation for investigators who may not have ready access to a statistician. Individuals within Defence often do not have the statistical knowledge or access to statisticians to complete the framework for a project. The goal is to establish a support system with tools and educational resources to support investigators. This will also provide encouragement for new investigators who identify a health problem with the confidence to consider finding a solution.

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Lifetime fluoride exposure and dental caries experience with Australian Defence Force personnel

Greg Mahoney, Gary Slade, Scott Kitchener, Adrian Barnett

While there is good evidence of caries-preventive benefits of fluoride in drinking water among children and adolescents, there is little information about effectiveness of water fluoridation among adults. Objectives: To determine whether exposure to fluoride in drinking water is associated with caries experience in Australian Defence Force (ADF) personnel. Methods: Cross sectional study of 876 deployable ADF personnel aged 17-56 years. At each person's mandatory

annual dental examination, military dentists recorded the number of decayed, missing and filled teeth (DMFT) using visual, tactile and radiographic criteria. Participants also completed a questionnaire, listing residential locations in each year from 1964 to 2003. People were classified into four categories according to the percentage of their lifetime living in places with fluoridated water: <10%, 10-<50%, 50-<90% and ≥90%. Mean DMFT was compared among those categories of fluoridation exposure and the association was evaluated statistically using analysis of variance to adjust for age, sex, years of service and rank. Results: Without adjustment for confounders, the mean DMFT (±95% confidence interval) was 6.3±0.8 for <10% fluoridation exposure, 7.8±0.8 for 10-<50% exposure, 7.5±0.7 for 50-<90% exposure and 4.6±0.6 for ≥90% exposure (P<0.01). However, age was inversely associated with mean DMFT and in the <10% exposure group, 91% of people were aged <35 years. Service rank was also significantly associated both with fluoridation exposure and DMFT. After adjustment for all covariates, mean DMFT was 24% lower among people in the two groups with ≥50% exposure compared with the <10% exposure group. Conclusions: Degree of lifetime exposure to fluoridated drinking water was inversely associated with DMFT in a dose-response manner among this adult military population. Supported by: Centre for Military and Veterans' Health; Australian Dental Research Foundation.

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Evaluation of methods for rapid cooling of heat induced injury, is intravenous normal saline an option?

Susan Winter, Steven Rudzki, Mark Patterson, Wade Sinclair

Heat illness and its treatment remains a significant problem for the ADF, both in operational and exercise environments. A combined study by James Cook University Defence Science and Technology Organisation and the Army (Army Safety and 3 Brigade) was conducted recently in Townsville to address this.

Whilst immersion in an ice/water bath is considered the gold standard, this is prohibitively difficult in the environments above. Cold IV saline is used post cardiac arrest for brain protection but has not been

validated for cooling those with heat induced injury.

We studied three methods of cooling fit soldiers, exercised in a controlled environment to a core temperature of 40 degrees centigrade. Each soldier was cooled on three separate occasions by (1) infusion of 2 L of Normal Saline over 20 minutes, (2) application of icepacks to groin, armpits and back of neck or (3) skin wetting with a high speed fan. Core temperature was monitored using an ingested radio pill, and vital signs were monitored throughout.

All methods were efficacious and safe. Skin wetting with a high speed fan appeared to be the fastest but was limited by a plateau effect. Ice and IV saline were similar in temperature reduction, but ice was the least preferred technique.

This study will aid development of doctrine to treat heat illness in the operational environment.

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Rehabilitation and Health Promotion

Chronic low back pain in the defence forces; effective treatment, evidence based outcomes and research proposal

Anna Lewis

Chronic Low Back Pain (CLBP) is a major health and socio-economic problem in our society today. There is a high prevalence of Low Back Injuries within the Defence Forces particularly due to the unique environment and duties performed, often in very challenging circumstances. CLBP is extremely costly in terms of medical expenses, absenteeism and disability and constitutes the second most common symptom presenting to general practice and is the leading source of musculoskeletal health system expenditure. In Australia, annual LBP expenditure exceeded \$9.2 billion in 2004 (Walker 2004).

Exercise is one of the few clearly effective treatments for CLBP and the two highest levels of evidence for treatment, levels I and II, strongly support physiotherapy supervised exercise programmes (NH&MRC 2007). Despite evidence to validate exercises, uncertainty still surrounds whether any specific type of exercise is more effective than another.

In March 2003, a rehabilitation area was established within the Navy Indoor Sports Centre (NISC) at HMAS Kuttabul, Fleet Base East, Sydney. The aim of this programme was to facilitate Defence members' rehabilitation and consequent return to sea-going status and operational readiness in a more expedient manner. This area was purpose designed and fitted with Clinical Pilates equipment and the programme has produced some excellent outcomes since inception. Significantly, results include the reversion of at least four members from medical discharge and subsequent return to sea going status.

Pilot studies conducted in 2004 and 2005 produced some excellent outcomes and a research project is now being formulated to commence in 2008. The aim of this research is to investigate the effect of Clinical Pilates treatment on pain and function for patients (Defence personnel) with Chronic Low Back Pain.

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ADF rehabilitation program
– outcomes and experiences

Jim Porteous

The Australian Defence Force Rehabilitation Program (ADFRP) is much more than clinical treatment or health care of military personnel. It is an holistic assessment and management system that combines the elements of health care, occupational health and safety, and personnel capability management.

Through effective rehabilitation the ADF maximizes the personnel dimension of capability with the intent to return an injured or ill member to maximum effectiveness within the ADF environment, or if this is not possible, the civilian environment.

The new program was implemented across Australia between June and September of 2006. Since implementation we have received more than 5000 referrals to the ADF Rehabilitation Program.

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