





The prevalence of pathological pulmonary change and genetic predisposition to pulmonary oedema in occupational divers.

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Pulmonary change & genetic predisposition to pulmonary oedema



Investigators

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Purpose

This research study seeks to:

- Identify the prevalence of reduced FEV₁ in a cohort of occupational divers;
- Identify a genetic basis for susceptibility to pulmonary oedema, and determine the prevalence of this gene within a cohort of occupational divers;
- Compare lung function measurements of occupational divers with Australian Predicted Norms and lung function data collected from professional fire-fighters (South Australian Metropolitan Fire Service), who use compressed air through breathing apparatus and are similarly matched in terms of fitness, gender and age.
- Inform divers and underwater medical specialists about the limitations and risks of diving using S.C.U.B.A for better management of the health of divers.




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Background

- Pilot studies – potential risk
- 64% overweight; 31% regular medication for hypertension, asthma, hypercholesterolaemia and cardiac irregularities. Findings indicated that increased diving experience correlated with changes in pulmonary function, indicating pathological changes of unknown clinical significance
- In commercial divers, Skogstad et al found FVC decreased by 0.91%/year; FEV₁ by 0.84%/year; and DLCO by 1.3%/year during six years.
- Pulmonary oedema in divers is unknown, Slade et al argue over 1% of scuba divers have experienced it, though this is likely under-reported.
- Factors that increase divers' risk of pulmonary oedema including equipment failure, stress and panic, cardiovascular disease history and heavy exertion.
- Genetic variation in the regulatory proteins important in lung fluid balance may influence susceptibility to pulmonary oedema (Snyder et al)




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Study Plan

- Prospective and retrospective approaches to gather data from occupational divers at multiple sites across Australia.
- A convenience sample of participants undergoing their required annual occupational diving medical.
- To detect a 5% increase in the proportion of divers with abnormal spirometry after 3 years with at least 80% power and p<0.05, a sample of 340 divers is required.
- Medical assessment (ASNZ2299): participants will complete a health questionnaire
- Spirometry
- A finger prick blood sample
- Previous years spirometry & health assessment data




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Analysis

- Results will be entered into SPSS
- Interpretation of spirometric measures will be performed to the American Thoracic Society and European Respiratory Society (ATS/ERS) guidelines and the Global Initiative on Obstructive Lung Disease (GOLD) criteria.[19]
- DNA extraction and analysis from the blood samples will be conducted by an experienced DNA analyst.




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Significance

- International need for evidence based guidelines for the assessment and management of fitness to dive.
- Add significantly to the identification of a genetic basis for susceptibility to pulmonary oedema, and determine the prevalence of this gene within the diving community.
- This study will provide information on the prevalence of lung disease and pulmonary oedema associated with occupational diving, contribute to current understanding of potential respiratory complications associated with diving and inform best diving and medical practice. Increased knowledge will benefit OH&S policy, the commercial dive industry, tourism and diving medicine.



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