

The evidence base for seafarer pre-employment medical examinations (PEMEs)

Tim Carter

Norwegian Centre for Maritime Medicine, Haukeland University Hospital, Bergen, Norway

Pre-employment medical examinations (PEMEs) are exercises in prediction. How likely is it that a seafarer will pose a risk to the safety of others, become incapacitated, need evacuation or even die while they are at sea? What is the probability of this happening between this PEME and the next? What is the scope for mitigating these risks by changing the working or living environment, by lifestyle changes on the part of the seafarer, by improving the management of illness at sea or by treating any medical conditions or risk factors for illness found at the PEME?

In a recent issue of 'International Maritime Health' I argued for better recognition of the differences in perspective between the various interest groups who specify fitness criteria for seafarers, as well as greater openness about information collected on findings at PEME and on illness arising at sea and its consequences [1]. The article on assessing the validity of laboratory tests and imaging techniques in this issue provides a rational framework for decision taking on the content one aspect of the PEME [2]. This science-based approach is likely to be more productive than the political grandstanding I indulged in by praising the virtues of the clinical basis for statutory fitness criteria and contrasting this with the technology based criteria adopted, mainly to reduce repatriation and treatment costs, by employers and their insurers.

There are well-established statistical methods that are widely used to determine the benefits and the pitfalls of prognostic testing when it is being considered in other areas of health-care. Much of the initial enthusiasm for so called 'screening tests' as part of routine checks on healthy people has dwindled because so often the false positive results create an army of 'worried well', while the false negatives discredit the use of such tests because opportunities to treat illness early are missed. As this article demonstrates the same statistical methods can

usefully be applied to decisions about the content of seafarer PEMEs.

While the article concentrates on the laboratory tests and imaging procedures, similar approaches can be applied to the use of an individual's medical history, clinical examination and clinical tests to determine fitness. This means that all parts of the process need to be open to critical evaluation, not just the additional laboratory tests and imaging techniques that are included in some insurer and employer protocols.

A good example of the need for such an approach at the heart of the statutory requirements is the use of colour vision testing in seafarers. The first question to be addressed is what level of colour deficiency is compatible with safe work at sea, both as a lookout scanning for coloured navigation lights and as an engineer identifying colour coded cables correctly? The second is what method of testing for colour deficiencies correctly separates out all those able to perform one or other of these tasks from all those who are unable to do so? The third is what are the implications of the colour vision tests adopted for the employment of the 5% of the male population who have some degree of colour vision deficiency?

The answers to these questions show up wide gaps in our knowledge about task demands: the lookout criteria which have served for the last century were defined in 1910–1913 at a time when ships' bridges were not enclosed, refractive correction was not generally permitted and navigation lights were oil burning [3]. It is unlikely that they are still valid, but as yet the international maritime community has not been prepared to invest in a project to re-assess the visual demands and then to determine which test protocols will best identify those individuals who meet them. There have long been national differences in colour vision testing for engineers and a number

of major maritime states have not required it, but have never identified any incidents arising because of deficient colour vision, so why has this requirement persisted?

It is now well established that the number of Ishihara plates miss-read does not reliably predict the severity of colour deficiency, yet this test is generally used, with only those who miss-read more than two plates having additional testing [4, 5]. As a consequence the maritime industry rejects up to 5% of all male applicants based on ancient information about the visual task demands and poorly validated test schedules.

The validation of laboratory tests and imaging techniques is only a small part of the task ahead if PEME procedures are to be optimised to maximise the reduction in risk from health problems at sea while, at the same time, minimising unjustified discrimination against seafarers who are, in reality, fully fit to work there. Those professionally engaged in the assessment of seafarer fitness need

to take an active role in advocating change rather than seeing themselves as passively complying with criteria set by others.

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