The Institute of Naval Medicine 1969-2019: departments past and present

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Introduction

In the year of its 50th anniversary, the Institute of Naval Medicine (INM) continues to provide operational support, research and specialist advice to members of the Royal Naval Medical Service. This article offers a retrospective of the history of each department and, with the help of the current departmental heads, summarises present departmental activity and looks to the future.

Diving and Hyperbaric Medicine Department: history

Diving and submarine escape have been an important part of INM’s history. The early work was led by Surgeon Commanders David Elliott and Peter Bernand, followed by Tom Shield. The Undersea Medicine Department supported the Submarine Escape Training Tank at HMS DOLPHIN throughout its long life and has seen escape transformed from the unsophisticated Davis apparatus to the possibility of dry(ish) transfer to the surface, courtesy of a submersible vehicle.

Medical Officers at Alverstoke defined safe decompression tables and diving routines until quite recently and, in the 1970s, worked on board HMS RECLAIM to support record-making deep dives from the ship. The bell from HMS RECLAIM is displayed in the Main Building foyer in INM. After the Gulf War, personnel, together with staff of the RN Physiological Laboratory across the road, helped to enhance equipment so that men could dive to neutralise the latest generations of very deeply sited mines which had to be dealt with by hand.

Hyperbaric medicine is a developing treatment with a wide range of uses including the management of decompression illness in divers, carbon monoxide poisoning, and the treatment of tissues deprived of oxygen by disease. INM was an early provider, and in 1996 became an operating partner of the Sir James Watt Hyperbaric Medicine Unit at the Royal Hospital HASLAR.

The gradual withdrawal of acute medical services from HASLAR, beginning with the closure of the intensive care unit, made treatment of acutely ill patients increasingly difficult, and the work was eventually moved to Chichester. The NHS consultant directing the work there is Surgeon Commander Mark Glover, who retired from INM to establish this unit; present INM diving Medical Officers are rostered for duty.

Figure 1: Surgeon Rear Admiral Sir James Watt KBE FRCS RN, honorary freeman of the Worshipful Company of Barbers, MOIC INM 1969-1972. [© Institute of Naval Medicine]
Two individuals from INM were particularly involved in hyperbaric medicine. John Rawlins was seconded from INM to the RAF at Farnborough as a researcher. He proved to be brilliantly inventive, and worked courageously and successfully on protective helmets for Naval aircrew, then on an underwater escape system which allowed aircrew to eject safely from ditched aircraft even when unconscious. He used himself as a volunteer subject, being ejected underwater repeatedly in that hair-raising work.

Rawlins became Medical Officer-in-Charge (MOIC) in due course and was eventually relieved at INM by John Harrison; a quiet man until roused, with a twinkle in his eye. He was a radiologist who excelled nationally, protecting divers in the RN and the civilian world from the potentially crippling occupational disease aseptic bone necrosis. He advised on prevention of the injury and how to manage its victims.

Submarine and Radiation Medicine Department: history
INM responded quickly to fill the need for submarine medicine from the start of the Polaris project. Advising on, and providing the submerged submarine crew with a satisfactory environment during weeks of continuous submerged patrol in a sealed metal tube has presented INM’s submarine medicine and environmental chemistry departments with continuing challenges since 1969. Submariners cannot just open a window for a breath of fresh air, and INM has a proud history of identifying substances which may be hazardous to them, advising on their control and monitoring their concentration in the submarine’s environment.

Milestones in INM’s history are cataloguing and controlling all substances said to be required on board; forbidding some and monitoring many others against specially set 24-hour exposure control levels, and using much more sensitive instruments to monitor samples of the atmosphere onboard. In the last 50 years, this Department has been both a gatekeeper and a world leader.

Environmental and Industrial Hazards Laboratories 2019
The Environmental and Industrial Hazards (EIH) laboratory is the sole Ministry of Defence (MoD) facility providing direct Environmental Health support to UK forces, both at home and abroad. As such it provides important support to Force Health Protection. The lab’s most important role is the water quality service, which provides policy, information and advice on all aspects of drinking water quality at sea, on land and in the air. This is by far the single most important resource on any military deployment but is often overlooked in favour of other more technical resources. It is the oldest continuous task carried out at INM, dating back to the water analysis carried out at Greenwich and Clevedon before the Royal Naval Medical School (RNMS) moved to Alverstoke in 1948.

Of equal importance to submariners is clean air, which is a limited resource whilst dived, and needs careful monitoring, as exposure to any contaminants is essentially constant. The

Figure 2: Surgeon Rear Admiral J.S.P. Rawlins OBE QHP RN. MOIC INM 1975-1977. [© Institute of Naval Medicine]
laboratory plays a key role in the safety certification process for Continuous At Sea Deterrent (CASD) and the submarine flotilla, providing both analysis of atmospheric samples and helping to staff teams carrying out investigations and acceptance trials at sea. More recently occupational and environmental analysis has become more common, having receded during Operations TELIC and HERRICK. The laboratory holds ISO 17025 accreditation for the majority of its work and enjoys a reputation for timely and effective support throughout the armed forces.

(Mr David Lewis)

Underwater Medicine Division 2019

The Underwater Medicine Department is responsible for the provision of diving and hyperbaric medicine and submarine and radiation medicine to the military. The diving and hyperbaric medicine consists of three senior diving medicine specialists and up to four General Duty Medical Officers (MOs) trained in diving medicine, supported by a Petty Officer Medical Assistant and a civilian Administration Officer. It provides 24/7 emergency cover for military diving support and advice, with emergency management and treatment for all divers in the geographical area surrounding Portsmouth and the South Coast via the category one hyperbaric chamber based in St Richards Hospital, Chichester. It has a deployable capability to provide trained MOs for high risk diving operations worldwide, including submarine escape and rescue. It also provides training to military doctors, medics and divers in diving medicine, sets the diving medical standards and oversees all fitness to dive decisions, and is involved in assisting the development of the Ministry of Defence (MoD)’s diving safety policy.

(Surgeon Commander Simon Phillips Royal Navy)

Environmental Medicine and Science (EMS) Division 2019

This division is vital to the occupational and environmental health of Defence personnel, critical to Force Generation and Protection, strategically and directly aligned to MoD’s key tasks of CASD and defending national interests by projecting power. Increasingly, it also plays a key role in supporting civil emergencies. These military tasks are performed by 54 civilians from backgrounds ranging from clinical medicine, human factors to environmental science; professional skilled staff, many with secondary roles, delivering high quality environmental health and occupational medicine support to the military through a combination of specialist clinics, analytical laboratories, scientific support and applied research.

There are four specialist out-patient clinics for occupational assessments: audiology; physical fitness and anthropometry; cold injury; and heat injury. In the main, these clinics provide assessments which are specific to the injury of the patient and their likely prognosis as an aid to determine future employability. As a secondary function, they provide a means of ensuring the MoD’s Duty of Care to personnel who have become injured or downgraded as a consequence of their military service.

Applied Physiology and Human Factors 2019

The Applied Physiology (AP) group comprises seven staff including the INM Health Analyst post. Five of the team have primary roles to support wider clinical work: the physiologists in this group support clinical work directly through official government committees, and the Head (a registered Nutritionist), the Dietitian and the Health Analyst (a Public
Health Nutritionist) combine with a Fee Earner to form the Defence Nutrition Advisory Service (DNAS). This underpins INM’s support to the RN and defence in relation to Defence Nutrition and the Armed Forces Weight Management Policy; the Head of AP is the Chair of the Defence Nutrition Working Group G. The team provides policy advice and training in key areas of Preventive Health for Defence, specifically: nutrition and weight management; physical fitness and heat illness.

The Human Factors Department (HFD) comprises six members of staff who have expertise in the areas of Applied Psychology and Ergonomics. The HF group is tasked by all four commands (Navy, Army, Air and Joint Forces), DE&S, Ministry of Defence Police (MDP), and the Defence Safety Authority (DSA). The team provides support to various aspects of safety; provision of rapidly deployable specialist HF support to Service Inquiries for the Defence Safety Authority, and Fleet Commander’s Safety Inquiries for the Navy Safety Centre.

(Dr Adrian Allsopp)

**Noise and vibration: history**

Research and teaching about adverse effects of noise and vibration was established very early by an outstanding doctor and scientist, Surgeon Commander Ross Adlard Coles, a founder of scientific audiology as it exists today. His initial work at INM and with the Medical Research Council around 1969 centred on audiometric surveys of noise-exposed personnel on aircraft carrier flight decks, and the like. He established lasting links between INM and the Institute of Sound and Vibration Research in Southampton. Having left the Navy RN in 1970, he became a leading light in diagnostic audiology and caring for deaf people and sufferers from tinnitus.

The department had a new lease of life in 2007 when many Gulf War veterans suffered hearing loss following exposure to prolonged land, sea and air bombardment.

**Acoustics and Vibration Section 2019**

Acoustics and Vibration (AcVib) is a small section of just four staff which account for the highest proportion of INM reports, which relate to occupational surveys of exposure to noise and vibration. The primary output in the past three years has been work to underpin the MoD’s exemption from the Vibration at Work Regulations as these relate to small fast marine craft. Without this critical output the Secretary of State for Defence might not have granted the current exemption from this legislation which would have severely restricted or prevented the use of small boats, particularly Rigid Inflatable Boats and Scimitar Class Patrol Boats in use by the RN, MoD Police and Royal Marines (RMs). Following the delivery of the first of the Queen Elizabeth Class Carriers and as the 2035 Carrier Strike Group strategy progresses, this team is critical to the baseline assessments and workplace exposure monitoring of new and re-fitted ships as part of the RN’s Duty of Care and compliance with the law.

The group conducts regular and frequent training courses for the assessment of noise and hand-arm vibration exposure in conjunction with the workshops at HMS SULTAN for workplace practical training. This co-location arrangement ensures that the courses are military relevant and efficiently run; the provision of training is a requirement under the Health & Safety Executive regulations for staff where mitigation to reduce harmful exposures is mandated.

Exposure to impulse noise (i.e. weapons) has been particularly important for the MoD where reducing the incidence of noise-induced hearing loss is a key priority. In addition to expert advice to the Defence Hearing Working Group and to the Defence Standards organisation, INM conducts surveys of exposure to impulse noise, ranging from personal weapons to sea-to-air missiles, each requiring different instrument and recording specifications and survey methodology.

(Dr Adrian Allsopp)

**Cold Injury Clinics and Cold Immersion: history**

INM’s Frank Golden and Mike Tipton from Portsmouth University together established a global reputation for the Institute as they unravelled many of the mysteries surrounding the effects of surviving cold water immersion, often by Frank ignoring danger and using himself as an experimental subject. He oversaw many life-saving improvements to equipment and practices, among other things successfully advocating that survivors should be lifted horizontally from the water. Every day someone, somewhere, survives cold water immersion thanks to the work of Surgeon Rear Admiral Frank Golden.

During conflicts in harsh conditions in the 20th century, heat illness and disabling non-freezing cold injury were major problems for service personnel undertaking training or operations in extreme temperatures: for example, there was a high rate of morbidity in UK personnel serving in Korea, and later in the Falklands conflict. In response, INM established a specialist clinical and research centre. Run by Dr Howard Oakley for many years, this incorporates the only specialist Cold Injury Clinic in the world, which has cared for cold injury casualties in the hundreds.

**Cold and Heat Injury Clinics and Cold Immersion 2019**

The Cold Injury Clinic (CIC) is the second largest out-patient clinic; it assessed around 350 patients in 2018-9, while the Heat Illness Clinic (HIC) saw approximately 140 referrals. These assessments require specialised facilities and instruments as well as clinical skills and judgement; they are unique, not just nationally but internationally, and could not be contracted to an existing external agency.

The Survival and Thermal Medicine (STM) group, together with Applied Physiology (AP), conducts regular training to new-entry medical personnel from all three Services in heat illness and cold injuries. This group also provides training, including practical sessions, to Physical Training Instructors.
as part of their Leadership Training in human physiology, fitness testing and heat exhaustion.
((Dr Adrian Allsopp))

Royal Navy Medical Service School 2019

The Royal Navy Medical Service School (RNMS) was established in April 2019 in recognition of the breadth and number of Phase 2 and 3 courses that it designs, delivers and assures in direct support of the Maritime Training Strategy and wider Defence commitments. This change in nomenclature and subtle re-structuring of the School has now aligned it to the other Schools across the RN. Twelve permanent staff are supported by a faculty of over 30 RNMS personnel which delivers approximately 340 training days per year. Significant additions to the School’s portfolio over the last five years include its accreditation by the Resuscitation Council to deliver Advanced and Immediate Life Support training, and the sole training provision for all professional medical training required by the Medical Assistant for promotion to Leading Hand and Petty Officer – essential in enabling operational effectiveness of the RNMS. The School is also responsible for setting and governing the First Aid training requirements across the RN.
((Lieutenant Commander John Lawton-Roberts Royal Navy))

Corporate Services 2019

The Corporate Services Department provides the ‘glue’ that holds INM together and enables its scientists and medical staff to deliver their critical outputs to the RN and broader Defence. It provides a focal point for a variety of enquiries and infrastructure initiatives, including Freedom of Information requests, financial forecasting, budgeting and analysis in liaison with Navy Command Finance, Human Resources and recruitment.

The Logistics Team provides a complete logistics service ensuring medical supplies and scientific consumables are available as and when required. The Technical Services section deals with minor breakages and repairs, and coordinates various sub-contractors implementing more involved infrastructure developments and replacement. The IHUB team delivers much of the general administration required to run the INM, such as printing and travel booking. It also provides valued IT support, not just on core MoD systems, but also on those used for accessing and processing Medical Records. Corporate Services are also responsible for the Historic Collections of books and artefacts, making them available to researchers and students of RN medical history.
((Mr David Eggleston))

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The 2019 paragraphs have been contributed by Heads of Division and other INM staff, the whole having been put in order by the Historic Collections Librarian.

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