The Norwegian Institute of Aviation Medicine

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This month's article was submitted by Dr. Anthony Wagstaff of the Norwegian Institute of Aviation Medicine. It is interesting how aeromedical research institutes are formed and develop differently as a result of the history and culture of the nations where they originate. In this case, Norway's extreme weather and unique geography have had a direct impact on the development of their aeromedical institutions. Many thanks to Dr. Wagstaff for a very interesting submission.

THE EARLY DAYS

The Norwegian Institute of Aviation Medicine was founded after WW2, as part of the newly formed Royal Norwegian Air Force (RNoAF). The developments in military aviation of the time posed new and important research questions, and aircrew needed physiological training to meet the challenges of altitude, g-forces, and survival. In 1948, a small set-up was formed in temporary offices in Oslo. An agreement with the University of Oslo secured an area on the new Oslo University campus and the first post-war university building was erected around a brand new decompression chamber system. The institute was initially under the leadership of the researcher Per Fredrik Scholander, famous at the time for his work on physiology, mostly in the United States. The new institute was ready in 1954, but Scholander did not stay longer than 1958, after which he returned to the United States. The next head of the institute was Fredrik Vogt Lorentzen, a physician and Himalaya mountain climber. He spent the first year travelling, mostly in the United States, visiting Aerospace Medicine institutions to gather impressions and knowledge for the development of the new Norwegian Institute.

DEVELOPMENT OF THE INSTITUTE

In addition to its roles in research and aeromedical training for the RNoAF, the Institute gradually took on a wider range of roles as the needs became apparent. The Institute was given responsibility for medical certification of military aircrew in 1977 and through the 1990s the Institute developed a more formalized environmental health and safety activity, including a closer cooperation with the flight safety organization of the Air Force. Many pilot officers of different ranks have served at the institute to complement the interdisciplinary group of physicians, psychologists, physiologists, engineers, and other health personnel and specialists. When the Institute has had success with the provision of quality advice to the Air Force, it has been because the blend of research-based knowledge and an understanding of the aviation environment has been molded by teamwork. (Interdisciplinary work is not easy, but if it works, the potential is substantial.)

Since 2000, the Norwegian Institute of Aviation Medicine has also been a certified Civilian Aeromedical Centre according to EASA regulations. This additional perspective has been fruitful, as there are many synergies to be found. Since 2006, the RNoAF Flight surgeon service has also been a part of the Institute of Aviation Medicine, thereby bringing together all aspects of aviation medicine in one organization.

SPECIAL CHALLENGES IN NORWAY

Norway is a country with extreme atmospheric conditions over a complex mountainous terrain, a coast with long and deep fjords, and with several arctic islands, including the Svalbard Islands. Norway's road and railway systems are limited in capacity and efficiency, so domestic air travel is an important part of the transport infrastructure. The oil sector is reliant on offshore helicopter operations and short-field regional airports are important travel hubs for rural towns and islands. Military aviation spans a large area of operations, the sea area of Norwegian economic responsibility being seven times the size of its land area. The Air Force operates in challenging high-north weather conditions, light conditions, and landscape, making the human element particularly important, but also vulnerable. The RNoAF has also, in the last 10 years, phased in new transport aircraft (C-130J) and maritime helicopters (NH-90), and is currently phasing in new multirole fighters (F-35) and Search-and-Rescue helicopters (AW-101), as well as acquiring new Maritime Patrol Aircraft (P-8). These processes will make the RNoAF a modern and capable Air Force; however, at the same time, placing substantial demands on its aircrew and the personnel supporting the operations.

TRENDS IN RESEARCH

The number of employees at the Institute of Aviation Medicine is close to 30, having increased from only a handful at the starting point nearly 70 years ago. Research can be seen as a spin-off from operational activity. In such a small institution, however, it must be both. The Institute needs the right knowledge-base to give advice and make independent decisions that are relevant and well-founded. The gradual change in research focus can be seen by studying the scientific articles which have been produced since the 1950s, many of which have been published in the "blue journal," but also in other international peer-reviewed journals. From

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mostly basic physiology in the early days, research at the Institute nowadays addresses more directly issues surrounding current and future challenges of the RNoAF. Contemporary research questions often arise from interactions with the Air Force itself being discussed in our team and then further developed in collaboration with experts from other organizations. Examples are projects within human factors issues such as attentional (mindfulness) training, stress, vision, and other aviation stressors such as noise and vibration, as well as clinical outcomes such as medical loss of license. Many projects are used directly by the Armed Forces for making informed decisions. One current example is a study on fatigue in the RNoAF 330 Search and Rescue squadron, gathering background data, activity data, and cognitive tests in order to provide advice on the future organization of the service, but also to build knowledge on the subject itself, resulting in scientific publications. Another example is a recent study on acute hypoxia in a simulated high-altitude airdrop scenario due to oxygen system failure, using the Institute's decompression chamber facility and various physiological outcome variables to assess risk.

Being a small institute with a diverse array of tasks, time, and resources for research is a constant challenge. So, why do we still do research? The answer is two-fold: firstly, research helps us answer relevant and specific questions to support operations. Secondly, research competence allows for an evaluative perspective, which also might make us an interesting partner for future projects.

Future leadership in our field will hopefully continue to an understanding of the importance of research as a necessary basis for relevant and precise Aerospace Medicine practice and advice. Saluti securitatique volatus. Health and Safety in Flight.