

DiMiMED INTERNATIONAL CONFERENCE ON DISASTER AND MILITARY MEDICINE 2019

The 7th DiMiMED was held in Dusseldorf, Germany in association with MEDICA on the 18th and 19th November 2019. It was a most successful and informative conference at which 193 personnel were in attendance from 28 nations. While most of the attendees were from the military, there was also a significant representation from the civilian humanitarian community. This is probably a reflection of the commonality of problems confronting the medical profession in both military and civilian environments, and the common over-riding desire to relieve suffering and distress which unites the medical profession throughout.

The Conference was chaired by Brig Gen (Retd) Dr Rob van der Meer and Col (Retd) Dr Gerald Kerr, who were ably assisted by the various module moderators throughout the Conference. The Conference and its organisation were made possible only through the generous support of BETA Publications and of Messe Dusseldorf.

The delegates were welcomed at the opening of the Conference by Mr Wolfram N Diener, Managing Director, Messe Dusseldorf GmbH. In his address, Mr Diener commented on the uniqueness of an event such as DiMiMED where the Medical Profession and the Medical Industry had an opportunity to discuss and view each other's needs and products respectively. Through such interactions, innovations were born, and MEDICA bore witness to the advances already evident in medical technology including the various 'wearable' devices which are now readily available to assist the medical profession. On this basis, the future of both MEDICA and DiMiMED was assured and he wished all participants a successful and fruitful Conference.

Following words of welcome on behalf of the Conference Scientific Committee, Brig Gen Dr Stefan Kowitz, Director of Multinational Medical Coordination Centre / European Medical Command (MMCC/EMC) was invited to address the delegates. He referenced the various security and environmental challenges which confronted the military and civilian world, and emphasised the need for, and his organisation's role in, capability development. He commented on the need to obtain resourcing for the 'medical footprint' and outlined some of the initiatives such as the Framework Nation Concept which aimed to avoid wasteful duplication while at the same time ensuring that there was provision for all requirements through a degree of 'burden sharing'. The closer links between NATO, EU and the PESCO Nations could provide the foundations for further development and cooperation. The role of the MMCC/EMC is to support EU/NATO medical services by coordinating and facilitating rapid medical reinforcement. In addition, expansion of the military medical and civilian interface is anticipated. Increased awareness of the potential of cyber-attacks and health crises such as SARS, H1N1, Ebola and Zika to negatively affect medical service delivery, is required. Other areas of focus include strategic patient flow management and coordinated procurement. Germany is the Lead Nation for MMCC/EMC, and Gen Kowitz described the

administrative structures involved. The MMCC/EMC are addressing the threat arising from CBRN by developing medical counter measures including compiling equipment procurement lists. In the area of humanitarian cooperation, an Emergency Medical Treatment 3 / Role 3 is being discussed. Finally, a need for bulk medevac capability is identified, and this may include the use of evacuation by rail. Overall, the MMCC/EMC is a lighthouse project for NATO – EU cooperation/coordination. It has a bridging function between NATO and EU medical stakeholders, military and civilian.

The keynote address was delivered by Lt Gen (Retd) Professor Martin Bricknell of King's College, London. His topic was "Civil-Military Medical Co-Operation: A Sovereignty or Humanitarian Issue?". Prof. Bricknell pointed out that a humanitarian crisis has become a 'contested concept' between military and civilian humanitarian groups. He outlined the downward progression pathway from Stable State, through Fragile State to Failed State brought about by increasing levels of instability and identified those zones along the way which were more likely to be the focus for potential intervention by 'Sovereign' and 'Humanitarian' actors. Quoting from a UN document, Prof Bricknell reminded the Conference that Defence, Public Order & Safety as well as Health are some of the functions of Government. The close association between security and stabilisation was apparent and the role of the Government in promoting security was crucial. Security, governance and the rule of law, as well as social and economic development facilitate political settlement. The Humanitarian Heritage has its origins with Henri Dunant and the Battle of Solferino, the Red Cross movement and the Geneva Conventions. Initially, the hallmark of humanitarian activity was that it was voluntary in nature. However, in the second half of the 20th Century the United Nations assumed a Humanitarian role. UN General Assembly Resolution 46/182 identified the concepts of Humanity, Neutrality, Impartiality and Operational Independence as prerequisites in rendering humanitarian assistance. However, it was acknowledged that Operational Independence could not be applied when State resources were deployed. Prof Bricknell then examined the Intra-State Crisis response using the UK model as an example. Military forces are used as a national resource. In particular, the UK military medical contribution includes medical support to military forces, and, in the event of a mass casualty event, the military provide technical support to the National Health Service (NHS), while the NHS supports the Armed Forces. Regarding an Inter-State Crisis, the factors to be considered were outlined. In the UK, the guiding document is the Fusion Doctrine – National Security Capability Review 2018. In such circumstances, the UK military contribution depends on the military mission. The military medical contribution to security and stabilisation includes Emergency Care, Military-Military Assistance and Military-Civilian Assistance. In the case of the Failed State, a UN Resolution results in a 'Supra-State' mandate. The various humanitarian and emergency relief agencies are organised into the UN Cluster System. The political process must remain central to the achievement of stabilisation.

The opening module of the Conference was on Disaster Medicine and Traumatology. The first presentation was on “Combat Vascular Damage Control in Austere Conditions: Russian Experience” in which the rising trend in the rate of combat vascular injuries in recent conflicts was noted. These present a challenge for the surgeons in Role 2 MTF. The historical background to the use of temporary intraluminal vascular shunting was revealed. Papers published on the use of this technique in WWII were disappointing, but more recent publications in the 1970s suggested much improved results with a major reduction in limb amputation as a result. A review was then presented of primary vascular surgery procedures carried out at the Role 2 level over three different military campaigns. The indications for combat temporary vascular shunting were either vascular damage control surgery or staged repair for combined orthopaedic and vascular injuries. In the case of the vascular damage control cases, the rate of thrombosis and subsequent overall rate of amputation were revealed. The technique employed was demonstrated as well as the types of temporary shunts used. A useful classification method for acute limb ischaemia in arterial trauma was presented, dividing such cases into Compensated, Uncompensated and Irreversible, along with the recommended surgical intervention. Mean ‘dwell’ times for the shunts were presented as well as the associated rate of shunt thrombosis. The anatomic location of extremity vascular injuries and associated outcome was compared to WWII outcomes. Comparative data with more recent papers was also provided. It was concluded that temporary vascular shunting was associated with a low mortality rate and a low to moderate amputation rate. Such an intervention is particularly attractive when otherwise faced with protracted evacuation times to more definitive surgical repair. It is, of course, of relevance only in cases of uncompensated ischaemia. Its use in compensated ischaemia could result in blockage by the shunt of important collateral vessels and is therefore contraindicated. However, it was also acknowledged that the techniques involved needed to be studied and practiced on simulation models and in wet labs.

The second presentation in this module was an in-depth study of the prevalence and risk factors associated with low back pain and related disability in helicopter pilots. Universally recognized, it is a potential threat to flight safety. Positive and negative predictive factors were identified. Mitigation involving the use of Lumbar Support was also explored. The aetiology of low back pain in helicopter pilots is multifactorial, including individual factors, type of helicopter, and in-flight posture.

The third presentation related to Civilian-Military interoperability. The presenter drew upon his extensive experience in the prehospital setting, particularly in areas of conflict, and most especially, the Ukraine. He also referred to the work of the Trauma Haemostasis and Oxygenation Research (THOR) network in the area of prehospital combat care. The ratio of killed to wounded has steadily improved over the years with the advances in prehospital care – 2014 1:2.4; 2015 1:4; 2016 1:6; 2017 1:7. There was a combination of factors contributing to these figures including Tactical Combat Casualty Care Training for military personnel, improved transport evacuation method and forward use of blood and blood products.

The final presentation on this module focused on applying telemedicine in the aviation environment and initial experiences. Several problems were highlighted which will need to be further addressed in the future.

The second module of the Conference related to Combat Medical Care and was moderated by Lt Col Dr Florent Josse. The opening presentation dealt with Forward Air Medevac in Mali. It discussed variations which existed between different conflicts e.g. Afghanistan versus MINUSMA, both in the number of medevac platforms available and in the composition and qualifications of the medical crew. It also focused on the qualifications and training of the Forward Air Medevac crew in Mali.

The second presentation of this module focused on the potential of REBOA (Resuscitative Endovascular Balloon Occlusion of the Aorta) in combat casualty care. It was entitled “REBOA – From far forward to Role 2 – Indications and Experiences in the Field”. Not alone did it concentrate on the life-saving indications but also gave a comprehensive explanation of the technique.

The third presentation was entitled “Inspired Solutions for Mobile Disaster and Military Life Support” and was delivered on behalf of industry by Thornhill Medical. The company can trace its links with combat casualty care back to the war in Vietnam. Two of its products of interest to the disaster and military medicine community. One is “MOVES SLC” described as an integrated Intensive Care Unit combining an oxygen concentrator, a unique oxygen-conserving ventilator, suction, and complete vital signs monitoring into a single, compact, portable, battery-operated system. The second product by Thornhill Medical is “MADM” – an inline direct injection anaesthetic vaporiser. By connecting to a ventilator, it can deliver gas anaesthesia.

The fourth presentation in this module was entitled “New Challenges in Kunduz – use of Warm Blood”. The challenges of Remote Damage Control Resuscitation were outlined and the benefits to be gained from replacing crystalloids with warm blood as close to the front as possible. The Diagast AB Test Card facilitates ‘bedside’ testing for compatibility between recipient and donor regarding Anti A or Anti B antibodies. The Eldoncard can be used to determine the individual’s AB Blood Group and Rhesus status. Prior to deployment, potential donors can be screened for Hepatitis B and HIV etc. The necessity of personnel completing the ‘Whole Blood Field Transfusion Course’ was emphasised.

The fifth presentation demonstrated the potential of computer games as a learning tool in the area of combat casualty care. Entitled “Santrain – A Serious Game Approach for TCC Training”, the game is still in development but demonstrates huge potential as well as being providing training in a non-threatening environment.

The sixth presentation of the Combat Medical Care module was entitled “Intraosseous Access (IO) is obsolete in Tactical Combat Casualty Care in Haemorrhagic Shock Resuscitation”. The presenter discussed the difficulties associated with using IO as a means

of administering whole blood, and indeed the redundancy associated with the technique when vascular access can be easily achieved under ultrasound guidance.

The final presentation of this module was from Fort Defiance Industries entitled “Far-Forward Surgical Sterilisation” and the options available for field sterilisation in resource limited and austere environments.

The third module of the Conference was dedicated to CBRN issues and was moderated by Col Salvatore Schmidt. He opened this module with a presentation entitled “Management of CBRN Incidents – How to Prepare the (Military) Health System?” Recent incidents involving Chemical, Biological and Radiological agents. Training and Specialised Medical Skills were referenced along with resources and capabilities. The necessity of regularly training was emphasised.

This was followed by a presentation from Primal Therapies entitled “SMMRT: A Validated Technology for the Selective Control of Infectious Agents in Personal Hygiene and Disinfection”. The presence of biofilms and their contribution to various human diseases opens the possibility of manipulation of these biofilms through Selective Microbial Metabolism Regulation Technology (SMMRT) resulting in the eradication of disease promoting species.

The next presentation was entitled “Capacity Building of Israeli Medical Teams to ensure CBRN Preparedness” and discussed the role of education and training in delivering resilience, recovery, resourcefulness and robustness. Training can take place at different levels including Individual Training, Group Training, Organisational Training and Inter-organisational Training. While training is the priority, evaluation must follow. Evaluation of the level of knowledge, self-efficacy and resilience are required. Planning is the key as well as collaboration, communication and attending to the needs of all.

The fourth presentation of the CBRN module was entitled “Dilemmas in Optimising Treatment of CWA in the Battlefield”. The difficulties of performing routine medical procedures such as intubation when wearing CBRN Personal Protective Equipment were emphasised. Any detection device must have both high sensitivity and specificity in dealing with casualties in a CBRN environment. Broadly speaking the chemical agents can be divided into Nerve Agents, Opiates, Organophosphates and Others. Decontamination requires a plentiful supply of water, and involves individuals, cadavers, vehicles and medical equipment. The concerns of friends and relatives are another factor to be considered. Illustrative of public anxiety was the fact that there were many presentations to the Emergency Department with various symptoms during the First Gulf War resulting from fears of chemical poisoning.

The final presentation of the CBRN module was entitled “Risk Communication in the management of CBRN Threats”. The presenter discussed current risk communication strategies which are based on previous experiences of risk analysis. A need for a new template of risk analysis was identified which would identify a risk earlier, respond to it

faster, reduce its effects in a smoother and coordinated matter, leading to a smarter legacy and risk governance.

Day 2 of the Conference opened with the Infectious Diseases module, moderated by Col Dr Benjamin Queyriaux. The first presentation was entitled “Influenza, a major threat to Armed Forces”. This presentation featured a comprehensive review of the different types and subtypes which led to various pandemics over the years. Influenza B is largely confined to humans, but Influenza A is also found in many other species as well. Spread can be both direct and indirect. The different subtypes can target differing age groups. The 1918 (H1N1) pandemic focused on young adults, the major component of military forces. The 1977 pandemic is suspected to have resulted from a biolab ‘leak’. In the 1918 pandemic, infection rates of 50% were recorded and half of these were symptomatic. Mortality rates of 3% were noted (prior to the use of antivirals, or antibiotics to treat bacterial complications). However, the 2009 H1N1 pandemic had a 10% infectivity rate. The next pandemic could have infectivity rates anywhere between 10% and 50%. The currently available vaccine is ‘quadrivalent’ rather than the previously available ‘trivalent’ vaccine, and the former offers, at a financial cost, increased protection to the elderly. This is of questionable value to the military organisation which is composed largely of young adults. Some countries opt to vaccinate on an annual basis, but one country opts for vaccination every three years.

The second presentation was entitled “Influenza surveillance and Pandemic Planning in the US Department of Defence”. It delivered a comprehensive overview of the processes undertaken on behalf of US personnel, both military and civilian, by the Force Health Protection community and especially the USEU Command Counter Bio-Threat Cell, in the areas of surveillance and influenza pandemic planning. There is involvement at local, regional and global levels among partners. Surveillance regarding Avian Influenza is also carried out to detect the potential for the emergence of mosaic viruses constituted from two different influenza viruses’ antigenic shift.

The third presentation was entitled “The Role of Indonesian National Armed Forces for Influenza Pandemic Epicentre Containment Exercise in Indonesia”. This gave an in-depth account of the processes and procedures undertaken by the military in assisting the civilian health authorities in combating a potential Influenza pandemic.

The fourth presentation was entitled “Pandemic Preparedness, reality and illusion”. It was a very practical examination and audit of preparedness and the difficulties which arise when a pandemic is on the horizon. The supply chain is one such difficulty in so far as it ceases to function when the demand is unforeseen and overwhelming. The answer is to stockpile in advance – such items as face masks, drugs, gloves and PPE. Uptake of vaccine can be disappointing and can result in wasted expenditure on vaccines left unused.

Communication at all levels, and between all levels is seen to be vital. The value of a ‘sentinel system’ was emphasised, but there is a need for a further international civilian-military meeting to explore the different surveillances, plans and preparedness throughout

the regions. Even the compilation of an international list of 'points of contact' could prove very useful. Financial support remains a vital constituent to any successful planning initiative in the future.

The final presentation of this module, entitled "Efficacy of an Intramuscular Bivalent Norovirus G1.1/G11.4 Virus-Like-Particle Vaccine Candidate in US Military Trainees", discussed the prevalence of Norovirus and the desirability of developing a vaccine. Takeda Pharmaceuticals presented the outcome of their study during which participants received either the active vaccine or a placebo and were monitored for a period of 45 days. Results were promising and further evaluation and studies are awaited.

The Mental Health Module was moderated by Col Dr Eric Vermetten. The opening presentation of this module was entitled "Preventing Psychological Diseases in Military Personnel in the Italian Army: Organisational and Individual Level of Intervention". The presenter described the discipline, military psychology, as understanding the sociopsychological organisational processes with a view to achieving the objective of psychological 'wellness' and operational effectiveness. Prevention was a key factor as was monitoring. Prevention was facilitated by education and stress management. Pre-deployment briefings included movies, hand-outs and family involvement. The critical role of leadership in all these areas was emphasised. Psychological Mobile Teams were available when critical events occurred and facilitated group discussion. Post-deployment stresses were also identified and discussed, ranging from the 'Honeymoon' period immediately following return to the need for 'own' space and loss of independence. Reintegration was the overall objective. The key role of families was recognised by continuing to monitor them following critical events.

The second presentation was entitled "Evidenced Based Principles for Managing Traumatic Stress within Organisations". The presenter concentrated on those principles which were supported by research and evidence. Prevention was facilitated through the establishment of supportive teams manifesting both cohesion and leadership. Interestingly, not only will strong leadership reduce levels of stress, it also makes it more likely to be reported. Training has a central role to play in contributing to positive mental health, training in doing the job well. Competency is associated with being able to bring up and discuss mental health problems. Screening tests to select 'out' those considered not to be suitable have been shown, time and time again, to be unsuccessful. There is no test which can be relied upon to detect psychological vulnerability. Greater success is achieved by providing support in the immediate post-traumatic period. Post-deployment screening has failed to reveal differences in mental health outcomes. Peer support or social support have been demonstrated to have a positive effect.

The third presentation entitled "Reduced Risk Products Science" was delivered by Phillip Morris Products and discussed a product which reduced, but did not remove, the hazards and health risks associated with tobacco.

The fourth presentation in the Mental Health Module was entitled “Military First Responders and Terrorism”. Three categories of mental health victims are associated with a terrorist attack: firstly, those who underwent the horror of being a victim; secondly, the First Responders who witnessed the immediate aftermath of the incident; thirdly, those who suffered the guilt of having failed to prevent the event. Regarding the First Responders, competence and confidence comes from repeated training. Cohesion and leadership mitigate psychological problems.

The fifth presentation was entitled “Long-term Post-Traumatic Stress Response Symptomatology in Japanese Ground Self-Defence Force Responders Dispatched for the Great East Japan Earthquake in 2011”. It identified the risk factors associated with development of PTSD in First Responders and these included older age; total time exposure on the mission; over-time participation; personally affected; radiation exposure; body-recovery activity. One arising recommendation is that exposure to such activities should be limited in duration.

The sixth presentation was entitled “Jenny: A Portable Modular Critical Care Unit. A Single Device for Stable Patient Therapy and Transport from the Emergency site to the OR”, and was presented by MS Westfalia.

The final presentation of the Mental Health Module was entitled “Mental Health Professional in the Field in the Israeli Defence Forces”. The presenter revealed that Mental Health Officers in the Israeli Defence Forces are composed of (i) Psychiatrists – 10%; (ii) Psychologists – 30%; (iii) Social Workers – 60%. EMDR is a constituent element of training at Mental Health Officer Training School. On completion of training, the Mental Health Officer is deployed to a specific unit. Use of modern educational and training tools are used. In the case of combat stress reaction and the associated signs of detachment, shaking, loneliness, confusion and helplessness, the ‘iCOVER’ strategy is available on You Tube.

The final module of the Conference was again on Disaster Medicine and Traumatology and the first presentation was entitled “Central Sulawesi, Indonesia’s Triple Disasters Civil Military Coordination”. This presentation dealt with the 7.5 Richter Earthquake which was followed by a tsunami and soil liquefaction in Indonesia in 2018. It resulted in 2,256 dead, 4,612 injured and 223,751 displaced. Immediate concerns related to evacuation, supply of water, funerals, restoration of power supplies/electricity, clean-up and restoration/provision of dwellings. The main medical conditions included Upper Respiratory Tract Infections, Diarrhoea, Trauma and wound infections. An earthquake of 20 seconds gives inhabitants 20 minutes to get to height of at least 20 metres to be protected from the tsunami.

The second presentation of this module was entitled “The Rapid Triage Solution using Mobile Technology to Optimize Track and Trace during MCIS” and delivered by Black Space Technology Limited.

The third presentation was entitled “National Security and Pandemics” and was a very comprehensive review of the threat posed by disease. Scenarios discussed were (i) those arising from an Influenza-type illness and (ii) from a haemorrhagic fever pandemic. Issues which can arise range from the uncontrolled spread by migrant communities to supply shortage of critical medicines. This in turn could lead to civil unrest. Roles, both mitigating and aggravating, were identified for Global Health Governance, Geopolitical stability, Climate change, use of biological agents as weapons. Instability is increased when the Government Military Forces are also affected by the pandemic. At the same time, civil unrest may require a more active role from the military forces. Finally, the presenter discussed some goals for Government to mitigate a pandemic. These include limiting or slowing spread of the Pandemic into the country, slowing the spread within the country and sustaining the country’s infrastructure and economy.

The fourth presentation, entitled “Single Use Instruments in the Military – Chances and Challenges” was presented by SI US Instruments GMBH. The advantages of single use instruments include avoidance of having to provide sterilisation facilities, and hygiene.

The fifth presentation was entitled “Advances in Prehospital Care: Improvement from the Perspective of Future Operations”. It was a fitting way to finish the module with a review of recent developments and projections into the future.

Before the closure of the Conference, the winning Poster in the Poster Competition was announced. In total there were 6 posters competing for the €1000 award and the prize, with the congratulations of the Scientific Committee, went to the Poster entitled “Military Healthcare Connectivity Between a Military Hospital and Army Troops in Republic of Korea”.

Another element of DiMiMED, the value of which cannot be over-estimated, were the frequent Coffee and Lunch breaks interspersed throughout the Conference. These facilitated, within comfortable and relaxed surroundings, the exchange of information and experiences among the participants, and between the participants and Industry. Finally, the DiMiMED experience was ‘rounded-off’ by a visit to the vast wonderland of the MEDICA Exhibition itself.